



ASME[®] 2019 ICEF

Internal Combustion Engine
Fall Technical Conference

Program

CONFERENCE
October 20–23, 2019

EXHIBITION
October 21–22, 2019

Marriott Chicago O'Hare
Chicago, IL

<https://event.asme.org/ICEF>

Technical Sessions

MONDAY, OCTOBER 21

Monday, October 21, 10:00AM–12:00PM

TRACK 1: LARGE BORE ENGINES

Track Organizer: **Muni Biruduganti**, Argonne National Laboratory, Lemont, IL, United States
Track Co-Organizer: **Matthew Hart**, Wabtec, Erie, PA, United States

1-1: LARGE BORE I

Marriott Chicago O'Hare, Chicago E

Session Organizer: **Matthew Hart**, Wabtec, Erie PA, United States

10:00AM	A Fundamental Thermodynamic Study on the Effects of Engine Scale in Diesel Engines Technical Paper Publication. ICEF2019-7121 <i>Kevin Burnett, Ashwani Gupta, University of Maryland, College Park, MD, United States, Jim Cowart, United States Naval Academy, Annapolis, MD, United States</i>
10:30AM	Numerical Simulation of a Large Bore Dual Fuel Marine Engine Using Tabulated Detailed Reaction Mechanisms Technical Paper Publication. ICEF2019-7148 <i>Sascha Andree, University of Rostock, Rostock, Germany, Dmitry Goryntsev, AVL Dacolt BV, Maastricht, Netherlands, Martin Theile, Forschungszentrum für Verbrennungsmotoren und Thermodynamik Rostock GmbH, Rostock, Germany, Björn Henke, Karsten Scheef, Jürgen Nocke, University of Rostock, Rostock, Germany, Ferry Tap, AVL Dacolt BV, Maastricht, Netherlands, Bert Buchholz, Egon Hassel, University of Rostock, Rostock, Germany</i>
11:00AM	A Literature Review of NOx Formation Kinetics and a Prediction Method for Lean-Burn, Two-Stroke Natural Gas Engines Technical Paper Publication. ICEF2019-7193 <i>Taylor F. Linker, Texas A&M University, College Station, TX, United States, Mark Patterson, Baker Hughes, a GE Company, Houston, TX, United States, Gregory Beshouri, Advanced Engine Technologies Corporation, San Leandro, CA, United States, Abdullah U. Bajwa, Timothy J. Jacobs, Texas A&M University, College Station, TX, United States</i>
11:30AM	A New Single-Zone Multi-Stage Scavenging Model for Real-Time Emissions Control in Two-Stroke Engines Technical Paper Publication. ICEF2019-7198 <i>Abdullah U. Bajwa, Texas A&M University, College Station, TX, United States, Mark Patterson, Baker Hughes, a GE Company, Houston, TX, United States, Taylor F. Linker, Timothy J. Jacobs, Texas A&M University, College Station, TX, United States</i>

TRACK 2: FUELS

Track Organizer: **Gregory Bogin**, Colorado School of Mines, Golden, CO, United States
Track Co-Organizers: **Hailin Li**, West Virginia University, Morgantown, WV, United States

2-1: SPARK IGNITION I

Marriott Chicago O'Hare, Chicago F

Session Organizer: **Douglas E. Longman**, Argonne National Laboratory, Argonne, IL, United States
Session Co-Organizer: **Hunter Mack**, University of Massachusetts Lowell, Lowell, MA, United States

10:00AM	Numerical Investigation of a Central Fuel Property Hypothesis Under Boosted Spark-Ignition Conditions Technical Paper Publication. ICEF2019-7284 <i>Pinaki Pal, Argonne National Laboratory, Lemont, IL, United States, Ramachandraiah Krishna Kalvakala, University of Illinois at Chicago, Chicago, IL, United States, Yunchao Wu, University of Connecticut, Storrs, CT, United States, Matthew McNenly, Simon Lapointe, Russell Whitesides, Lawrence Livermore National Laboratory, Livermore, CA, United States, Tianfeng Lu, University of Connecticut, Storrs, CT, United States, Suresh Aggarwal, University of Illinois at Chicago, Chicago, IL, United States, Sibendu Som, Argonne National Laboratory, Naperville, IL, United States</i>
10:30AM	Two-Stage Lean-Burn Combustion Inside a Natural-Gas Spark-Ignition Engine With a Bowl-in-Piston Chamber Technical Paper Publication. ICEF2019-7181 <i>Jinlong Liu, Cosmin Dumitrescu, West Virginia University, Morgantown, WV, United States</i>
11:00AM	Twin-Peak Heat Release Phenomenon Inside a Heavy-Duty Diesel Engine Retrofitted to Natural-Gas Spark Ignition Technical Paper Publication. ICEF2019-7182 <i>Jinlong Liu, Cosmin Dumitrescu, Christopher Ulishney, West Virginia University, Morgantown, WV, United States</i>
11:30AM	Sensitivity Analysis of Fuel Physical Property Effects on Spark Ignition Engine Performance Technical Paper Publication. ICEF2019-7157 <i>Noah Van Dam, University of Massachusetts Lowell, Lowell, MA, United States, Ramachandraiah Krishna Kalvakala, University of Illinois at Chicago, Chicago, IL, United States, Frederik Boink, Eindhoven University of Technology, Eindhoven, Netherlands, Zongyu Yue, Argonne National Laboratory, Lemont, IL, United States, Sibendu Som, Argonne National Laboratory, Naperville, IL, United States</i>

Monday, October 21, 10:00AM–12:00PM

TRACK 3: ADVANCED COMBUSTION

Track Organizer: **Sundar Krishnan**, *University of Alabama, Tuscaloosa, AL, United States*
Track Co-Organizer: **Cosmin Dumitrescu**, *West Virginia University, Morgantown, WV, United States*

