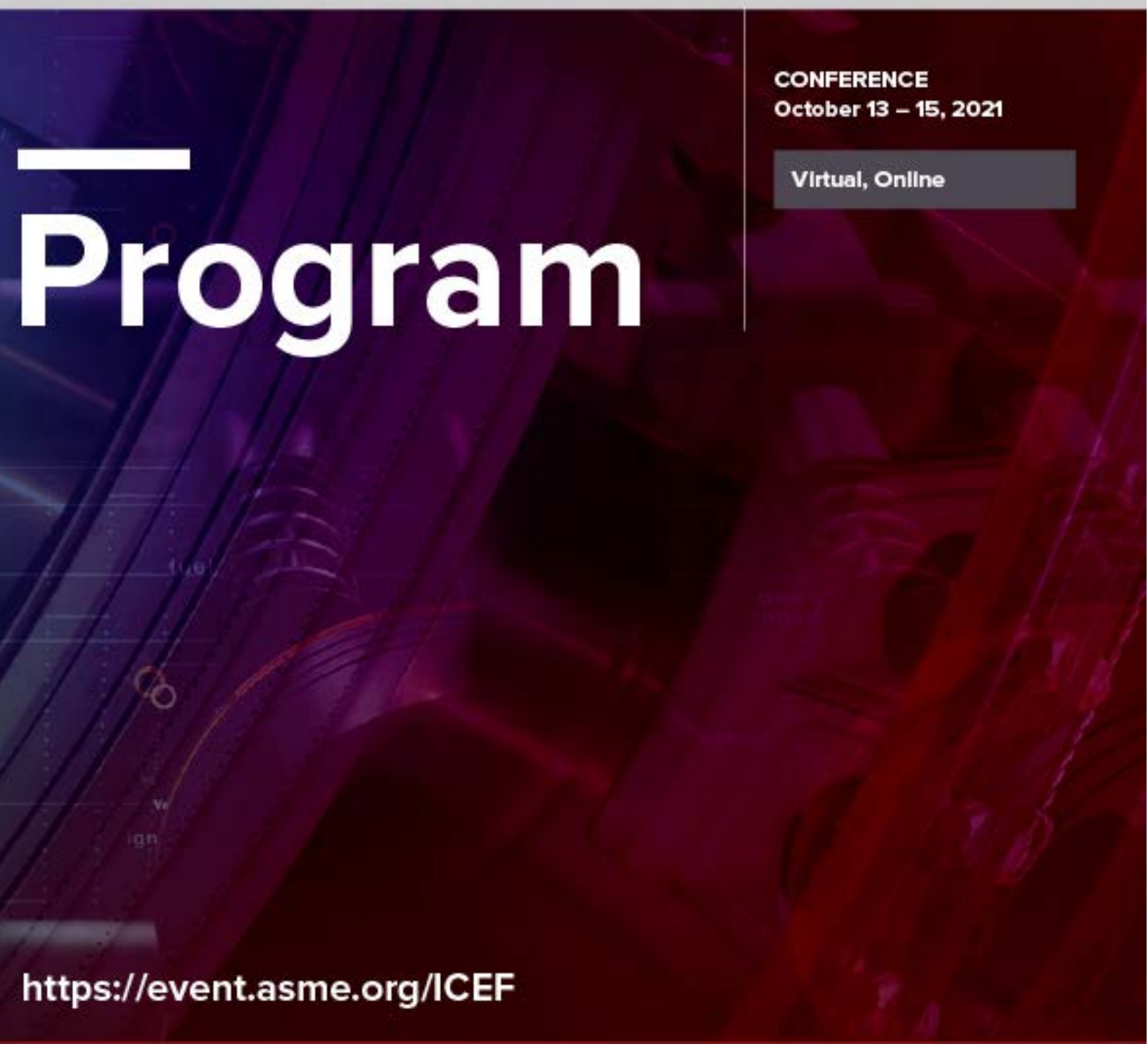
ASME ICEF 2021

The Internal Combustion Engine Fall Conference



CONFERENCE
October 13 – 15, 2021

Virtual, Online

Program

https://event.asme.org/ICEF

The American Society of Mechanical Engineers • ASME®

ASME
SETTING THE STANDARD

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Times listed are EST

Welcome to the 2021 ASME Internal Combustion Engine Fall Technical Conference, which is a virtual event now, owing to the COVID-19 pandemic. The Internal Combustion Engine (ICE) executive committee, together with the ASME staff have worked hard to make this virtual event very exciting for you. The three-day event begins on the morning of Wednesday, October 13th with a welcome and keynote address, and ends with an ICE division associates meeting on the afternoon of Friday, October 15th. Technical presentations, keynotes and invited talks are planned throughout Wednesday, October 13th and Thursday, October 14th. The annual awards ceremony will also be held virtually on the evening of October 13th. A special workshop will be hosted by SmartUQ entitled "Introduction to Machine Learning and Uncertainty Quantification for Automotive Applications" on the morning of Friday, October 15th. Due to the virtual nature of the conference, actual networking may be a little less fluid than usual, especially for early-career attendees who may be attending for the first time. Like last year, we will have an Early Career Networking session on Thursday October 14th. The session has been designed to give early career researchers an opportunity to chat with key leaders in industry, academia, and US national laboratories. We hope that young researchers will take advantage of this exciting opportunity to grow their networks and explore the wide range of career options in this field.

This conference is intended to provide a collegial atmosphere to discuss and exchange information related to the science and engineering of internal combustion engines.

The morning keynote on Wednesday, October 13th will be delivered by Dr. James Szybist, head of the Propulsion Science Section at Oak Ridge National Laboratory. The keynote address on Wednesday afternoon will be delivered by Dr. Elana Chapman, Senior Fuels/Biofuels Engineer at General Motors. Our Thursday morning keynote will be Cynthia Webb who is the Director of Regulatory Technology at the PACCAR Technical Center. The Thursday afternoon keynote will be from Professor Federico Millo from Politecnico di Torino in Italy.

We are especially grateful for the participation of the many volunteers who ensure the high technical standards of the conference and an engaging program. The virtual meeting has been made possible by the contributions of our session chairs and organizers, technical reviewers, and the authors of the

papers. We are thankful to all our speakers for agreeing to participate and share their expertise and knowledge with the community.

During these unprecedented times, we look forward to your support and participation for this virtual ASME ICE conference. While working remotely has posed many challenges for all of us, we are glad that your favorite conference is still “on”. We hope you enjoy the content offering of the conference and learn from the excellent keynotes and panel discussions, the 70+ technical presentations, and the workshop.

Stay home, stay safe, and we hope to see you live and in-person in 2022!

Sincerely,

Prof. Caroline Genzale

Associate Professor

Mechanical Engineering, Georgia Institute of Technology

Conference Chair

Kelly Senecal, Ph.D.

