



ASME ICEF 2023



The ICE Forward Conference
ASME Internal Combustion Engine Division

Program

CONFERENCE
October 8-11, 2023

Pittsburgh Marriott City Center,
Pittsburgh, Pennsylvania, USA

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

Welcome from the Conference Chairs

Welcome to the ASME ICE Forward 2023 Conference. After an exceptional ASME ICE Forward 2022 conference at which we celebrated the 100th year anniversary of the ASME Internal Combustion Engine Division (ICED), we are excited to build on that momentum with the ASME ICE Forward 2023 conference. The ICED executive committee, along with ASME staff, have worked diligently to put together what promises to be an engaging and exciting event. The ASME ICE Forward 2023 conference will begin with our traditional welcome reception, featuring a poster session along with networking opportunities, on Sunday, October 8. Two keynote lectures are scheduled for Monday, October 9. On Monday morning (8 am), Mr. James Gamble of Wabtec will present his keynote lecture on the role of the ICE in decarbonizing freight rail while on Monday afternoon (1:10 pm), Mr. Mike Rochford of Caterpillar will talk about preparing for a decarbonized future. On Tuesday morning (8 am), Emeritus Prof. Dave Foster of University of Wisconsin-Madison will present the 2nd ASME ICE Division Distinguished Invited Lecture. The traditional Tuesday luncheon lecture will be presented by Dr. Carlo Bussi of Ferrari, who will discuss the evolution of ICE technology in Formula One Racing. A special panel session focused on the opportunities and challenges with hydrogen ICEs is scheduled for Tuesday at 3:10 pm. Also, technical presentations are scheduled throughout Monday and Tuesday. The annual Honors and Awards Banquet will be held on Monday evening. The 2023 ICE Division Undergraduate Student Research Competition winners will present their research on Monday during lunch while the 4th Annual Early Career Networking Breakfast will provide networking opportunities for early career researchers on Tuesday morning. Finally, conference attendees may also participate in technical tour(s) organized by our local host, Wabtec, on Wednesday morning (advance registration required).

The ICE Forward conference has historically been a collegial forum for participants to discuss current and future trends, and to exchange information related to the science and engineering of internal combustion engines. This event is tailored to provide opportunities for experts and early-career researchers alike from industry, academia, and governmental agencies worldwide to share the latest technological developments and to network with peers and future collaborators. The conference program is distributed into seven technical tracks with multiple concurrent sessions, spread over two days. The technical tracks cover a wide range of topics: (1) Off-Road Systems; (2) Fuels and Carbon Management; (3) Advanced Combustion; (4) Powertrains and Hybridization; (5) Emissions Control (CLEERS* at ICE Forward); (6) Modeling and Simulation; and (7) Design, Lubrication, and Thermal Management. We are excited to note that, starting from ASME ICE Forward 2023, a new technical track (Track 5) has been formed with emissions control as the primary focus. This track features technical papers and presentations from the CLEERS (Cross-Cut Lean Exhaust Emissions Reductions Simulations) research community, along with those of other emissions control researchers.

As always, we are grateful to the volunteers of the ASME ICE Forward conference who ensure the conference's high technical standards and engaging program. This conference is made possible by the collaborative efforts of our track and session chairs and organizers, technical reviewers, authors, attendees, and sponsors. We are thankful to all the speakers for participating and sharing their expertise and knowledge with the ICE community.

We are convinced that the internal combustion engine will have a strong, continuing presence as part of the future global energy and transportation portfolio. With increasing focus on higher efficiencies, cleaner fuels, hybridization, and advanced aftertreatment technologies for both on-road and off-road engines, it is evident that the ICE is indeed moving forward.

We hope to see you as an author, speaker, sponsor, or attendee at the ASME ICE Forward 2023 conference, which will be singularly focused on moving the ICE forward!



A handwritten signature in blue ink that reads "Sundar Rajan Krishnan".

Sundar Rajan Krishnan
Conference Chair

Professor of Mechanical Engineering, The University of Alabama



A handwritten signature in black ink that reads "Dustin T. Osborne".

Dustin Osborne
Conference Co-Chair

Principal Engineer, Southwest Research Institute

ASME ICE Division Executive Committee



Sibendu Som, Ph.D.
*Director - Advanced Propulsion and Power
Department
Argonne National Laboratory
Division Chair*



Thomas Lavertu, Ph.D.
*Senior Engineer – Advanced Engine Technologies
Wabtec
Secretary*



Kelly Senecal, Ph.D.
*Owner & Vice President, Convergent Science
Vice Chair & Sponsorship Program Chair*



Kalyan Srinivasan, Ph.D.
*Professor, The University of Alabama
Treasurer*



Sundar Rajan Krishnan, Ph.D.
*Professor, The University of Alabama
Conference Chair*



Will Northrop, Ph.D.
*Professor, University of Minnesota
Past Chair*



Dustin Osborne
*Principal Engineer, Southwest Research Institute
Conference Co-Chair*



Ronald O. Grover, Jr., Ph.D.
*Staff Researcher, General Motors
Industry Advisor*



Scott Curran, Ph.D.
*Group Leader for Fuel Science & Engine
Technologies Research
Oak Ridge National Laboratory
Member*



Andrea Strzelec, Ph.D, FSAE
*Sr. Research Scientist
USCAR
Incoming Member*

Associates Meeting

Tuesday, October 10

5:10–6:10PM

Marquis Ballroom

Make plans to attend the associates meeting to learn more about the [ASME](#) and the [ICE Division](#) organizational structure.

Technical Committees Meeting

Wednesday, October 11

7:00–7:50AM

Marquis Ballroom

This is an opportunity to recap with your technical committee members and make plans for ICEF2024.

Let's get social

Post that you are planning to attend the conference, that you are authoring a technical paper, exhibiting, sponsoring, or that you are having an amazing time at ICEF!

<https://www.linkedin.com/groups/12154802/>



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REGISTRATION INFORMATION

Marquis Ballroom Foyer, 2nd Fl

Registration Hours:

Sunday, October 8
2:00PM–6:30PM

Monday, October 9
7:00AM–6:30PM

Tuesday, October 10
7:00AM–5:00PM

Wednesday, October 11
7:00AM–8:00AM

AUDIOVISUAL EQUIPMENT IN SESSION ROOMS

All technical sessions are equipped with one LCD projector, one screen, and a Laptop. Please bring your presentation on a thumb drive at least 15 minutes prior to the session start time.

BADGE REQUIRED FOR ADMISSION

All conference attendees must wear the official ASME ICE Forward badge at all times in order to gain admission to special sessions, technical sessions, exhibits, meals, and other conference events. Without a badge, you will NOT be allowed to attend any conference activities.

CONFERENCE APP

ICE Forward will utilize a mobile event app in place of a printed program to enhance the conference experience for attendees, speakers, and sponsors.

You will be able to:

- Connect with Attendees
- View Speaker Profiles
- Access Session Information
- Watch On-Demand Content
- Download Final Papers
- And More!

*All features may not be available at all events.

Keep an eye on your email for more information on how to access and navigate the ASME Conference App!

Conference Information

INTERNET ACCESS IN THE HOTEL

Wi-Fi is included in your guest room and in the meeting space.

You can access WIFI in the conference space.

Network Name: MarriottBonvoy_Conference

Password: ICEF2023

CONFERENCE PROCEEDINGS

Each attendee will receive an email with a unique code to access digital copies of all the papers accepted for presentation at the conference. The official conference archival proceedings will be published after the conference and will not include accepted papers that were not presented at the conference. The official conference proceedings are registered with the Library of Congress and are submitted for abstracting and indexing. The proceedings are published on the ASME Digital Library. You will be provided with an individual link to the online papers via email. In the event you do not receive the email, send a request to conferencepubs@asme.org.

SPEAKER READY ROOM

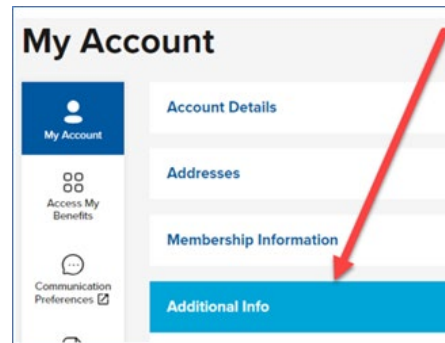
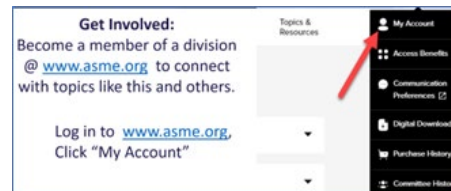
The Executive Boardroom (10th FL) will serve as the Speaker Ready Room on Monday from 7:00AM to 5:00PM and Tuesday from 7:00AM to 3:00PM on a first-come, first-served basis. An LCD projector and screen will be available for authors to practice their presentations. All necessary connecting cables will be provided.

PRESENTER ATTENDANCE POLICY

According to ASME's Presenter Attendance Policy, if a paper is not presented at the conference, the paper will not be published in the official Archival Proceedings, which are registered with the Library of Congress and are abstracted and indexed. The paper also will not be published in the ASME Digital Collection and may not be cited as a published paper.

HOW TO BECOME A MEMBER OF THE ICE DIVISION

1. www.asme.org
2. Click on "My ACCOUNT"
3. Click on "Additional Info"
4. Click on "Edit" on "Technical Division Interests".
5. Select your division interests.
6. SAVE your selections.



Please ensure that you have granted permission to receive communications from the ICED.

1. Login to asme.org and click on Communication Preferences.
2. Click "Login to Preference Center".
3. Under ASME Sections and Technical Division Communications, Opt-In to division communications by checking the box next to Technical Divisions.
4. Check all your Preferences to be sure you receive the information from ASME that you are interested in.
5. Click "Save Preferences".

Keynote Sessions & ICE Division Distinguished Lecture

KEYNOTE SESSIONS

MONDAY, OCTOBER 9

8:00AM–9:15AM ET

MARQUIS BALLROOM, 2ND FL

The Role of the ICE in Decarbonizing Freight Rail



James Gamble

*Vice President, Engine and Power Solutions
Technology
Wabtec*

MONDAY, OCTOBER 9, 2023

1:10 PM–2:20PM ET

MARQUIS BALLROOM, 2ND FL

Preparing for a Reduced-Carbon Future



Mike Rochford

*Vice President and General Manager - Systems
Products & Services
Caterpillar Inc.*

TUESDAY, OCTOBER 10

11:35AM–1:00PM ET

MARQUIS BALLROOM, 2ND FL

ICE Technology Evolution in F1 – The Pathway Toward Sustainable Power Units



Carlo Bussi, Ph.D.

*Head of PU Performance and Control Strategies
Direzione Gestione Sportiva
Ferrari S.p.A.*

ICE DIVISION DISTINGUISHED LECTURE

TUESDAY, OCTOBER 10

8:00AM–9:15AM

MARQUIS BALLROOM, 2ND FL

Where Do We Go From Here?



David E. Foster, Ph.D.

*Phil and Jean Myers Professor Emeritus of Mechanical
Engineering
University of Wisconsin-Madison*



Moderator

Kelly Senecal, Ph.D.

*Co-founder
Convergent Science*

ICE Panel Session

PANEL SESSION

TUESDAY, OCTOBER 10

3:10PM–5:10PM

MARQUIS BALLROOM, 2ND FL

Opportunities and Challenges for Hydrogen ICE (H2ICE)

This panel discussion will focus on exploring the opportunities and challenges surrounding H2ICE technology, which has garnered substantial interest within the industry. We have assembled a distinguished group of experts from both industry and government agencies with the intent to create a dynamic and intimate setting, fostering an in-depth conversation with conference attendees. This event will delve into key technical aspects of H2ICE technology development and research.