3-1: COMBUSTION DIAGNOSTICS

Marriott Chicago O'Hare, Chicago G

Session Organizer: **Brian Fisher**, *Naval Research Laboratory, Washington, DC, United States*
Session Co-Organizer: **Joshua Bittle**, *University of Alabama, Tuscaloosa, AL, United States*

10:00AM	<p>Classifying IC Engine Swirl Fields by Complex Moments Technical Paper Publication. ICEF2019-7132</p> <p>Kwee-Yan Teh, Penghui Ge, <i>University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai, Shanghai, China</i>, Feng-nian Zhao, <i>Shanghai Jiao Tong University, Shanghai, Shanghai, China</i>, David L.S. Hung, <i>University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai, Shanghai, China</i></p>
10:30AM	<p>Characteristics of Diesel Spray With Varying Injection Rate Technical Paper Publication. ICEF2019-7242</p> <p>Intarat Naruemon, Long Liu, Dai Liu, Xiuzhen Ma, <i>Harbin Engineering University, Harbin, Heilongjiang, China</i></p>
11:00AM	<p>Observation of Flame Propagation in a Heavy-Duty Natural-Gas Lean Burn Spark-Ignition Engine Technical Paper Publication. ICEF2019-7184</p> <p>Jinlong Liu, Cosmin Dumitrescu, <i>West Virginia University, Morgantown, WV, United States</i></p>
11:30AM	<p>Spectral Microscopy Imaging System for High-Resolution and High-Speed Imaging of Fuel Sprays Technical Paper Publication. ICEF2019-7204</p> <p>Ken Maassen, Farzad Poursadegh, <i>Georgia Institute of Technology, Atlanta, GA, United States</i>, Caroline Genzale, <i>Georgia Institute of Technology, Decatur, GA, United States</i></p>

TRACK 5: POWERTRAIN TECHNOLOGIES AND CONTROL

Track Organizer: **Fabrizio Ponti**, *University of Bologna, Forli, Italy*
Track Co-Organizers: **Richard Burke**, *University of Bath, Bath, United Kingdom*

5-1: POWERTRAIN TECHNOLOGIES

Marriott Chicago O'Hare, Salon 8

Session Organizer: **Vittorio Ravaglioli**, *University of Bologna, Forli, Italy*

10:00AM	<p>A Novel Air and EGR Emulation Facility for the Optimization of the Powertrain Architecture Technical Paper Publication. ICEF2019-7166</p> <p>Simon C. Orchard, Nick Evans, <i>University of Bath, Bath, United Kingdom</i>, Tomasz Duda, <i>University of Bath, Bristol, United Kingdom</i>, Umud Ozturk, Ed Chappell, Richard Burke, <i>University of Bath, Bath, United Kingdom</i></p>
10:30AM	<p>Turbocharger Speed Monitoring Based on Vibration Measurements for Diesel Engine Management Technical Paper Publication. ICEF2019-7178</p> <p>Ornella Chiavola, Giancarlo Chiatti, Fulvio Palmieri, <i>Roma Tre University, Rome, Italy</i></p>
11:00AM	<p>Needle Displacement Visualization With Simultaneous Measurement of Injection Rate for CR Diesel Injector: A Novel Experimental Technique Technical Paper Publication. ICEF2019-7179</p> <p>Giancarlo Chiatti, Ornella Chiavola, Fulvio Palmieri, <i>Roma Tre University, Rome, Italy</i></p>

Technical Sessions

MONDAY, OCTOBER 21

Monday, October 21, 10:00AM–12:00PM

TRACK 6: NUMERICAL SIMULATION

Track Organizer: **Yuanjiang Pei**, *Aramco Research Center - Detroit, Novi, MI, United States*
Track Co-Organizer: **Muhsin Ameen**, *Argonne National Laboratory, Lemont, IL, United States*

6-1: ENGINE SIMULATION I

Marriott Chicago O'Hare, Salon 9

Session Organizer: **Noah Van Dam**, *University of Massachusetts Lowell, Lowell, MA, United States*

10:00AM	Assessment of Turbulent Combustion Models for Simulating Pre-Chamber Ignition in a Natural Gas Engine Technical Paper Publication. ICEF2019-7278 <i>Joohan Kim, Riccardo Scarcelli, Argonne National Laboratory, Lemont, IL, United States, Sibendu Som, Argonne National Laboratory, Naperville, IL, United States, Ashish Shah, Muni Biruduganti, Argonne National Laboratory, Lemont, IL, United States, Douglas E. Longman, Argonne National Laboratory, Argonne, IL, United States</i>
10:30AM	Application of Tabulated Detailed Chemistry to LES Model of Diesel ICE Combustion Technical Paper Publication. ICEF2019-7128 <i>Oldrich Vitek, Vit Dolecek, Czech Technical University in Prague, Prague, Czech Republic, Dmitry Goryntsev, Ferry Tap, AVL Dacolt BV, Maastricht, Netherlands, Zoran Pavlovic, AVL-AST d.o.o., Maribor, Slovenia, Peter Priesching, AVL List GmbH, Graz, Austria</i>
11:00AM	Phenomenological Modeling of Combustion in Pre-Chamber and the Pilot Flame for Natural Gas Engines Technical Paper Publication. ICEF2019-7189 <i>Long Liu, Xia Wen, Qian Xiong, Xiuzhen Ma, Harbin Engineering University, Harbin, China</i>

TRACK 7: ENGINE DESIGN AND MECHANICAL DEVELOPMENT

Track Organizer: **Dan Richardson**, *Cummins, Columbus, IN, United States*
Track Co-Organizers: **David Rutledge**, *Cummins, Bedford, IN, United States*

