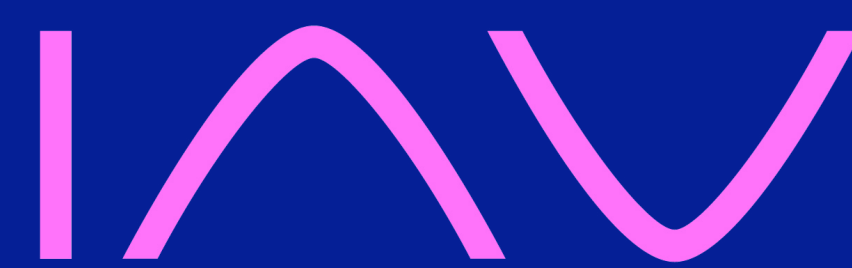


IAV SPARK 25

IAV Symposium on Pre-ignition,
Auto-ignition, Reactivity, and Knock

December 2 – 3, 2025
Shinola Hotel, Downtown Detroit



Featuring the CONVERGE CFD Workshop by
Convergent Science



Symposium Sponsor

Program Day 1 – 02.12.2025

Time	Title	Speaker	Co-Author(s)
08:45	Welcome at the Symposium and CONVERGE CFD Workshop	Dr. Kelly Senecal; <i>Convergent Science</i> Marc Sens; <i>IAV</i>	
	CONVERGE CFD Workshop		
09:00	Simulation-Based Combustion System Development of a Direct-Injection Hydrogen Engine	Emma Zhao; <i>Aramco Americas: Aramco Research Center – Detroit</i>	
09:30	CFD-CHT Analysis for Predicting Surface Temperatures and Abnormal Combustion in a Hydrogen Heavy-Duty Engine with Prechamber Ignition	Anthony Spezia; <i>Marquette University</i>	
10:00	Simulation and Experimental Validation of a Pre-Chamber Optimization Approach for Conventional and Alternative Fuels	Alex Hoth; <i>Dumarey Group</i>	
10:30	Coffee Break		
10:45	CONVERGE Chemistry Tools and the C3 Mechanism	Shuaishuai Liu; <i>Convergent Science</i>	
11:30	Advances in Combustion Modeling With CONVERGE	Shuaishuai Liu; <i>Convergent Science</i>	
12:00	Advances in Ignition and Pre-Ignition Modeling With CONVERGE	Sameera Wijeyakulasuriya; <i>Convergent Science</i>	
12:30	Machine Learning Applied to Engine Optimization	Sameera Wijeyakulasuriya; <i>Convergent Science</i>	
13:00	Lunch Break		
	IAV SPARK25		
14:00	Keynote I	Dr. Dave Cleary; <i>HORSE Powertrain</i>	
	Spark Plug Layout vs. Injector Layout for Ignition	Chair: Dr. Riccardo Scarcelli; Argonne National Laboratory	
14:30	Application of CFD Modelling to Pressure Sensing Spark Plug Development	Dr. John Burrows; <i>Tenneco</i>	Mitch Nickert, Dr. Pan Jinfeng; <i>Tenneco</i>
15:00	A Methodology for Injector Design to Improve Auto-ignitability and flammability within a Low Temperature Gasoline Combustion System	Dr. Ronald O. Grover, JR; <i>General Motors</i>	Dr. Hanho Yun, Dr. Cherian A. Idicheria, Dr. Scott E. Parrish; <i>General Motors</i>
15:30	Coffee Break		
	Hydrogen ICE	Chair: Dr. Tim Frazier; Cummins	
16:00	Development of a Stochastic Preignition (SPI) test for Lean Premixed Spark Ignited Hydrogen Engines and Understanding the Impacts of Lubricant Composition on SPI	Dr. Vickey Kalaskar; <i>SwRI</i>	Dr. Alexander Michlberger, Dr. Abdullah Bajwa; <i>SwRI</i>
16:30	Modeling the Impact of Mixture Formation on Regular and Abnormal Combustion in a Hydrogen Direct-Injection Engine	Dr. Riccardo Scarcelli; <i>Argonne National Laboratory</i>	Wang Yiqing, Xu Chao, Ales Srna; <i>Argonne National Laboratory</i>
	Interactive Discussion		
17:30	Combustion Engines: Future Visions and Realities Join a candid, interactive discussion with the expert audience and the scientific advisory board, moderated by IAV.		
18:00	End of Day 1 and Start of Cocktail Reception (Drinks and Finger Food)		