Vice President

Convergent Science

Conference Co-Chair

ASME ICEF 2021

Eastern Standard Time				
Wednesday, October 13, 2021 - Day 1				
9:30 AM	9:40 AM	**Will Northrop, ICE Division Chair - Welcome (Live)** **CEO ASME - Tom Costabile**		
9:40 AM	10:25 AM	**Keynote 1 (Live)** **Kelly Senecal, Conference Co-Chair- Moderator (Live)** **Dr. James P. Szybist, Propulsion Science Section at Oak Ridge National Laboratory** **Presentation Title:"Perspective on Engines in a Decarbonized Transportation Sector"** **Q&A**		
10:25 AM	10:30 AM	Break		
10:30 AM	11:30 AM	**Room 1** **Session 01-02 - Large Bore Engines II** **Chair: Chris Stoos**	**Room 2** **Session 02-02: Spark Ignition II (Alternative Fuels)** **Chair: Francis Haas**	**Room 3** **Session 04-01 Controls I** **Chair: Vittorio Ravaglioli** **Co-Chair: Jose Ramon Serrano**
		ICEF2021-67492 Analysis on Combined Heat and Power Hybrid Systems for Unconventional Drilling Operations Author: Diego Dranuta Ferrer	ICEF2021-68203 Investigations of Low-Temperature Heat Release and Negative Temperature Coefficient Regions of Iso-Paraffinic Kerosene in a Constant Volume Combustion Chamber Author: Richard Smith	ICEF2021-67541 Modeling and Control of a Hybrid Opposed Piston Engine Author: Joseph Drallmeier
		ICEF2021-67511 A Fundamental Thermodynamic Investigation of Compression Ratio Effects in Relation to Diesel Engine Size Author: Kevin Burnett	ICEF2021-66772 Environment and Economic Assessment of CNG and Gasoline Engines: An Experimental Analysis Author: Sridhar Sahoo	ICEF2021-66616 Control-Oriented Model of the Mean and Dispersion of Diesel Combustion Phasing With Ignition Assis Author: Omar Ahmed
			ICEF2021-67547 Experimental Investigation of a Simulated Byproduct Fuel Mixture From the Cl-ODH Process in a Spark-Ignition Engine Author: Kaushik Nonavinakere Vinod	ICEF2021-67710 Ammonia Slip Estimation Based on ASC Control-Oriented Modelling And OBD NOx Sensor Cross-Sensitivity Analysis Author: Enrique J. Sanchis
		Room #1 - 15 mins Q&A LIVE	Room #2 - 15 mins Q&A	Room #3 - 15 mins Q&A
11:30AM	11:35AM	Break		
11:35AM	12:20PM	**Keynote 2 (Live)** **Kelly Senecal, Moderator** **Dr. Elana Chapman, Senior Fuels/Biofuels Engineer at General Motors (GM)** **Presentation Title: "The Shifting Energy Landscape and the Future of Fuels"** **Q&A**		
12:20PM	12:30PM	Lunch Break		
12:30PM	1:30PM	**Room 1** **Session 02-03 - Compression Ignition I** **Chair: Hailin Li**	**Room 2** **Session 06-01 - Ignition Modeling** **Chair: Anqi Zhang**	**Room 3** **Session 04-03 Emissions I** **Chair: Stani Bohac** **Co-Chair: Richard Burke**
		ICEF2021-67395 Primary & Secondary Reference Fuel Effects as a Function of Compression Ratio in a Cfr Diesel Engine Author: Jim Cowart	ICEF2021-67598 High-Fidelity Energy Deposition Ignition Model Coupled With Flame Propagation Models at Engine-Like Flow Conditions Author: Samuel Kazmouz	ICEF2021-67633 Development of a Low-Cost Exhaust H2 Measurement Method for In-Use Vehicles Author: Mark Guan
		ICEF2021-67749 A Numerical and Experimental Study of Soot Precursor and Primary Particle Size of N-Butylbenzene in Laminar Flame Author: Zhiwen Gan	ICEF2021-67902 CFD Modeling of Low Temperature Ignition Processes From a Nanosecond Pulsed Discharge at Quiescent Conditions Author: Vyaas Gururajan	ICEF2021-67741 Hydrocarbon Species Impact on NO to NO2 Conversion in a Compression Ignition Engine Under Low Temperature Combustion Conditions Author: Nupur Gupta
		ICEF2021-67785 Evaluating Diesel/Biofuel Blends Using Artificial Neural Networks and Linear/Nonlinear Equations Author: Travis Kessler	ICEF2021-68226 Multiphysics Modeling of Spark Discharges in High Crossflow Ignition Environments Author: Vivek Subramaniam	ICEF2021-68317 Hardware-in-the-Loop Investigation of Emissions Challenges in Hybrid Medium- and Heavy-Duty Powertrains Using a Pre-Production Diesel-Electric Parallel Hybrid System With and Without Stop-Start Operation Author: ScottCurran
		Room #1 - 15 mins Q&A LIVE	Room #2 - 15 mins Q&A	Room #3 - 15 mins Q&A
1:30PM	*1:35PM*	Break		
1:35PM	2:35PM	**Room 1** **Session 06-06 Machine Learning** **Chair: Pinaki Pal**	**Room 2** **Session 06-05 Advanced Combustion Engine Modeling** **Chair: Haiwen Ge**	**Room 3** **Session 04-04 Emissions II** **Chair: Richard Burke** **Co-Chair: Jose Ramon Serrano**
		ICEF2021-67925 Data-Driven Approaches to Learn HyChem Models Author: Weiqi Ji	ICEF2021-67836 A Numerical Study on the Effects of Egr Dilution in a Pre-Chamber Ignited Natural Gas Engine Author: Prasanna Chinnathambi	ICEF2021-70947 On Blow-by Aerosol Sources in a Single-Cylinder Crankcase Environment Author: Niclas Nowak
		ICEF2021-76121 Efficient Optimization of Fuel Formulation Using Adaptive Learning and Artificial Intelligence Author: Juliane Mueller	ICEF2021-74466 The Interaction Between the Pilot Diesel and Main NG Injection in an HPDI Engine Author: L.M.T.Somers	ICEF2021-67794 Characterization of a Lightly Loaded Underfloor Catalyzed Gasoline Particulate Filter in a Turbocharged Light Duty Truck Author: Stani Bohac
		ICEF2021-76148 An Active Machine Learning Algorithm (Activo) for Accelerating Simulation-Driven Engine Design Optimization Author: Opeoluwa Owoyele	ICEF2021-76576 Cfd Modeling of Pre-Spark Heat Release in a Boosted Disi Engine Author: Henglie Guo	ICEF2021-67337 Effect of Butanol on the Performance of DeNOx Aftertreatment Systems of a Diesel Vehicle Under WLTC Driving Conditions Author: Juan Hernández
		Room #1 - 15 mins Q&A LIVE	Room #2 - 15 mins Q&A	Room #3 - 15 mins Q&A
2:35PM	2:40PM	Break		
2:40PM	4:10PM	**Panel Session 1** **Moderators: Sibendu Som, Tom Lavertu** **"Towards Decarbonizing Heavy-Duty Freight Transportation"** **Jian Li, Volvo Group** **Michael Weismiller, Department of Energy** **Daniel Mohr, Cummins Inc.** **Maarten Meijer, PACCAR** **James Cigler, Navistar**		
4:10PM	4:15PM	Break		
4:15 PM	4:55 PM	**Room 1** **Session 01-01: Large Bore Engines I** **Chair: Munidhar Biruduganti**	**Room 2** **Session 02-01: Spark Ignition I** **Chair: Gregory Bogin**	**Room #3** **Session 03-02 - Combustion Diagnostics** **Chair: Isaac Ekoto** **Co-Chair: Brian Fisher**
		ICEF2021-67715 Optimization of a Marine Medium-Speed Engine With Multi-Injector System by 1d Predictive Simulation Author: LongLiu	ICEF2021-67516 Analysis of Premixed Laminar Combustion of Methane With Noble Gases as a Working Fluid Author: Mammadbaghir Baghirzade	ICEF2021-66274 Application of Conditional Space-Time Proper Orthogonal Decomposition to Engine In-Cylinder Flow Analysis Author: Rui Gao
		ICEF2021-67717 A Numerical Investigation on Mixing Characteristics of Natural Gas Jets With High-Pressure Injection Author: Long Liu	ICEF2021-67780 Demonstration of the Benefits of SAE 30 Stationary Gas Engine Oil in Full Scale Engine Tests Author: Zoe Fard	ICEF2021-67489 Optical and Numerical Investigations of Flame Propagation in a Heavy Duty Spark Ignited Natural Gas Engine Author: Cosmin Dumitrescu
		Room #1 - 10 mins Q&A LIVE	Room #2 - 10 mins Q&A	Room #3 - 10 mins Q&A
5:00PM	5:40PM	Awards Ceremony		