7-1: MECHANICAL DESIGN I

Marriott Chicago O'Hare, Salon 8

Session Organizer: **David Rutledge**, *Cummins, Bedford, IN, United States*

10:00AM	Analysis of a Five-Stroke Engine With a Two-Zone Equilibrium Combustion Products Model Technical Paper Publication. ICEF2019-7206 <i>Kurt Stuart, Terry Yan, Southern Illinois University, Edwardsville, IL, United States, James Mathias, Southern Illinois University, Carbondale, IL, United States</i>
10:30AM	High Efficiency Diesel Engine Concept With Variable Valve Train and Cylinder Deactivation for Integration Into a Tractor Technical Paper Publication. ICEF2019-7177 <i>Matthias Thees, Michael Guentner, Thomas Buitkamp, University of Kaiserslautern, Kaiserslautern, Rhineland-Palatinate, Germany, Peter Pickel, John Deere GmbH & Co. KG, Kaiserslautern, Rhineland-Palatinate, Germany</i>
11:00AM	Novel Engine Cycle Enabling Partial Load Fuel Efficiency Beyond Full Load Conditions Technical Paper Publication. ICEF2019-7172 <i>Arjen de Jong, Econamiq, Utrecht, Utrecht, Netherlands</i>
11:30AM	Development of an Artificial Neural Network Model for the Performance Prediction of a Variable Compression Ratio Gasoline Spark Ignition Engine Technical Paper Publication. ICEF2019-7118 <i>Srinibas Tripathy, Sridhar Sahoo, D.K. Srivastava, Indian Institute of Technology Kharagpur, Kharagpur, India</i>

Monday, October 21, 1:00PM–3:30PM

TRACK 2: FUELS

Track Organizer: **Gregory Bogin**, Colorado School of Mines, Golden, CO, United States
Track Co-Organizer: **Hailin Li**, West Virginia University, Morgantown, WV, United States

2-2: SPARK IGNITION II

Marriott Chicago O'Hare, Chicago F

Session Organizer: **David L.S. Hung**, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai, Shanghai, China
Session Co-Organizer: **Gregory Bogin**, Colorado School of Mines, Golden, CO, United States

1:00PM	<p>Effect of Hydrogen and Carbon Monoxide Addition to Methane on Laminar Burning Velocity Technical Paper Publication. ICEF2019-7169</p> <p>Mohammadrasool Morovatiyan, University of Massachusetts Lowell, Lowell, MA, United States, Martia Shahsavan, University of Massachusetts Lowell, Nashua, NH, United States, Mammadbaghir Baghirzade, John H. Mack, University of Massachusetts Lowell, Lowell, MA, United States</p>
1:30PM	<p>Combustion and Greenhouse Gas Emissions of a Natural Gas-Diesel Dual Fuel Engine at Low and High Load Conditions Technical Paper Publication. ICEF2019-7124</p> <p>Hongsheng Guo, Jennifer Littlejohns, Brian Liko, National Research Council Canada, Ottawa, ON, Canada</p>
2:00PM	<p>Effect of Ambient Pressure on the Behavior of Single-Component Fuels in a Gasoline Multi-Hole Injector Technical Paper Publication. ICEF2019-7258</p> <p>Lorenzo Nocivelli, Argonne National Laboratory, Lemont, IL, United States, Junhao Yan, University of Illinois at Urbana-Champaign, Urbana, IL, United States, Kaushik Saha, Indian Institute of Technology Delhi, Delhi, India, Gina M. Magnotti, Argonne National Laboratory, Lemont, IL, United States, Chia-fon Lee, University of Illinois at Urbana-Champaign, Urbana, IL, United States, Sibendu Som, Argonne National Laboratory, Naperville, IL, United States</p>

TRACK 3: ADVANCED COMBUSTION

Track Organizer: **Sundar Krishnan**, University of Alabama, Tuscaloosa, AL, United States
Track Co-Organizers: **Cosmin Dumitrescu**, West Virginia University, Morgantown, WV, United States

3-2: LTC/GCI/RCCI/HCCI

Marriott Chicago O'Hare, Chicago G

Session Organizer: **Sotirios Mamalis**, Stony Brook University, Stony Brook, NY, United States
Session Co-Organizer: **Gokul Vishwanathan**, Olney, MD, United States

1:00PM	<p>Air Fuel Dilution in a Pilot Ignited Direct Injection Natural Gas Engine: Pollutants, Performance, and System Level Considerations Technical Paper Publication. ICEF2019-7200</p> <p>Aditya Prakash Singh, University of British Columbia, Vancouver, Vancouver, BC, Canada, Gordon P. McTaggart-Cowan, Westport Fuel Systems, Vancouver, BC, Canada, Patrick Kirchen, University of British Columbia, Vancouver, Vancouver, BC, Canada</p>
1:30PM	<p>Experimental Study of the Effect of Start of Injection and Blend Ratio on Single Fuel Reformate RCCI Technical Paper Publication. ICEF2019-7208</p> <p>Vassilis Triantopoulos, Jason B. Martz, University of Michigan - Ann Arbor, Ann Arbor, MI, United States, Jeff Sterniak, Robert Bosch LLC, Farmington Hills, MI, United States, George Lavoie, University of Michigan - Ann Arbor, Ann Arbor, MI, United States, Dennis Assanis, University of Delaware, Newark, MI, United States, Stanislav V. Bohac, University of Michigan - Ann Arbor, Ann Arbor, MI, United States</p>
2:00PM	<p>Operating Limits of Spark-Assisted Compression Ignition Combustion Under Boosted Ultra-EGR Dilute Conditions in a Negative Valve Overlap Engine Technical Paper Publication. ICEF2019-7220</p> <p>Giancarlo Chiatti, Ornella Chiavola, Fulvio Palmieri, Roma Tre University, Rome, Italy</p>
2:30PM	<p>A Computational Investigation of the Impact of Multiple Injection Strategies on Combustion Efficiency in Diesel-Natural Gas Dual Fuel Low Temperature Combustion Engine Technical Paper Publication. ICEF2019-7197</p> <p>Lorenzo Bartolucci, Stefano Cordiner, Vincenzo Mulone, Università degli Studi di Roma Tor Vergata, Roma, Italy, Sundar Krishnan, Kalyan Srinivasan, The University of Alabama, Tuscaloosa, AL, United States</p>