Thomas Howell
Segment Leader of Conventional Powertrain
AVL



Arvind Thiruvengadam
Principal Engineer of Advanced Engines
PACCAR



Brent Keppy
Manager of Powertrain Solutions
Bosch North America



Moderator
Li Qiao
Professor, Associate Head for Engagement & Recognition
Purdue University



Gurpreet Singh
Program Manager, Vehicle Technologies Office
U.S. Department of Energy

Panel Organizers

Yuanjiang Pei, *Aramco Americas*
Sibendu Som, *Argonne National Laboratory*
Yu Zhang, *Cummins*
Kelly Senecal, *Convergent Science*



Lee Stark
Technical Strategy and Integration Director
Cummins

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LOCAL HOST



SUNDAY, OCTOBER 8 (DURING THE WELCOME RECEPTION)

5:00PM–6:30PM

MARQUIS BALLROOM FOYER, 2ND FL

TECHNICAL POSTER PRESENTERS

Flavio Dal Forno Chuahy

Oak Ridge National Laboratory

11113 Computational Modeling of a 1:10 and 1:1 Scale Large-Bore Marine Two-Stroke Engine

Scott Curran

Oak Ridge National Laboratory

109040 Cyclic Variability of Low-Load Dual-Fuel Ammonia Combustion for Marine Applications Using a Port Fuel Injection System on a 6.7l Four-Stroke Diesel Engine

Scott Curran

Oak Ridge National Laboratory

120440 Initial Experimental Results for Lean Natural Gas Combustion in a Pre-Chamber Spark-Ignition Heavy-Duty Multi-Cylinder Engine

Muhannad Hendy

The University of Alabama

120666 Recurrence Quantification Analysis of Cyclic Combustion Variations in Dual Fuel Low Temperature Combustion

Brian Kaul

Oak Ridge National Laboratory

120428 Emissions and Efficiency Impacts of Biodiesel/Very Low Sulfur Fuel Oil Blends in the Enterprise Research Engine

Prateek Khatri

University at Buffalo

110160 Thermally Stable Pd/SSZ-13 Catalysts With Excellent Methane Oxidation Activity Under Lean Conditions

William Partridge

Oak Ridge National Laboratory

110505 What Is the Best Configuration of Sampling Capillary for Fast-SpaciMS in Catalytic Monoliths?

Joshua Landis

University of Massachusetts Lowell

120546 Analysis of Nox Production & Ammonia Generation Efficiency in Ammonia/Hydrogen Combustion Engines

Shawn Reggeti

University of Minnesota

120637 Turbulent Jet Ignition for Ammonia Engines with an Actively Fueled Pre-Chamber

Poonam Rani

University of Virginia

110167 Impact of Engine Oil Derived Species on the Performance of Cu-SSZ-13 SCR Catalysts

Arun Ravi Varma

Carnegie Mellon University

111707 CFD Model Development for Highly Dilute Stoichiometric Heavy-Duty Natural Gas Engines



ASME ICED Technical Poster Chair

Kalyan Srinivasan, Ph.D.

Professor, University of Alabama

Awards

MONDAY, OCTOBER 9

6:30PM–9:00PM

MARQUIS BALLROOM A&B, 2ND FL

ASME's Internal Combustion Engine (ICE) Division recognizes the outstanding achievements in the internal combustion engine field through its honors and awards program. Every year, ICEF hosts the Awards Dinner, this year sponsored by Aramco Americas, where we recognize these remarkable individuals.

Click [here](#) for more information on the ICE awards or to complete a nomination packet. Special thanks to the numerous volunteers that serve on ICE's award committees. Without their expertise, time, and dedication, this would not be possible. Congratulations to all award recipients!

AWARDS BANQUET sponsored by Aramco Americas



ASME SOCIETY AWARDS

ASME INTERNAL COMBUSTION ENGINE AWARD

[The Internal Combustion Engine Award \(ICE\)](#) recognizes eminent achievement or distinguished contribution over a substantial period of time, which may result from research, innovation, or education in advancing the art of engineering in the field of internal combustion engines; or in directing the efforts and accomplishments of those engaged in engineering practice in the design, development, application, and operation of internal combustion engines. In 1966, by bequest, the Diesel and Gas Engine Power Division established this award.



Jeffrey D. Naber, Ph.D.
*Richard & Elizabeth Henes Professor in Energy Systems
Mechanical Engineering - Engineering Mechanics Dept
Michigan Technological University*

ASME DEDICATED SERVICE AWARD

[The ASME Dedicated Service Award](#) honors unusual dedicated voluntary service to the Society marked by outstanding performance, demonstrated effective leadership, prolonged and committed service, devotion, enthusiasm, and faithfulness.



Kalyan Srinivasan, Ph.D.
*Professor
The University of Alabama*

ASME FELLOWS

The ASME Committee of Past Presidents confers the [Fellow](#) grade of membership on worthy candidates to recognize their outstanding engineering achievements.



Sibendu Som, Ph.D.
*Director - Advanced Propulsion and Power Department
Argonne National Laboratory*

ICED AWARDS

MERITORIOUS SERVICE AWARD

The ASME Internal Combustion Engine Division created [this award](#) to honor loyal service, guidance, leadership, and worthy contributions to the progress of the ICE Division.



Charles Finney
*Senior R&D Staff
Oak Ridge National Laboratory*



Christopher R. Stoops
*Lead Engineer
Locomotive Technology Center
Southwest Research Institute*

MERITORIOUS SERVICE AWARD (CONT'D)



Dan E. Richardson
Global Power Cylinder Senior Technical Advisor
Cummins, Inc.

ENGINE IMPACT AWARD

The ASME Internal Combustion Engine Division created [this award](#) to honor internal combustion engine related research and development that has been put into practice towards a commercial product developed by industry. This award is specifically created to recognize researchers in industry who have made tremendous contributions to the ICE community.



Paul Najt
Retired
General Motors Research



Robert McDavid Ph.D.
Engineering Manager-1
Combustion & Thermofluids Research
Caterpillar

CONFERENCE AWARDS

ICE DIVISION UNDERGRADUATE STUDENT RESEARCH COMPETITION PRESENTATIONS AND LUNCH

MONDAY, OCTOBER 9

11:35AM–1:00PM

MARQUIS BALLROOM A&B, 2ND FL

The students will present during Monday's Lunch.

LUNCH SPONSORED BY Engine Technology Forum



The [ASME ICED undergraduate student research competition](#) is an annual event inviting undergraduate researchers that have studied in the field of internal combustion engines, emissions systems, fuels and sprays, or carbon management. Up to two winning submissions are selected to deliver their presentations to a group of leading experts in the internal combustion engine field at the ASME ICE Forward Conference.

The two winning students will receive free conference registration for the conference along with paid travel and lodging expenses for the conference. Many of the past winners have made connections during the conference leading to recruitment for career and graduate school opportunities.



Nicholas Dillon
Georgia Southern University

“Investigations of Low-Reactivity X-98 Ethanol in Reactivity Controlled Compression Ignition with High-Reactivity Jet-A for Performance and Emissions Improvement”



Ziming Zhou
University of Michigan – Shanghai Jiao Tong University
Joint Institute

“Planar In-cylinder Flow Field Prediction based on Physics-inspired Automated Machine Learning Framework”



Dr. Noah Van Dam
University of Massachusetts Lowell
Undergraduate Student Research Competition Chair

BEST PAPER AWARD FROM ICEF202

For the Most Valuable Technical Paper Contribution titled, “Control Oriented Reduced Order Modelling of Conversion Efficiency in Dual Layer Washcoat Catalysts with Accumulation and Oxidation Functions,” at the 2022 ASME ICE Forward Conference, October 16–19, 2022.



Pedro Piqueras
Universitat Politècnica de València, CMT - Clean
Mobility & Thermofluids



Benjamín Pla
Universitat Politècnica de València, CMT - Clean
Mobility & Thermofluids



Enrique José Sanchis
Universitat Politècnica de València, CMT - Clean
Mobility & Thermofluids



Elena García
Universitat Politècnica de València, CMT - Clean
Mobility & Thermofluids

ICED Webinar Series: The Future of the Internal Combustion Engine

BEST PRESENTATION

For the Excellent Presentation of Technical Paper titled, "Application of Modal Decomposition Techniques to Characterize the Internal Nozzle Flow of a Medium-Duty Diesel Injector Operating with Gasoline-Like Fuels," at the 2022 ASME ICE Forward Conference, October 16–19, 2022.



Katherine J. Asztalos
Argonne National Laboratory

BEST STUDENT PRESENTATION

For the Excellent Presentation of Technical Paper titled, "Temperature Dependent Removal Efficiency of Crankcase Emission Control Devices," at the 2022 ASME ICE Forward Conference, October 16–19, 2022.



Myles Hicks
Engineer
Donaldson Emissions

ICED WEBINAR SERIES: THE FUTURE OF THE INTERNAL COMBUSTION ENGINE

DECEMBER 13, 2023
8:30–9:30AM EASTERN TIME

[Complimentary Registration](#)

Fundamental Hydrogen-Air Mixing, Combustion and Particulate Formation Processes in H2ICE

Hydrogen is regarded as a carbon-neutral fuel or energy carrier owing to no carbon-dioxides formation through combustion and its high energy density. The combustion behavior of hydrogen is different from conventional hydrocarbon fuels due to high diffusivity and burning velocity, low ignition energy, low flame quenching distance and wider flammable range, leading to excellent lean stratified combustion. Hydrogen combustion was analyzed in KAIST from a high-pressure hydrogen jet, mixing with air and combustion behavior in a constant-volume combustion chamber and a reciprocating engine. Schlieren images were taken at different ambient pressures to determine the behavior of the hydrogen jet, especially the stratified charge formation at different pressure. Direct combustion image and pressure measurement were used to analyze the combustion characteristics. An outwardly-opening injector injected the hydrogen-producing hollow-cone-shaped jet at 100 bars at all conditions. The jet collapse was caused by a pressure difference between the inside and outside of the hollow-cone-shaped jet. Energy conversion efficiency was maximized when the spark discharge occurred right after the end of the injection in a single-cylinder hydrogen engine experiment. The amount of NO_x emission increased as the ignition timing was advanced since the in-cylinder pressure and temperature were changed. When the engine operated at homogenous combustion mode, it emitted high NO_x emissions because of higher in-cylinder pressures and temperatures. However, even though the pressure and temperature were lower at lean stratified charge mode, more NO_x was produced than in lean homogenous combustion mode because of the locally rich area near the spark plug. The optimization of lean stratified charge combustion was carried out to mitigate the gaseous pollutant formation.

ICED Webinar Series: The Future of the Internal Combustion Engine

In the Technion, recent experimental studies found elevated particle formation in a non-premixed hydrogen and hydrogen-rich reformat combustion compared to hydrocarbon fuels in a wide range of direct-injection spark-ignition engine operation regimes. This discovery contradicted all previously published data on particle formation in hydrogen combustion. In this presentation, we conceptualize the particle formation mechanism in non-premixed hydrogen combustion in internal combustion engines (ICE). This enabled us to match the previously published and newly gained data. The interlinked series of fundamental and engine-based experiments were accomplished, which allowed understanding and describing the physics behind the observed peculiarities in particle formation. The results show that enhanced particle formation in non-premixed hydrogen combustion in ICE results from a combined influence of the hydrogen's low flame quenching distance that intensifies lubricant evaporation and the interaction between the lubricant vapor formed near the cylinder surface and the gaseous jet.

SPEAKERS



Leonid Tartakovsky, Ph.D.
Technion – Israel Institute of Technology

Assoc. Professor Leonid Tartakovsky is a Director of the Technion Internal Combustion Engines Laboratory at the Faculty of Mechanical Engineering and a member of the Nancy & Stephen Grand Technion Energy Program. Prof. Tartakovsky holds a Ph.D. degree in Mechanical Engineering from the Central Automobile and Automotive Engines Research Institute – NAMI in Moscow. His research interests are focused on carbon-neutral propulsion technologies, thermochemical recuperation of waste heat, hydrogen and reformates combustion and emissions control. L. Tartakovsky serves as an Associate Editor of the SAE International Journal of Engines and Frontiers in Aerospace Engineering – Energetics and Propulsion. He is the Editorial Board member of several journals. Prof. Tartakovsky is a recipient of the SAE Forest R. McFarland Award, was elected SAE Fellow in 2016, and SAE Top Contributor in 2019. He is a Founding Chairman of three international conferences, served on the Organizing Committee of multiple conferences and has above 110 publications in journals, book chapters, and conference proceedings.



