



ASME[®] 2018 ICEF

Internal Combustion Engine Fall
Technical Conference

Program

CONFERENCE

November 4 – 7, 2018

EXHIBITION

November 5 – 6, 2018

Hilton San Diego Resort & Spa
San Diego, CA

Technical Sessions

MONDAY, NOVEMBER 5

TRACK 2 FUELS

Track Chair: **Gregory Bogin**, Colorado School of Mines, Golden, CO, United States

Track Co-Chair: **Hailin Li**, West Virginia University, Morgantown, WV, United States

2-1 SPARK IGNITION, FUEL SPRAYS AND IGNITION KINETICS SAN DIEGO, CA, HILTON RESORT & SPA, LAS PALMAS 10:00AM - 12:00PM

Session Chair: **Douglas Longman**, Argonne Natl Lab., Argonne, IL, United States

Session Co-Chair: **Scott Wayne**, West Virginia University, Morgantown, WV, United States

EXPERIMENTAL INVESTIGATIONS OF HYDROGEN-NATURAL GAS ENGINES FOR MARITIME APPLICATIONS

Technical Paper Publication. ICEF2018-9615

Harsh Sapra, **Milinko Godjevac**, **Klaas Visser**, Delft University of Technology, Delft, South Holland, Netherlands, **Yuri Linden**, Defense Material Organization, Utrecht, Netherlands, **Wim van Sluijs**, Pon Power, Papendrecht, Netherlands

DEFINING THE BOUNDARY CONDITIONS OF THE CFR ENGINE UNDER RON CONDITIONS FOR KNOCK PREDICTION AND ROBUST CHEMICAL MECHANISM VALIDATION

Technical Paper Publication. ICEF2018-9640

Saif Salih, Oakland University, Troy, MI, United States, **Dan DeVescovo**, Oakland University, Rochester, MI, United States, **Christopher Kolodziej**, **Alexander Hoth**, Argonne National Laboratory, Lemont, IL, United States, **Toby Rockstroh**, Argonne National Lab., Naperville, IL, United States

DEMONSTRATING A DIRECT-INJECTION CONSTANT-VOLUME COMBUSTION CHAMBER AS A VALIDATION TOOL FOR CHEMICAL KINETIC MODELING OF LIQUID FUELS

Technical Paper Publication. ICEF2018-9729

Aaron Suttle, **Dennis Parnell**, **Joshua Bittle**, University of Alabama, Tuscaloosa, AL, United States, **Brian Fisher**, Naval Research Laboratory, Washington, DC, United States

A COMPREHENSIVE KINETICS LIBRARY FOR SIMULATING THE COMBUSTION OF AUTOMOTIVE FUELS

Technical Paper Publication. ICEF2018-9733

Chitral Naik, Reaction Design of ANSYS, San Diego, CA, United States, **Karthik Puduppakkam**, **Ellen Meeks**, ANSYS, San Diego, CA, United States

TRACK 3 ADVANCED COMBUSTION

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

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

3-1 FUNDAMENTALS/SI/THERMODYNAMICS SAN DIEGO, CA, HILTON RESORT & SPA, ST. TROPEZ 10:00AM - 12:00PM

Session Chair: **Hui Xu**, Cummins Inc., Columbus, IN, United States

Session Co-Chair: **Joshua Bittle**, University of Alabama, Tuscaloosa, AL, United States, **Tiegang Fang**, NC State University, Raleigh, NC, United States, **Isaac Ekoto**, 7011 East avenue, Livermore, CA, United States

EFFECT OF DIRECT FUEL INJECTION STRATEGY ON COMBUSTION, PERFORMANCE AND EMISSIONS OF A PORT FUEL INJECTED COMPRESSED NATURAL GAS ENGINE USING SIMULATION TOOLS

Technical Paper Publication. ICEF2018-9547

Virendra Jagtap, COEP-ARAI M. Tech, Pune, Maharashtra, India, **Kamlesh Patel**, Convergent Science India LLP, Pune, Maharashtra, India, **Brijesh Patel**, The Automotive Research Association of India, Pune, Maharashtra, India

DAMKÖHLER NUMBER ANALYSIS ON THE EFFECT OF OZONE ON AUTO-IGNITION AND FLAME PROPAGATION IN INTERNAL COMBUSTION ENGINES

Technical Paper Publication. ICEF2018-9559

Seunghwan Keum, **Tang-Wei Kuo**, General Motors, Pontiac, MI, United States

CYLINDER-SPECIFIC COMBUSTION PHASING MODELING FOR A MULTIPLE-CYLINDER DIESEL ENGINE

Technical Paper Publication. ICEF2018-9560

Wenbo Sui, **Carrie M. Hall**, Illinois Institute of Technology Mechanical, Materials and Aerospace Engineering, Chicago, IL, United States

NUMERICAL SIMULATION OF COMBUSTION CHAMBER DESIGN FOR CI ENGINES CONVERTED TO NATURAL GAS SI OPERATION

Technical Paper Publication. ICEF2018-9609

Jinlong Liu, **Cosmin Dumitrescu**, West Virginia University, Morgantown, WV, United States

3-2 COMBUSTION DIAGNOSTICS

SAN DIEGO, CA, HILTON RESORT & SPA, PORTOFINO

10:00AM - 12:00PM

Session Chair: **Sotirios Mamalis**, Stony Brook University, STONY BROOK, NY, United States

Session Co-Chair: **Hongsheng Guo**, National Research Council, Ottawa, ON, Canada, **Lorenzo Bartolucci**, University of Rome Tor Vergata, Rome, Italy

EFFECT OF COMBUSTION CHARACTERISTICS ON KNOCKING IN A DIRECT INJECTION TURBO-CHARGED GASOLINE ENGINE

Technical Paper Publication. ICEF2018-9524

Heechang Oh, Jinwook Son, Juhun Lee, Soohyung Woo, Youngnam Kim, Seungwoo Hong, Hyundai Motor Company, Hwasung-si, Gyeonggi-do, Korea (Republic)

EFFECTS OF OUTLIER FLOW FIELD ON THE CHARACTERISTICS OF IN-CYLINDER COHERENT STRUCTURES IDENTIFIED BY POD-BASED CONDITIONAL AVERAGING AND QUADRUPLE POD

Technical Paper Publication. ICEF2018-9561

Rui Gao, Li Shen, Kwee-Yan Teh, David L.S. Hung, University of Michigan-Shanghai Jiao Tong University Joint Institute, Shanghai, China, **Penghui Ge, Fengnian Zhao**, Shanghai Jiao Tong University, Shanghai, China

FUNDAMENTAL STUDY OF DIESEL-PILOTED NATURAL GAS DIRECT INJECTION UNDER DIFFERENT OPERATING CONDITIONS

Technical Paper Publication. ICEF2018-9580

Georg Fink, Michael Jud, Thomas Sattelmayer, Technische Universität München, Garching, Germany

COMBUSTION IONIZATION FOR MISFIRE, KNOCK, AND SPORADIC PRE-IGNITION IN A GASOLINE DIRECT INJECTION ENGINE

Technical Paper Publication. ICEF2018-9589

Samuel Ayad, Wayne State University, Milford, MI, United States, **Swapnil Sharma, Rohan Verma, Naeim Henein** Wayne State University, Detroit, MI, United States

TRACK 5 INSTRUMENTATION, CONTROLS, AND HYBRIDS

Track Chair: **Fabrizio Ponti**, University of Bologna - DIN, Forli, Italy

Track Co-Chair: **Richard Burke**, University of Bath, Bath, United Kingdom

5-1 COMBUSTION ANALYSIS METHODS

SAN DIEGO, CA, HILTON RESORT & SPA, MARSEILLES

10:00AM - 12:00PM

Session Chair: **Vittorio Ravaglioli**, University of Bologna - DIN, Forli, Italy

Session Co-Chair: **Fabrizio Ponti**, University of Bologna - DIN, Forli, Italy

ACCURACY OF DIESEL ENGINE COMBUSTION METRICS OVER THE FULL RANGE OF ENGINE OPERATING CONDITIONS

Technical Paper Publication. ICEF2018-9507

Peter G. Dowell, Pareto Engineering, Billerica, United Kingdom, **Richard Burke, Sam Akehurst**, University of Bath, Bath, United Kingdom