Technical Sessions

MONDAY, OCTOBER 21

Monday, October 21, 1:00PM–3:30PM

TRACK 5: POWERTRAIN TECHNOLOGIES AND CONTROL

Track Organizer: **Fabrizio Ponti**, *University of Bologna, Forli, Italy*
Track Co-Organizer: **Richard Burke**, *University of Bath, Bath, United Kingdom*

5-2: POWERTRAIN CONTROL

Marriott Chicago O'Hare, Salon 8

Session Organizer: **Umud Ozturk**, *University of Bath, Bath, United Kingdom*

1:00PM	Diesel Engine Acoustic Diagnostics With Machine Learning During Various Degradation Modes Technical Paper Publication. ICEF2019-7120 <i>Patrick Moore, Dianne Luning Prak, Len Hamilton, Jim Cowart, United States Naval Academy, Annapolis, MD, United States</i>
1:30PM	Transient Control of Fully Variable Valve Actuation for Diesel Engine Using Dynamic Programming Method Technical Paper Publication. ICEF2019-7131 <i>Yong Lu, Jian Li, Dongyan Hou, Lixian Miao, Harbin Engineering University, Harbin, Hei'long'jiang, China</i>
2:00PM	Investigation of Gasoline Compression Ignition for Combustion Control Technical Paper Publication. ICEF2019-7199 <i>Vittorio Ravaglioli, Fabrizio Ponti, University of Bologna, Forli, Italy, Matteo De Cesare, Magneti Marelli SpA - Div. Powertrain, Bologna, Italy</i>
2:30PM	Optimization of Engine Efficiency for Diesel Engine Equipped With EGR-VGT and Aftertreatment Systems Technical Paper Publication. ICEF2019-7233 <i>Kuo Yang, Pingan Chen, Tennessee Technological University, Cookeville, TN, United States</i>

TRACK 6: NUMERICAL SIMULATION

Track Organizer: **Yuanjiang Pei**, *Aramco Research Center - Detroit, Novi, MI, United States*
Track Co-Organizers: **Muhsin Ameen**, *Argonne National Laboratory, Lemont, IL, United States*

6-2: SPRAY MODELING

Marriott Chicago O'Hare, Salon 9

Session Organizer: **Gina M. Magnotti**, *Argonne National Laboratory, Lemont, IL, United States*
Session Co-Organizer: **Meng Tang**, *Aramco Research Center - Detroit, Novi, MI, United States*

1:00PM	Assessing Fuel Property Effects on Cavitation and Erosion Propensity Using a Computational Fuel Screening Tool Technical Paper Publication. ICEF2019-7269 <i>Gina M. Magnotti, Argonne National Laboratory, Lemont, IL, United States, Sibendu Som, Argonne National Laboratory, Naperville, IL, United States</i>
1:30PM	Investigation of the Effect of Plume Number on Spray Collapse Technical Paper Publication. ICEF2019-7187 <i>Panos Sphicas, Prince Mohammad Bin Fahd University, Khobar, Saudi Arabia</i>
2:00PM	Effects of Valve Strokes on Spray Shapes for GDI Injector Technical Paper Publication. ICEF2019-7133 <i>Eiji Ishii, Kazuki Yoshimura, Tomoyuki Hosaka, Hitachi, Ltd., Hitachinaka, Ibaraki, Japan</i>

Monday, October 21, 1:00PM–3:30PM

TRACK 7: ENGINE DESIGN AND MECHANICAL DEVELOPMENT

Track Organizer: **Dan Richardson**, Cummins, Columbus, IN, United States
Track Co-Organizer: **David Rutledge**, Cummins, Bedford, IN, United States

7-2: MECHANICAL DESIGN II

Marriott Chicago O'Hare, Salon 10

Session Organizer: **Sanjib Chowdhury**, Cummins Inc., Columbus, IN, United States
Session Co-Organizer: **David Rutledge**, Cummins, Bedford, IN, United States

1:00PM	<p>Application of the Common-Feeding Injection System Layout to Light Duty Commercial Vehicle Diesel Engines Technical Paper Publication. ICEF2019-7142</p> <p>Alessandro Ferrari, Antonio Mittica, Politecnico Di Torino, Torino, Italy, Lingxiang Ouyang, Sixi Tan, Nanyue Fuel Injection Systems, Hengyang, China, Zhiru Jin, Oscar Vento, Tantan Zhang, Politecnico di Torino, Turin, Italy</p>
1:30PM	<p>Development of GDI Engine for Improving Brake Thermal Efficiency Over 44% Technical Paper Publication. ICEF2019-7144</p> <p>Dongwon Jung, Byeongseok Lee, Jinwook Son, Soohyung Woo, Youngnam Kim, Hyundai Motor Company, Hwaseong-si, Gyeonggi-do, Korea (Republic)</p>

Monday, October 21, 4:00PM–6:00PM

TRACK 2: FUELS

Track Organizer: **Gregory Bogin**, Colorado School of Mines, Golden, CO, United States
Track Co-Organizers: **Hailin Li**, West Virginia University, Morgantown, WV, United States

2-3: KINETICS AND ALTERNATIVE FUELS

Marriott Chicago O'Hare, Chicago G

Session Organizer: **Valentin Soloiu**, Georgia Southern University, Statesboro, GA, United States
Session Co-Organizer: **Xin He**, Aramco Services Company, Novi, MI, United States