Thursday, October 14, 2021 - Day 2

9:30AM	10:20AM	**Welcome/Keynote 3 (Live)** **Kelly Senecal - Introduction and Moderator** **Cynthia Webb, Director of Regulatory Technology at the PACCAR Technical Center** **Presentation Title: "2020 to 2030: The Decade of Remarkable Regulation Driven Heavy-Duty Diesel Engine Technology Change"** **Q&A**		
10:20AM	10:30AM	Break		
10:30AM	11:30AM	**Room 1** **Session 05-02: Diesel Sprays** **Chair: Tiegang Fang**	**Room #2** **Session 07-01 Exhaust System Analysis** **Chair: Kevin Anderson** **Co-Chair: Dan Richardson**	**Room 3** **Session 06-02 High Fidelity LES/DNS Modeling** **Chair: Noah Van Dam**
		ICEF2021-67775 A Comparison of Injection, Spray, and Combustion Characteristics for Non-Eroded and Eroded Multi-Hole Fuel Injectors Author: Gina Magnotti	ICEF2021-67757 Development of Simplified Analysis Process for Multidisciplinary Design Optimization (MDO) of Exhaust Manifold During Concept Stage Author: Nilesh Ghodke	ICEF2021-67671 Investigating the Origins of Cyclic Variability in Internal Combustion Engines Using Wall-Resolved Large Eddy Simulations Author: Sicong Wu
		ICEF2021-67831 Impact of Fuel Injection Pressure on Spray and Combustion Characteristics of Ome and Diesel Fuel Blends Author: Simon Leblanc	ICEF2021-67640 On-Engine Expansion Measurement of Exhaust Manifold for Calibrating Thermo-Mechanical Fatigue FEA Model Author: Girish Kulkarni	ICEF2021-67835 Direct Numerical Simulation of Partial Fuel Stratification Assisted Lean Premixed Combustion for Assessment of Hybrid G-Equation/well-Stirred Reactor Model Author: Chaoxu
		ICEF2021-68205 Measurement of Air-Fuel Mixing in a Diesel Spray at Engine Relevant Conditions Using Uv-Vis Dbi Diagnostic. Author: Conner Godbold	ICEF2021-67753 Prediction of Exhaust System Vibration Through Harmonic Analysis & High Cycle Fatigue Life Evaluation Author: Bhaskarjyoti Saikia	ICEF2021-67848 Large Eddy Simulation of Gasoline Sprays in a Lagrangian-Eulerian Framework Using the High-Order Spectral Element Method Author: Juan Diego Colmenares Fernandez
		Room #1 - 15 mins Q&A LIVE	Room #2 - 15 mins Q&A	Room #3 - 15 mins Q&A
11:30AM	11:35AM	Break		
11:35AM	12:35PM	**Room 1** **Session 05-01: Modeling Fuel Injection and Sprays** **Chair: Tiegang Fang**	**Room 2** **Session 07-03 Overhead Dynamics** **Chair: Dave Rutledge** **Co Chair: Dan Richardson**	**Room 3** **Session 06-04 - System Level Modeling** **Chair: Yu Zhang**
		ICEF2021-67745 LES Study on Spray Combustion With Renewable Fuels Under ECN Spray-A Conditions Author: Jose M Garcia-Oliver	ICEF2021-67755 Investigation of Valvetrain Dynamics Using Transient Dynamic Simulation in Ansys Author: Ashish Koli	ICEF2021-76244 Injection Rate Shape Design of Gasoline-Like Fuels Using 1-D Hydraulic Models Operating at High Pressures Author: Tommy Tzanetakis
		ICEF2021-67888 Machine Learning-Enabled Prediction of Transient Injection Map In Automotive Injectors With Uncertainty Quantification Author: Gina Magnotti	ICEF2021-67594 Machine Learning Based Numerical Approach for Valve Seating Velocity Control in an Electromagnetic Camless System Author: Srinibas Tripathy	ICEF2021-76233 System Level Modeling Approach for Evaluation of Hybrid, Electric and Fuel Cell Powertrain Solutions in Medium Heavy-Duty Vehicles Author: Satyum Joshi
		ICEF2021-67549 Towards Modeling Cavitation and Erosion for a Multi-Component Alternative Diesel Fuel Author: Gina Magnotti	ICEF2021-76554 Analysis-Led Design of Valve Lift Profiles for High-Efficiency Dual-Fuel Combustion in a Heavy-Duty Single-Cylinder Engine Author: Deivanayagam Hariharan	ICEF2021-76776 A Numerical Investigation of Combining E-Compressor & Variable Valve Strategies Investigation for High Load Operation in a Heavy-Duty Gasoline Compression Ignition Engine Author: Praveen Kumar
		Room #1 - 15 mins Q&A LIVE	Room #2 - 15 mins Q&A	Room #3 - 15 mins Q&A
12:35PM	12:40PM	Break		
12:40PM	1:30PM	**Keynote 4 (Live)** **Moderator, Kelly Senecal** **Prof. Federico Millo, Professor at Politecnico di Torino, Italy** **Presentation Title: "Hydrogen as an Engine Fuel: Potentials and Challenges"** **Q&A**		
1:30PM	1:40PM	Lunch Break		
1:40PM	2:20PM	**Room 1** **Session 02-04 - Compression Ignition II, Alternative Fuels** **Chair: Valentin Soloiu**	**Room 2** **Session 04-02 - Controls II** **Chair: Benjamin Pla** **Co-Chair: Vittorio Ravaglioli**	**Room 3** **Session - 07-04 Variable Compression Ratio Startup and Oxy-Fuel Combustion** **Chair: Ambikapathy Naganathan** **Co Chair: Dan Richardson**
		ICEF2021-67419 Potentiality of Yellow Oleander (Thevetia Peruviana) Seed Oil as an Alternative Diesel Fuel in Compression Ignition Engines Author: Ujjwal K. Saha	ICEF2021-66745 Boosting the Capabilities of Gas Stand Data Acquisition and Control Systems by Using a Digital Twin Based on a Holistic Turbocharger Model Author: Luis Miguel Garca-Cuevas	ICEF2021-67727 Demonstration a Variable Compression Ratio Startup Strategy to Reduce Cold Start Misfiring With Hydrous Bioethanol Author: Sam Cockerill
		ICEF2021-67429 An Experimental Study on a Dual-Fuel Generator Fueled With Diesel and Simulated Biogas Author: Shouvik Dev	ICEF2021-76343 Next-Cycle Dilute Combustion Control Using Online Machine Learning Author: Bryan Maldonado	ICEF2021-67707 Adapting an Internal Combustion Engine to Oxy-Fuel Combustion With In-Situ Oxygen Production Author: Luis Miguel Garca-Cuevas
		Room #1 - 10 mins Q&A LIVE	Room #2 - 10 mins Q&A	Room #3 - 10 mins Q&A
2:20PM	2:30PM	Break		
2:30PM	3:10PM	**Room 1** **Session 07-02 Damper Assessment and Bearing Friction** **Chair: Amit Gabale** **Co Chair: Dan Richardson**		**Room 3** **Session - 05-03 Gasoline Sprays** **Chair: Josh Bittle**
		ICEF2021-67750 Compression Rubber Damper Assessment Through Simulation Author: Mayur Biyani		ICEF2021-67827 Comparison of Spray Formation of a Multi and a Single Hole Gasoline Direct Injector Author: Malki Maliha
		ICEF2021-66874 Experimental Investigation of the Influence of Engine Operating and Lubricant Oil Parameters on Sliding Bearing and Friction Behavior in a Heavy-Duty Diesel Engine Author: Matheus Marques Da Silva		ICEF2021-68309 Influence of Elevated Fuel Temperatures on the Spray Characteristics of Gasoline - Ethanol Blends Author: Niranjan Miganakallu
		Room #1 - 10 mins Q&A LIVE		Room #3 - 10 mins Q&A
3:10PM	3:15PM	Break		
3:15PM	4:45PM	**"Pathways to Achieve Ultra-Low NOx Emissions"** **Moderator, Ameya Joshi, Corning** **Bill Robertson, California Air Resources Board** **Chris Sharp, SwRI** **Ying Yuan, Cummins** **Steve Ciatti, PACCAR Technical Center** **Haying Chen, Oak Ridge National Laboratory**		
4:45PM	4:50PM	Break		
4:50PM	6:05PM	**Room #1** **Session 03-01 Novel Combustion and Emission Control Concepts** **Chair: Hongsheng Guo** **Co-Chair: Siddhartha Banerjee**	**Room 2** **Session 03-03 Dual Fuel Combustion** **Chair: Marcis Jansons,** **Co-chairs :Giacomo Belgiorno, Deivanayagam Hariharan**	**Room 3** **Session 06-03 Reduced Order Modeling** **Chair: Yu Zhang** **Co-Chair: Emma Zhao**
		ICEF2021-67851 Numerical Investigation of the Impact of Spray – Bowl Interaction on Thermal Efficiency of a Gasoline Compression Ignition Engine Author: Srinivasa Krishna Addepalli	ICEF2021-66341 Experimental Investigation of Effects of Split Diesel-Pilot Injection on Emissions From Ammonia-Diesel Dual Fuel Engine Author: Yoichi Niki	ICEF2021-66622 Simulation of Turbulent Combustion in Gasoline Direct Injection Spark-Ignited Engines Using a Stochastic Reactor Model Author: Brady Wilmer
		ICEF2021-67909 Ignition Stability Improvement and Emission Reduction via Multiple Ignition Sites Strategy Under Cold Start and Transient Conditions Author: Xiaoxi Zhang	ICEF2021-76498 Strategies to Reduce Hydrocarbon and Carbon Monoxide Emissions in Dual Fuel Engines Author: Prabhat Jha	ICEF2021-67858 Transient Thermo-Mechanical Stress Analysis of Hot Surface Probe Using Sequentially Coupled CFD-FEA Approach Author: Je Ir Ryu
		ICEF2021-66596 Achieving Near Zero Criteria Emissions in Heavy Duty Diesel Engines Author: Laurence Fromm	ICEF2021-76564 Strategies to Reduce Methane Slip in Natural Gas Diesel Dual Fuel Marine and Power Generation Engines Author: Greg Hampson	ICEF2021-67863 Estimation of Wiebe Function Parameters for Syngas and Anode Off-Gas Combustion in Spark-Ignition Engines Author: Ruinan Yang
		ICEF2021-67810 Cfd-Guided Evaluation of Spark-Assisted Gasoline Compression Ignition for Cold Idle Operation Author: Le Zhao	ICEF2021-76595 A Statistical Analysis and Modeling of Cyclic Combustion Variations in Dual Fuel Low Temperature Combustion Author: Sundar Rajan Krishnan	ICEF2021-76506 Quasi-Dimensional Si Combustion Model and Its Application in Engine Development Author: Hanjun Xu
		Room #1 - 15 mins Q&A LIVE	Room #2 - 15 mins Q&A LIVE	Room #3 - 15 mins Q&A
6:10PM	6:40PM	Early Career Networking Event		