A SIGNAL PROCESSING OF IN-CYLINDER PRESSURE FOR THE RESONANT FREQUENCY PREDICTION OF COMBUSTION PROCESS IN DIESEL ENGINES

Technical Paper Publication. ICEF2018-9534

Ximing Chen, Long Liu, Jingtao Du, Harbin Engineering University, Harbin, Heilongjiang, China, **Jiguang Zhang**, China State Shipbuilding Corporation Limited, Beijing, China

COMPARISON OF CYLINDER PRESSURE MEASUREMENTS ON A HEAVY-DUTY DIESEL ENGINE USING A SWITCHING ADAPTER

Technical Paper Publication. ICEF2018-9776

Adam Dempsey, Patrick Seiler, Caterpillar Inc., Mossville, IL, United States, **Simon Johnson**, Kistler Instrument Corp., Novi, MI, United States

NON-EQUIPROBABLE STATISTICAL ANALYSIS OF MISFIRES AND PARTIAL BURNS FOR CYCLE-TO-CYCLE CONTROL OF COMBUSTION VARIABILITY

Technical Paper Publication. ICEF2018-9540

Bryan P. Maldonado, Anna Stefanopoulou, University of Michigan, Ann Arbor, MI, United States

Technical Sessions

TRACK 6 NUMERICAL SIMULATION

Track Chair: **Caroline Genzale**, Georgia Tech, Decatur, GA, United States

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

6-1 SPRAY MODELING

SAN DIEGO, CA, HILTON RESORT & SPA, MONTE CARLO

10:00AM - 12:00PM

Session Chair: **Roberto Torelli**, Argonne National Laboratory, Lemont, IL, United States

Session Co-Chair: **Martin Davy**, University of Oxford, Oxford, United Kingdom

FLOW SIMULATION OF DIESEL NOZZLES WITH ALTERNATING DIAMETER

Technical Paper Publication. ICEF2018-9506

Constantin Vasconi, Roland Baar, Technische Universität Berlin, Department of Powertrain Technologies, Berlin, Germany

EFFECTS OF FLASH BOILING IN NOZZLE FLOW OF GDI INJECTOR ON AIR/FUEL MIXTURE

Technical Paper Publication. ICEF2018-9531

Eiji Ishii, Hitachi, Ltd., Hitachinaka, Ibaraki, Japan, **Kazuki Yoshimura**, Hitachi, Ltd., Hitachinaka, Ibaraki, Japan, **Seiichi Koshizuka, Akihiro Sekine, Shota Sugihara**, The University of Tokyo, Bunkyo-ku Tokyo, Japan

COMPUTATIONAL STUDY OF UNSTEADY CAVITATING FLOWS AND EROSION IN A FUEL NOZZLE

Technical Paper Publication. ICEF2018-9553

Javad Hosseinpour, Omid Samimi-Abianeh, Wayne State University, Detroit, MI, United States, **Luis Bravo**, Army Research Laboratory, Adelphi, MD, United States

NUMERICAL INVESTIGATION ON THE EFFECT OF ADVANCED BREAKUP MODEL ON SPRAY SIMULATION OF A MULTI-HOLE INJECTOR

Technical Paper Publication. ICEF2018-9612

Srinibas Tripathy, Sridhar Sahoo, Dhananjay Kumar Srivastava, Indian Institute of Technology Kharagpur, Kharagpur, India

TRACK 7 ENGINE DESIGN AND MECHANICAL DEVELOPMENT

Track Chair: **Dan Richardson**, Cummins, Columbus, IN, United States

Track Co-Chair: **David Rutledge**, Cummins, Columbus, IN, United States

7-1 DESIGN I

SAN DIEGO, CA, HILTON RESORT & SPA, MARBELLA

10:00AM - 12:00PM

Session Chair: **Douglas Kiesling**, GE Power, Waukesha, WI, United States

POWERTRAIN RESILIENT MOUNTING DESIGN ANALYSIS

Technical Paper Publication. ICEF2018-9539

Tigran Parikyan, AVL List GmbH, Graz, Austria, **Nikola Naranca**, AVL-AST d.o.o., Zagreb, Croatia (Hrvatska), **Jochen Neher**, MAN Diesel & Turbo SE, Augsburg, Germany

MODULAR 9.0L AND 4.5L NON-ROAD SPARK-IGNITED ENGINES FOR POWER GENERATION

Technical Paper Publication. ICEF2018-9616

Allen Gillette, Jesse Dees, John Crudden, Anthony Petcoff, Generac Power Systems Inc., Waukesha, WI, United States

CONTROLS DEVELOPMENT AND VEHICLE DRIVE CYCLE ANALYSIS OF INTEGRATED TURBOCOMPOUNDING, ELECTRIFICATION AND SUPERCHARGING SYSTEM (ITES)

Technical Paper Publication. ICEF2018-9703

Satyum Joshi, Erik Koehler, Michael Franke, Mufaddel Dahodwala, FEV North America, Inc., Auburn Hills, MI, United States, **Jeffrey Naber**, Michigan Tech University, Houghton, MI, United States

INVESTIGATING THE POTENTIAL OF AN INTEGRATED COOLANT WASTE HEAT RECOVERY SYSTEM IN AN HD ENGINE USING PPC OPERATION

Technical Paper Publication. ICEF2018-9708

Vikram Singh, Erik Svensson, Sebastian Verhelst, Martin Tuner, Lund University, Lund, Skane, Sweden

TRACK 2 FUELS

Track Chair: **Gregory Bogin**, Colorado School of Mines, Golden, CO, United States

Track Co-Chair: **Hailin Li**, West Virginia University, Morgantown, WV, United States

2-2 COMPRESSION IGNITION AND ALTERNATIVE FUELS

SAN DIEGO, CA, HILTON RESORT & SPA, LAS PALMAS

1:30PM - 3:00PM

Session Chair: **David L.S. Hung**, University of Michigan-Shanghai Jiao Tong University Joint Ins., Shanghai, China

Session Co-Chair: **Lu Qiu**, Cummins, Columbus, IN, United States

MODELING FUEL EFFECTS IN A DIESEL ENGINE USING MULTI-COMPONENT FUEL SURROGATES IN CFD

Technical Paper Publication. ICEF2018-9747

Karthik Puduppakkam, Ellen Meeks, ANSYS, San Diego, CA, United States, **Chitral Naik**, Reaction Design of ANSYS, San Diego, CA, United States

PERFORMANCE OF MICROEMULSION FUELS AS AN ALTERNATIVE FOR DIESEL ENGINE

Technical Paper Publication. ICEF2018-9566

Iyman Abrar, Ashok N. Bhaskarwar, Indian Institute of Technology Delhi, Delhi, India

CI ENGINE MODEL PREDICTIVE CONTROL WITH AVAILABILITY DESTRUCTION MINIMIZATION

Technical Paper Publication. ICEF2018-9673

Muataz Abotabik, Rick Meyer, Western Michigan University, Kalamazoo, MI, United States

TRACK 3 ADVANCED COMBUSTION

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

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

3-3 FUNDAMENTALS/SI/THERMODYNAMICS-II

SAN DIEGO, CA, HILTON RESORT & SPA, ST. TROPEZ

1:30PM - 3:00PM

Session Chair: **Tiegang Fang**, NC State University, United States

Session Co-Chair: Isaac Ekoto, 7011 East avenue, Livermore, CA, United States **Marcis Jansons**, Wayne State University, Grosse Pointe, MI, United States,

EXPERIMENTAL INVESTIGATION OF A HEAVY-DUTY CI ENGINE RETROFITTED TO NATURAL GAS SI OPERATION

Technical Paper Publication. ICEF2018-9611

Jinlong Liu, Hemanth Bommisetty, Cosmin Dumitrescu, West Virginia University, Morgantown, WV, United States

PERFORMANCE AND COMBUSTION INVESTIGATION OF A LEAN BURN NATURAL GAS ENGINE USING CFD

Technical Paper Publication. ICEF2018-9613

Sridhar Sahoo, Srinibas Tripathy, Dhananjay Kumar Srivastava, Indian Institute of Technology Kharagpur, Kharagpur, India

