
Thursday, July 6 | DAY 1

*Time zone is JST

9:00 - 10:00 Opening Remark & Plenary Lecture PL-1

Chair: Gen Shibata (Hokkaido University)

- PL-1** Evolution Direction and Environmental Contribution of ICEs toward Carbon Neutrality
Eiji Nakai (Mazda Motor Corporation)

10:10 - 11:50 A1. Abnormal Combustion in SI Engines

Chair: Akira Iijima (Nihon University), Yuta Shima (Daihatsu Motor Co., Ltd.)

- A1-1** On Knocking Combustion Development of Oxygenated Gasoline Fuels in a Cooperative Fuel Research Engine
Dong Han, Zijian Sun, Xin Liang, Zhen Huang (Shanghai Jiao Tong University)
- A1-2** Investigation of LSPI and Improvement of Fuel Economy in Super-highly Boosted Gasoline Engine
Koji Morikawa, Fuchao Shen, Toshio Yamada, Yasuo Moriyoshi, Tatsuya Kuboyama (Chiba University)
- A1-3** Influence of Nitric Oxide and Other Factors on Acoustic Knock Onset for Lean DISI Engine Operation
Magnus Sjöberg, Namho Kim (Sandia National Laboratories), Naoyoshi Matsubara, Nozomi Yoko, Koichi Nakata (Toyota Motor Corporation)
- A1-4** A Study on Dominant Factor of Knock Intensity in SI Engine
Katsuya Matsuura (Honda R&D Co., Ltd.)

10:10 - 11:50 B1. Simulation of Diesel Spray

Chair: Daisuke Kawano (Osaka Sangyo University), Go Asai (YANMAR Holdings Co., Ltd.)

- B1-1** Advanced Idea on Fuel Droplet Breakup Model for Diesel Combustion Calculation
Taizo Kitada, Kai Kikuchi, Masato Kuchita, Kei Shigahara (Mitsubishi Motors), Tetsuya Oda (Tottori Univ.), Eriko Matsumura, Jiro Senda (Doshisha Univ.)
- B1-2** Axis-symmetric Diesel Spray Flame Model Coupled with Momentum Flux Distribution Measurement
Takayuki Fuyuto, Yoshiyuki Mandokoro (Toyota Central R&D Labs., Inc.), Yuki Tagita (DENSO Corp., Toyota Motor Corporation), Tsutomu Umehara (Toyota Motor Corporation, Toyota Industries Corporation)
- B1-3** Development of an Ignition Delay Equation with the Livengood-wu Integral for Wide Ranges of Intake Gas Conditions and Fuel Injection Pressures in Diesel Combustion
Yuhei Sakane, Ryota Kanno, Yang Yurui, Yoshimitsu Kobashi, Gen Shibata, Hideyuki Ogawa (Hokkaido University)
- B1-4** Analysis of the Relationship between Near-wall Velocity Distribution and Wall Heat Flux by a Diesel Spray Flame Impingement
Hyun Jo, Yuta Kawai, Naoto Horibe, Hiroshi Kawanabe, Takuji Ishiyama (Kyoto University), Daijiro Ishi, Yuji Mihara (Tokyo City University)

10:10 - 11:50 **C1. Alternative Fuel Spray**

Chair: Daisuke Tsuru (Kyushu University), Yoshihiro Kobayashi (Tokyo Denki University)

- C1-1** Mixture Formation of OME3-5 and Octanol in Comparison to Diesel-like Dodecane under ECN Spray a Conditions
Lukas Strauß, Andreas Peter, Sebastian Rieß, Michael Wensing (FAU Erlangen-Nürnberg)
- C1-2** Complex Physicochemical Process of Low Sulfur Heavy Fuel Oil under High Temperatures and Pressures
Jia Deng, Ping Yi, Tie Li (Shanghai Jiao Tong University), Shiding Hong (Shanghai Chimbusco Marine Bunker CO., LTD), Run Chen (Shanghai Jiao Tong University)
- C1-3** Numerical Study on Combustion Process of Methanol-diesel Spray Using Stratified Injection
Long Liu, Weijia Cheng, Yang Wang, Xiuzhen Ma (Harbin Engineering University)
- C1-4** An Optical Investigation into the Reactive Fuel Spray of High-pressure DME and Ethanol
Simon LeBlanc, Long Jin, Alex Bastable, Xiao Yu, Jimi Tjong, Ming Zheng (University of Windsor)