4:00PM	<p>Reduced Chemical Kinetic Models of C1 - C4 Alcohols Using the Alternate Species Elimination Approach Technical Paper Publication. ICEF2019-7114</p> <p>Apeng Zhou, Caterpillar Inc., Mossville, IL, United States, Shirin Jouzdani, Benjamin Akih Kumgeh, Syracuse University, Syracuse, NY, United States</p>
4:30PM	<p>A Study on the Autoignition Characteristics of Gasoline-Biodiesel Blended Fuel Using a Rapid Compression Expansion Machine Technical Paper Publication. ICEF2019-7103</p> <p>Kyeonghun Jwa, University of Ulsan, Ulsan, Ulsan, Korea (Republic), JinWoo Lee, Ulsan College, Ulsan, Korea (Republic), Ocktaeck Lim, University of Ulsan, Ulsan, Korea (Republic)</p>
5:00PM	<p>Investigating the Effects of Engine Operating Conditions on the Cyclic Variability of a Commercial Flex-Fuel Engine Technical Paper Publication. ICEF2019-7109</p> <p>Fazal Um Min Allah, Caio Henrique Rufino, Waldyr Luiz Ribeiro Gallo, University of Campinas, Campinas - SP, NA, Brazil, Clayton Barcelos Zabeu, Instituto Maua de Tecnologia, Brazil, Mauá, São Caetano do Sul - SP, Brazil</p>
5:30PM	<p>Screening Compounds for Fast Pyrolysis and Catalytic Biofuel Upgrading Using Artificial Neural Networks Technical Paper Publication. ICEF2019-7170</p> <p>Travis Kessler, University of Massachusetts Lowell, Lowell, MA, United States, Thomas Schwartz, University of Maine, Orono, ME, United States, Hsi-Wu Wong, John H. Mack, University of Massachusetts Lowell, Lowell, MA, United States</p>

Technical Sessions

MONDAY, OCTOBER 21

Monday, October 21, 4:00PM–6:00PM

TRACK 3: ADVANCED COMBUSTION

Track Organizer: **Sundar Krishnan**, *University of Alabama, Tuscaloosa, AL, United States*
Track Co-Organizer: **Cosmin Dumitrescu**, *West Virginia University, Morgantown, WV, United States*

3-3: FUNDAMENTAL THERMODYNAMICS

Marriott Chicago O'Hare, Chicago F

Session Organizer: **Tiegang Fang**, *North Carolina State University, Cary, NC, United States*
Session Co-Organizer: **Hongsheng Guo**, *National Research Council Canada, Ottawa, Canada*

4:00PM	<p>Implementing Natural Gas in a Compression Ignition Cycle Using Noble Gas Addition Technical Paper Publication. ICEF2019-7159</p> <p>Martia Shahsavan, <i>University of Massachusetts Lowell, Nashua, NH, United States</i>, Mohammadrasool Morovatiyan, Mammadbaghir Baghirzade, John H. Mack, <i>University of Massachusetts Lowell, Lowell, MA, United States</i></p>
4:30PM	<p>Effect of Fuel Injection Parameters on Performance and Emissions for High Efficiency Engines Technical Paper Publication. ICEF2019-7221</p> <p>Raj Kumar, Yan Wang, Ryan Vojtech, James Cigler, <i>Navistar Inc., Melrose Park, IL, United States</i></p>
5:00PM	<p>An Experimental Study on the Effects of Intake Charge and Pilot Injection on Premixed Burn Fraction and NO_x Emission Characteristics of a CRDI Turbocharged Diesel Engine Technical Paper Publication. ICEF2019-7243</p> <p>Nivin Chacko, <i>VIT Vellore, Vellore, Tamil Nadu, India</i>, Vijay Anirudh P, <i>College of Engineering, Guindy, Chennai, Tamil Nadu, India</i>, Thangaraja Jeyaseelan, <i>VIT Vellore, Vellore, Tamil Nadu, India</i></p>
5:30PM	<p>Characteristics of Cycle-to-Cycle Combustion Variability at Partial-Burn Limited and Misfire Limited Spark Timing Under Highly Diluted Conditions Technical Paper Publication. ICEF2019-7256</p> <p>Bryan Maldonado, Anna Stefanopoulou, <i>University of Michigan, Ann Arbor, MI, United States</i>, Riccardo Scarcelli, <i>Argonne National Laboratory, Lemont, IL, United States</i>, Sibendu Som, <i>Argonne National Laboratory, Naperville, IL, United States</i></p>
<p>3-4: LTC/GCI/RCCI/HCCI II Marriott Chicago O'Hare, Salon 8 Session Organizer: Lorenzo Bartolucci, <i>University of Rome Tor Vergata, Rome, Italy</i></p>	
4:00PM	<p>Investigation Into Reactivity Separation Between Direct Injected and Premixed Fuels in RCCI Combustion Mode Technical Paper Publication. ICEF2019-7130</p> <p>Ziming Yan, <i>Stony Brook University, Centereach, NY, United States</i>, Deivanayagam Hariharan, <i>Stony Brook University, Stony Brook, NY, United States</i>, Brian Gainey, <i>Stony Brook University, Port Jefferson, NY, United States</i>, Benjamin Lawler, <i>Stony Brook University, Stony Brook, NY, United States</i></p>
4:30PM	<p>A Computational Investigation of Piston Bowl Geometry and Injector Spray Pattern Effects on Gasoline Compression Ignition in a Heavy-Duty Diesel Engine Technical Paper Publication. ICEF2019-7155</p> <p>Yu Zhang, Yuanjiang Pei, Meng Tang, Michael Traver, <i>Aramco Research Center - Detroit, Novi, MI, United States</i></p>
5:00PM	<p>On the Effects of Injection Strategy, EGR, and Intake Boost on TSCI With Wet Ethanol Technical Paper Publication. ICEF2019-7164</p> <p>Brian Gainey, <i>Stony Brook University, Port Jefferson, NY, United States</i>, Ziming Yan, <i>Stony Brook University, Centereach, NY, United States</i>, Mozhgan Rahimi Boldaji, Benjamin Lawler, <i>Stony Brook University, Stony Brook, NY, United States</i></p>
5:30PM	<p>A Comparison of Low-Load Efficiency Optimization on a Heavy-Duty Engine Operated With Gasoline-Diesel RCCI and CDC Technical Paper Publication. ICEF2019-7149</p> <p>R.C. Willems, <i>Eindhoven University of Technology, Eindhoven, Netherlands</i>, F.P.T. Willems, <i>Eindhoven University of Technology; TNO Automotive Helmond, Eindhoven, Netherlands</i>, N.G. Deen, L.M.T. Somers, <i>Eindhoven University of Technology, Eindhoven, Netherlands</i></p>