Wednesday, October 13, 2021, 9:30 – 10:25 AM

Dr. James P. Szybist is the head of the Propulsion Science Section at Oak Ridge National Laboratory, and additionally leads the Fuel Property technical team within the U.S. Department of Energy's Co-Optima initiative and is on the leadership team of the DOE partnership to advance combustion engine (PACE) consortium. His research interests center around developing a better understanding of engine and fuel interactions, including the autoignition processes that result in knock in spark ignited engines and autoignition in low temperature combustion engines, and using kinetics to develop an improved conceptual understanding of the phenomenon. He is a Fellow of the Society of Automotive Engineers (SAE) and the 2015 recipient of the SAE Harry L. Horning Award. He received his Ph.D. from Penn State University in Fuel Science in in 2005 and then joined Oak Ridge National Laboratory as a post-doc.

Presentation Title: Perspective on Engines in a Decarbonized Transportation Sector

Wednesday, October 13, 2021, 11:35 AM – 12:20 PM

Dr. Elana Chapman is a recognized expert in the area of Fuel Science. Currently a Senior Fuels/Biofuels Engineer at General Motors (GM), she has spent over 13 years supporting the Advanced Engineering and Production Combustion groups with test fuels, and performed other projects related to fuels and engine performance to meet future vehicle emissions and performance standards. Dr. Chapman serves as GM's Executive Committee member and Co-Chair on the Coordinating Research Council - Advanced Vehicle Fuels and Lubricants Committee, and member of the Performance Committee, in addition to other industry consortiums on GM's behalf. She serves as the Chair of the SAE Fuels & Lubricants Committee and has authored over 29 technical papers. She earned a BS in Mechanical Engineering from the University of Dayton and a MS in Fuel Science, MS in Mechanical Engineering, PhD in Fuel Science, and an Advanced Energy Storage Technologies certificate from Penn State University.

Presentation Title: The Shifting Energy Landscape and the Future of Fuels

Thursday, October 14, 2021, 9:30 – 10:20 AM

Cynthia Webb is the director of Regulatory Technology at the PACCAR Technical Center, where she is responsible for OBD regulatory, Production Vehicle Compliance, Future Regulatory and Advanced Technology Evaluation. She has worked in the field of engine ad emissions systems for twenty-nine years with the primary focus of her work on advanced emissions system R&D including control, calibration, catalyst aging, and diagnostics for on-highway applications. Throughout the course of her career, she has worked to establish the feasibility and guidance of new emissions regulations and the development of strategies and new technologies to meet those regulations. She has published 24 professional publications related to the field and has received 21 patent awards. Additionally, she was also an R&D award finalist in 2015, received the SAE John Johnson award for Outstanding Research in Diesel Engines in 2017 and the SAE Rodica Barnescu award for Technical and Leadership Excellence in 2021.

Presentation Title: 2020 to 2030: The Decade of Remarkable Regulation Driven Heavy-Duty Diesel Engine Technology Change

Thursday, October 14, 2021, 12:40 – 1:30 PM

Federico Millo is a full professor of automotive internal combustion engines at Politecnico di Torino, Italy, where he also received his MS in mechanical engineering in 1989, before joining the faculty as a researcher assistant in 1991. His research activity has been entirely focused on internal combustion engines, in particular on the analysis and on the diagnostic of the combustion process, on the use of alternative fuels, on pollutant emissions control in SI and diesel engines, on engine modelling and on the development of engine control strategies for conventional as well as for hybrid powertrains. He has been principal investigator for several research projects with major OEMs such as General Motors, FCA, Honda and Ferrari. He has published over 150 articles based off his research activity, most

WEDNESDAY, OCTOBER 13, 2021

04-01 Controls I
10/13/2021
10:30 AM to 11:30 AM - Room 3

Session Chair: ***Vittorio Ravaglioli - University of Bologna - DIN***
Co-Session Chair: ***Stani Bohac - Light-Duty Vehicles and Small Engines Center***

Modeling and Control of a Hybrid Opposed Piston Engine
Technical Paper Publication - ICEF2021-67541
Joseph Drallmeier - University of Michigan
Jason Siegel - University of Michigan
Robert Middleton - University of Michigan
Anna Stefanopoulou - University of Michigan
Ashwin Salvi - Achates Power Inc.
Ming Huo - Achates Power Inc.

Control-Oriented Model of the Mean and Dispersion of Diesel Combustion Phasing With Ignition Assist
Technical Paper Publication - ICEF2021-66616
Omar Ahmed - University of Michigan
Robert Middleton - University of Michigan
Anna Stefanopoulou - University of Michigan
Kenneth Kim - U.S. Army DEVCOM Army Research Laboratory
Chol-Bum Kweon - U.S. Army DEVCOM Army Research Laboratory

Ammonia Slip Estimation Based on ASC Control-Oriented Modelling And OBD NOx Sensor Cross-Sensitivity Analysis
Technical Paper Publication - ICEF2021-67710
Pedro Piqueras - Universitat Politècnica de València
Benjamín Pla - Universitat Politècnica de València
Enrique José Sanchis - Universitat Politècnica de València
André Aronis - Universitat Politècnica de València

02-02 Spark Ignition II (Alternative Fuels)
10/13/2021
10:30 AM to 11:30 AM - Room 2

Session Chair: ***Francis Haas- Rowan University***

Investigations of Low-Temperature Heat Release and Negative Temperature Coefficient Regions of Iso-Paraffinic Kerosene in a Constant Volume Combustion Chamber
Technical Paper Publication - ICEF2021-68203
Valentin Soloiu - Georgia Southern University
Richard C. Smith - Georgia Southern University
Amanda Weaver - Georgia Southern University
Drake Grall - Georgia Southern University
Cesar Carapia - Georgia Southern University
Lily Parker - Georgia Southern University

Marcel Ilie - Georgia Southern University
Mosfequr Rahman - Georgia Southern University
Gustavo Molina - Georgia Southern University