A COMPUTATIONAL INVESTIGATION OF NON-PREMIXED COMBUSTION OF NATURAL GAS INJECTED INTO MIXTURE OF ARGON AND OXYGEN

Technical Paper Publication. ICEF2018-9618

Martia Shahsavan, Mohammadrasool Morovatiyan, John Mack, University of Massachusetts Lowell, Lowell, MA, United States

3-4 LTC/GCI/RCCI/HCCI

SAN DIEGO, CA, HILTON RESORT & SPA, PORTOFINO

1:30PM - 3:00PM

Session Chair: **Brian Fisher**, Naval Research Laboratory, Washington, DC
Session Co-Chair: **Siddhartha Banerjee**, EtaGen, Menlo Park, CA, United States

EFFECTS OF PORT FUEL AND DIRECT INJECTION STRATEGIES AND INTAKE CONDITIONS ON GASOLINE COMPRESSION IGNITION OPERATION

Technical Paper Publication. ICEF2018-9723

Buyu Wang, Thomas Wallner Argonne National Laboratory, Lemont, IL, United States, **Michael Pamminger**, Illinois Institute of Technology, Chicago, IL, United States

HYDROUS ETHANOL STEAM REFORMING AND THERMOCHEMICAL RECUPERATION TO IMPROVE DUAL-FUEL DIESEL ENGINE EMISSIONS AND EFFICIENCY

Technical Paper Publication. ICEF2018-9753

Jeffrey Hwang, University of Minnesota, Plymouth, MN, United States, **Seamus Kane, William Northrop**, University of Minnesota, Minneapolis, MN, United States

ASSESSING THE IMPACT OF THERMAL BARRIER COATINGS ON CHARGE TEMPERATURE STRATIFICATION WITHIN A HOMOGENEOUS CHARGE COMPRESSION IGNITION ENGINE

Technical Paper Publication. ICEF2018-9762

Ryan O'Donnell, Zoran Filipi, Clemson University, Greenville, SC, United States, **Tom Powell**, Clemson University - ICAR, Greenville, SC, United States, **Mark Hoffman**, Auburn University, Auburn, AL, United States

Technical Sessions

TRACK 4 EMISSIONS CONTROL SYSTEMS

Track Chair: **Alexander Sappok**, CTS Corporation, Boston Innovation Office, Malden, MA, United States

Track Co-Chair: **Shahrokh Etemad**, Fairfield University, Fairfield, CT, United States

4-1 EMISSIONS MEASUREMENT AND CATALYST SYSTEMS

SAN DIEGO, CA, HILTON RESORT & SPA, MARSEILLES

1:30PM - 3:00PM

Session Chair: **Andrea Strzelec**, Mississippi State University, Starkville, MS, United States

Session Co-Chair: **Richard Blint**, N2Kinetics Research, a, MI, United States

SCR-CATALYST UTILISATION AND MIXING COMPARISON USING A NOVEL BIOMIMETIC FLASH-BOILING INJECTOR

Technical Paper Publication. ICEF2018-9763

Peter Larsson, Lars-Uno Larsson, Swedish Biomimetics 3000 AB, Malmö, Sweden, **Paul Ravenhill**, Swedish Biomimetics 3000 AB, Hethel, Norfolk, United Kingdom, Sweden, **Per Tunestal**, Lund University, Lund, Sweden

EFFECTS OF INJECTION PRESSURE ON EMISSION AND COMPONENTS OF PARTICULATE MATTER FROM MARINE DIESEL ENGINE

Technical Paper Publication. ICEF2018-9644

Mayuko Nakamura, Atsuto Ohashi, Akiko Masuda, Chiori Takahashi, National Institute of Maritime, Port and Aviation Technology, Tokyo, Japan, **Yoichi Niki**, National Institute of Maritime, Port and Aviation Technology, Mitaka-Shi, Japan

EXHAUST EMISSION CHARACTERISTICS OF EXCAVATOR WITH 6.0 LITER DIESEL ENGINE IN REAL WORK CONDITIONS

Technical Paper Publication. ICEF2018-9777

Sang-Il Kwon, National Institute of Environmental Research, Incheon, Korea (Republic), **Sung-Woo Kim, Ki-Ho Kim**, Korea Petroleum Quality & Distribution Authority, Chungcheongbuk-do, Korea (Republic), **Youngho Seo**, Korea Automotive Technology Institute, Cheonan-si, Korea (Republic), **Mun Soo Chon**, Korean National University of Transportation, Chungju-si, Korea (Republic), **Daesik Kim**, Gangneung-Wonju National University, Wonju, Gangwon, Korea (Republic), **Sungwook Park**, Hanyang University, Seoul, Korea (Republic), **Hyun-Gu Roh**, Induk University, Seoul, Korea (Republic), **Hyun Kyu Suh**, Kongju National University, Cheonan-Si, Korea (Republic), **Suhan Park**, Chonnam National University, Gwangju, Korea (Republic)

TRACK 6 NUMERICAL SIMULATION

Track Chair: **Caroline Genzale**, Georgia Tech, Decatur, GA, United States

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

6-2 CI COMBUSTION AND KINETICS MODELING

SAN DIEGO, CA, HILTON RESORT & SPA, MONTE CARLO

1:30PM - 3:00PM

Session Chair: **Muhsin Ameen**, Argonne National Laboratory, Downers Grove, IL, United States

NUMERICAL INVESTIGATION OF COMBUSTION RECESSON ON ECN DIESEL SPRAY A

Technical Paper Publication. ICEF2018-9597

Xiaohang Fang, Riyaz Ismail, Martin Davy, University of Oxford, Oxford, United Kingdom, **Joseph Camm**, Loughborough University, Loughborough, United Kingdom

NUMERICAL INVESTIGATION OF FUEL EFFECTS ON SOOT EMISSIONS AT HEAVY-DUTY DIESEL ENGINE CONDITIONS

Technical Paper Publication. ICEF2018-9696

Meng Tang, Jeffrey Naber, Seong-Young Lee, Michigan Technological University, Houghton, MI, United States, **Yuanjiang Pei, Yu Zhang, Michael Traver, David J. Cleary**, Aramco Research Center - Detroit, Novi, MI, United States, **Zhaoyu Luo**, Convergent Science Inc., Madison, WI, United States

MODELING THE EFFECT OF PARAMETRIC VARIATIONS ON SOOT PARTICLE SIZE DISTRIBUTION IN A DIESEL ENGINE

Technical Paper Publication. ICEF2018-9699

Pavan Prakash Duvvuri, Rajesh Kumar Shrivastava, Cummins Inc., Pune, Maharashtra, India, **Sujith Sukumaran**, Cummins Inc., Columbus, IN, United States, **Sreedhara S.**, IIT Bombay, Mumbai, Maharashtra, India

TRACK 7 ENGINE DESIGN AND MECHANICAL DEVELOPMENT

Track Chair: **Dan Richardson**, Cummins, Columbus, IN, United States

Track Co-Chair: **David Rutledge**, Cummins, Columbus, IN, United States

7-2 DESIGN II

SAN DIEGO, CA, HILTON RESORT & SPA, MARBELLA

1:30PM - 3:00PM

Session Chair: **David Rutledge**, Cummins, Columbus, IN, United States

A CONCEPTUAL STUDY FOR THE SMALLEST POSSIBLE DIESEL ENGINE - POTENTIAL AND LIMITATIONS

Technical Paper Publication. ICEF2018-9522

Yousef Jeihouni, Michael Franke, FEV North America, Inc., Auburn Hills, MI, United States, **Avnish Dhongde**, RWTH Aachen University, Aachen, NRW, Germany, **Harsh Sankhla**, FEV GmbH, Aachen, NRW, Germany

SIMULATION AND EXPERIMENTAL STUDY OF A DIESEL ENGINE BASED ON AN ELECTRO-HYDRAULIC FVVA SYSTEM

Technical Paper Publication. ICEF2018-9541

Yong Lu, Jian Li, Lijun Xiong, Bo Li, Harbin Engineering University, Harbin, China