Choongsik Bae, Ph.D.
Korea Advanced Institute of Science and Technology (KAIST)

Prof. Choongsik Bae serves as a professor at the Korea Advanced Institute of Science and Technology (KAIST) and leads the Future Transport Power Lab, since 1998. He is also leading the CERC (Combustion Engineering Research Center) as a director. Throughout his academic career, he had the privilege of supervising 34 Ph.D. students and 50 M.S. students. He obtained his B.S. and M.S. in Aerospace Engineering from Seoul National University, Republic of Korea, and Ph.D. in Mechanical Engineering from

Imperial College London, United Kingdom, in 1998. He is active in the interaction with the industry that he has worked as a Technical Advisor of Hyundai Motors on the occasion of his sabbatical leave from 2011 to 2012. He has been the Dean of the College of Engineering at KAIST during 2019–2020, working for innovation in engineering education. Throughout his research career, he made distinguishing research and technological achievements, including 152 international research papers. Several outstanding awards, such as the SAE Arch T. Colwell Merit award in 1997, SAE Harry Horning Award in 2006, the SAE Fellow obtainment in 2012, and Presidential Commendation in 2022, distinguish what he achieved. Prof. Bae is currently working on the research for transport carbon-neutral transport power, including hydrogen jet formation, hydrogen combustion engine, and e-fuel engine combustion, mobile carbon capture, etc. He also continues research in conventional gasoline engines with the variety of diagnostics, such as PIV, LIF, LIBs, and optical imaging of in-cylinder flow, mixing, and combustion process.

MODERATOR



Avinash Kumar Agarwal, Ph.D.
Indian Institute of Technology Kanpur

Avinash Kumar Agarwal is a Professor of I C Engines at IIT Kanpur. He is interested in combustion, conventional and alternative fuels, Methanol/DME/Hydrogen/HCNG fueled engine development, optical diagnostics, and laser ignition. Prof. Agarwal has published over 510 peer-reviewed international journal and conference papers, 63 edited books, and 129 book chapters, attracting 15200+ Scopus and 23000+ Google Scholar citations. He edited Handbook of Combustion and 60+ Springer books on energy, environment, and sustainability. For his outstanding contributions, Prof. Agarwal is conferred upon Sir J C Bose National Fellowship (2019) by SERB, SAE India Foundation GURU Award (2022), Clarivate Analytics India Citation Award-2017 in Engineering and Technology, Prestigious Shanti Swarup Bhatnagar Prize (2016) in Engineering Sciences, and many other awards in addition to inaugural version of Distinguished Alumni Award-2021 by MNIT Jaipur and Distinguished Alumni Award-2022 by IIT Delhi. He is an elected Fellow of the SAE (2012), ASME (2013), INAE (2015), ISEES (2016), RSC (2018), NASI (2018), WSSET (2020), AAAS (2020), and CI (2022). At IIT Kanpur, Prof. Agarwal has established a state-of-the-art [Engine Research Laboratory](#), and he was also the founder-director of IIT Kanpur's [Science and Technology Research Park](#).

ICED Webinar Series: The Future of the Internal Combustion Engine

ICED WEBINAR COMMITTEE



Kelly Senecal
Convergent Science



Tiegang Fang
North Carolina State University



Yuanjiang Pei
Aramco Americas



Ronald (Ron) Grover, Jr.
General Motors



Avinash K. Agarwal
Indian Institute of Technology Kanpur



Laura Herrera, CMP
ASME Senior TEC Operations Manager

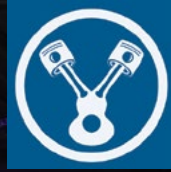
The ASME Internal Combustion Engine (ICE) Division Executive Committee has been holding a complimentary webinar series titled, The Future of the Internal Combustion Engine. The goal of this series is to communicate the role of the ICE in our decarbonized society.

A dedicated webinar committee ensures that both the latest academic research topics and industry developments are covered.

- Light Duty
- Heavy Duty
- Combustion
- Hybridization
- Alternative Fuels
- Computer Simulations
- AI, and much more!

[Past webinars are available to be seen on-demand!](#)





ICED Webinar Series

The Future of the Internal Combustion Engine

The ASME Internal Combustion Engine (ICE) Division Executive Committee has been holding a complimentary webinar series titled “The Future of the Internal Combustion Engine”. The goal of this series is to communicate the role of the ICE in our decarbonized society.

Topics include

- Light Duty
- Heavy Duty
- Combustion
- Hybridization
- Alternative Fuels
- Computer Simulations
- AI, and much more!



[Watch the on-demand webinars!](#)

Networking Events

WELCOME RECEPTION & TECHNICAL POSTER SESSION

WELCOME RECEPTION SPONSORED BY CATERPILLAR



Sunday, October 8

5:00PM–6:30PM

Marquis Ballroom Foyer, 2nd FL

All conference registrants are invited to join their colleagues for complimentary light refreshments during this Sunday evening event. Greet friends and meet thinkers from around the world who are shaping the future of ICE, all in a casual atmosphere. Be sure to visit the technical posters during this time!

BREAKFAST

Monday, October 9

Madison Ballroom A&B, 2nd FL

7:00AM–8:00AM

Tuesday, October 10

Student & Early Career Networking Breakfast

Madison Ballroom A&B, 2nd FL

7:00AM–8:00AM

Wednesday, October 11

Breakfast and ICE Technical Committees Meeting

Madison Ballroom A&B, 2nd FL

7:00AM–8:00AM

NETWORKING BREAKS

Grand Ballroom Foyer

2nd FL

Monday, October 9

9:15AM–9:30AM

1:00PM–1:10PM

2:20PM–2:30PM

4:10PM–4:30PM

Tuesday, October 10

9:15AM–9:30AM

1:00PM–1:10PM

2:50PM–3:10PM

LUNCH WITH UNDERGRADUATE COMPETITION WINNERS AND TUESDAY KEYNOTE

MONDAY LUNCH SPONSORED BY ENGINE TECHNOLOGY FORUM



Monday, October 9

Marquis Ballroom A&B, 2nd FL

11:35AM–1:00PM

Lunch & Keynote

Tuesday, October 10

Marquis Ballroom A&B, 2nd FL

11:35AM–1:00PM

AWARDS BANQUET SPONSORED BY ARAMCO AMERICAS

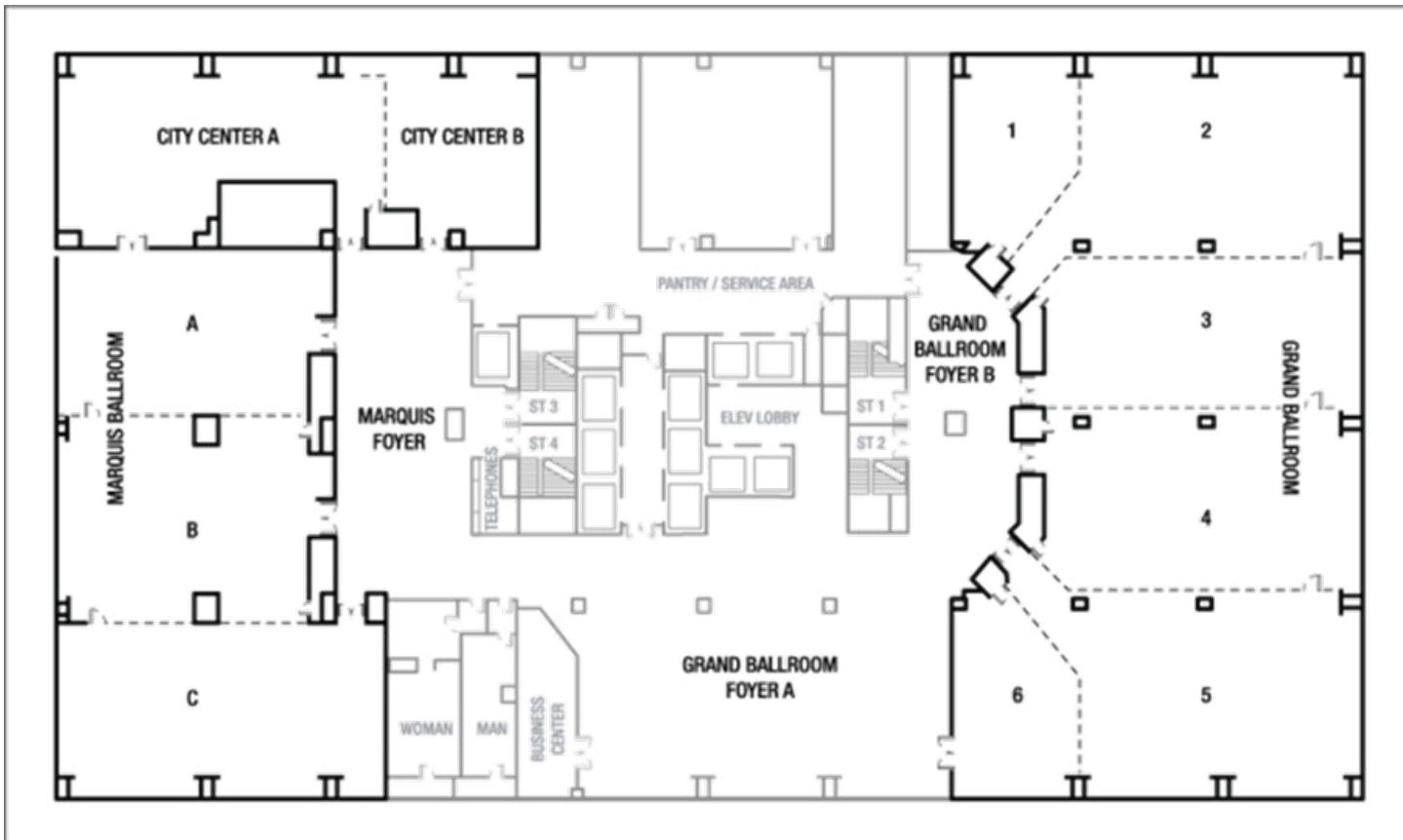


Monday, October 9

6:30PM–9:00PM

Marquis Ballroom A&B, 2nd FL

PITTSBURGH MARRIOTT CITY CENTER – 2ND FL



UNLOCK THE POTENTIAL OF H2ICE WITH CONVERGE CFD SOFTWARE

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- Fast-moving flame fronts
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- Emissions

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WABTEC GROVE CITY ENGINE PLANT TOURS

Advance Registration Required



Wednesday, October 11

8:00AM–12:00PM

Located halfway between Erie and Pittsburgh, Grove City is home to both of Wabtec's diesel engine manufacturing plants and approximately 1000 employees. The variety of engines spans from non-emissions mechanical-fuel-injection FDL (228) to the latest T4 GEVO (250), and from an inline-6 to a V-16. Markets include locomotive, marine, and stationary power.

The highlights of each facility are listed below. Attendees may choose ONE facility to tour.

Grove City Main – GRV

The 440,000 sq. ft. GRV plant produces up to 1,500 new engines each year, with both component machining and final assembly all on site. The facility also houses six test cells for final testing, along with the latest emissions testing capability. This tour will cover component machining, engine assembly, and engine test.

Grove City Remanufacturing – GRR

The 240,000 sq. ft. GRR plant overhauls locomotive engines and is also the site of individual component return & repair operations. The facility is responsible for producing over 1,200 remanufactured engines each year. This tour will cover the entire engine and component remanufacturing process, from incoming inspections to rebuild and full assembly.

Visitor Restrictions

- Age: Under 16 not allowed
- No canes or crutches allowed. Wheelchairs can be accommodated.
- Attire: full-length pants, and non-slip closed-toed shoes required
- PPE: Safety glasses, ear plugs, and vests will be provided.
- No cameras or taking of pictures inside the facilities
- Must stay within the walkway and with tour guides

Student and Early Career Networking Breakfast

TUESDAY OCTOBER 10

7:00AM–8:00AM

MARQUIS BALLROOM A&B, 2ND FL

This one-hour in-person event is free to conference registrants and is a fantastic opportunity for students, postdocs, and early career engineers in the field of internal combustion engines to connect and engage with successful leaders in the field in an informal, unmoderated, small group discussion setting.

Meet with the following key leaders of the field in an informal unmoderated group discussion setting:

- Matthew Hart, Wabtec Corp.
- Christopher Stoos, Southwest Research Institute
- Yuanjiang Pei, Aramco Americas
- David Rutledge, Cummins Inc.
- Josh Pihl, Oak Ridge National Laboratory
- Muhsin Ameen, Argonne National Laboratory
- Cosmin Dumitrescu, West Virginia University
- Hunter Mack, University of Massachusetts Lowell
- Hailin Li, West Virginia University
- Vittorio Ravaglioli, University of Bologna

Target Participants:

- Engineering Students
- Postdocs
- Engineers within first three years of professional work

What to expect:

- Key leaders from industry, academia, and national labs will be positioned at multiple tables in a round-table discussion style atmosphere.
- Attendees are invited to meet with these senior colleagues over breakfast and enjoy conversation in a small group setting.
- Conversations are intended to be informal with open-ended discussions.