Environment and Economic Assessment of CNG and Gasoline Engines: An Experimental Analysis
Technical Paper Publication - ICEF2021-66772
Sridhar Sahoo - Indian Institute of Technology Kharagpur
Dhananjay Kumar Srivastava - Indian Institute of Technology Kharagpur

Experimental Investigation of a Simulated Byproduct Fuel Mixture From the Cl-ODH Process in a Spark-Ignition Engine
Technical Paper Publication - ICEF2021-67547
Matthew Gore - North Carolina State University
Kaushik Nonavinakere Vinod - North Carolina State University
Tiegang Fang - North Carolina State University

01-02 Large Bore Engines II
10/13/2021
10:30 AM to 11:30 AM - Room 1

Session Chair: ***Christopher Stoos - University of Texas at San Antonio***

Analysis on Combined Heat and Power Hybrid Systems for Unconventional Drilling Operations
Technical Paper Publication - ICEF2021-67492
Diego Dranuta Ferrer - West Virginia University
Derek Johnson - West Virginia University

A Fundamental Thermodynamic Investigation of Compression Ratio Effects in Relation to Diesel Engine Size
Technical Paper Publication - ICEF2021-67511
Kevin Burnett - University of Maryland
Ashwani Gupta - University of Maryland
Dianne Luning Prak - US Naval Academy
Jim Cowart - US Naval Academy

06-01 Ignition Modeling
10/13/2021
12:30 PM to 1:30 PM - Room 2

Session Chair: ***Anqi Zhang - Aramco Services Company: Aramco Research Center - Detroit***

High-Fidelity Energy Deposition Ignition Model Coupled With Flame Propagation Models at Engine-Like Flow Conditions
Technical Paper Publication - ICEF2021-67598
Samuel Kazmouz - Argonne National Laboratory
Riccardo Scarcelli - Argonne National Laboratory
Joohan Kim - Argonne National Laboratory

Zhen Cheng - Convergent Science, Inc.
Shuaishuai Liu - Convergent Science Inc.
Meizhong Dai - Convergent Science Inc.
Eric Pomraning - Convergent Science Inc.
Peter Senecal - Convergent Science Inc.
Seong-Young Lee - Michigan Technological University

CFD Modeling of Low Temperature Ignition Processes From a Nanosecond Pulsed Discharge at Quiescent Conditions
Technical Paper Publication - ICEF2021-67902
Vyaas Gururajan - Argonne National Laboratory
Riccardo Scarcelli - Argonne National Laboratory
Sayan Biswas - University of Minnesota
Isaac Ekoto - Sandia National Laborarory

Multiphysics Modeling of Spark Discharges in High Crossflow Ignition Environments
Technical Paper Publication - ICEF2021-68226
Vivek Subramaniam - Esgee Technologies Inc.
Anand Karpatne - Esgee Technologies Inc.
Naveen Raj - Esgee Technologies Inc.
Douglas Breden - Esgee Technologies Inc.
Laxminarayan Raja - The University of Texas at Austin

02-03 Compression Ignition I
10/13/2021
12:30 PM to 1:30 PM - Room 1

Session Chair: ***Hailin Li - West Virginia University***

Primary & Secondary Reference Fuel Effects as a Function of Compression Ratio in a Cfr Diesel Engine
Technical Paper Publication - ICEF2021-67395
Kevin Burnett - University of Maryland
Ashwani Gupta - University of Maryland
Dianne Luning Prak - Naval Academy
Jim Cowart - Naval Academy

A Numerical and Experimental Study of Soot Precursor and Primary Particle Size of N-Butylbenzene in Laminar Flame
Technical Paper Publication - ICEF2021-67749
Mingshan Sun - Beihang University
Zhiwen Gan - Beihang University

Evaluating Diesel/Biofuel Blends Using Artificial Neural Networks and Linear/Nonlinear Equations
Technical Paper Publication - ICEF2021-67785
Travis Kessler - University of Massachusetts Lowell
Thomas Schwartz - University of Maine
Hsi-Wu Wong - University of Massachusetts Lowell
John Mack - University of Massachusetts Lowell

04-03 Emissions I
10/13/2021
12:30 PM to 1:30 PM - Room 3

Session Chair: ***Richard Burke - University of Bath***
Session Co- Chair: ***Stani Bohac - Light-Duty Vehicles and Small Engines Center***

Development of a Low-Cost Exhaust H2 Measurement Method for In-Use Vehicles
Technical Paper Publication - ICEF2021-67633
Mark Guan - University of British Columbia
Patrick Steiche - Hydra Energy Coporation
Patrick Kirchen - University of British Columbia
Steven Rogak - University of British Columbia

Hydrocarbon Species Impact on NO to NO2 Conversion in a Compression Ignition Engine Under Low Temperature Combustion Conditions,
Technical Paper Publication - ICEF2021-67741
Nupur Gupta - University of Windsor
Xiao Yu - University of Windsor
Simon Leblanc - University of Windsor
Nick Eaves - University of Windsor
Ming Zheng - University of Windsor

Hardware-in-the-Loop Investigation of Emissions Challenges in Hybrid Medium- and Heavy-Duty Powertrains Using a Pre-Production Diesel-Electric Parallel Hybrid System With and Without Stop-Start Operation
Technical Paper Publication - ICEF2021-68317
Chloe Lerin - oak ridge national laboratory
Melanie Moses-Debusk - Oak Ridge National Laboratory
Scott Curran - Oak Ridge National Laboratory
Adian Cook - Oak Ridge National Laboratory
Vicente Boronat Colomer - Oak Ridge National Laboratory
Brian Kaul - Oak Ridge National Laboratory
Dean Deter - Oak Ridge National Laboratory

04-04 Emissions II
10/13/2021
1:35 PM to 2:35 PM - Room 3

Session Chair: ***Richard Burke - University of Bath***
Session Co-Chair: ***Jose Ramon Serrano- Motores Termicos Universitat Politecnica de Valencia***

On Blow-by Aerosol Sources in a Single-Cylinder Crankcase Environment
Technical Paper Publication - ICEF2021-70947
Niclas Nowak - UT99 AG
Kai Scheiber - Institute of Internal Combustion Engines
Jürgen Pfeil - Institute of Internal Combustion Engines
Christian Stieler - UT99 AG

Marc-Tran Heller - UT99 AG
Thomas Koch - Institute of Internal Combustion Engines
Gerhard Kasper - Institute of Mechanical Process Engineering and Mechanics

Characterization of a Lightly Loaded Underfloor Catalyzed Gasoline Particulate Filter in a Turbocharged Light Duty Truck
Technical Paper Publication - ICEF2021-67794
Stanislav Bohac - U.S. Environmental Protection Agency
Scott Ludlam - U.S. Environmental Protection Agency

Effect of Butanol on the Performance of DeNOx Aftertreatment Systems of a Diesel Vehicle Under WLTC Driving Conditions
Technical Paper Publication - ICEF2021-67337
Alejandro Calle-Asensio - Universidad de Castilla-La Mancha
Juan José Hernández - Universidad de Castilla-La Mancha
José Rodríguez-Fernández - Universidad de Castilla-La Mancha
Victor Domínguez-Pérez - Universidad de Castilla-La Mancha

06-05 Advanced Combustion Engine Modeling
10/13/2021
1:35 PM to 2:35 PM - Room 2

Session Chair: ***Haiwen Ge - Texas Tech University***

A Numerical Study on the Effects of Egr Dilution in a Pre-Chamber Ignited Natural Gas Engine
Technical Paper Publication - ICEF2021-67836
Prasanna Chinnathambi - Argonne National Lab
Joohan Kim - Argonne National Laboratory
Riccardo Scarcelli - Argonne National Lab
Sibendu Som - Argonne National Lab
Ashish Shah - Argonne National Lab
Munidhar S Biruduganti - Argonne National Lab
Douglas E Longman - Argonne National Lab

The Interaction Between the Pilot Diesel and Main NG Injection in an HPDI Engine
Technical Paper Publication - ICEF2021-74466
Xander Seykens - TU/e
Nick Diepstraten - TU/e
Bart Somers - Eindhoven University of Technology