DEVELOPMENT OF A NEW FOUR VALVE CYLINDER HEAD TO INCREASE THE EFFICIENCY OF A WORLDWIDE HIGH RELIABLE GAS ENGINE

Technical Paper Publication. ICEF2018-9646

Ruediger Herdin, Andreas Herdin, PGES GmbH, Vienna, Austria, Hans Alten, HERON Technik GmbH, Graz, Austria, Guenther Herdin, PGES GmbH, Dietach, Austria, Dominik Mairegger, PGES GmbH, Jenbach, Tirol, Austria

TRACK 1 LARGE BORE ENGINES

Track Chair: *Dustin Osborne, SWRI, San Antonio, TX, United States*

Track Co-Chair: *Munidhar Biruduganti, Argonne National Lab, Lemont, IL, United States*

1-1 LARGE BORE I

SAN DIEGO, CA, HILTON RESORT & SPA, LAS PALMAS

3:30PM - 5:30PM

Session Chair: *Christopher Stoos, Southwest Research Institute, San Antonio, TX, United States*

IGNITION OF DIESEL PILOT FUEL IN DUAL-FUEL ENGINES

Technical Paper Publication. ICEF2018-9671

Marcus Grochowina, Technical University of Munich, Munich, Germany, Daniel Hertel, Simon Tartsch, Thomas Sattelmayer, Technical University of Munich, Garching, Bavaria, Germany

EVALUATION OF STRATEGIES FOR HIGHLY TRANSIENT OPERATION OF DIESEL-GAS ENGINES

Technical Paper Publication. ICEF2018-9710

Maximilian Malin, Christoph Redtenbacher, Nicole Wermuth, Gottfried Lurf, LEC GmbH, Graz, Austria, Andreas Wimmer, LEC GmbH / Graz University of Technology, Graz, Austria

INFLUENCE OF DIESEL FUEL INJECTION CHARACTERISTICS ON DUAL FUEL COMBUSTION MODES IN A LARGE BORE, MEDIUM SPEED ENGINE

Technical Paper Publication. ICEF2018-9765

Adam E Klingbeil, General Electric Company, Niskayuna, NY, United States, John (Seunghyuck) Hong, Roy Primus, GE Global Research, Niskayuna, NY, United States

PERFORMANCE CHARACTERIZATION OF ALTERNATIVE IGNITION SYSTEMS USING OPTICAL TOOLS IN NATURAL GAS ENGINES

Technical Paper Publication. ICEF2018-9704

Bipin Bihari, Munidhar Biruduganti, Roberto Torelli, Argonne National Lab, Lemont, IL, United States, Dan Singleton, Transient Plasma Systems, Inc., Torrance, CA, United States

TRACK 3 ADVANCED COMBUSTION

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

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

3-5 FUNDAMENTALS/SI/THERMODYNAMICS-III

SAN DIEGO, CA, HILTON RESORT & SPA, ST. TROPEZ

3:30PM - 5:30PM

OPTIMIZATION OF ELECTRODE ARRANGEMENT AND PRECHAMBER GEOMETRY OF PASSIVE PRECHAMBER SPARK PLUGS FOR TURBOCHARGED GAS ENGINES WITH HIGH CHARGE MOTION

Technical Paper Publication. ICEF2018-9628

Dominik Mairegger, PGES GmbH, Jenbach, Tirol, Austria, Ruediger Herdin, PGES GmbH, Vienna, Austria, Lucas Konstantinoff, Lukas Moeltner, MCI Innsbruck, Innsbruck, Austria

AN EXHAUST GAS TEMPERATURE INCREASE TECHNIQUE USING EGR DEVICE FOR THE APPLICATION OF WASTE HEAT RECOVERY TECHNOLOGY ON A LEAN BURN GAS ENGINE

Technical Paper Publication. ICEF2018-9635

Yasuhisa Ichikawa, Hidenori Sekiguchi, Oleksiy Bondarenko, Koichi Hirata, National Institute of Maritime, Port and Aviation Technology, Mitaka-Shi, Tokyo, Japan

CHARACTERIZATION OF THE EFFECT OF EXHAUST BACK PRESSURE ON CRANK ANGLE-RESOLVED EXHAUST EXERGY IN A DIESEL ENGINE

Technical Paper Publication. ICEF2018-9706

Hamidreza Mahabadipour, Kendyl Partridge, Prabhat Jha, Sundar Rajan Krishnan, University of Alabama, Tuscaloosa, AL, United States, Kalyan Srinivasan, The University of Alabama, Starkville, MS, United States

SYSTEMATIC UNCERTAINTY CONSIDERATIONS IN THE COMPARISON OF EXPERIMENTAL AND COMPUTED CYLINDER PRESSURE AND HEAT RELEASE HISTORIES

Technical Paper Publication. ICEF2018-9707

Kendyl Partridge, Prabhat Jha, Hamidreza Mahabadipour, Sundar Rajan Krishnan, University of Alabama, Tuscaloosa, AL, United States, Kalyan Srinivasan, The University of Alabama, Starkville, MS, United States

Technical Sessions

3-6 COMBUSTION DIAGNOSTICS-II

SAN DIEGO, CA, HILTON RESORT & SPA, PORTOFINO

3:30PM - 5:30PM

Session Chair: **Brian Fisher**, Naval Research Laboratory, Washington, DC

Session Co-Chair: **Marcis Jansons**, Wayne State University, Detroit, MI
United States

EFFECTS OF VARIOUS DISCHARGE STRATEGIES ON IGNITION OF LEAN METHANE/AIR MIXTURE

Technical Paper Publication. ICEF2018-9648

Shuai Huang, Tie Li, Chongmin Wu, Bin Wang, Shanghai Jiao Tong University, Shanghai, China, **Ming Zheng**, Univ Of Windsor, Windsor, ON, Canada

INVESTIGATION OF THE EFFECT OF ELECTRODE SURFACE ROUGHNESS ON SPARK IGNITION

Technical Paper Publication. ICEF2018-9691

Mohammadrasool Morovatiyan, Martia Shahsavan, Mengyan Shen, John Mack, University of Massachusetts Lowell, Lowell, MA, United States

DATA MINING APPLICATIONS ON DETECTING VORTEX CENTER CHARACTERISTICS OF CYCLE-BASED IN-CYLINDER FLOW IN A SPARK-IGNITION DIRECT-INJECTION ENGINE

Technical Paper Publication. ICEF2018-9741

Fengnian Zhao, Jianhua Zhou, Penghui Ge, Xuesong Li, Min Xu, Shanghai Jiao Tong University, Shanghai, China, **David L.S. Hung**, Univ of Michigan-Shanghai Jiao Tong Univ Joint Ins, Shanghai, China

FLAME EMISSION CHARACTERISTICS IN A DIRECT INJECTION SPARK IGNITION OPTICAL ENGINE USING IMAGE PROCESSING BASED DIAGNOSTICS

Technical Paper Publication. ICEF2018-9746

Zhe Sun, Zhen Ma, Xuesong Li, Min Xu, Shanghai Jiao Tong University, Shanghai, China

TRACK 4 EMISSIONS CONTROL SYSTEMS

Track Chair: **Alexander Sappok**, CTS Corporation, Boston Innovation Office, Malden, MA, United States

Track Co-Chair: **Shahrokh Etemad**, Fairfield University, Fairfield, CT, United States

4-2 PARTICULATE FILTER SYSTEMS

SAN DIEGO, CA, HILTON RESORT & SPA, MARSEILLES

3:30PM - 5:30PM

Session Chair: **Paul Ragaller**, CTS Corporation, Boston Innovation Office, Malden, MA, United States

Session Co-Chair: **Sandeep Viswanathan**, Corning Inc., Corning, NY, United States

DIRECT SIMULTANEOUS MEASUREMENT OF PARTICULATE MATTER AND AMMONIA STORAGE ON COMBINED SELECTIVE CATALYTIC REDUCTION FILTER SYSTEMS USING RADIO FREQUENCY SENSORS

Technical Paper Publication. ICEF2018-9528

Paul Ragaller, Alexander Sappok, Jie Qiao, Xiaojin Liu, Jonathan Aguilar, CTS Corporation, Boston Innovation Office, Malden, MA, United States