11:50 - 13:05

Lunch Break

13:05 - 14:45 **A2. Prechamber Combustion**

Chair: Tatsuya Kuboyama (Chiba University), Kei Yoshimura (SUZUKI MOTOR CORPORATION)

- A2-1** Measurement Techniques for Active Pre-chamber Ignition Systems: Optical Experiments and Thermodynamic Evaluation
Tim Russwurm, Andreas Peter, Sebastian Rieß, Michael Wensing (Friedrich-Alexander-University Erlangen-Nürnberg)
- A2-2** Investigation of Ignition Specification for Lean Limit Expansion of Pre-chamber Combustion
Naoki Yoneya , Kenta Mitsufuji , Kengo Kumano , Yoshihiro Sukegawa , Yoshifumi Uchise , Hideo Jitsu (Hitachi, Ltd.)
- A2-3** Effects of Passive Pre-chamber Geometry and Ignition System on the Engine Performance
Francesco Di Sabatino (Sandia National Laboratories), Pablo Jose Martinez-Hernandez, Ricardo Novella Rosa (Universitat Politècnica de València), Isaac Ekoto (Sandia National Laboratories)
- A2-4** Study on Relation of Flame Propagation in Pre-chamber and Jet Energy under Diluted Conditions for Turbulent Jet Ignition
Sou Furukawa, Terutaka Ishii, Satoshi Sakaida, Kotaro Tanaka, Mitsuru Konno (Ibaraki University), Naoki Yoneya, Kenta Mitsufuji (Hitachi, Ltd.)

13:05 - 14:45 **B2. Diesel Combustion**

Chair: Noboru Uchida (New A.C.E. Institute Co., Ltd.), Taizo Kitada (Mitsubishi Motors Corporation)

- B2-1** A New Concept for High Efficiency and Clean Diesel Combustion by Controlling Mixture Distribution with Dual Zone Combustion Chamber
Sangkyu Kim, Shintaro Okada, Kuichun Li, Takeru Matsuo, Jun Kanzaki, Daisuke Shimo (Mazda Motor Corporation)
- B2-2** Engine Experiments Using a CFD-improved Dimple Stepped-lip Piston in a Diesel Engine
Angela Wu, Seokwon Cho, Dario Lopez Pintor, Stephen Busch (Sandia National Laboratories), Federico Perini, Rolf Reitz (Wisconsin Engine Research Consultants)

- B2-3** A Novel Peripheral Fuel Injection Technique to Reduce Emissions in Diesel Engines
Edward Bogdanowicz (The University of Alabama), Allen Loper, Joshua Bittle, Ajay K. Agrawal (The University of Alabama)
- B2-4** Effects of Aromatic Hydrocarbon Doping on Soot Formation under Pyrolysis Conditions
Julien Manin (Sandia National Laboratories), Hyung Sub Sim (Sandia National Laboratories, Sejong University), Kevin Wan (Sandia National Laboratories)

13:05 - 14:45 C2. Gasoline Fuel Spray

Chair: Tsuneaki Ishima (Gunma University), Akira Tsunoi (Bosch Corporation)