Cfd Modeling of Pre-Spark Heat Release in a Boosted Disi Engine
Technical Presentation Only - ICEF2021-76576
Hengjie Guo - Argonne National Laboratory
Roberto Torelli - Argonne National Laboratory
James Szybist - Oak Ridge National Laboratory
Sibendu Som - Argonne National Laboratory

06-06 Machine Learning
10/13/2021
1:35 PM to 2:35 PM - Room 1

Session Chair: ***Pinaki Pal - Argonne National Laboratory***

Data-Driven Approaches to Learn HyChem Models
Technical Paper Publication - ICEF2021-67925
Weiqi Ji - Massachusetts Institute of Technology
Julian Zanders - Massachusetts Institute of Technology
Ji-Woong Park - Argonne National Laboratory
Sili Deng - Massachusetts Institute of Technology

Efficient Optimization of Fuel Formulation Using Adaptive Learning and Artificial Intelligence
Technical Presentation Only - ICEF2021-76121
Juliane Mueller - Lawrence Berkeley National Lab
Matthew Mcnenly - Lawrence Livermore National Laboratory
Namho Kim - Sandia National Laboratories
Simon Lapointe - Lawrence Livermore National Laboratory
Magnus Sjoberg - Sandia National Laboratories
Russell Whitesides - Lawrence Livermore National Laboratory

An Active Machine Learning Algorithm (Activo) for Accelerating Simulation-Driven Engine Design Optimization
Technical Presentation Only - ICEF2021-76148
Opeoluwa Owoyele - Argonne National Laboratory
Pinaki Pal - Argonne National Laboratory

01-01 Large Bore Engines I
10/13/2021
4:15 PM to 4:55 PM - Room 1

Session Chair: ***Munidhar S Biruduganti - Argonne National Laboratory***

Optimization of a Marine Medium-Speed Engine With Multi–injector System by 1d Predictive Simulation
Technical Paper Publication - ICEF2021-67715
Dai Liu - Harbin Engineering University
Peng Zhang - Harbin Engineering University
Long Liu - Harbin Engineering University
Qian Xia - China Shipbuilding Power Engineering Institute Co., Ltd.
Xiuzhen Ma - Harbin Engineering University

A Numerical Investigation on Mixing Characteristics of Natural Gas Jets With High-Pressure Injection
Technical Paper Publication - ICEF2021-67717
Long Liu - Harbin Engineering University
Tianyang Dai - Harbin Engineering University
Qian Xiong - Harbin Engineering University
Yuehua Qian - China Shipbuilding Power Engineering Institute Co., Ltd.
Bo Liu - China Shipbuilding Power Engineering Institute Co., Ltd.

02-01 Spark Ignition I
10/13/2021
4:15 PM to 4:55 PM - Room 2

Session Chair: ***Gregory Bogin - Colorado School of Mines***

Analysis of Premixed Laminar Combustion of Methane With Noble Gases as a Working Fluid
Technical Paper Publication - ICEF2021-67516
Mammadbaghir Baghirzade - University of Massachusetts Lowell
Md Nayer Nasim - University of Massachusetts Lowell
Behlol Nawaz - University of Massachusetts Lowell
Jonathan Aguilar - University of Massachusetts Lowell
Martia Shahsavan - University of Massachusetts Lowell
Mohammadrasool Morovatiyan - University of Massachusetts Lowell
John Hunter Mack - University of Massachusetts Lowell

Demonstration of the Benefits of SAE 30 Stationary Gas Engine Oil in Full Scale Engine Tests
Technical Paper Publication - ICEF2021-67780
Thijs Schasfoort - HollyFrontier Lubricants & Specialties
Zoe Fard - HollyFrontier Lubricants & Specialties
Torsten Gehrmann - MAN Truck & Bus SE (Stationary Gas Engines)
Steffen Hollatz - MAN Truck & Bus SE

03-02 Combustion Diagnostics
10/13/2021
4:15 PM to 4:55 PM - Room 3

Session Chair: ***Isaac Ekoto - Sandia National Laboratories***
Session Co-Chair: ***Brian Fisher - Naval Research Laboratory***

Application of Conditional Space-Time Proper Orthogonal Decomposition to Engine In-Cylinder Flow Analysis
Technical Paper Publication - ICEF2021-66274
Rui Gao - Shanghai Jiao Tong University
Kwee-Yan Teh - Shanghai Jiao Tong University
Fengnian Zhao - Shanghai Jiao Tong University
Mengqi Liu - Shanghai Jiao Tong University
David Hung - Shanghai Jiao Tong University

Optical and Numerical Investigations of Flame Propagation in a Heavy-Duty Spark Ignited Natural Gas Engine
Technical Paper Publication - ICEF2021-67489
Jinlong Liu - West Virginia University
Christopher Ulishney - West Virginia University
Cosmin Dumitrescu - West Virginia University

THURSDAY, OCTOBER 14, 2021

07-01 Exhaust System Analysis
10/14/2021
10:30 AM to 11:30 AM - Room 2

Session Chair: ***Kevin Anderson - Calif State Polytechnic University***
Session Co- Chair: ***Dan Richardson, Ph.D. - Cummins Inc.***

Development of Simplified Analysis Process for Multidisciplinary Design Optimization (MDO) of Exhaust Manifold During Concept Stage,
Technical Paper Publication - ICEF2021-67757
Nilesh Ghodke - Cummins Technical Center India
Prashant Pimpalkar - Cummins Technical Center India
Joshua Miller - Cummins Technical Center
Bhaskarjyoti Saikia - Cummins Technical Center India
Brandon Meyer - Cummins Technical Center
Girish Kulkarni - Cummins Technical Center India
Sanjay Deshpande - Cummins Technical Center India

On-Engine Expansion Measurement of Exhaust Manifold for Calibrating Thermo-Mechanical Fatigue FEA Model
Technical Paper Publication - ICEF2021-67640
Girish Kulkarni - Cummins Technologies India Pvt Ltd
Pravin Kakde - Cummins Technologies India Pvt Ltd
Kapil Mestry - Cummins Technologies India Pvt Ltd
Vinod Parekar - Cummins Technologies India Pvt Ltd
Sandeep Bhosale - Cummins Technologies India Pvt Ltd

Prediction of Exhaust System Vibration Through Harmonic Analysis & High Cycle Fatigue Life Evaluation
Technical Paper Publication - ICEF2021-67753
Bhaskarjyoti Saikia - Cummins Technical Center India
Girish Kulkarni - Cummins Technical Center India
Hrushikesh Sathe - Cummins Technical Center India
Pravin Kakde - Cummins Technical Center India
Yiran Li - Cummins Inc.
Tanmay Vyas - Cummins Technical Center India

05-02 Diesel Sprays
10/14/2021
10:30 AM to 11:30 AM - Room 1

Session Chair: ***Tiegang Fang - North Carolina State University***

A Comparison of Injection, Spray, and Combustion Characteristics for Non-Eroded and Eroded Multi-Hole Fuel Injectors
Technical Paper Publication - ICEF2021-67775
Gina M. Magnotti - Argonne National Laboratory
A. Cody Nunno - Argonne National Laboratory
Prithwish Kundu - Argonne National Laboratory
Aniket Tekawade - Argonne National Laboratory
Brandon A. Sforzo - Argonne National Laboratory
Alan L. Kastengren - Argonne National Laboratory
Christopher F. Powell - Argonne National Laboratory
Sibendu Som - Argonne National Laboratory

Impact of Fuel Injection Pressure on Spray and Combustion Characteristics of Ome and Diesel Fuel Blends
Technical Paper Publication - ICEF2021-67831
Simon Leblanc - University of Windsor
Xiao Yu - University of Windsor
Gared Pisciotto - University of Windsor

Xiaoye Han - University of Windsor
Jimi Tjong - University of Windsor
Ming Zheng - University of Windsor

Measurement of Air-Fuel Mixing in a Diesel Spray at Engine Relevant Conditions Using Uv-Vis Dbi Diagnostic
Technical Paper Publication - ICEF2021-68205
Conner Godbold - Georgia Institute of Technology
Farzad Poursadegh - University of Melbourne
Oleksandr Bibik - Georgia Institute of Technology
Caroline Genzale - Georgia Institute of Technology