EXPERIMENTAL INVESTIGATION OF SOOT ACCUMULATION AND REGENERATION IN A CATALYZED GASOLINE PARTICULATE FILTER UTILIZING PARTICULATE QUANTIFICATION AND GAS SPECIATION MEASUREMENTS

Technical Paper Publication. ICEF2018-9627

Dhruvang Rathod, Zoran Filipi, Clemson University, Greenville, SC, United States, **Simona Onori**, Stanford University, Stanford, CA, United States, **MARK HOFFMAN**, Auburn University, Auburn, AL, United States

DESIGN AND EXPERIMENTAL VALIDATION OF A SPATIALLY DISCRETIZED, CONTROL-ORIENTED TEMPERATURE MODEL FOR A CERIA-WASHCOATED GASOLINE PARTICULATE FILTER

Technical Paper Publication. ICEF2018-9687

Sean Moser, Clemson University International Center for Automotive Research, Greenville, SC, United States, **Simona Onori**, Stanford University, Stanford, CA, United States, **Mark Hoffman**, Auburn University, Auburn, AL, United States

TRACK 5 INSTRUMENTATION, CONTROLS, AND HYBRIDS

Track Chair: **Fabrizio Ponti**, University of Bologna - DIN, Forli, Italy

Track Co-Chair: **Richard Burke**, University of Bath, Bath, United Kingdom

5-2 ENGINE SYSTEM CONTROLS

SAN DIEGO, CA, HILTON RESORT & SPA, MARBELLA

3:30PM - 5:30PM

Session Chair: **Fabrizio Ponti**, University of Bologna - DIN, Forli, Italy

Session Co-Chair: **Richard Burke**, University of Bath, Bath, United Kingdom

COMBUSTION VARIABILITY MODEL FOR CONTROL OF INJECTION TIMING FOR EXHAUST HEATING

Technical Paper Publication. ICEF2018-9638

Mitchell Bieniek, Anna Stefanopoulou, University of Michigan, Ann Arbor, Ann Arbor, MI, United States, **John Hoard**, University of Michigan, South Lyon, MI, United States, **Brien Fulton, Michiel Nieuwstadt**, Ford Motor Company, Dearborn, MI, United States

HEAT RELEASE EXPERIMENTAL ANALYSIS FOR RCCI COMBUSTION OPTIMIZATION

Technical Paper Publication. ICEF2018-9714

Vittorio Ravaglioli, Fabrizio Ponti, Filippo Carra, University of Bologna - DIN, Forli, Italy, **Matteo De Cesare**, Magneti Marelli spa Powertrain, Bologna, Italy

ANALYSIS OF THE OPPORTUNITIES AND TRADE-OFFS FOR AN 48V ELECTRIFIED AIR PATH

Technical Paper Publication. ICEF2018-9583

Yang Liu, Ramkumar Vijayakumar, Richard Burke, University of Bath, Bath, United Kingdom

COORDINATED CONTROL STRATEGY IN ENGINE STARTING PROCESS FOR A NOVEL COMPOUND POWER - SPLIT HYBRID ELECTRIC VEHICLE

Technical Paper Publication. ICEF2018-9651

Dengfeng Shen, Clemens Gühmann, Xizhen Dong, TU Berlin, Berlin, Berlin, Germany, **Tong Zhang**, Corun CHS Technology Co., Ltd., Shanghai, Shanghai, China

TRACK 6 NUMERICAL SIMULATION

Track Chair: **Caroline Genzale**, Georgia Tech, Decatur, GA, United States

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

6-4 ENGINE SIMULATION

SAN DIEGO, CA, HILTON RESORT & SPA, MONTE CARLO

3:30PM - 5:30PM

Session Chair: **Haiwen Ge**, Texas Tech University, Lubbock, TX, United States

Session Co-Chair: **Seong-Young Lee**, Michigan Technological University, Houghton, MI, United States

TURBULENT REACTIVE FLOW MODELING IN ENGINES: FEARCE, A ROBUST AND ACCURATE SOFTWARE FOR SIMULATING ENGINE DYNAMICS

Technical Paper Publication. ICEF2018-9552

David Carrington, Jiajia Waters, Los Alamos National Laboratory, Los Alamos, NM, United States

NUMERICAL ANALYSIS OF THE COMBUSTION PROCESS IN DUAL-FUEL ENGINES WITH DIRECT INJECTION OF NATURAL GAS

Technical Paper Publication. ICEF2018-9579

Michael Jud, Christoph Wieland, Georg Fink, Thomas Sattelmayer, Technical University of Munich, Garching, Bavaria, Germany

NUMERICAL SIMULATION OF IGNITION MECHANISM IN THE MAIN CHAMBER OF SPARK-IGNITED NATURAL GAS ENGINES

Technical Paper Publication. ICEF2018-9587

Matias Muller, Corbin Freeman, Haiwen Ge, Texas Tech University, Lubbock, TX, United States, **Peng Zhao**, Oakland University, Rochester Hills, MI, United States

NUMERICAL STUDY ON EVAPORATION OF LUBRICATING OIL DROPLETS IN THE NATURAL GAS ENGINE CONDITIONS

Technical Paper Publication. ICEF2018-9639

Liyang Feng, Zixin Wang, Ping Yi, Weixin Gong, Jingchen Cui, Lei Chen, Jiangping Tian, Wuqiang Long, Dalian University of Technology, Dalian, Liaoning, China

Technical Sessions

TUESDAY, NOVEMBER, 06

TRACK 1 LARGE BORE ENGINES

Track Chair: **Dustin Osborne**, SWRI, San Antonio, TX, United States

Track Co-Chair: **Munidhar Biruduganti**, Argonne National Lab, Lemont, IL, United States

1-2 LARGE BORE II

SAN DIEGO, CA, HILTON RESORT & SPA, LAS PALMAS

9:30AM - 12:00PM

Session Chair: **Matthew Hart**, GE Transportation, ERIE, PA, United States

HEAVY DUTY ENGINE PISTON COOLING GALLERY OIL FILLING RATIO MEASUREMENT AND COMPARISON OF RESULTS WITH SIMULATION

Technical Paper Publication. ICEF2018-9582

Yu Chen, Shashank Moghe, MAHLE Engine Components USA, Inc., Farmington Hills, MI, United States

EXPERIMENTAL AND NUMERICAL INVESTIGATION OF THE ARGON POWER CYCLE

Technical Paper Publication. ICEF2018-9670

Miguel Sierra Aznar, Farouk Chorou, Noble Thermodynamic Systems, Inc., Berkeley, CA, United States, **Jyh-Yuan Chen**, University of California at Berkeley, Berkeley, CA, United States, **Andreas Dreizler**, Technische Universität Darmstadt, Darmstadt, Hesse, Germany, **Robert W. Dibble**, King Abdullah University of Science and Technology, Thuwal, Makkah, Saudi Arabia

OPTIMUM OPERATING STRATEGIES FOR GAS ENGINES USING VARIABLE INTAKE VALVE TRAIN

Technical Paper Publication. ICEF2018-9523

Jan Zelenka, Claudio Hoff, Andreas Wimmer, LEC GmbH, Graz, Austria, **Claudio Christen**, ABB Turbo Systems Ltd., Baden, Switzerland, **Robert Böwing, Josef Thalhauser**, GE Jenbacher GmbH & Co OG, Jenbach, Austria

LINER DESIGN TO REDUCE UNBURNED HYDROCARBON EXHAUST EMISSIONS

Technical Paper Publication. ICEF2018-9682

Paul Wang, Caterpillar Inc., Peoria, IL, United States, **Allen Y Chen**, Caterpillar Inc., Dunlap, IL, United States

TRACK 2 FUELS

Track Chair: **Gregory Bogin**, Colorado School of Mines, Golden, CO, United States

Track Co-Chair: **Hailin Li**, West Virginia University, Morgantown, WV, United States

2-3 COMPRESSION IGNITION

SAN DIEGO, CA, HILTON RESORT & SPA, MARBELLA

9:30AM - 12:00PM

Session Chair: **Valentin Soloiu**, Georgia Southern University, Statesboro, GA, United States