Monday, October 21, 4:00PM–6:00PM

TRACK 4: EMISSIONS CONTROL SYSTEMS

Track Organizer: **Alexander Sappok**, CTS Corporation, Newton, MA, United States
Track Co-Organizer: **Shahrokh Etemad**, Fairfield University, Fairfield, CT, United States

4-1: CATALYST SYSTEMS AND EMISSIONS MODELING/CONTROL

Marriott Chicago O'Hare, Salon 9

Session Organizer: **Stani Bohac**, United States EPA, Ann Arbor, MI, United States
Session Co-Organizer: **Alexander Sappok**, CTS Corporation, Newton, MA, United States

4:00PM	<p>Evaluation of Effective Active Site on Pd Methane Oxidation Catalyst in Exhaust Gas of Lean Burn Gas Engine Technical Paper Publication. ICEF2019-7152</p> <p>Yoshifuru Nitta, National Institute of Maritime, Port and Aviation Technology, Tokyo, Japan, Yudai Yamasaki, University of Tokyo, Bunkyo-ku, Tokyo, Japan</p>
4:30PM	<p>Mathematical Modeling of Electrical Heater Assisted CO Conversion in an Oxidation Catalyst at Low Loads and Cold Start Conditions Technical Paper Publication. ICEF2019-7110</p> <p>Sreeharsh Nair, Priyabrata Mohapatra, Mayank Mittal, Indian Institute of Technology Madras, Chennai, India</p>
5:00PM	<p>A Methodology for Measuring Turbocharger Adiabatic Maps in a Gas-Stand and its Usage for Calibrating Control Oriented and 1D Models at Early ICE Design Stages Technical Paper Publication. ICEF2019-7125</p> <p>Jose R. Serrano, Francisco Arnau, Luis M. Garcia-Cuevas, Alejandro Gomez-Vilanova, Universitat Politecnica de Valencia, Valencia, Spain, Stephane Guilain, Renault Nissan Mitsubishi, Lardy, France, Samuel Batard, Groupe Renault, Lardy, France</p>
5:30PM	<p>Direct Measurement of Ammonia Storage on Passive SCR Systems for Lean Gasoline NOX Reduction Using Radio Frequency Sensing Technical Paper Publication. ICEF2019-7224</p> <p>Paul Ragaller, CTS Corporation, Boston Innovation Office, Malden, MA, United States, Alexander Sappok, CTS Corporation, Newton, MA, United States, Joshua Mandelbaum, Luc Lapenta, CTS Corporation, Boston Innovation Office, Malden, MA, United States, Josh Pihl, Vitaly Prikhodko, Oak Ridge National Laboratory, Oak Ridge, TN, United States, James Parks, Oak Ridge National Laboratory, Knoxville, TN, United States</p>

TRACK 6: NUMERICAL SIMULATION

Track Organizer: **Yuanjiang Pei**, Aramco Research Center - Detroit, Novi, MI, United States
Track Co-Organizers: **Muhsin Ameen**, Argonne National Laboratory, Lemont, IL, United States

6-3: ENGINE SIMULATION II

Marriott Chicago O'Hare, Salon 10

Session Organizer: **Jihad Badra**, Saudi Aramco, Dhahran, Saudi Arabia

4:00PM	<p>Systematic Multi-Index Validations of SIDI Engine Flow Field LES Computations Using Crank Angle-Resolved PIV Measurements Technical Paper Publication. ICEF2019-7145</p> <p>Mengqi Liu, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai, Shanghai, China, Fengnian Zhao, Shanghai Jiao Tong University, Shanghai, Shanghai, China, Xuesong Li, Min Xu, Institute of Automotive Engineering, Shanghai, Shanghai, China, Zongyu Yue, Argonne National Laboratory, Lemont, IL, United States, Sibendu Som, Argonne National Laboratory, Naperville, IL, United States, David L.S. Hung, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai, Shanghai, China</p>
4:30PM	<p>A Computational Study of the Thermodynamic Conditions Leading to Autoignition in Nanosecond Pulsed Discharges Technical Paper Publication. ICEF2019-7260</p> <p>Vyaas Gururajan, Riccardo Scarcelli, Argonne National Laboratory, Lemont, IL, United States, Anand Karpatne, Douglas Breden, Esgee Technologies, Austin, TX, United States, Laxminarayan Raja, University of Texas at Austin, Austin, TX, United States, Isaac Ekoto, Sayan Biswas, Sandia National Laboratories, Livermore, CA, United States</p>
5:00PM	<p>CFD Simulation of a Premixed Spark Injection Hydrogen Engine Technical Paper Publication. ICEF2019-7257</p> <p>Benjamin Lee, Sivapathas Parameswaran, Haiwen Ge, Texas Tech University, Lubbock, TX, United States, Peng Zhao, Oakland University, Rochester Hills, MI, United States</p>

Technical Sessions

TUESDAY, OCTOBER 22

Tuesday, October 22, 9:30AM–11:30AM

TRACK 1: LARGE BORE ENGINES

Track Organizer: **Dustin Osborne**, Southwest Research Institute, San Antonio, TX, United States
Track Co-Organizer: **Muni Biruduganti**, Argonne National Laboratory, Lemont, IL, United States