06-02 High Fidelity LES/DNS Modeling
10/14/2021
10:30 AM to 11:30 AM - Room 3

Session Chair: ***Noah Van Dam - University of Massachusetts Lowell***

Investigating the Origins of Cyclic Variability in Internal Combustion Engines Using Wall-Resolved Large Eddy Simulations
Technical Paper Publication - ICEF2021-67671
Sicong Wu - Argonne National Laboratory
Saumil Patel - Argonne National Laboratory
Muhsin Ameen - Argonne National Laboratory

Direct Numerical Simulation of Partial Fuel Stratification Assisted Lean Premixed Combustion for Assessment of Hybrid G-Equation/well-Stirred Reactor Model
Technical Paper Publication - ICEF2021-67835
Chao Xu - Argonne National Laboratory
Muhsin Ameen - Argonne National Laboratory
Pinaki Pal - Argonne National Laboratory
Sibendu Som - Argonne National Laboratory

Large Eddy Simulation of Gasoline Sprays in a Lagrangian-Eulerian Framework Using the High-Order Spectral Element Method
Technical Paper Publication - ICEF2021-67848
Juan Diego Colmenares Fernandez - Argonne National Laboratory
Muhsin M Ameen - Argonne National Laboratory
Samil S Patel - Argonne National Laboratory

05-01 Modeling Fuel Injection and Sprays
10/14/2021
11:35 AM to 12:35 PM - Room 1

Session Chair: ***Tiegang Fang - North Carolina State University***

LES Study on Spray Combustion With Renewable Fuels Under ECN Spray-A Conditions
Technical Paper Publication - ICEF2021-67745
Daniel Mira - Barcelona Supercomputing Center (BSC-CNS)

Eduardo J. Perez-Sanchez - Barcelona Supercomputing Center (BSC-CNS)
Anurag Surapaneni - Barcelona Supercomputing Center (BSC-CNS)
Jesus Benajes - Universitat Politecnica de Valencia
Jose M Garcia-Oliver - Universitat Politecnica de Valencia
Jose M Pastor - Universitat Politecnica de Valencia
Daiana De-Leon-Ceriani - Universitat Politecnica de Valencia

Machine Learning-Enabled Prediction of Transient Injection Map In Automotive Injectors With Uncertainty Quantification
Technical Paper Publication - ICEF2021-67888
Sudeepta Mondal - Argonne National Laboratory
Gina Magnotti - Argonne National Laboratory
Bethany Lusch - Argonne National Laboratory
Romit Maulik - Argonne National Laboratory
Roberto Torelli - Argonne National laboratory

Towards Modeling Cavitation and Erosion for a Multi-Component Alternative Diesel Fuel
Technical Presentation Only - ICEF2021-67549
Sampath K. Rachakonda - Argonne National Laboratory
Gina M. Magnotti - Argonne National Laboratory

06-04 System Level Modeling
10/14/2021
11:35 AM to 12:35 PM - Room 3

Session Chair: ***Yu Zhang - Aramco Research Center – Detroit***

Injection Rate Shape Design of Gasoline-Like Fuels Using 1-D Hydraulic Models Operating at High Pressures
Technical Presentation Only - ICEF2021-76244
Tom Tzanetakis - Aramco Americas: Aramco Research Center - Detroit
Atharva T. Desai - Michigan Technological University
Michael Traver - Aramco Americas: Aramco Research Center - Detroit
Jeffrey D. Naber - Michigan Technological University

System Level Modeling Approach for Evaluation of Hybrid, Electric and Fuel Cell Powertrain Solutions in Medium Heavy-Duty Vehicles
Technical Presentation Only - ICEF2021-76233
Satyum Joshi - FEV North America, Inc.
Mufaddel Dahodwala - FEV North America, Inc.
Nitisha Ahuja - FEV North America, Inc.
Fnu Dhanraj - FEV North America, Inc.
Erik Koehler - FEV North America, Inc.
Michael Franke - FEV North America, Inc.
Dean Tomazic - FEV North America, Inc.

A Numerical Investigation of Combining E-Compressor & Variable Valve Strategies Investigation for High Load Operation in a Heavy-Duty Gasoline Compression Ignition Engine
Technical Presentation Only - ICEF2021-76776
Praveen Kumar - Aramco Americas
Yu Zhang - Aramco Americas
Michael Traver - Aramco Americas
John Watson - BorgWarner ETTS

07-03 Overhead Dynamics
10/14/2021
11:35 AM to 12:35 PM - Room 2

Session Chair: ***David Rutledge - Cummins Inc.***
Session Co-Chair: ***Dan Richardson, Ph.D. - Cummins Inc.***

Investigation of Valvetrain Dynamics Using Transient Dynamic Simulation in Ansys
Technical Paper Publication - ICEF2021-67755
Ashish Koli - Cummins Technology India Limited
Nikhil Rao - Cummins Technology India Limited
Vinod Parekar - Cummins Technology India Limited

Machine Learning Based Numerical Approach for Valve Seating Velocity Control in an Electromagnetic Camless System
Technical Paper Publication - ICEF2021-67594
Srinibas Tripathy - Indian Institute of Technology Madras
Mithun Babu M - Indian Institute of Technology Madras
Kanupriya M - ANNA University
Mayank Mittal - Indian Institute of Technology Madras

Analysis-Led Design of Valve Lift Profiles for High-Efficiency Dual-Fuel Combustion in a Heavy-Duty Single-Cylinder Engine
Technical Presentation Only - ICEF2021-76554
Deivanayagam Hariharan - The University of Alabama
Kalyan Kumar Srinivasan - The University of Alabama
Sundar Rajan Krishnan - The University of Alabama

02-04: Compression Ignition II (Alternative Fuels)
10/14/2021
1:40 PM to 2:20 PM - Room 1

Session Chair: ***Valentin Soloiu - Georgia Southern University***

Potentiality of Yellow Oleander (Thevetia Peruviana) Seed Oil as an Alternative Diesel Fuel in Compression Ignition Engines
Technical Paper Publication - ICEF2021-67419

Jyotirmoy Kakati - Indian Institute of Technology Guwahati
Tapan K. Gogoi - Tezpur University
Sukhomay Pal - Indian Institute of Technology Guwahati
Ujjwal K. Saha - Indian Institute of Technology Guwahati

An Experimental Study on a Dual-Fuel Generator Fueled With Diesel and Simulated Biogas
Technical Paper Publication - ICEF2021-67429
Shouvik Dev - National Research Council Canada
David Stevenson - National Research Council Canada
Hongsheng Guo - National Research Council Canada
Amin Yousefi - National Research Council Canada
James Butler - National Research Council Canada

04-02 Controls II
10/14/2021
1:40 PM to 2:20 PM - Room 2

Session Chair: ***Vittorio Ravaglioli - University of Bologna - DIN***

Boosting the Capabilities of Gas Stand Data Acquisition and Control Systems by Using a Digital Twin Based on a Holistic Turbocharger Model
Technical Paper Publication - ICEF2021-66745
Jose Ramon Serrano - CMT - Motores Termicos Universitat Politecnica de Valencia
Luis Miguel Garcia-Cuevas - CMT - Motores Termicos. Universitat Politecnica de Valencia
Vishnu Samala - CMT - Motores Termicos. Universitat Politecnica de Valencia
Juan Antonio López - CMT - Motores Termicos. Universitat Politecnica de Valencia
Holger Mai - KRATZER AUTOMATION AG

Next-Cycle Dilute Combustion Control Using Online Machine Learning
Technical Presentation Only - ICEF2021-76343
Bryan Maldonado - Oak Ridge National Laboratory
Brian Kaul - Oak Ridge National Laboratory
Catherine Schuman - Oak Ridge National Laboratory
Steven Young - Oak Ridge National Laboratory
Parker Mitchell - Oak Ridge National Laboratory

07-04 Variable Compression Ratio Startup and Oxy-Fuel Combustion
10/14/2021
1:40 PM to 2:20 PM - Room 3

Session Chair: ***Ambikapathy Naganathan – Cummins***
Session Chair: ***Dan Richardson, Ph.D. - Cummins Inc.***