Session Co-Chair: **Xin He**, Aramco Services Company, Novi, MI, United States

GTL KEROSENE AND N-BUTANOL IN RCCI MODE - COMBUSTION AND EMISSIONS INVESTIGATION

Technical Paper Publication. ICEF2018-9585

Valentin Soloiu, Jose Moncada, Remi Gaubert, Spencer Harp, Marcel Ilie, Justin Wiley, Georgia Southern University, Statesboro, GA, United States

EFFECTS OF N-BUTANOL CONTENT ON THE DUAL-FUEL COMBUSTION MODE WITH CNG AT TWO ENGINE SPEEDS

Technical Paper Publication. ICEF2018-9595

Xiangyu Meng, Wuqiang Long, Yihui Zhou, Mingshu Bi, Dalian University of Technology, Dalian, Liaoning, China, **Chia-Fon Lee**, University of Illinois at Urbana-Champaign, Beijing Institute of Technology, Urbana, IL, United States

INVESTIGATION OF THE IMPACT OF ADDING TITANIUM DIOXIDE TO JOJOBA BIODIESEL-DIESEL-N-HEXANE MIXTURE ON THE PERFORMANCE AND EMISSION CHARACTERISTICS OF A DIESEL ENGINE

Technical Paper Publication. ICEF2018-9647

Ahmed I. Elseesy, Hamdy Hassan, Egypt-Japan University of Science and Technology, Alexandria, Egypt, **Alaa Dawood**, Benha University, Mechanical Engineering Department, Benha Faculty of Engineering, Benha, Qal, Benha, Egypt, **Ali M.A. Attia**, Benha University, Benha, Qal, Egypt, **Shinichi Ookawara**, School of Materials and Chemical Technology, Department of Chemical Science and Engineering, Tokyo, Japan, **Hidenori Kosaka**, Tokyo Institute of Technology, Department of Systems and Control Engineering, Tokyo, Japan

QUANTIFICATION AND ANALYSIS OF THE CHARGE COOLING EFFECT OF METHANOL IN A COMPRESSION IGNITION ENGINE UTILIZING PPC STRATEGY

Technical Paper Publication. ICEF2018-9657

Sam Shamun, Pravesh Shukla, Pablo Garcia Valladolid, Sebastian Verhelst, Martin Tunér, Lund University, Lund, Scania, Sweden, **Burak Zincir**, Istanbul Technical University, Istanbul, Tuzla, Turkey

CI ENGINE MODEL PREDICTIVE CONTROL WITH AVAILABILITY DESTRUCTION MINIMIZATION

Technical Paper Publication. ICEF2018-9673

Muataz Abotabik, Rick Meyer, Western Michigan University, Kalamazoo, MI, United States

TRACK 3 ADVANCED COMBUSTION

Track Chair: **Sundar Rajan Krishnan**, niversity of Alabama, Tuscaloosa, AL, United States

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

3-7 LTC/GCI/RCCI/HCCI-II

SAN DIEGO, CA, HILTON RESORT & SPA, ST. TROPEZ

9:30AM - 12:00PM

MEDIUM AND HIGH LOAD PERFORMANCE OF PARTIALLY PREMIXED COMBUSTION IN A WAVE-PISTON MULTI-CYLINDER ENGINE WITH DIESEL AND PRF70 FUEL

Technical Paper Publication. ICEF2018-9568

Kenan Muric, Per Tunestal, Lund University, Lund, Sweden, **Ingemar Magnusson**, Volvo Group, Gothenburg, Sweden

NUMERICAL ANALYSIS OF A SIX-STROKE GASOLINE COMPRESSION IGNITION (GCI) ENGINE COMBUSTION WITH CONTINUOUSLY VARIABLE VALVE DURATION (CVVD) CONTROL

Technical Paper Publication. ICEF2018-9590

Oudumbar Rajput, Youngchul Ra, Michigan Technological University, Houghton, MI, United States, **Kyoung-Pyo Ha**, Hyundai Motor Company, Gyeonggi-do, Korea (Republic), **You-sang Son**, Hyundai Motor Company, Seoul, Korea (Republic)

INITIAL RESULTS ON A NEW LIGHT-DUTY 2.7L OPPOSED-PISTON GASOLINE COMPRESSION IGNITION MULTI-CYLINDER ENGINE

Technical Paper Publication. ICEF2018-9610

Ashwin Salvi, Reed Hanson, Rodrigo Zermeno, Gerhard Regner, Fabien Redon, Achates Power, Inc., San Diego, CA, United **Mark Sellnau**, Delphi Technologies, Bloomfield Hills, MI, United States

APPLICATION OF VARIABLE VALVE ACTUATION STRATEGIES AND DIRECT GASOLINE INJECTION SCHEMES TO REDUCE COMBUSTION HARSHNESS AND EMISSIONS OF BOOSTED HCCI ENGINE

Technical Paper Publication. ICEF2018-9625

Jacek Hunicz, Lublin University of Technology, Lublin, Poland, **Maciej Mikulski**, TNO Automotive, Helmond, Netherlands

EMISSION AND COMBUSTION CHARACTERISTICS OF DIESEL ENGINE FUMIGATED WITH AMMONIA

Technical Paper Publication. ICEF2018-9634

Yoichi Niki, Yoshifuru Nitta, Hidenori Sekiguchi, Koichi Hirata, National Institute of Maritime, Port and Aviation Technology, Mitaka-Shi, Toyko, Japan

TRACK 6 NUMERICAL SIMULATION

Track Chair: **Caroline Genzale**, Georgia Tech, Decatur, GA, United States

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

6-3 SI COMBUSTION AND TURBULENT FLOW MODELING

SAN DIEGO, CA, HILTON RESORT & SPA, MONTE CARLO

9:30AM - 12:00PM

Session Chair: **Noah Van Dam**, Argonne National Lab, Chicago, IL, United States

Session Co-Chair: **Mingjie Wang**, Convergent Science, Madison, WI, United States

A COMPREHENSIVE IGNITION SYSTEM MODEL FOR SPARK IGNITION ENGINES

Technical Paper Publication. ICEF2018-9574

Haiwen Ge, Texas Tech University, Lubbock, TX, United States, **Peng Zhao**, Oakland University, Rochester Hills, MI, United States

PREDICTION OF CYCLIC VARIABILITY AND KNOCK-LIMITED SPARK ADVANCE (KLSA) IN SPARK-IGNITION (SI) ENGINE

Technical Paper Publication. ICEF2018-9605

Zongyu Yue, Argonne National Laboratory, Argonne, IL, United States, **Kevin Dean Edwards**, Oak Ridge National Laboratory, Knoxville, TN, United States, **C. Scott Sluder**, Oak Ridge National Laboratory, Oak Ridge, TN, United States, **Sibendu Som**, Argonne National Laboratory, Naperville, IL, United States

DEVELOPMENT OF A SPECIES-BASED EXTENDED COHERENT FLAMELET MODEL (SB-ECFM) FOR GASOLINE DIRECT INJECTION ENGINE (GDI) SIMULATIONS

Technical Paper Publication. ICEF2018-9684

Olivier Colin, Stephane Chevillard, Julien Bohbot, IFP Energies nouvelles, Rueil-Malmaison Cedex, France, **P.K. Senecal, Eric Pomraning, Mingjie Wang**, Convergent Science, Madison, WI, United States

NUMERICAL EVALUATION OF THE EFFECTS OF LOW PRESSURE EGR MIXER CONFIGURATION ON TURBOCHARGER COMPRESSOR PERFORMANCE

Technical Paper Publication. ICEF2018-9686

Amin Reihani, University of Michigan, Ann Arbor, MI, United States, **John Hoard**, University of Michigan, South Lyon, MI, United States, **Stefan Klinkert, Chih-Kuang Kuan, Daniel Styles**, Ford Motor Company, Dearborn, MI, United States

Technical Sessions

DEVELOPMENT OF A HYBRID LAGRANGIAN-EULERIAN MODEL TO DESCRIBE SPARK-IGNITION PROCESSES AT ENGINE-LIKE TURBULENT FLOW CONDITIONS