This is your opportunity to:

- Connect and engage with well-established professionals and ICE research leaders from industry, academia, and national labs.
- Gain valuable professional connections, insight, and career advice from successful senior colleagues.
- Connect with other early-career colleagues, students, and peers attending the event.
- Help boost your professional network!



ASME ICED Student and Early Career Networking Breakfast Chair
Dustin Osborne
Southwest Research Institute

TRACK 1: OFF-ROAD SYSTEMS

Chair: **Matthew Hart**, *Wabtec Corp.*
Co-Chair: **Munidhar Biruduganti**, *Argonne National Laboratory*
Co-Chair: **Christopher Stoos**, *Southwest Research Institute*

TRACK 2: FUELS AND CARBON MANAGEMENT

Chair: **Hailin Li**, *West Virginia University*
Co-Chair: **Hunter Mack**, *University of Massachusetts Lowell*

TRACK 3: ADVANCED COMBUSTION

Chair: **Cosmin Dumitrescu**, *West Virginia University*
Co-Chair: **Gokul Vishwanathan**, *Propane Education & Research Council*

TRACK 4: POWERTRAINS AND HYBRIDIZATION

Chair: **Fabrizio Ponti**, *University of Bologna*
Co-Chair: **Richard Burke**, *University of Bath*
Co-Chair: **Shahrokh Etemad**, *Fairfield University*

TRACK 5: EMISSIONS CONTROL (CLEERS* AT ICE FORWARD)

Chair: **Vitaly Prikhodko**, *ORNL*
Co-Chair: **Josh Pihl**, *ORNL*

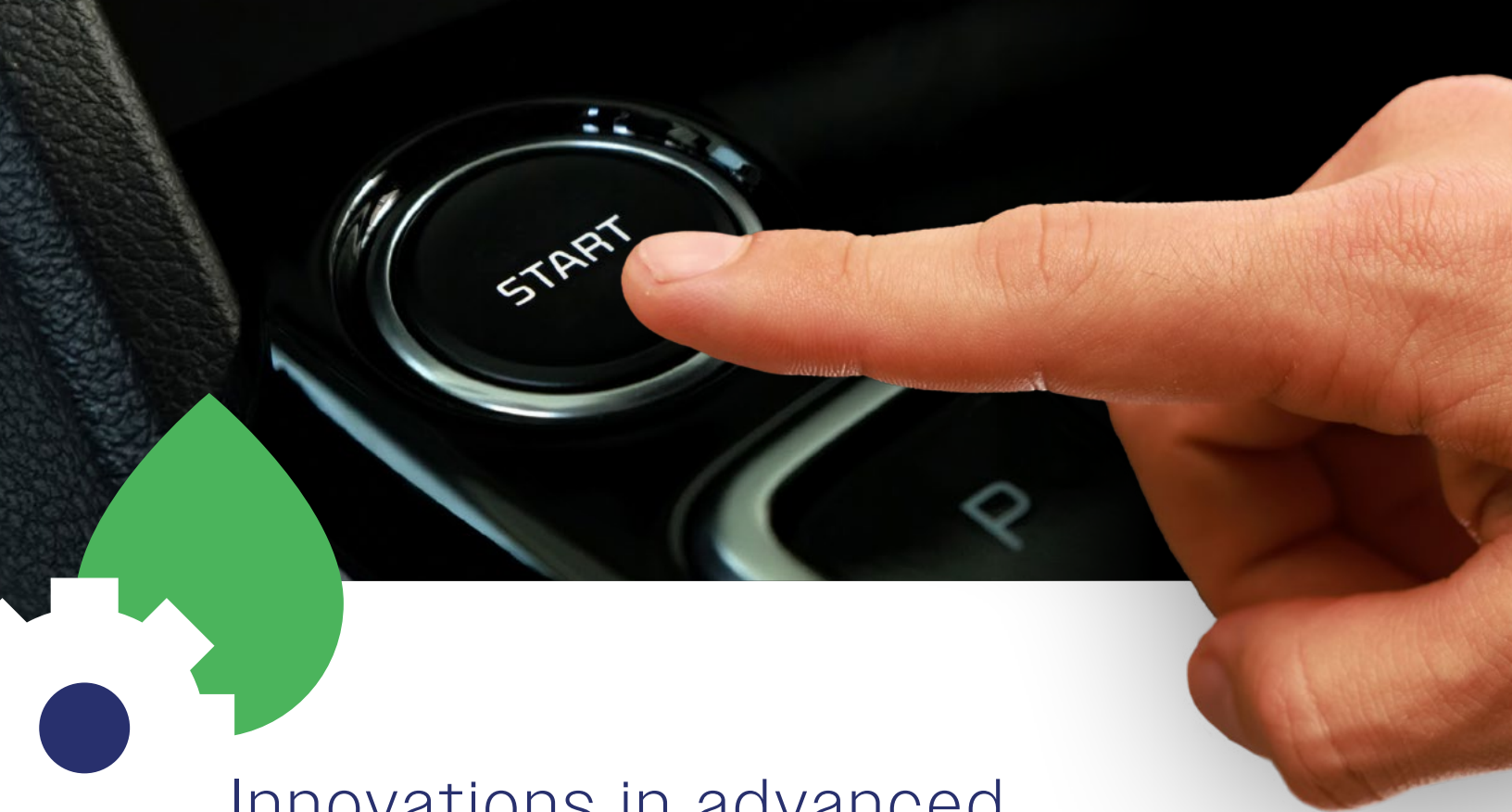
TRACK 6: MODELING AND SIMULATION

Chair: **Yuanjiang Pei**, *Aramco Americas*
Co-Chair: **Muhsin Ameen**, *Argonne National Laboratory*

TRACK 7: DESIGN, LUBRICATION, AND THERMAL MANAGEMENT

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





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*Subject to change. Please refer to the ASME Events App for updated information.

SUNDAY, OCTOBER 8, 2023

TECHNICAL POSTERS

10/8/2023

5:00PM–6:30PM

Computational Modeling of a 1:10 and 1:1 Scale Large-Bore Marine Two-Stroke Engine

Poster Presentation: ICEF2023-111113

Flavio Chuahy - Oak Ridge National Laboratories, Brian Kaul - Oak Ridge National Laboratory, Michael Kass - Oak Ridge National Laboratory, Charles Finney - Oak Ridge National Laboratory

Cyclic Variability of Low-Load Dual-Fuel Ammonia Combustion for Marine Applications Using a Port Fuel Injection System on a 6.7L Four-Stroke Diesel Engine

Poster Presentation: ICEF2023-109040

Scott Curran - Oak Ridge National Laboratory, Brian Kaul - Oak Ridge National Laboratory

CFD Model Development for Highly Dilute Stoichiometric Heavy-Duty Natural Gas Engines

Poster Presentation: ICEF2023-111707

Arun Ravi Varma - Carnegie Mellon University, Satbir Singh - Carnegie Mellon University, Rajivasanth Rajasegar - Sandia National Laboratories, Ales Srna - Sandia National Laboratories

Initial Experimental Results for Lean Natural Gas Combustion in a Pre-Chamber Spark-Ignition Heavy-Duty Multi-Cylinder Engine

Poster Presentation: ICEF2023-120440

Scott Curran - Oak Ridge National Laboratory, Mike Bunce - MAHLE Powertrain

Recurrence Quantification Analysis of Cyclic Combustion Variations in Dual Fuel Low Temperature Combustion

Poster Presentation: ICEF2023-120666

Muhannad Hendy - The University of Alabama, Abhinandhan Narayanan - The University of Alabama, Kalyan Kumar Srinivasan - The University of Alabama, Sundar Rajan Krishnan - The University of Alabama

Emissions and Efficiency Impacts of Biodiesel/Very Low Sulfur Fuel Oil Blends in the Enterprise Research Engine

Poster Presentation: ICEF2023-120428

Brian Kaul - Oak Ridge National Laboratory, Mike Kass - Oak Ridge National Laboratory, Kenneth Kar - ExxonMobil Technology & Engineering Company, Scott Berkhaus - ExxonMobil Technology & Engineering Company, Eric Nafziger - Oak Ridge National Laboratory

Thermally Stable Pd/SSZ-13 Catalysts With Excellent Methane Oxidation Activity Under Lean Conditions

Poster Presentation: ICEF2023-110160

Prateek Khatri - University at Buffalo, Tala Mon - University at Buffalo, Joshua Pacheco - Zeolyst International, Bjorn Moden - Zeolyst International, Eleni A. Kyriakidou - University at Buffalo

What Is the Best Configuration of Sampling Capillary for Fast-SpaciMS in Catalytic Monoliths?

Poster Presentation: ICEF2023-110505

Tomas Hlavaty - University of Chemistry and Technology, Prague, Martin Isoz - University of Chemistry and Technology, Prague, Petr Koci - University of Chemistry and Technology, Prague, Dhruva Deka - Oak Ridge National Laboratory, William Partridge - Oak Ridge National Laboratory

Poster on Analysis of NO_x Production and Ammonia Generation Efficiency in Ammonia/Hydrogen Combustion Engines

Poster Presentation: ICEF2023-120546

Joshua Landis - University of Massachusetts Lowell, Visal Veng - University of Massachusetts Lowell, Behlol Nawaz - University of Massachusetts Lowell, Mdnyer Nasim - University of Massachusetts Lowell, Shubhrakanti Das - University of Massachusetts Lowell, J. Hunter Mack - University of Massachusetts Lowell, Juan Trelles - University of Massachusetts Lowell

Turbulent Jet Ignition for Ammonia Engines With an Actively Fueled Pre-Chamber

Poster Presentation: ICEF2023-120637

Shawn Reggeti - University of Minnesota, William Northrop - University of Minnesota

Technical Conference Schedule

Impact of Engine Oil Derived Species on the Performance of Cu-SSZ-13 SCR Catalysts

Poster Presentation: ICEF2023-110167

Poonam Rani - *University of Virginia*, Huifang Shao - *Afton Chemical Corporation*, William S. Epling - *University of Virginia*

MONDAY, OCTOBER 9, 2023

02-01: HYDROGEN AND AMMONIA

10/9/2023

9:30AM-11:35AM

SALON 2 GRAND BALLROOM

Chair: Dimitris Assanis - *Stony Brook University*

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

Combustion Performance and Emissions Characterization of Methane-Hydrogen Blends (up to 50% by Vol.) in a Spark-Ignited CFR Engine

Technical Paper Publication: ICEF2023-110538

Jason Loprete - *Stony Brook University*, Rodrigo Ristow Hadlich - *Stony Brook University*, Amanda Sirna - *Stony Brook University*, Amr Shaalan - *Stony Brook University*, Dimitris Assanis - *Stony Brook University*

Investigation of the Laminar Burning Velocity and Exhaust Characteristics of Methane-Ammonia-Hydrogen Ternary Blends

Technical Paper Publication: ICEF2023-109918

Md Nayer Nasim - *University of Massachusetts Lowell*, Behlol Nawaz - *University of Massachusetts Lowell*, Shubhra Kanti Das - *University of Massachusetts Lowell*, Joshua Landis - *University of Massachusetts Lowell*, Amr Shaalan - *Stony Brook University*, Noah Van Dam - *University of Massachusetts Lowell*, Juan Pablo Trelles - *University of Massachusetts Lowell*, Dimitris Assanis - *Stony Brook University*, J. Hunter Mack - *University of Massachusetts Lowell*

Numerical Investigation of the Effect of Ammonia Addition on the Performance of a Stoichiometric Operated Natural Gas Spark Ignition Engine

Technical Paper Publication: ICEF2023-110115

Ruomiao Yang - *Zhejiang University*, Yuchao Yan - *Zhejiang University*, Juan Ou - *Zhejiang University*, Zhentao Liu - *Zhejiang University*, Jinlong Liu - *Zhejiang University*

The Application of Argon-Oxygen Atmosphere to Investigate the Formation and Evolution of Fuel Nitrogen Oxides During the Oxidation of Hydrogen-Ammonia Fuel Mixtures Under Representative Engine In-Cylinder Conditions

