

WORKSHOP ON IGNITION FOR INTERNAL COMBUSTION ENGINES AGENDA

HOSTED BY THE VIRTUAL ENGINE RESEARCH INSTITUTE AND FUELS INITIATIVE (VERIFI)

Thursday, June 27, 2019

Workshop on Ignition for Internal Combustion Engines, Building 240, Room 1416

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| 8:15 – 8:55 a.m. | Registration |
| 9:00 – 9:05 a.m. | Welcome to Argonne National Laboratory Paul Kearns, Director at Argonne National Laboratory |
| 9:05 – 9:15 a.m. | Workshop Objectives and Mechanics Sibendu Som, Manager at Argonne National Laboratory |
| 9:15 – 9:30 a.m. | Overview on DOE Funded Research on Ignition Systems Michael R. Weismiller, Technology Manager at DOE - Vehicle Technologies Office |
| 9:30 – 10:15 a.m. | Novel Ignition Systems for High Efficiency Engines Keynote: Cherian Idicheria, Staff Researcher at General Motors |
| 10:15 – 10:45 a.m. | Coffee Break |
| 10:45 – 11:15 a.m. | Spark Discharge Dynamics in High-velocity Flow Fields Seong-Young Lee, Professor at Michigan Technological University |
| 11:15 – 11:45 a.m. | Time-Resolved X-ray Diagnostics of Ignition Kernels Brandon Sforzo, Mechanical Engineer at Argonne National Laboratory |
| 11:45 a.m. – 1:00 p.m. | Lunch and Networking |
| 1:00 – 2:00 p.m. | Tour of the Argonne Leadership Computing Facility |
| 2:00 – 2:30 p.m. | High-Fidelity Modeling of Spark Plug Ignition and Erosion Douglas Breden, Member of Technical Staff at Esgee Technologies |

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| 2:30 – 3:00 p.m. | Advanced Spark and Corona Ignition Systems: Optical Engine Experiments and Simulations Michele Battistoni, Professor at University of Perugia |
| 3:00 – 3:30 p.m. | Coffee Break |
| 3:30 – 4:00 p.m. | Recent Development of the Advanced Corona Ignition System (ACIS) Kristopher Mixell, Director of Ignition Coils and ACIS at Federal Mogul |
| 4:00 – 4:30 p.m. | Path to Commercialization of Transient Plasma Ignition Dan Singleton, CEO at Transient Plasma Systems |
| 4:30 – 5:00 p.m. | Fundamental and Applied Transient Plasma Ignition Research at Sandia National Laboratories Isaac Ekoto, Principal Member of Technical Staff at Sandia National Laboratories |
| 5:00 – 5:30 p.m. | Group Photo and transfer to Guest House |
| 5:30 – 6:30 p.m. | Sponsor Reception and Poster Session by Argonne Researchers Guest House |
| 6:30 – 8:00 p.m. | Sponsor Dinner Guest House |

Friday, June 28, 2019

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| 8:00 – 8:25 a.m. | Registration |
| 8:30 – 9:00 a.m. | High Efficiency Engines – The Pre-Chamber Spark Plug as the Base Technology Marc Sens, Senior Vice President Advanced Development Thermodynamic/Powertrain Concepts at IAV GmbH |
| 9:00 – 9:30 a.m. | MAHLE Jet Ignition(R) Research: Efficiency Potential and Application Challenges Mike Bunce, Head of Research at Mahle Powertrain |
| 9:30 – 10:00 a.m. | Experimental and Computational Study of Pre-Chamber Turbulent Jet Ignition for Lean-Burn Engines Li Qiao, Professor at Purdue University |
| 10:00 – 10:30 a.m. | Coffee Break |
| 10:30 – 11:00 a.m. | State of the Art Ignition Modeling for CFD Aided Engine Design Eric Pomraning, Owner and Vice President at Convergent Science Inc. |
| 11:00 – 11:30 a.m. | Addressing Ignition Challenges in High BMEP Natural Gas Engines Daniel O'Connor, Manager of Ignition Systems at Cummins |

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| 11:30 a.m. – 12:00 p.m. | Alternative Ignition Systems for Future Natural Gas Engines Arnold Kim, Engineering Project Team Leader at Caterpillar |
| 12:00 – 1:15 p.m. | Lunch and Networking |
| 1:15 – 1:45 p.m. | Performance Characterization of Alternative Ignition Systems Using Optical Tools in Natural Gas Engines Munidhar Biruduganti, Principal Engine Research Engineer at Argonne National Laboratory |
| 1:45 – 2:15 p.m. | Multi-Dimensional Modeling of Pre-Chamber Ignition and Combustion in Natural Gas Engines Joochan Kim, Postdoctoral Appointee at Argonne National Laboratory |
| 2:15 – 2:45 p.m. | Advanced Ignition Modeling Research at Argonne National Laboratory Riccardo Scarcelli, Principal Mechanical Engineer at Argonne National Laboratory |
| 2:45 – 2:50 p.m. | Thank You Doug Longman, Manager at Argonne National Laboratory |
| 2:50 – 5:00 p.m. | Two parallel sessions: Tours Two tours for everyone (buses leave from 240 TCS conference center entrance) <ul style="list-style-type: none"> <input type="checkbox"/> Engine facilities <input type="checkbox"/> Advanced Photon Source One-on-One (The VERIFI team will email room information to individuals who signed up for this session.) |

TOUR DESCRIPTIONS

Engine Facilities

Argonne's engine testing capability spans from light duty to heavy duty, with engines ranging in size from 0.5L up to 19L. Argonne's facilities include state-of-the-art instrumentation for in-cylinder visualization and regulated and un-regulated emissions characterization (gaseous and particulate). These experiments generate high-quality data for validation of VERIFI simulations.

Advanced Photon Source

The Advanced Photon Source (APS) is a user facility at Argonne, which produces the brightest x-ray beams in the Western hemisphere, enabling multi-disciplinary research that advances science. A dedicated hutch at APS allows VERIFI researchers to gain fundamental understanding of fuel injection and spray phenomena (such as cavitation and jet interactions) and aid advanced model developments.

Argonne Leadership Computing Facility

The Argonne Leadership Computing Facility (ALCF) is a user facility at Argonne that provides the computational science community with a world-class computing capability dedicated to breakthrough science and engineering. The tour will include a visit to Argonne's 10-petaflop MIRA supercomputer. The VERIFI team uses these facilities and collaborates extensively with ALCF scientists to scale up engine calculations.

One-on-One Session

VERIFI experts will be available for discussions with industry representatives to understand their computing needs and provide guidance on how VERIFI projects could help them design and optimize next-generation engines and fuels. Argonne will provide a list of VERIFI experts available for discussion.