IAV SPARK

IAV Symposium on Pre-ignition,
Auto-ignition, Reactivity, and Knock

December 2 – 3, 2025
Shinola Hotel, Downtown Detroit

25



Featuring the CONVERGE CFD Workshop by
Convergent Science



Symposium Sponsor

Program Day 2 – 03.12.2025

Time	Title	Speaker	Co-Author(s)
08:50	Welcome into Day 2	Marc Sens; <i>IAV</i>	
09:00	Keynote Speech II	Dr. Kelly Senecal; <i>Convergent Science</i>	
	Future Fuels / Fuel Blends	Chair: Jens Muehlmann; <i>Volkswagen</i>	
09:30	H2-NG Blends for A Stoichiometric Natural Gas Engine – Performance and Emissions Assessment	Dr. Sriram Popuri; <i>Cummins Inc.</i>	Dr. Sriram Popuri, Larry Bruner, Banerjee Pranay; Cummins Inc, Griffin Matuszak, Rafael Lago Sari, Brock Merritt; <i>Aramco Americas</i>
10:00	Enhancing Ammonia Combustion in SI Engines: Effects of Compression Ratio, Pre-Chamber Ignition, and Hydrogen Blending	Dr. Metin Korkmaz; <i>Champion Ignition</i>	
10:30	Coffee Break		
	High Efficiency ICE by Pre Chamber Spark Plugs	Chair: Hans Lipp; <i>Tenneco</i>	
11:00	Bosch Pre-Chamber Spark Plug: Enabler for High Efficiency and High Performance Engines	Dr. Alexander Eichhorn; <i>Robert Bosch GmbH</i>	Matthias Blankmeister; <i>Robert Bosch GmbH</i>
11:30	Investigating Knock Behavior in Passive Pre-chamber Ignition Using Optical Diagnostics	Prof. Li Qiao; <i>Purdue University</i>	Afaque Alam, Dong Eun Lee; <i>Purdue University</i> Dr. Xin Yu; <i>Aramco Americas</i>
12:00	Synergy between High-Octane Fuels and Passive Prechamber Enabling High Efficiency and Power-Density Hybrid Engine	Dr. Xin Yu; <i>Aramco Americas</i>	Dr. Anqi Zhang, Andrew Baur; <i>Aramco Americas</i>
12:30	Lunch Break		
	Pre Chamber Spark Plug Fundamentals	Chair: Dr. Pei Yuanjian, <i>Aramco Americas</i>	
14:00	Measurements and CFD comparison during CLO (Catalyst Light Off)	Dr. Cherian A. Idicheria; <i>General Motors</i>	Kulwinder Singh, Jaehak Jung; <i>General Motors</i>
14:30	Endoscopic Visualization and Analysis of Combustion Instability in Pre-chamber Jet Ignition Under Cold Start Spark Retard Conditions	Dr. Afaque Alam; <i>Purdue University</i>	Prof. Li Qiao; <i>Purdue University</i> Dr. Xin Yu; <i>Aramco Americas</i>
15:00	Comparative Analysis of Passive and Active Pre-Chamber Ignition Systems for Enhanced Efficiency in Spark Ignition Engines	Ahmed Assabiki; <i>Champion Ignition</i>	Dr. Metin Korkmaz; <i>Champion Ignition</i>
15:30	Coffee Break		
	Application Outlook	Chair: Ryan Heinbuch; <i>General Motors</i>	
16:00	Active Turbulent Jet Ignition: Bridging High Load Efficiency and Cold Start Performance	Dimitrios Karageorgiou; <i>Aramco Europe</i>	
16:30	Hydrogen Internal Combustion Engine Pre-ignition – Learnings and Future Work	Dr. Hui Xu; <i>Cummins Inc.</i>	
17:15	End of Day 2	Dr. Kelly Senecal; <i>Convergent Science</i> Marc Sens; <i>IAV</i>	