Technical Paper Publication: ICEF2023-110096

Yuchao Yan - *Zhejiang University*, Ruomiao Yang - *Zhejiang University*, Juan Ou - *Zhejiang University*, Zhentao Liu - *Zhejiang University*, Jinlong Liu - *Zhejiang University*

Investigation of the Effect of Ammonia Addition on the Two-Stage Ignition Process of Dimethyl Ether Based on Chemical Kinetic Analysis

Technical Paper Publication: ICEF2023-110108

Juan Ou - *Zhejiang University*, Ruomiao Yang - *Zhejiang University*, Yuchao Yan - *Zhejiang University*, Zhentao Liu - *Zhejiang University*, Jinlong Liu - *Zhejiang University*

03-01: FUNDAMENTAL SPRAYS/IGNITION/COMBUSTION

10/9/2023

9:30AM-11:35AM

SALON 3 GRAND BALLROOM

Chair: Adam Klingbeil - *Wabtec Corporation*

Co-Chair: Cosmin Dumitrescu - *West Virginia University*

Spark Plasma Stretching and Flame Propagation via High Frequency Pulsed Current Management

Technical Paper Publication: ICEF2023-109853

Linyan Wang - *University of Windsor*, Xiao Yu - *University of Windsor*, Ming Zheng - *University of Windsor*

Data-Driven Detection and Prediction of Spray Collapse Characteristics for Multi-Component Fuel Mixtures

Technical Paper Publication: ICEF2023-110017

Fengnian Zhao - *Shanghai Jiao Tong University*, Ziming Zhou - *Shanghai Jiao Tong University*, Wensong Liu - *Shanghai Jiao Tong University*, David Hung - *Shanghai Jiao Tong University*

Cellular Instabilities in Spherically Expanding Hydrogen-Oxygen-Carbon Dioxide Flames

Technical Paper Publication: ICEF2023-110157

Behlol Nawaz - University of Massachusetts Lowell, Md Nayer Nasim - University of Massachusetts Lowell, Shubhra Kanti Das - University of Massachusetts Lowell, J. Hunter Mack - University of Massachusetts Lowell

Experimental Study and Analysis of Ultra-Low Temperature Fuel Spray With a Heavy-Duty Injector Under Vaporizing Conditions

Technical Paper Publication: ICEF2023-110171

Zhihao Zhao - Michigan Technological University, Anqi Zhang - Aramco Americas, Henry Schmidt - Michigan Technological University, William Atkinson - Michigan Technological University, Jeffrey Naber - Michigan Technological University

Visualization of Methane/Air Pre-Chamber Combustion Using an Optical Pre-Chamber Enclosed in an Optical Rapid Compression Machine

Technical Presentation Only: ICEF2023-109931

Akash Dhotre - University of Minnesota, Twin Cities, Sayan Biswas - University of Minnesota, Twin Cities

05-01: EMISSIONS CONTROL FOR ALTERNATIVE FUELS

10/9/2023

9:30AM-11:35AM

MARQUIS C

Chair: Josh Pihl - Oak Ridge National Laboratory

Co-Chair: Vitaly Prikhodko - Oak Ridge National Laboratory

Potential of H₂-Assisted Light-Off of Oxidation Catalyst in H₂-Diesel Dual-Fuel Engines

Technical Paper Publication: ICEF2023-110095

Pedro Piqueras - Universitat Politècnica de València, Joaquin De La Morena - Universitat Politècnica de Valencia, Enrique José Sanchis - Universitat Politècnica de València, Carla Conde - Universitat Politècnica de València, José Martín Herreros - University of Birmingham, Athanasios Tsolakos - University of Birmingham

Pt- and Pd-Based Catalysts for NO_x Reduction From H₂ Combustion Engines

Technical Presentation Only: ICEF2023-109410

Jieling Shao - Chalmers University of Technology, Phuoc Hoang Ho - Chalmers University of Technology, Louise Olsson - Chalmers University of Technology, Derek Creaser - Chalmers University of Technology

Reactivity of Potential Net-Zero Carbon Fuels on Emissions Control Catalysts

Technical Presentation Only: ICEF2023-109532

Sreshtha Sinha Majumdar - Oak Ridge National Laboratory, Josh Pihl - Oak Ridge National Laboratory

NO_x SCR for Alternative Fuel Engines: Activity Loss and HCN Formation in the Presence of HCHO

Technical Presentation Only: ICEF2023-110027

Simon Barth - Karlsruhe Institute of Technology, Maria Casapu - Karlsruhe Institute of Technology, Jan-Dierk Grunwaldt - Karlsruhe Institute of Technology

Emissions Control Catalyst Tolerance to Renewable Fuel-Based Phosphorous

Technical Presentation Only: ICEF2023-110497

Todd Toops - Oak Ridge National Laboratory, Dhruva Deka - Oak Ridge National Laboratory, Jonathan Willocks - Oak Ridge National Laboratory

06-01: SPRAY MODELING AT EXTREME CONDITIONS

10/9/2023

9:30AM-11:35AM

CITY CENTER A

Chair: Noah Van Dam - University of Massachusetts Lowell

Co-Chair: Pinaki Pal - Argonne National Laboratory

A Phenomenological Thermal Spray Wall Interaction Modeling Framework Applied to a High Temperature Ignition Assistant Device

Technical Paper Publication: ICEF2023-109989

Surya Kaundinya Oruganti - Argonne National Laboratory, Roberto Torelli - Argonne National Laboratory, Kenneth S. Kim - U.S. Army DEVCOM Army Research Laboratory, Eric Mayhew - U.S. Army DEVCOM Army Research Laboratory, Chol-Bum "Mike" Kweon - U.S. Army DEVCOM Army Research Laboratory

Technical Conference Schedule

Quantitative Validation of a Computational Fluid Dynamics Methodology for Gasoline Sprays Under Cold Start Conditions

Technical Paper Publication: ICEF2023-110054

Dimitris Assanis - Stony Brook University, Joonsik Hwang - Mississippi State University, Gaurav Guleria - Stony Brook University, Dario Lopez-Pintor - Sandia National Laboratories, Scott Wagnon - Lawrence Livermore National Laboratory, Russel Whitesides - Lawrence Livermore National Laboratory

Numerical Evaluation of Wall-Guided Spark Assistance for Cold Operations in a Heavy-Duty Gasoline Compression Ignition Engine

Technical Presentation Only: ICEF2023-109828

Le Zhao - Aramco Americas, Yu Zhang - Aramco Americas, Yuanjiang Pei - Aramco Americas, Anqi Zhang - Aramco Americas

A Hybrid VOF-Lagrangian-Eulerian Treatment for Spray Formation

Technical Presentation Only: ICEF2023-110187

Mario Trujillo - University of Wisconsin--Madison, Chia-Wei Kuo - University of Wisconsin-Madison

Numerical Evaluation of Spray Models in a DISI Engine Under Cold-Start Conditions

Technical Presentation Only: ICEF2023-119484

Diego Bestel - Argonne National Laboratory, Le Zhao - Aramco Americas, Anqi Zhang - Aramco Americas, Ji-Woong Park - Aramco Americas, Roberto Torelli - Argonne National Laboratory, Joochan Kim - Argonne National Laboratory, Muhsin Ameen - Argonne National Laboratory

01-01: DUAL FUEL AND ADVANCED IGNITION SYSTEMS

10/9/2023

9:30AM-11:35AM

CITY CENTER B

Chair: Munidhar Biruduganti - Argonne National Laboratory

Co-Chair: Matthew Hart - Wabtec Corporation

Biofuels and E-Fuels Used in a Multi-Fuel-Engine as Solution for Rapid Reduction of Greenhouse Gas Impacts of NRMM Engines

Technical Paper Publication: ICEF2023-109334

Matthias Thees - RPTU University at Kaiserslautern, Michael Guenther - RPTU University at Kaiserslautern, Jonas Fuhrmeister - RPTU University at Kaiserslautern

Effect of Engine Speed and Biogas Composition on Performance of a Small Biogas-Diesel Dual-Fuel Generator

Technical Paper Publication: ICEF2023-109342

Austin Dahlseide - National Research Council Canada, Shouvik Dev - National Research Council Canada, David Stevenson - National Research Council Canada, Hongsheng Guo - National Research Council Canada

Effect of Gas Composition on the Oxidation of Gas Component Emissions of a Dual-Fuel Diesel-Natural Gas Engine at Low Load Conditions

Technical Paper Publication: ICEF2023-109624

Christopher Ulishney - West Virginia University, Cosmin Dumitrescu - West Virginia University

Alternative Spark Plug Electrode Materials for Economical, Reliable Engine Operation

Technical Paper Publication: ICEF2023-109959

Anton Tiltz - LEC GmbH, Manuel Gruber - Montanuniversität Leoben, Walter Harrer - Montanuniversität Leoben, Michael Engelmayer - LEC GmbH, Wolfgang Fimml - INNIO Jenbacher GmbH & Co. OG, Andreas Wimmer - Graz University of Technology

Large-Bore Locomotive Engines: Numerical Simulations of Natural Gas/Diesel Dual-Fuel Operation

Technical Paper Publication: ICEF2023-110164

Samuel Kazmouz - Argonne National Laboratory, Sicong Wu - Argonne National Laboratory, Adam Klingbeil - Wabtec Corporation, Thomas Lavertu - Wabtec Corporation, Vijayaselvan Jayakar - Wabtec Corporation, Pushkar Sheth - Wabtec Corporation, Sameera Wijeyakulasuriya - Convergent Science Inc., Muhsin Ameen - Argonne National Laboratory

02-02: DUAL FUEL AND FUEL BLENDS - I

10/9/2023

2:30PM–4:10PM

SALON 2 GRAND BALLROOM

Chair: **J. Hunter Mack** - *University of Massachusetts Lowell*
Co-Chair: **Valentin Soloiu** - *Georgia Southern University*

Understanding Diesel-Pilot Assisted Methane Combustion in a Compression Ignition Engine

Technical Paper Publication: ICEF2023-109875

Amanda Sirna - *Stony Brook University*, **Amir Hassan** - *Stony Brook University*, **Rodrigo Ristow Hadlich** - *Stony Brook University*, **Jason Loprete** - *Stony Brook University*, **Juan Pablo Trelles** - *University of Massachusetts*, **Noah Van Dam** - *University of Massachusetts*, **Hunter Mack** - *University of Massachusetts*, **Dimitris Assanis** - *Stony Brook University*

Propyl Oxymethylene Ether-Ignited Natural Gas Dual Fuel Low Temperature Combustion: A Low Carbon Pathway for High Efficiencies and Low Emissions

Technical Paper Publication: ICEF2023-110454

Abhinandhan Narayanan - *The University of Alabama*, **Stephen Mundy** - *The University of Alabama*, **Hariraja Thothadri** - *The University of Alabama*, **Justin Gray** - *The University of Alabama*, **Yamini Baskara Babu** - *The University of Alabama*, **Stephen Lucas** - *Colorado State University*, **Bret Windom** - *Colorado State University*, **Kalyan Kumar Srinivasan** - *The University of Alabama*, **Sundar Rajan Krishnan** - *University of Alabama*

Effect of Hydrogen Enrichment on Combustion and Emissions of a Heavy Duty Natural Gas- Diesel Dual Fuel Engine at Low and Medium Load Conditions

Technical Paper Publication: ICEF2023-109966

Hongsheng Guo - *National Research Council Canada*, **Amin Yousefi** - *National Research Council Canada*, **Shouvik Dev** - *National Research Council Canada*, **Brian Liko** - *National Research Council Canada*, **Simon Lafrance** - *National Research Council Canada*

Characterization of Flex-Fuel Prechamber Enabled Mixing-Controlled Combustion (PC-MCC) With Gasoline/Ethanol Blends at High Load

Technical Paper Publication: ICEF2023-110006

Jared Zeman - *Marquette University*, **Adam Dempsey** - *Marquette University*

03-02: DUAL FUEL COMBUSTION - I

10/9/2023

2:30PM–4:10PM

SALON 3 GRAND BALLROOM

Chair: **Shouvik Dev** - *National Research Council Canada*
Co-Chair: **Adam Klingbeil** - *Wabtec Corporation*

Effects of Hydrogen on Combustion in Ammonia–Diesel Dual Fuel Engine and Demonstration of Autothermal Catalyst to Reform Ammonia Into Hydrogen