Technical Paper Publication. ICEF2018-9690

Riccardo Scarcelli, Anqi Zhang, Argonne National Laboratory, Lemont, IL, United States, **Thomas Wallner**, Argonne National Laboratory, Argonne, IL, United States, **Sibendu Som**, Argonne National Laboratory, Naperville, IL, United States, **Jing Huang, Sameera Wijeyakulasuriya, Yijin Mao**, Convergent Science, Inc., Madison, WI, United States, **Xiucheng Zhu, Seong-Young Lee**, Michigan Technological University, Houghton, MI, United States

6-5 1-D AND COUPLED MODELING APPROACHES SAN DIEGO, CA, HILTON RESORT & SPA, PORTOFINO 9:30AM - 12:00PM

Session Chair: **Seunghwan Keum**, General Motors, Pontiac, MI, United States

Session Co-Chair: **Gina Magnotti**, Argonne National Laboratory, Argonne, IL, United States

NUMERICAL INVESTIGATION ON LNG INJECTION IN A SI-ICE

Technical Paper Publication. ICEF2018-9532

Gianluca Pasini, Maria Berardi, Stefano Frigo, Marco Antonelli, University of Pisa - DESTEC, Pisa, Italy

IMPACT OF A HOLISTIC TURBOCHARGER MODEL IN THE PREDICTION OF ENGINES PERFORMANCE IN TRANSIENT OPERATION AND IN STEADY STATE WITH LP-EGR

Technical Paper Publication. ICEF2018-9550

Jose R. Serrano, Francisco Arnau, Luis Miguel García-Cuevas González, Alejandro Gomez-Vilanova, Universitat Politècnica de València, Valencia, Spain, **Stephane Guilain**, Groupe Renault, Lardy, France

INVESTIGATION OF THE NO₂ FORMATION KINETICS IN DUAL-FUEL ENGINES WITH LEAN PREMIXED METHANE-AIR CHARGE

Technical Paper Publication. ICEF2018-9581

Ehsan Arabian, Thomas Sattelmayer, Technical University of Munich, Garching, Bavaria, Germany

COMPARISON OF NEAR-WALL FLOW AND HEAT TRANSFER OF AN INTERNAL COMBUSTION ENGINE USING PARTICLE IMAGE VELOCIMETRY AND COMPUTATIONAL FLUID DYNAMICS

Technical Paper Publication. ICEF2018-9676

Angela Wu, Mark Greene, David Reuss, Volker Sick, University of Michigan, Ann Arbor, MI, United States, **Seunghwan Keum**, General Motors, Pontiac, MI, United States

COMPUTATIONAL FLUID DYNAMICS SIMULATION OF AN OPPOSED-PISTON TWO-STROKE GASOLINE COMPRESSION IGNITION ENGINE

Technical Paper Publication. ICEF2018-9713

Ahmed Moiz, SwRI, San Antonio, TX, United States, **Janardhan Kodavasal**, Argonne National Lab, Argonne, IL, United States, **Sibendu Som**, Argonne National Laboratory, Naperville, IL, United States, **Reed Hanson, Fabien Redon, Rodrigo Zermeno**, Achates Power Inc., San Diego, CA, United States

TRACK 7 ENGINE DESIGN AND MECHANICAL DEVELOPMENT

Track Chair: **Dan Richardson**, Cummins, Columbus, IN, United States

Track Co-Chair: **David Rutledge**, Cummins, Columbus, IN, United States

7-3 DESIGN III

SAN DIEGO, CA, HILTON RESORT & SPA, MARSEILLES 9:30AM - 12:00PM

Session Chair: **Sanjib Chowdhury**, Cummins, Columbus, IN, United States

DESIGN OF AN ADVANCED AIR PATH TEST STAND FOR STEADY AND TRANSIENT EVALUATION

Technical Paper Publication. ICEF2018-9567

Ramkumar Vijayakumar, Richard Burke, Yang Liu, James W. G. Turner, University of Bath, Bath, Somerset, United Kingdom

SPRAY EVAPORATIVE COOLING SYSTEM DESIGN FOR AUTOMOTIVE IC ENGINES

Technical Paper Publication. ICEF2018-9659

Jisjoe Thalackottore-Jose, Julian Dunne, Jean-Pierre Pirault, Christopher Long, University of Sussex, Brighton, United Kingdom

ANALYSIS OF DIFFERENT UNIFLOW SCAVENGING OPTIONS FOR A MEDIUM-DUTY 2-STROKE ENGINE FOR A US LIGHT-TRUCK APPLICATION

Technical Paper Publication. ICEF2018-9766

James W. G. Turner, Roshan Wijetunge, David W. Blundell, Paul Burke, University of Bath, Bath, Somerset, United Kingdom, **Robert A. Head, Junseok Chang, Saudi Aramco**, Dhahran, Saudi Arabia, Nayan Engineer, Aramco Research Center, Novi, MI, United States

NUMERICAL STUDY ON FRETTING WEAR OF MATING SURFACE BETWEEN PISTON CROWN AND SKIRT IN HEAVY DUTY DIESEL ENGINE

Technical Paper Publication. ICEF2018-9621

Yi Wang, Shuo Liu, Xianghui Meng, Yi Cui, Shanghai Jiao Tong University, Shanghai, China, **Limin Wu**, Shanghai Marine Diesel Engine Research Institute, Shanghai, China, **Mei Li**, Shanghai Marine Diesel Engine Research Institute, Shanghai, Christmas Island, China

PISTON RINGS FRICTION COMPARISON IN A FREE PISTON AND CONVENTIONAL CRANKSHAFT ENGINES

Technical Paper Publication. ICEF2018-9774

Mehar Bade, Nigel Clark, Terence Musho, Parviz Famouri, West Virginia University, Morgantown, WV, United States

TRACK 1 LARGE BORE ENGINES

Track Chair: **Dustin Osborne**, SWRI, San Antonio, TX, United States

Track Co-Chair: **Munidhar Biruduganti**, Argonne National Lab, Lemont, IL, United States

1-3 LARGE BORE III

SAN DIEGO, CA, HILTON RESORT & SPA, MARBELLA

1:30PM - 3:30PM

Session Chair: **Munidhar Biruduganti**, Argonne National Lab, Lemont, IL, United States

STUDY ON THE PHENOMENOLOGICAL SPRAY MODELLING OF HEAVY OIL FOR MARINE DIESEL ENGINES

Technical Paper Publication. ICEF2018-9505

Changfu Han, Long Liu, Dai Liu, Yan Peng, Harbin Engineering University, Harbin, China

AN EXPERIMENTAL STUDY ON FUEL ECONOMY IMPROVEMENT OF A MARINE DIESEL ENGINE USING A SEQUENTIAL TURBOCHARGING SYSTEM

Technical Paper Publication. ICEF2018-9569

Hechun Wang, Yinyan Wang, Harbin Engineering University, Harbin City, Heilongjiang, China, **Xiannan Li**, Shanghai Marine Diesel Engine Research Institute, Shanghai, China, **Hailin Li**, West Virginia University, Morgantown, WV, United States

FUEL CONSUMPTION AND EMISSIONS IN TRANSIENT OPERATION DURING SHIP MANEUVERING

Technical Paper Publication. ICEF2018-9602

Felix Dahms, Egon Hassel, Jürgen Nocke, Michael Reska, University of Rostock, Chair of Technical Thermodynamics, Rostock, Germany, **Marko Püschel**, FVTR GmbH, Rostock, Germany

TRACK 3 ADVANCED COMBUSTION

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

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

3-8 LTC/GCI/RCCI/HCCI-III

SAN DIEGO, CA, HILTON RESORT & SPA, ST. TROPEZ

1:30PM - 3:30PM

CFD ANALYSIS OF DIESEL-METHANE DUAL FUEL LOW TEMPERATURE COMBUSTION AT LOW LOAD AND HIGH METHANE SUBSTITUTION

Technical Paper Publication. ICEF2018-9649

Andrea Aniello, Lorenzo Bartolucci, Stefano Cordiner, Vincenzo Mulone, University of Rome Tor Vergata, Rome, Italy, **Sundar Rajan Krishnan**, University of Alabama, Tuscaloosa, AL, United States, **Kalyan Srinivasan**, The University of Alabama, Starkville, MS, United States