1-2: LARGE BORE II

Marriott Chicago O'Hare, Chicago F

Session Organizer: **Christopher Stoos**, SWRI, San Antonio, TX, United States

9:30AM	The Challenges of Turbocharger Matching for North American Freight Locomotives Technical Paper Publication. ICEF2019-7210 <i>Thomas Lavertu</i> , Wabtec, Ballston Lake, NY, United States, <i>Matthew Hart</i> , Wabtec, Erie, PA, United States, <i>Christopher Homison</i> , Wabtec, Lawrence Park, PA, United States, <i>Preeti Vaidya</i> , Wabtec, Bengaluru, India
10:00AM	Optimization of High Pressure Direct Injection Micro-Pilot as a Retrofit Technology for Conventional Dual Fuel Engines Technical Paper Publication. ICEF2019-7275 <i>Gregory Beshouri</i> , <i>Gerry Fischer</i> , Advanced Engine Technologies Corporation, San Leandro, CA, United States
10:30AM	Experimental Investigations of Marine Diesel Engine Performance Against Dynamic Back Pressure at Varying Sea-States due to Underwater Exhaust Systems Technical Paper Publication. ICEF2019-7216 <i>Harsh Sapra</i> , <i>Jaswinder Singh</i> , TU Delft, Delft, South Holland, Netherlands, <i>Chris Dijkstra</i> , Netherlands Defence Academy, Den Helder, Netherlands, <i>Peter De Vos</i> , <i>Klaas Visser</i> , TU Delft, Delft, South Holland, Netherlands
11:00AM	Overcoming Turbocharger Limitations for Low BMEP Two-Stroke Large Bore Gas Engines: A Technical Analysis and Case Study Technical Paper Publication. ICEF2019-7280 <i>Mohamed Toema</i> , <i>Paul Watts</i> , HOERBIGER, Houston, TX, United States, <i>Gregory Beshouri</i> , Advanced Engine Technologies Corporation, San Leandro, CA, United States, <i>Hans Mathews</i> , HOERBIGER, Houston, TX, United States

TRACK 2: FUELS

Track Organizer: **Gregory Bogin**, Colorado School of Mines, Golden, CO, United States
Track Co-Organizers: **Hailin Li**, West Virginia University, Morgantown, WV, United States

2-4: COMPRESSION IGNITION

Marriott Chicago O'Hare, Chicago G

Session Organizer: **Hunter Mack**, University of Massachusetts Lowell, Lowell, MA, United States
Session Co-Organizer: **Douglas E. Longman**, Argonne National Laboratory, Lemont, IL, United States

9:30AM	RCCI Investigations With n-Butanol and ULSD Technical Paper Publication. ICEF2019-7226 <i>Valentin Soloiu</i> , Georgia Southern University, Statesboro, GA, United States, <i>Cesar E. Carapia</i> , Georgia Southern University, Douglasville, GA, United States, <i>Justin T. Wiley</i> , Georgia Southern University, Temple, GA, United States, <i>Jose Moncada</i> , <i>Remi Gaubert</i> , Georgia Southern University, Statesboro, GA, United States, <i>Aliyah Knowles</i> , Georgia Southern University, Lilburn, GA, United States, <i>Marcel Ilie</i> , <i>Mosfequr Rahman</i> , Georgia Southern University, Statesboro, GA, United States
10:00AM	Thermochemical and Sensible Energy Recuperation Using Thermally-Integrated Reactor and Diesel-Ammonia Dual Fueling Strategy Technical Paper Publication. ICEF2019-7241 <i>Seamus Kane</i> , <i>Darrick Zarling</i> , <i>William Northrop</i> , University of Minnesota, Minneapolis, MN, United States
10:30AM	Experimental Investigation and Thermodynamic Modelling of an RCCI Engine With Gasoline and Ethanol as Pilot Fuels Technical Paper Publication. ICEF2019-7274 <i>Chinmaya Mishra</i> , <i>PMV Subbarao</i> , Indian Institute of Technology, Delhi, Delhi
11:00AM	Effect of Fuel Chemical and Physical Properties on Spray and Ignition Characteristics Under Heavy-Duty Diesel Engine Conditions Technical Paper Publication. ICEF2019-7266 <i>Meng Tang</i> , Michigan Technological University, Houghton, MI, United States, <i>Yuanjiang Pei</i> , <i>Yu Zhang</i> , <i>Michael Traver</i> , Aramco Research Center - Detroit, Novi, MI, United States, <i>Jeffrey Naber</i> , Michigan Technological University, Houghton, MI, United States

Tuesday, October 22, 9:30AM–11:30AM

TRACK 3: ADVANCED COMBUSTION

Track Organizer: **Sundar Krishnan**, *University of Alabama, Tuscaloosa, AL, United States*

Track Co-Organizer: **Cosmin Dumitrescu**, *West Virginia University, Morgantown, WV, United States*

3-5: FUNDAMENTAL THERMODYNAMICS II

Marriott Chicago O'Hare, Salon 8 Session Organizer: **Cosmin Dumitrescu**, *West Virginia University, Morgantown, WV, United States*

9:30AM	<p>Investigation of the Electrical-to-Thermal Energy Transfer Efficiency of Different Discharge Strategies Through Electrical and Calorimetry Measurement Technical Paper Publication. ICEF2019-7232</p> <p><i>Hua Zhu, Zhenyi Yang, Xiao Yu, Ming Zheng, Li Liang, University of Windsor, Windsor, ON, Canada</i></p>
10:00AM	<p>Optimization of the Mechanical and Thermodynamic Efficiency Loss Dynamic in a Lean Single Cylinder Natural Gas-Fueled Jet Ignition Engine Technical Paper Publication. ICEF2019-7213</p> <p><i>Nathan Peters, Sai Krishna Pothuraju Subramanyam, Michael Bunce, Hugh Blaxill, MAHLE Powertrain, Plymouth, MI, United States</i></p>
10:30AM	<p>High Efficiency Natural Gas Engine Combustion Using Controlled Auto-Ignition Technical Paper Publication. ICEF2019-7292</p> <p><i>Greg Hampson, Woodward, Inc., Loveland, CO, United States</i></p>