Technical Paper Publication: ICEF2023-109103

Yoichi Niki - *National Institute of Maritime, Port and Aviation Technology*, **Koichi Hirata** - *National Institute of Maritime, Port and Aviation Technology*, **Kazuyuki Kobayashi** - *Daihatsu Diesel Mfg. Co., Ltd.*, **Yuki Shimizu** - *Daihatsu Diesel Mfg. Co., Ltd.*

Empirical Investigation of Reactivity-Controlled Compression Ignition Engine Fuelled by Ethanol and DME at Low Engine Load

Technical Paper Publication: ICEF2023-110365

Simon Leblanc - *University of Windsor*, **Linyan Wang** - *University of Windsor*, **Long Jin** - *University of Windsor*, **Navjot Sandhu** - *University of Windsor*, **Xiao Yu** - *University of Windsor*, **Ming Zheng** - *University of Windsor*

05-02: SIMULATIONS AND SYSTEMS

10/9/2023

2:30PM–4:10PM

MARQUIS C

Chair: **Vitaly Prikhodko** - *Oak Ridge National Laboratory*
Co-Chair: **Josh Pihl** - *Oak Ridge National Laboratory*

Ammonia Adsorption in an SCR Catalyst: Improved Mass Transfer Modeling Using a Data-Driven Framework

Technical Presentation Only: ICEF2023-110028

Andres Suarez-Corredor - *Scania CV AB*, *Chalmers University of Technology*, **Matthäus U. Bäbler** - *KTH Royal Institute of Technology*, **Louise Olsson** - *Chalmers University of Technology*, **Magnus Skoglundh** - *Chalmers University of Technology*, **Björn Westerberg** - *Scania CV AB*

Exhaust Aftertreatment Modeling: Mastering the Challenge of the Virtual Test Bed

Technical Presentation Only: ICEF2023-119327

Thomas Glatz - *AVL Mobility Technologies Inc.*, **Johann C. Wurzenberger** - *AVL*, **Susanne Kutsch** - *AVL*

Technical Conference Schedule

Dealing With Emissions at Extreme Temperatures: Simulation-Driven Solutions for the Case of a Plug-in-Hybrid

Technical Presentation Only: ICEF2023-119427

Menelaos Zafeiridis - *Exothermia SA*, Panagiota Alexiadou - *Exothermia SA*, Grigorios Koltsakis - *Aristotle University of Thessaloniki*

Integrated Simulation Methodology for Enabling Near-Zero Emissions in Vehicles

Technical Presentation Only: ICEF2023-119578

Andrea Strzelec - *University of Wisconsin-Madison*, Santhosh Gundlapally - *Gamma Technologies*, Syed Wahiduzzaman - *Gamma Technologies*, Josh Pihl - *Oak Ridge National Laboratory*, Bruce Vernham - *Isuzu Technical Center of North America*, Erik Koehler - *FEV North America*, Mario Trujillo - *University of Wisconsin-Madison*

04-01: POWERTRAIN CONTROLS AND DIAGNOSTICS

10/9/2023

2:30PM-4:10PM

CITY CENTER A

Chair: Vittorio Ravaglioli - *University of Bologna*

Co-Chair: Joaquin De La Morena - *Universitat Politècnica de Valencia*

Experimental Demonstration of a High-Power Density Electric Generator

Technical Paper Publication: ICEF2023-110134

Matthew Gore - *North Carolina State University*, Kaushik Nonavinakere Vinod - *North Carolina State University*, Tiegang Fang - *North Carolina State University*

48 V High Power Hybrid Architecture for MHD Off-Road Applications

Technical Paper Publication: ICEF2023-110727

Ziming Yan - *MAHLE Powertrain*, Nathan Peters - *MAHLE Powertrain*, Rupert De Salis - *MAHLE Powertrain*, Mike Bunce - *MAHLE Powertrain*

Experimental Characterization and Modelling of the Electrical and Hydraulic Effects on Injected Mass Variation in a High-Pressure Gdi Injection System Performing Consecutive Injections

Technical Presentation Only: ICEF2023-110151

Giacomo Silvagni - *University of Bologna*, Vittorio Ravaglioli - *University of Bologna*, Davide Viscione - *University of Bologna*, Fabrizio Ponti - *University of Bologna*, Enrico Corti - *University of Bologna*, Federico Stola - *Marelli Europe S.p.a.*, Gian Marco Bianchi - *University of Bologna*

Combining Gasoline Compression Ignition and Powertrain Hybridization for Long Haul Applications

Technical Presentation Only: ICEF2023-110182

Rafael Sari - *Aramco Americas*, Brock Merritt - *Aramco Americas*, Yu Zhang - *Aramco Americas*, Praveen Kumar - *Aramco Americas*, Ashish Shah - *Aramco Americas*

07-01: ENGINE COMPONENT DESIGN

10/9/2023

2:30PM-4:10PM

CITY CENTER B

Chair: Dan Richardson - *Cummins Inc.*

Co-Chair: David Rutledge - *Cummins Inc.*

Simulation Based Thermal Fatigue Validation Test Development for Exhaust Manifold

Technical Paper Publication: ICEF2023-109157

Ambikapathy Naganathan - *Cummins Inc.*, Billy Holland - *Cummins Inc.*, Caner Demirdogen - *Cummins Inc.*

Laser-Structured Thin Film Sensor Technology for Sliding Bearings in Internal Combustion Engines

Technical Paper Publication: ICEF2023-109661

Constantin Kiesling - *LEC GmbH*, Matheus Marques Da Silva - *Graz University of Technology*, Martin Kober - *LEC GmbH*, Andreas Wimmer - *Graz University of Technology*, Jan Friedrich Düsing - *Laser Zentrum Hannover e.V.*, Gunther Hager - *Miba Gleitlager Austria GmbH*

The Use of PD Patterns to Evaluate the Wear-Resistance and Manufacturing Quality to Estimate Expected Lifetime of Ignition Coils

Technical Paper Publication: ICEF2023-109962

Johan Tidholm - *SEM AB*, Martin Gordon - *SEM AB*, Thomas Hammarström - *Chalmers University of Technology*

Design of a Novel Impulse Turbine for a Supercharged Single Cylinder Diesel Engine: A Simulation Approach

Technical Paper Publication: ICEF2023-110004

Ramkumar Jayaraman - *Indian Institute of Technology Madras*, Anand Krishnasamy - *Indian Institute of Technology Madras*, Ramesh A - *Indian Institute of Technology Madras*

06-02: MACHINE LEARNING

10/9/2023

4:30PM–5:45PM

SALON 2 GRAND BALLROOM

Chair: **Pinaki Pal** - Argonne National Laboratory
Co-Chair: **Noah Van Dam** - University of Massachusetts Lowell

Multi-Fidelity Neural Network Regression for Efficient Training of Energy-Assisted Diesel Engine Control System

Technical Paper Publication: ICEF2023-109750

Ari Nejadmalayeri - University of Minnesota Twin Cities, **Sai Ranjeet Narayanan** - University of Minnesota Twin Cities, **Suo Yang** - University of Minnesota Twin Cities, **Zongxuan Sun** - University of Minnesota Twin Cities, **Harsh Darshan Sapra** - University of Wisconsin-Madison, **Randy Hessel** - University of Wisconsin-Madison, **Sage Kokjohn** - University of Wisconsin-Madison, **Kenneth Kim** - U.S. Army DEVCOM Army Research Laboratory, **Chol-Bum M. Kweon** - U.S. Army DEVCOM Army Research Laboratory

A Deep Learning Approach to Predict In-Cylinder Pressure of a Compression Ignition Engine

Technical Paper Publication: ICEF2023-110524

Rodrigo Ristow Hadlich - Stony Brook University, **Jason Loprete** - Stony Brook University, **Dimitris Assanis** - Stony Brook University

Deep Learning of Unsteady Flamelet Progress Variable Manifolds via Hierarchical Clustering and Grouped Multi-Target Artificial Neural Networks

Technical Presentation Only: ICEF2023-119569

Tadbhagya Kumar - Argonne National Laboratory, **Ahmed Almeldein** - University of Massachusetts Lowell, **Pinaki Pal** - Argonne National Laboratory, **Islam Kabil** - University of Connecticut

04-02: EMISSIONS CONTROL SYSTEMS

10/9/2023

4:30PM–5:45PM

CITY CENTER A

Chair: **Joaquin De La Morena** - Universitat Politècnica de València
Co-Chair: **Vittorio Ravaglioli** - University of Bologna

Impact of Cylinder-to-Cylinder Dispersion of Exhaust Gas Recirculation on the Three-Way Catalyst Performance and Tailpipe Emissions of Spark-Ignition Engines

Technical Paper Publication: ICEF2023-110087

Pedro Piqueras - Universitat Politècnica de València, **Joaquin De La Morena** - Universitat Politècnica de València, **Enrique José Sanchis** - Universitat Politècnica de València, **Carla Conde** - Universitat Politècnica de València

Evaluation of Aftertreatment System Configurations for a 48 V Mild Hybrid Commercial Vehicle Under Real Driving Conditions

Technical Presentation Only: ICEF2023-110513

Praveen Kumar - Aramco Americas, **Rafael Sari** - Aramco Americas, **Brock Merritt** - Aramco Americas, **Ashish Shah** - Aramco Americas, **Yu Zhang** - Aramco Americas

07-02: DESIGN FOR TURBOCHARGING AND HYDROGEN ICE

10/9/2023

4:30PM–5:45PM

CITY CENTER B

Chair: **David Rutledge** - Cummins Inc.
Co-Chair: **Dan Richardson** - Cummins Inc.

Novel Approaches to Improve the Performance of a Single Cylinder Engine by Turbocharging, Supercharging and Turbo-Compounding: A Comparative Study

Technical Paper Publication: ICEF2023-110442

Ramkumar Jayaraman - Indian Institute of Technology Madras, **Anand Krishnasamy** - Indian Institute of Technology Madras, **Ramesh A** - Indian Institute of Technology Madras

Hydrogen Internal Combustion Engine Component Investigation and Development for Heavy Duty Truck Applications

Technical Paper Publication: ICEF2023-110098

Jason Bieneman - MAHLE, **Fabio Araujo** - MAHLE, **Nikhil Nachappa lychodianda Kushalappa** - MAHLE

Technical Conference Schedule

High-Performance Alloys for Conventional ICE and Hydrogen ICE Applications

Technical Paper Publication: ICEF2023-110018

Andreas Frehn - Materion Brush GmbH, David Krus - Materion Corporation, Steffen Mack - Materion Brush GmbH

03-03: DUAL FUEL COMBUSTION - II

10/9/2023

4:30PM-5:45PM

SALON 3 GRAND BALLROOM

Chair: Shouvik Dev - NRC Canada

Co-Chair: Adam Klingbeil - Wabtec Corporation

Optimization of the Combustion Chamber Design of a Natural Gas-Diesel Dual Fuel Engine Running at Low Load

Technical Paper Publication: ICEF2023-110482

Francesco Scignoli - University of Modena and Reggio Emilia, Tommaso Savioli - Atris Engineering s.r.l., Carlo Alberto Rinaldini - University of Modena and Reggio Emilia

Pathways to Improve Fuel Conversion Efficiencies in Diesel – Natural Gas Dual Fuel Combustion at Low Loads

Technical Presentation Only: ICEF2023-110185

Giacomo Silvagni - University of Bologna, Abhinandhan Narayanan - The University of Alabama, Vittorio Ravaglioli - University of Bologna, Fabrizio Ponti - University of Bologna, Kalyan Srinivasan - The University of Alabama, Sundar Krishnan - The University of Alabama

Correlating Cycle-Resolved Unburned Hydrocarbon Emissions With Low Load Cyclic Variations in Diesel – Ng Dual Fuel Combustion

Technical Presentation Only: ICEF2023-110450

Abhinandhan Narayanan - The University of Alabama, Giacomo Silvagni - University of Bologna, Hariraja Thothadri - The University of Alabama, Nik Collins - The University of Alabama, Paulius Puzinauskas - The University of Alabama, Fabrizio Ponti - University of Bologna, Vittorio Ravaglioli - University of Bologna, Kalyan Kumar Srinivasan - The University of Alabama, Sundar Rajan Krishnan - The University of Alabama