EFFECT OF FUEL INJECTION TIMING DURING NEGATIVE VALVE OVERLAP PERIOD ON A GDI-HCCI ENGINE

Technical Paper Publication. ICEF2018-9653

Sok Ratnak, Jin Kusaka, Yasuhiro Daisho, Waseda University, Tokyo, Japan, **Kei Yoshimura**, Suzuki Motor Corporation, Yokohama, Japan, **Kenjiro Nakama**, Suzuki Motor Corporation, Hamamatsu, Select State/Province, Japan

INJECTOR TIP TEMPERATURE AND COMBUSTION PERFORMANCE OF A NATURAL GAS-DIESEL DUAL FUEL ENGINE AT MEDIUM AND HIGH LOAD CONDITIONS

Technical Paper Publication. ICEF2018-9664

Hongsheng Guo, Brian Liko, National Research Council Canada, Ottawa, ON, Canada

EXPERIMENTAL COMPARISON OF GCI AND DIESEL COMBUSTION IN A MEDIUM-DUTY OPPOSED-PISTON ENGINE

Technical Paper Publication. ICEF2018-9701

Reed Hanson, Fabien Redon, Ashwin Salvi, Gerhard Regner, Achates Power, Inc., San Diego, CA, United States

3-9 FUNDAMENTALS/SI/THERMODYNAMICS-IV

SAN DIEGO, CA, HILTON RESORT & SPA, PORTOFINO

1:30PM - 3:30PM

EVALUATION OF A HOT-SURFACE IGNITION SYSTEM FOR A DIRECT-INJECTION OF NATURAL GAS ENGINE

Technical Paper Publication. ICEF2018-9734

Gordon McTaggart-Cowan, Jian Huang, Marco Turcios, Ashish Singh, Westport Sandeep Munshi, Westport Fuel Systems, Vancouver, BC, Canada

A STUDY TO DETERMINE FACTORS THAT HAVE INFLUENCE ON THE PROPENSITY OF NATURAL LSPI OCCURRING IN GTDI ENGINES

Technical Paper Publication. ICEF2018-9760

Paras Sethi, Paul Truckel, Jason Bieneman, MAHLE Engine Components, Farmington Hills, MI, United States, **Eric Passow, Max Maschewske, Kimm Karris**, MAHLE Engine Components, Muskegon, MI, United States

CYCLE-TO-CYCLE NO & NOX EMISSIONS FROM A HSDI DIESEL ENGINE

Technical Paper Publication. ICEF2018-9772

Felix Leach, Martin Davy, University of Oxford, Oxford, Oxfordshire, United Kingdom, **Mark Peckham**, Cambustion Ltd., Cambridge, United Kingdom

IMPACTS OF SPARK DISCHARGE CURRENT AND DURATION ON FLAME DEVELOPMENT OF LEAN MIXTURES UNDER FLOW CONDITIONS

Technical Paper Publication. ICEF2018-9771

Zhenyi Yang, Xiao Yu, Shui Yu, Graham Reader, Ming Zheng, David S-K Ting, University of Windsor, Windsor, ON, Canada, **Jianming Chen, Guangyun Chen**, Zhuzhou Torch Spark Plugs Co., Ltd., Zhuzhou, China

Technical Sessions

TRACK 5 INSTRUMENTATION, CONTROLS, AND HYBRIDS

Track Chair: **Fabrizio Ponti**, University of Bologna - DIN, Forli, Italy

Track Co-Chair: **Richard Burke**, University of Bath, Bath, United Kingdom

5-3 ADVANCED MEASUREMENT TECHNIQUES SAN DIEGO, CA, HILTON RESORT & SPA, MARSEILLES 1:30PM - 3:30PM

Session Chair: **Diana Grauer**, Schlumberger, Sugar Land, TX, United States

Session Co-Chair: **Richard Burke**, University of Bath, Bath, United Kingdom

INTEGRATION OF PRINTED SENSORS IN PLAIN ENGINE BEARINGS

Technical Paper Publication. ICEF2018-9545

Roger Gorges, William Bisgrove, Ryan Curtis, Jeff Carter, Jonathan Ritchie, MAHLE Engine Systems UK Ltd., Rugby, United Kingdom, **James George**, Mahle GmbH, Stuttgart, Germany, **Ingo Wirth, Volker Zoellmer, Tim Rusch**, Fraunhofer Institut für Fertigungstechnik und Angewandte Materialforschung (IFAM), Bremen, Germany

ANALYSIS OF PASSENGER CAR TURBOCHARGED DIESEL ENGINES PERFORMANCE WHEN TESTED AT ALTITUDE AND OF THE ALTITUDE SIMULATOR DEVICE USED

Technical Paper Publication. ICEF2018-9549

Alberto Broatch, Vicente Bermudez, Jose R. Serrano, Roberto Tabet-Aleixandre, Universitat Politècnica de Valencia, Valencia, Spain, **Javier Gomez, Stefan Bender**, HORIBA Europe GmbH - NL, Darmstadt, Germany

IN-CYLINDER CO2 SAMPLING USING SKIP-FIRING METHOD

Technical Paper Publication. ICEF2018-9570

Matthew Duckhouse, Mark Peckham, Matthew Hammond, Combustion Ltd., Cambridge, United Kingdom, **Byron Mason, Edward Winward**, Loughborough University, Loughborough, United Kingdom

DIESEL ENGINE ACOUSTIC EMISSION AIRFLOW CLOGGING DIAGNOSTICS WITH MACHINE LEARNING

Technical Paper Publication. ICEF2018-9601

Jim Cowart, Patrick Moore, Harrison Yosten, Leonard Hamilton, Dianne Luning Prak, US Naval Academy, Annapolis, MD, United States

TRACK 6 NUMERICAL SIMULATION

Track Chair: **Caroline Genzale**, Georgia Tech, Decatur, GA, United States

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

6-6 ENGINE SIMULATION II SAN DIEGO, CA, HILTON RESORT & SPA, MONTE CARLO 1:30PM - 3:30PM

PREDICTING CYCLE-TO-CYCLE VARIATION WITH CONCURRENT CYCLES IN A GASOLINE DIRECT INJECTED ENGINE WITH LARGE EDDY SIMULATIONS

Technical Paper Publication. ICEF2018-9722

Dan Probst, Sameera Wijeyakulasuriya, Eric Pomraning, Convergent Science, Inc., Madison, WI, United States, **Janardhan KodavasaI**, Argonne National Lab, Argonne, IL, United States, **Riccardo Scarcelli**, Argonne National Laboratory, Lemont, IL, United States, **Sibendu Som**, Argonne National Laboratory, Naperville, IL, United States

EVALUATING OPTIMIZATION STRATEGIES FOR ENGINE SIMULATIONS USING MACHINE LEARNING EMULATORS

Technical Paper Publication. ICEF2018-9726

Dan Probst, Mandhupati Raju, P.K. Senecal, Convergent Science Inc., Madison, WI, United States, **Ahmed Abdul Moiz**, Southwest Research Institute, San Antonio, TX, United States, **Pinaki Pal, Janardhan KodavasaI**, Argonne National Laboratory, Argonne, IL, United States, **Sibendu Som**, Argonne National Laboratory, Naperville, IL, United States, **Yuanjiang Pei**, Aramco Research Center - Detroit, Novi, MI, United States

PREDICTIVE CFD MODELING OF DIESEL ENGINE COMBUSTION USING AN EFFICIENT WORKFLOW BASED ON TABULATED CHEMISTRY

Technical Paper Publication. ICEF2018-9758

Ferry Tap, Casper Meijer, Dmitry Goryntsev, Anton Starikov, AVL Dacolt BV, Maastricht, Netherlands, **Mijo Tvrdjevic, Peter Priesching**, AVL List GmbH, Graz, Austria

BENEFITS OF HIGHER-TEMPERATURE OPERATION IN BOOSTED SI ENGINES ENABLED BY ADVANCED MATERIALS

Technical Paper Publication. ICEF2018-9739

Zachary G. Mills, J. Allen Haynes, Charles E.A. Finney, Kevin Dean Edwards Oak Ridge National Laboratory, Oak Ridge, TN, United States