TRACK 6: NUMERICAL SIMULATION

Track Organizer: **Yuanjiang Pei**, *Aramco Research Center - Detroit, Novi, MI, United States*

Track Co-Organizers: **Muhsin Ameen**, *Argonne National Laboratory, Lemont, IL, United States*

6-4: MIXED MODE COMBUSTION

Marriott Chicago O'Hare, Salon 9

Session Organizer: **Pinaki Pai**, *Argonne National Laboratory, Lemont, IL, United States*

9:30AM	<p>A Novel Active Optimization Approach for Rapid and Efficient Design Space Exploration Using Ensemble Machine Learning Technical Paper Publication. ICEF2019-7237</p> <p><i>Opeoluwa Owoyele, Pinaki Pal, Argonne National Laboratory, Lemont, IL, United States</i></p>
10:00AM	<p>Engine Combustion System Optimization Using CFD and Machine Learning: A Methodological Approach Technical Paper Publication. ICEF2019-7238</p> <p><i>Jihad Badra, Saudi Aramco, Dhahran, EP, Saudi Arabia, Fethi Khaled, King Abdullah University of Science and Technology, Thuwal, Makkah, Saudi Arabia, Meng Tang, Yuanjiang Pei, Aramco Research Center - Detroit, Novi, MI, United States, Janardhan Kodavasal, Cummins, Chicago, IL, United States, Pinaki Pal, Opeoluwa Owoyele, Argonne National Laboratory, Lemont, IL, United States, Carsten Fuetterer, Mattia Brenner, Friendship Systems, Potsdam, Germany, Amir Farooq, King Abdullah University of Science and Technology, Thuwal, Makkah, Saudi Arabia</i></p>
10:30AM	<p>Numerical Investigation of Fuel Property Effects on Mixed-Mode Combustion in a Spark-Ignition Engine Technical Paper Publication. ICEF2019-7265</p> <p><i>Chao Xu, Pinaki Pal, Xiao Ren, Argonne National Laboratory, Lemont, IL, United States, Sibendu Som, Argonne National Laboratory, Naperville, IL, United States, Magnus Sjöberg, Sandia National Laboratories, Livermore, CA, United States, Noah Van Dam, University of Massachusetts Lowell, Lowell, MA, United States, Yunchao Wu, Tianfeng Lu, University of Connecticut, Storrs, CT, United States, Matthew McNenly, Lawrence Livermore National Laboratory, Livermore, CA, United States</i></p>
11:00AM	<p>Numerical Study of Advanced Compression Ignition and Combustion in a Gasoline Direct Injection Engine Technical Paper Publication. ICEF2019-7281</p> <p><i>Sayop Kim, Argonne National Laboratory, Woodridge, IL, United States, Joohan Kim, Ashish Shah, Pinaki Pal, Riccardo Scarcelli, Toby Rockstroh, Argonne National Laboratory, Lemont, IL, United States, Sibendu Som, Argonne National Laboratory, Naperville, IL, United States, Yunchao Wu, Tianfeng Lu, University of Connecticut, Storrs, CT, United States</i></p>

Technical Sessions

TUESDAY, OCTOBER 22

Tuesday, October 22, 9:30AM–11:30AM

TRACK 7: ENGINE DESIGN AND MECHANICAL DEVELOPMENT

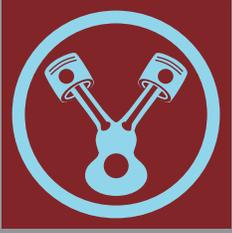
Track Organizer: **Dan Richardson**, Cummins, Columbus, IN, United States
Track Co-Organizer: **David Rutledge**, Cummins, Bedford, IN, United States

7-3: MECHANICAL DESIGN III

Marriott Chicago O'Hare, Salon 10

Session Organizer: **David Rutledge**, Cummins, Bedford, IN, United States

9:30AM	Challenges in Measuring Lube Oil Consumption of Internal Combustion Engines Using Deuterium as a Tracer Technical Paper Publication. ICEF2019-7111 <i>Bernhard Rossegger</i> , Graz University of Technology, Graz, Styria, Austria, Michael Engelmayer , Andreas Wimmer , LEC GmbH, Graz, Austria
10:00AM	A Study on the Distribution of Oil Film Thickness in the Circumferential Direction of Oil Ring in a Gasoline Engine Technical Paper Publication. ICEF2019-7174 <i>Akemi Ito</i> , <i>Tadatsugu Hakkaku</i> , <i>Kazuya Mochiduki</i> , <i>Keita Tomotsune</i> , Tokyo City University, Tokyo, Japan, Masatsugu Inui , Hirota-ka Akamatsu , Nissan Motors, Ltd., Kanagawa, Japan
10:30AM	A Study on a Rotational Force Acting on the Piston Ring of a Gasoline Engine Technical Paper Publication. ICEF2019-7176 <i>Kenta Tomizawa</i> , Tokyo City University, Setagaya, Japan, Akemi Ito , Tokyo City University, Tokyo, Japan
11:00AM	Innovative Instrumented Sliding Bearings as a New Approach to On-Board Bearing Monitoring Technical Paper Publication. ICEF2019-7191 <i>Thomas Breiteneder</i> , <i>Claudia Schubert-Zallinger</i> , Technical University of Graz, Graz, Austria, Jan Vystejn , Andreas Wimmer , LEC GmbH, Graz, Austria, Gunther Hager , Stefan Schallmeiner , Miba Gleitlager Austria GmbH, Laakirchen, Austria



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