05-03: ADVANCED EMISSIONS CONTROL

10/9/2023

4:30PM-5:45PM

MARQUIS C

Chair: Melanie DeBusk - Oak Ridge National Laboratory

Co-Chair: Josh Pihl - Oak Ridge National Laboratory

An Update on the Demonstration of Low NOx Emissions for Nonroad Engines

Technical Presentation Only: ICEF2023-110181

Christopher Sharp - Southwest Research Institute

The Role of Cation Migration in NOx Storage in Pd/FER PNAs

Technical Presentation Only: ICEF2023-110140

Janos Szanyi - Pacific Northwest National Laboratory, Inhak Song - Pacific Northwest National Laboratory, Konstantin Khivantsev - Pacific Northwest National Laboratory, Yong Wang - Pacific Northwest National Laboratory

Thermally Stable Single Atom Catalysts for Low Temperature Oxidation

Technical Presentation Only: ICEF2023-110519

Yong Wang - Washington State University, Dong Jiang - Washington State University, Carlos Eduardo Garcia Vargas - Washington State University

TUESDAY, OCTOBER 10, 2023

02-03: FUEL PROPERTY EFFECTS
10/10/2023

9:30AM–11:35AM
SALON 2 GRAND BALLROOM

Chair: **David Hung** - *Shanghai Jiaotong University*
Co-Chair: **Hailin Li** - *West Virginia University*

Mixing-Controlled Compression Ignition With Exhaust Rebreath on a Heavy-Duty Engine: A CFD Modelling Investigation Comparing Diesel Fuel and Ethanol

Technical Paper Publication: ICEF2023-109548

Tyler Johnston - *Marquette University*, **Adam Dempsey** - *Marquette University*

Reducing Methane Emissions From Lean Burn Natural Gas Engines With Prechamber Ignited Mixing-Controlled Combustion

Technical Paper Publication: ICEF2023-109652

Osama Nsaif - *Marquette University*, **Sage Kokjohn** - *University of Wisconsin-Madison*, **Randy Hessel** - *University of Wisconsin-Madison*, **Adam Dempsey** - *Marquette University*

Predicting Diesel Engine Cetane Number and Similarity for Newer Commercial Sustainable Aviation Fuels

Technical Paper Publication: ICEF2023-109879

Jim Cowart - *U.S. Navy*, **Terrence Dickerson** - *U.S. Navy*, **Dianne Luning Prak** - *U.S. Navy*

Combustion Research in Wide DCN Range Synthetic Aviation Fuels in a High Compression Ratio Engine

Technical Paper Publication: ICEF2023-110189

Valentin Soloiu - *Georgia Southern University*, **Amanda Weaver** - *Georgia Southern University*, **James Willis** - *Georgia Southern University*, **Aidan Rowell** - *Georgia Southern University*, **Nicholas Dillon** - *Georgia Southern University*

Uncertainty Quantification of a Deep Learning Based Fuel Property Prediction Model

Technical Presentation Only: ICEF2023-110154

Kiran Yalamanchi - *Argonne National Laboratory*, **Sahil Kommalapati** - *Argonne National Laboratory*, **Pinaki Pal** - *Argonne National Laboratory*, **Nursulu Kuzhagaliyeva** - *King Abdullah University of Science and Technology*, **Abdullah Alramadan** - *Saudi Aramco Research and Development Center*, **Balaji Mohan** - *Saudi Aramco Research and Development Center*, **Yuanjiang Pei** - *Aramco Americas*, **Mani Sarathy** - *King Abdullah University of Science and Technology*, **Emre Cenk** - *Saudi Aramco Research and Development Center*, **Jihad Badra** - *Saudi Aramco Research and Development Center*

06-03: LOW CARBON MODELING
10/10/2023

9:30AM–11:35AM
CITY CENTER A

Chair: **Joochan Kim** - *Argonne National Laboratory*
Co-Chair: **Yu Zhang** - *Cummins Inc.*

Computational Investigation on the Effects of Pre-Chamber Volume in an Active Narrow-Throat Pre-Chamber Engine

Technical Paper Publication: ICEF2023-110084

Mickael Silva - *King Abdullah University of Science and Technology*, **Xinlei Liu** - *King Abdullah University of Science and Technology*, **Ponnya Hlaing** - *King Abdullah University of Science and Technology*, **Emre Cenk** - *Saudi Aramco Research and Development Center*, **Abdullah Al-Ramadan** - *Saudi Aramco Research and Development Center*, **James Turner** - *King Abdullah University of Science and Technology*, **Hong G. Im** - *King Abdullah University of Science and Technology*

A Computational Analysis of Fuel Evaporation and Mixing in a Methanol Opposed-Piston Engine With a Passive Pre-Chamber

Technical Paper Publication: ICEF2023-110099

Rafael Menaca - *King Abdullah University of Science and Technology*, **Mickael Silva** - *King Abdullah University of Science and Technology*, **Kevin Moreno-Cabezas** - *King Abdullah University of Science and Technology*, **Giovanni Vorraro** - *King Abdullah University of Science and Technology*, **James W.G. Turner** - *King Abdullah University of Science and Technology*, **Hong G. Im** - *King Abdullah University of Science and Technology*

Technical Conference Schedule

Numerical Evaluation of Fuel-Air Mixing in a Direct-Injection Hydrogen Engine Using a Multi-Hole Injector

Technical Presentation Only: ICEF2023-110152

Bifen Wu - Argonne National Laboratory, Roberto Torelli - Argonne National Laboratory, Yuanjiang Pei - Aramco Americas

A Comprehensive Model to Predict Combustion Process, Knock Likelihood and Cycle-by-Cycle Variability in a Hydrogen-Fueled Internal Combustion Engine

Technical Presentation Only: ICEF2023-110573

Andrea Piano - Politecnico di Torino, Federico Millo - Politecnico di Torino, Gianpaolo Quattrone - Politecnico di Torino

01-02: LARGE ENGINE SYSTEMS 10/10/2023

9:30AM–11:35AM
CITY CENTER B

Chair: Harsh Sapra - University of Wisconsin
Co-Chair: Matthew Hart - Wabtec Corporation

A Hybrid Heavy Duty Diesel Power System for Off-Road Applications: Concept Validation

Technical Paper Publication: ICEF2023-109633

Chad Koci - Caterpillar Inc., Radoslav Ivanov - R-Flow Ltd., Jay Steffen - Caterpillar Inc., Jeremy Adams - Caterpillar Inc., Rich Kruswyk - Caterpillar Inc., Tim Bazyn - Caterpillar Inc., Lauren Duvall - Caterpillar Inc., Robert McDavid - Caterpillar Inc., Marc Montgomery - SuperTurbo Technologies Inc., Jason Keim - SuperTurbo Technologies Inc., Thomas Waldron - SuperTurbo Technologies Inc.

Efficiency and Emissions Improvement Package for the 7FDL High-Power, Medium-Speed, Locomotive Diesel Engine

Technical Paper Publication: ICEF2023-109814

Matthew Hart - Wabtec Corporation, Taylor Gray - Wabtec Corporation, Jesse Brigden - Wabtec Corporation, Justin Brumberg - Wabtec Corporation, Aj Grayson - Wabtec Corporation, Alex Shindledecker - Wabtec Corporation

The Development and Application of Advanced Sensor Solutions for Gaining New Insights Into Large Engines

Technical Paper Publication: ICEF2023-110623

Ansel Higgs - Large Engines Competence Center GmbH, Bernhard Rossegger - Large Engines Competence Center GmbH, Anton Tiltz - Large Engines Competence Center GmbH, Martin Vareka - Large Engines Competence Center GmbH, Michael Engelmayer - Large Engines Competence Center GmbH, Andreas Wimmer - Large Engines Competence Center GmbH

Injection Technologies for Alternate Fuels

Technical Presentation Only: ICEF2023-110110

Oliver Wintersteller - Robert Bosch LLC, Jens Olaf Stein - Robert Bosch AG, Rene Schimon - Robert Bosch AG, Kurt Schratlbauer - Robert Bosch AG, Christoph Kendlbacher - Robert Bosch AG

03-04: ADVANCED SI/CI CONCEPTS - I 10/10/2023

9:30AM–11:35AM
SALON 3 GRAND BALLROOM

Chair: Niranjana Miganakallu - University of Wisconsin-Madison
Co-Chair: Cosmin Dumitrescu - West Virginia University

Ignition Systems for SI-ICE Fueled by Alternative and Renewable Fuels

Technical Paper Publication: ICEF2023-110153

Jakob Ängeby - SEM AB, Johan Tidholm - SEM AB, Bert Gustafsson - SEM AB, Anders Johnsson - SEM AB

Experimental Study of the Impact of Ethanol Content on Partially Premixed Combustion With Ethanol-Gasoline Blends

Technical Paper Publication: ICEF2023-110191

Brian Gainey - Clemson University, John Gandolfo - Clemson University, Benjamin Lawler - Clemson University

Cooled Spray Technology for Particulate Reduction in a Heavy-Duty Engine

Technical Paper Publication: ICEF2023-110394

Adam Klingbeil - Wabtec Corporation, Tristen Tinar - Southwest Research Institute, Scott Ellis - Southwest Research Institute

Ducted Fuel Injection Provides Consistently Lower Soot Emissions in Sweep to Full-Load Conditions

Technical Presentation Only: ICEF2023-110165

Noad J. Buurman - *Eindhoven University of Technology*, Gustav Nyrenstedt - *Sandia National Laboratories*, Charles J. Mueller - *Sandia National Laboratories*

05-04: METHANE EMISSIONS CONTROL

10/10/2023

9:30AM-11:35AM

MARQUIS C

Chair: Sreshtha Sinha Majumdar - *Oak Ridge National Laboratory*

Co-Chair: Vitaly Prikhodko - *Oak Ridge National Laboratory*

Catalyst Deactivation Modes of Pd/ γ -Al₂O₃ for Lean Methane Oxidation

Technical Presentation Only: ICEF2023-110107

Haiying Chen - *Oak Ridge National Laboratory*, Yuliana Lugo-Jose - *Johnson Matthey Inc.*, Joseph Fedeyko - *Johnson Matthey Inc.*, Todd Toops - *Oak Ridge National Laboratory*, Jacqueline Fidler - *CONSOL Energy Inc.*

Increasing Si/Al Molar Ratio to Improve Low Temperature CH₄ Oxidation Over Pd/LTA

Technical Presentation Only: ICEF2023-110161

Tala Mon - *University at Buffalo*, Jingzhi Liu - *Syracuse University*, Viktor Cybulskis - *Syracuse University*, Eleni Kyriakidou - *University at Buffalo*

Hydrothermally Durable, Low-Temperature Methane Oxidation Catalysts for Lean-Burn Natural Gas Engines in Hard-to-Electrify Industries

Technical Presentation Only: ICEF2023-119254

Melanie Moses-Debusk - *Oak Ridge National Laboratory*, Sreshtha Sinha Majumdar - *Oak Ridge National Laboratory*, Dhruba Deka - *Oak Ridge National Laboratory*

Advances in the Catalytic Oxidation of Methane Emitted From Natural Gas Engines

Technical Presentation Only: ICEF2023-110512

Michael Harold - *University of Houston*

Intra-Catalyst Methane Oxidation Pathways of Three Way Catalysts and Implications on Nitric Oxide Conversion Profiles for a Natural Gas Vehicle Exhaust Under Lambda Dithering

Technical Presentation Only: ICEF2023-110183

Dhruba Jyoti Deka - *Oak Ridge National Laboratory*, Calvin Thomas - *General Motors*, Josh Pihl - *Oak Ridge National Laboratory*, William Partridge - *Oak Ridge National Laboratory*

02-04: DUAL FUEL AND FUEL BLENDS - II

10/10/2023

1:10PM-2:50PM

SALON 2 GRAND BALLROOM

Chair: Valentin Soloiu - *Georgia Southern University*

Co-Chair: J. Hunter Mack - *University of Massachusetts Lowell*

The Effects of Intake Throttling With Hot and Cold EGR in a CNG/Diesel Dual Fuel Engine

Technical Paper Publication: ICEF2023-109529

Srinibas Tripathy - *Indian Institute of Technology Bombay*, Asish Kumar Sarangi - *Indian Institute of Technology Bombay*, Vimal Kumar Patel - *Indian Institute of Technology Bombay*, Sheshadri Sreedhara - *Indian Institute of Technology Bombay*

Performance and Emissions of an SI Engine Fueled With DME-Propane Blends

Technical Paper Publication: ICEF2023-110498

Hafiz Ahmad Hassan - *Illinois Institute of Technology*, King Ankobea-Ansah - *Illinois Institute of Technology*, David Wickman - *Wisconsin Engine Research Consultants, LLC*, William De Ojeda - *WM International Engineering LLC*, Carrie Hall - *Illinois Institute of Technology*

Evaluation of the Performance and Exhaust Emissions of a Four Cylinder CI Engine Operating With Dimethyl Ether (DME) and Propane Blends

Technical Paper Publication: ICEF2023-110517

King Ankobea-Ansah - *Illinois Institute of Technology*, Hafiz Ahmad Hassan - *Illinois Institute of Technology*, David Wickman - *Wisconsin Engine Research Consultants, LLC*, William De Ojeda - *WM International Engineering LLC*, Carrie Hall - *Illinois Institute of Technology*

Technical Conference Schedule

Experimental Investigation of a Butylcyclohexane / Propylcyclohexane Based Naphthenic Bio-Blendstock Surrogate Fuel for Use in a Compression Ignition Engine

Technical Paper Publication: ICEF2023-110527

Rodrigo Ristow Hadlich - Stony Brook University, Zhongnan Ran - Stony Brook University, Ruinan Yang - Stony Brook University, Ofei Mante - RTI International, David Dayton - RTI International, Dimitris Assanis - Stony Brook University

06-04: PROPULSION TECHNOLOGIES SYSTEM LEVEL MODELING 10/10/2023 1:10PM-2:50PM CITY CENTER A

Chair: Yu Zhang - Cummins Inc.