Demonstration a Variable Compression Ratio Startup Strategy to Reduce Cold Start Misfiring With Hydrous Bioethanol
Technical Presentation Only - ICEF2021-67727
Sam Cockerill - Libertine FPE Ltd

Adapting an Internal Combustion Engine to Oxy-Fuel Combustion With In-Situ Oxygen Production
Technical Paper Publication - ICEF2021-67707
Francisco José Arnau - CMT - Motores Termicos. Universitat Politecnica de Valencia
Ricardo Novella - CMT - Motores Térmicos. Universitat Politecnica de Valencia
Luis Miguel Garcia-Cuevas - CMT - Motores Termicos. Universitat Politecnica De Valencia
Fabio Alberto Gutierrez - CMT - Motores Termicos. Universitat Politecnica de Valencia

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05-03 Gasoline Sprays
10/14/2021
2:30 PM to 3:10 PM - Room

Session Chair: ***Joshua Bittle - University of Alabama***

Comparison of Spray Formation of a Multi and a Single Hole Gasoline Direct Injector

Technical Paper Publication - ICEF2021-67827
Malki Maliha - KIT IFKM
Heiko Kubach - KIT IFKM
Thomas Koch - KIT IFKM

Influence of Elevated Fuel Temperatures on the Spray Characteristics of Gasoline - Ethanol Blends
Technical Paper Publication - ICEF2021-68309
Niranjan Miganakallu - Michigan Technological University
Ashwin Karthik Purushothaman - Michigan Technological University
William Atkinson - Michigan Technological University
Nathan Peters - MAHLE Powertrain LLC
Tadeu Miguel Malago Amaral - MAHLE Metal Leve S.A
Antonio Galdino Leite - MAHLE Metal Leve S.A.
Fernando Jun Yoshino - MAHLE Metal Leve S.A
Mike Bunce - MAHLE Powertrain LLC
Youngchul Ra - Michigan Technological University
Jeffrey Naber - Michigan Technological University

07-02 Damper Assessment and Bearing Friction
10/14/2021
2:30 PM to 3:10 PM - Room 1

Session Chair: ***Amit Gabale - Cummins Inc***
Session Chair: ***Dan Richardson, Ph.D. - Cummins Inc.***

Compression Rubber Damper Assessment Through Simulation
Technical Paper Publication - ICEF2021-67750
Mayur Biyani - Cummins Technical Center India
Jugal Mittal - Cummins Technical Center India
Pranay Sharma - Cummins Technical Center India
Vinod Parekar - Cummins Technical Center India

Experimental Investigation of the Influence of Engine Operating and Lubricant Oil Parameters on Sliding Bearing and Friction Behavior in a Heavy-Duty Diesel Engine
Technical Paper Publication - ICEF2021-66874
Matheus Marques Da Silva - Graz University of Technology, Institute of Internal Combustion Engines and Thermodynamics
Constantin Kiesling - LEC GmbH
Christof Gumhold - LEC GmbH
Sven Warter - LEC GmbH
Andreas Wimmer - Graz University of Technology, Institute of Internal Combustion Engines and Thermodynamics
Stefan Schallmeiner - Miba Gleitlager Austria GmbH
Gunther Hager - Miba Gleitlager Austria GmbH

03-01 Novel Combustion and Emission Control Concepts
10/14/2021
4:50 PM to 6:05 PM - Room 1

Session Chair: ***Hongsheng Guo - National Research Council***
Session Chair: ***Siddhartha Banerjee - Private***

Numerical Investigation of the Impact of Spray – Bowl Interaction on Thermal Efficiency of a Gasoline Compression Ignition Engine
Technical Paper Publication - ICEF2021-67851
Srinivasa Krishna Addepalli - Argonne National Laboratory
Michael Pamminger - Illinois Institute of Technology
Riccardo Scarcelli - Argonne National Laboratory
Thomas Wallner - Argonne National Laboratory

Ignition Stability Improvement and Emission Reduction via Multiple Ignition Sites Strategy Under Cold Start and Transient Conditions
Technical Paper Publication - ICEF2021-67909
Xiaoxi Zhang - University of Windsor
Xiao Yu - University of Windsor
Simon Leblanc - University of Windsor
Ming Zheng - University of Windsor
Jimi Tjong - University of Windsor

Achieving Near Zero Criteria Emissions in Heavy Duty Diesel Engines
Technical Presentation Only - ICEF2021-66596
Laurence Fromm - Achates Power

Cfd-Guided Evaluation of Spark-Assisted Gasoline Compression Ignition for Cold Idle Operation
Technical Presentation Only - ICEF2021-67810
LE ZHAO - Argonne National Laboratory
Yu Zhang - Aramco Americas
Yuanjiang Pei - Aramco Americas
Anqi Zhang - Aramco Americas
Michael Traver - Aramco Americas
Muhsin Ameen - Argonne National Laboratory

03-03 Dual Fuel Combustion
10/14/2021
4:50 PM to 6:05 PM - Room 2

Session Chair: ***Marcis Jansons - Wayne State***
Session Co-Chair: ***Deivanayagam Hariharan - Stony Brook University***
Session Co- Chair: ***Giacomo Belgiorno - PUNCH Torino***

Experimental Investigation of Effects of Split Diesel-Pilot Injection on Emissions From Ammonia-Diesel Dual Fuel Engine
Technical Paper Publication - ICEF2021-66341
Yoichi Niki - National Institute of Maritime, Port and Aviation Technology, National Maritime Research Institute

Strategies to Reduce Hydrocarbon and Carbon Monoxide Emissions in Dual Fuel Engines
Technical Presentation Only - ICEF2021-76498
Prabhat Jha - The University of Oklahoma
Kalyan Srinivasan - The university of Oklahoma
Sundar Krishnan - The university of Alabma

Strategies to Reduce Methane Slip in Natural Gas Diesel Dual Fuel Marine and Power Generation Engines
Technical Presentation Only - ICEF2021-76564
Greg Hampson - Woodward
Domenico Chiera - Woodward, Inc
Nolan Polley - Woodward, Inc
James Wood - Woodward, Inc
Michael Buehner - Woodward, Inc

A Statistical Analysis and Modeling of Cyclic Combustion Variations in Dual Fuel Low Temperature Combustion
Technical Presentation Only - ICEF2021-76595
Sundar Rajan Krishnan - The University of Alabama
Nandagopalan Anandaraman - The University of Alabama
Deivanayagam Hariharan - The University of Alabama
Kalyan Kumar Srinivasan - The University of Alabama

06-03 Reduced Order Modeling
10/14/2021
4:50 PM to 6:05 PM - Room 3

Session Chair: ***Yu Zhang - Aramco Research Center - Detroit***
Session Co- Chair: ***Emma Zhao-Argonne National Laboratory***

Simulation of Turbulent Combustion in Gasoline Direct Injection Spark-Ignited Engines Using a Stochastic Reactor Model
Technical Paper Publication - ICEF2021-66622
Brady Wilmer - University of Minnesota
William Northrop - University of Minnesota

Transient Thermo-Mechanical Stress Analysis of Hot Surface Probe Using Sequentially Coupled CFD-FEA Approach
Technical Paper Publication - ICEF2021-67858
Sang-Guk Kang - U.S. Army Research Laboratory
Je Ir Ryu - U.S. Army Research Lab.
Austen Motily - University of Illinois at Urbana-Champaign
Prapassorn Numkiatsakul - University of Illinois at Urbana-Champaign
Tonghun Lee - University of Illinois at Urbana-Champaign
Waltraud Kriven - University of Illinois at Urbana-Champaign
Kenneth Kim - U.S. Army Research Laboratory
Chol-Bum Kweon - U.S. Army Research Laboratory

Estimation of Wiebe Function Parameters for Syngas and Anode Off-Gas Combustion in Spark-Ignition Engines
Technical Paper Publication - ICEF2021-67863
Ruinan Yang - Stony Brook University
Zhongnan Ran - Stony Brook University
Dimitris Assanis - Stony Brook University

Quasi-Dimensional Si Combustion Model and Its Application in Engine Development
Technical Presentation Only - ICEF2021-76506
Hanjun Xu - GAC Automotive Research & Development Center
Jian Wu - GAC Automotive Research & Development Center
Jingsi Wei - GAC Automotive Research & Development Center

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