Co-Chair: Joochan Kim - Argonne National Laboratory

Validation of a 1D Modeling Technique to Predict Performance of Turbocharged Engines Including a Double Scroll Turbine With Connection Valve

Technical Paper Publication: ICEF2023-109866

Calogero Avola - IHI Turbo America, Tetsu Suzuki - IHI Corporation, Ian May - General Motors, Ali Tafreshi - General Motors, Michihiko Tanigaki - IHI Turbo America, Carnell Williams - General Motors, Ken Briscoe - General Motors, Bill Gray - IHI Turbo America, Jon Trudeau - IHI Turbo America, Georgios Iosifidis - IHI Charging Systems International, Loic Durbiano - IHI Charging Systems International, Matt Delavan - IHI Turbo America

Model-Based Development of Hydrogen Internal Combustion Engine and Aftertreatment Concept for MY 2027 Heavy Duty Vehicle Application

Technical Presentation Only: ICEF2023-110007

Satyum Joshi - FEV North America, Inc., Joao Araujo - FEV North America, Inc.

Development of a Multizone Model Simulating PPCI and Diffusion Combustion in GCI Engines

Technical Presentation Only: ICEF2023-119513

Jinsu Kim - West Virginia University, Harold Sun - West Virginia University, Ashish Shah - Aramco Americas, Hailin Li - West Virginia University

01-03: OFFROAD SI SYSTEMS

10/10/2023

1:10PM-2:50PM

CITY CENTER B

Chair: Matthew Hart - Wabtec Corporation

Co-Chair: Christopher Stoos - Southwest Research Institute

Study of NOx Formation at Lean Conditions in a Prechamber-Ignited Two-Stroke Natural Gas Engine

Technical Paper Publication: ICEF2023-109975

Jacob Nowlin - Texas A&M University, Mark Patterson - Cooper Machinery Services, Timothy Jacobs - Texas A&M University

Hot-Surface Pilot Ignition: A Novel Sustainable Aviation Fuel Agnostic Combustion Strategy

Technical Paper Publication: ICEF2023-109999

Harsh Sapra - University of Wisconsin-Madison, Randy Hessel - University of Wisconsin-Madison, Niranjan Miganakallu - University of Wisconsin-Madison, Jacob Stafford - University of Wisconsin-Madison, Eri Amezcua - University of Wisconsin-Madison, David Rothamer - University of Wisconsin-Madison, Kenneth Kim - U.S. Army DEVCOM Army Research Laboratory, C.M. Kweon - U.S. Army DEVCOM Army Research Laboratory, Sage Kokjohn - University of Wisconsin-Madison

Cycle-by-Cycle Modeling of Integral Compressor Engines for Real-Time Emissions Control

Technical Paper Publication: ICEF2023-110401

Kevin Wallace - Texas A&M University, Timothy Jacobs - Texas A&M University

Investigation of Practical Delivery of Radical Species for Main Chamber Seeding Using a Radical-Generating Pre-Combustion Chamber

Technical Paper Publication: ICEF2023-110053

Kyle Beurlot - Texas A&M University, Timothy Jacobs - Texas A&M University, Greg Vieira - Colorado State University, Daniel Olsen - Colorado State University, Mark Patterson - Cooper Machinery Services

03-05: ADVANCED SI/CI CONCEPTS - II

10/10/2023

1:10PM–2:50PM

SALON 3 GRAND BALLROOM

Chair: **Cosmin Dumitrescu** - *West Virginia University*

Co-Chair: **Niranjan Miganakallu** - *University of Wisconsin-Madison*

The Role of Platinum Surface Catalytic Effects in Hot-Spot Induced Pre-Ignition in a Direct Injection Hydrogen Fueled, Heavy-Duty, Optical-Engine

Technical Presentation Only: ICEF2023-110198

Rajavasanth Rajasegar - *Sandia National Laboratories*, **Taesong Lee** - *Sandia National Laboratories*, **Aleš Srna** - *Sandia National Laboratories*

Fundamental Investigation of Direct Injection Compression Ignition of Hydrogen in an Internal Combustion Engine for Class 8 Heavy Duty Truck Application

Technical Presentation Only: ICEF2023-110396

Rohan Verma - *FEV North America, Inc.*, **Avnish Dhongde** - *FEV GmbH*, **Christopher Hayes** - *FEV North America, Inc.*, **Satyum Joshi** - *FEV North America, Inc.*

An Experimental Demonstration of Gasoline Compression Ignition (GCI) Technology on a Light-Duty Diesel Engine: From Idling to Full Torque and Power

Technical Presentation Only: ICEF2023-110535

Ashish Shah - *Aramco - Detroit Research Center*, **Brock Merritt** - *Aramco - Detroit Research Center*, **Praveen Kumar** - *Aramco - Detroit Research Center*, **James Braun** - *Aramco - Detroit Research Center*

Development of Turbulent Jet Controlled Compression Ignition Engine Concept Using Spray Guided Stratification for Fueling a Passive Prechamber

Technical Presentation Only: ICEF2023-119224

Xin Yu - *Aramco Services Company*, **Anqi Zhang** - *Aramco Services Company*, **Andrew Baur** - *Aramco Services Company*, **David Cleary** - *Aramco Services Company*

05-05: CATALYST DURABILITY

10/10/2023

1:10PM–2:50PM

MARQUIS C

Chair: **Josh Pihl** - *Oak Ridge National Laboratory*

Co-Chair: **Todd Toops** - *Oak Ridge National Laboratory*

Unraveling the Impact of Sulfur Exposure and Regeneration Cycles on a Cu-SSZ-13 SCR Catalyst

Technical Presentation Only: ICEF2023-109771

Poonam Rani - *University of Virginia*, **Huifang Shao** - *Afton Chemical Corporation*, **William S. Epling** - *University of Virginia*

Understanding Thermal Deactivation Processes of Three-Way Catalysts During Long Term Application

Technical Presentation Only: ICEF2023-110030

Sarina-Lena Heck - *Karlsruhe Institute of Technology*, **Paolo Dolcet** - *Karlsruhe Institute of Technology*, **Gülperi Nails** - *Karlsruhe Institute of Technology*, **Jan-Dierk Grunwaldt** - *Karlsruhe Institute of Technology*, **Maria Casapu** - *Karlsruhe Institute of Technology*

Durability Demonstration of a Close-Coupled SCR/ASC

Technical Presentation Only: ICEF2023-117699

Erik Sheets - *Johnson Matthey*, **John Foster** - *Daimler*, **Yaritza Lopez-De Jesus** - *Johnson Matthey*, **Alissa Recker** - *Daimler*, **Jason Pless** - *Johnson Matthey*, **Rasik Pondicherry** - *Daimler*, **Jason Barton** - *Daimler*, **Aaron Neuman** - *Daimler*, **Penelope Markatou** - *Johnson Matthey*

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LAST NAME	FIRST NAME	PAPER NUMBER	TITLE	TRACK/SESSION
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Ankobebe-Ansah	King	110517	Evaluation of the Performance and Exhaust Emissions of a Four Cylinder CI Engine Operating With Dimethyl Ether (DME) and Propane Blends	02-04: Dual Fuel and Fuel Blends - II
Assanis	Dimitris	110054	Quantitative Validation of a Computational Fluid Dynamics Methodology for Gasoline Sprays Under Cold Start Conditions	06-01: Spray Modeling at Extreme Conditions
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Barth	Simon	110027	NO _x SCR for Alternative Fuel Engines: Activity Loss and HCN Formation in the Presence of HCHO	05-01: Emissions Control for Alternative Fuels
Bestel	Diego	119484	Numerical Evaluation of Spray Models in a DISI Engine Under Cold-Start Conditions	06-01: Spray Modeling at Extreme Conditions
Beurlot	kyle	110053	Investigation of Practical Delivery of Radical Species for Main Chamber Seeding Using a Radical-Generating Pre-Combustion Chamber	01-03: Offroad SI Systems
Bieneman	Jason	110098	Hydrogen Internal Combustion Engine Component Investigation and Development for Heavy Duty Truck Applications	07-02: Design for Turbocharging and Hydrogen ICE
Chen	Haiying	110107	Catalyst Deactivation Modes of Pd/γ-Al ₂ O ₃ for Lean Methane Oxidation	05-04: Methane Emissions Control
Cowart	Jim	109879	Predicting Diesel Engine Cetane Number and Similarity for Newer Commercial Sustainable Aviation Fuels	02-03: Fuel Property Effects
Curran	Scott	109040	Cyclic Variability of Low-Load Dual-Fuel Ammonia Combustion for Marine Applications Using a Port Fuel Injection System on a 6.7l Four-Stroke Diesel Engine	Technical Posters
Curran	Scott	120440	Initial Experimental Results for Lean Natural Gas Combustion in a Pre-Chamber Spark-Ignition Heavy-Duty Multi-Cylinder Engine	Technical Posters
Dal Forno Chuahy	Flavio	111113	Computational Modeling of a 1:10 and 1:1 Scale Large-Bore Marine Two-Stroke Engine	Technical Posters
De La Morena	Joaquin	110087	Impact of Cylinder-to-Cylinder Dispersion of Exhaust Gas Recirculation on the Three-Way Catalyst Performance and Tailpipe Emissions of Spark-Ignition Engines	04-02: Emissions Control Systems
De La Morena	Joaquin	110095	Potential of H ₂ -Assisted Light-Off of Oxidation Catalyst in H ₂ -Diesel Dual-Fuel Engines	05-01: Emissions Control for Alternative Fuels

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Deka	Dhruba Jyoti	110183	Intra-Catalyst Methane Oxidation Pathways of Three Way Catalysts and Implications on Nitric Oxide Conversion Profiles for a Natural Gas Vehicle Exhaust Under Lambda Dithering	05-04: Methane Emissions Control
Dev	Shouvik	109342	Effect of Engine Speed and Biogas Composition on Performance of a Small Biogas-Diesel Dual-Fuel Generator	01-01: Dual Fuel and Advanced Ignition Systems
Dhotre	Akash	109931	Visualization of Methane/Air Pre-Chamber Combustion Using an Optical Pre-Chamber Enclosed in an Optical Rapid Compression Machine	03-01: Fundamental Sprays/Ignition/Combustion
Dumitrescu	Cosmin	109624	Effect of Gas Composition on the Oxidation of Gas Component Emissions of a Dual-Fuel Diesel-Natural Gas Engine at Low Load Conditions	01-01: Dual Fuel and Advanced Ignition Systems
Frehn	Andreas	110018	High-Performance Alloys for Conventional ICE and Hydrogen ICE Applications	07-02: Design for Turbocharging and Hydrogen ICE
Gainey	Brian	110191	Experimental Study of the Impact of Ethanol Content on Partially Premixed Combustion With Ethanol-Gasoline Blends	03-04: Advanced SI/CI Concepts - I
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Schedule at a Glance

Sunday, October 8	Monday, October 9	Tuesday, October 10	Wednesday, October 11
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