- C2-1** Characteristics of In-cylinder Flow of Optically Accessible Engine with High-pressure Spray-guided Injection
Donghwan Kim, Yousang Son, Sungwook Park (Hanyang University)
- C2-2** Influence of Swirl Control Valve Angle on In-cylinder Flow and Mixture Characteristic in a High-compression-ratio, Spray-guided, Gasoline Direct Injection Engine
Jisoo Shin, Donghwan Kim, Yousang Son, Sungwook Park (Hanyang University)
- C2-3** Effect of Various Test Fuels on Spray Structure and Nozzle Tip Wetting in LPDI Injector
Young Soo Yu (Hanyang University), Jeong Hwan Park, Hyungik Kim, Kyungsik Seo, Pyo Young Son (Hyundai-Kefico), Sungwook Park (Hanyang University)
- C2-4** Experimental Study on Plume Collapsing Using GDI Injectors with Various Spray Pattern Arrangement
Heechang Oh (Hyundai Motor Company), Joonsik Hwang (Mississippi State University), Logan White, Lyle M. Pickett (Sandia National Laboratories), Donghee Han (Mississippi State University)

14:45 - 15:05

Break

15:05 - 16:20 A3. SI Engines (1)

Chair: Makoto Koike (Toyota CRDL Inc.), Tomohiro Nakayama (Subaru)

- A3-1** Post-oxidation Phenomena Enhancement by Scavenging and Secondary Air Injection in Exhaust Manifold of a Turbocharged GDI Engine
Madan Kumar, Yasuo Moriyosh, Tatsuya Kuboyama (Chiba University)
- A3-2** High-speed Measurement of Unburnt Hydrocarbon in Combustion Chamber and Exhaust in Super-lean Burn Spark Ignition Engine
Tsuyoshi Nagasawa, Yuji Tagaya, Takeru Kimura, Hidenori Kosaka (Tokyo Institute of Technology)
- A3-3** In-cylinder Flow Characteristics of a Turbocharged Gasoline Direct Injection Engine under Late Intake Valve Closing Operation
Ji Yong Shin, Sanguk Lee, Choongsik Bae (Korea Advanced Institute of Science and Technology), Jinyoung Jung, Yousang Son, Hangpyo Heo, Juhun Lee (Hyundai Motor Company)

15:05 - 16:20 B3. Thermal Efficiency of Diesel Engines (1)

Chair: Hidenori Kosaka (Tokyo Institute of Technology), Keita Arato (ISUZU Advanced Engineering Center, LTD.)

- B3-1** Technologies Integration to Achieve Brake Thermal Efficiency Beyond 55% for HD Diesel Engines
Noboru Uchida, Kazumasa Watanabe, Fumihiko Kawaharazuka (New A.C.E. Institute Co., Ltd.)

- B3-2** The Importance of Late-cycle Combustion to Thermal Efficiency of Compression-ignition Engine: A Study Using Single-cylinder Engine Experiment
Khanh Cung, Chris Bitsis, Mike Smith, Thomas Briggs (Southwest Research Institute)
- B3-3** Mechanism of the Reduction in Afterburning and Thermal Efficiency Improvement with Highly Oxygenated Fuels in Diesel Combustion
Takao Kawabe, Kazuhiro Inoue, Kazuma Mori, Tomoki Ishikawa, Yoshimitsu Kobashi, Gen Shibata, Hideyuki Ogawa (Hokkaido University)

15:05 - 16:20 C3. Fuel Film

Chair: Yoshio Zama (Gunma University), Masayuki Yasuoka (Marelli Corp.)

- C3-1** RIM Experiment on Fuel Adhesion Characteristics of Inclined-wall-impinging Spray under Cross-flow Conditions
Gengxin Zhang, Penghua Shi, Hongliang Luo, Yoichi Ogata, Keiya Nishida (Hiroshima University)
- C3-2** Relationship between Wall Surface Roughness and Fuel Film Evaporation for Spray Impingement
Yoshihiro Kobayashi, Yutaro Kasuya, Hiroki Hori, Masataka Arai (Tokyo Denki University)
- C3-3** High-speed Low-coherence Interferometry for Film Thickness Measurements in Impinging Gasoline Direct Injection Sprays
Logan White, Julien Manin, Lyle M. Pickett (Sandia National Laboratories)

16:20 - 16:40

Break

16:40 - 17:55 A4. SI Engines (2)

Chair: Kazuhiro Akihama (Nihon University), Kenjiro Nakama (SUZUKI MOTOR CORPORATION)

- A4-1** Influence of Thermal Piston Insulation on the Indicated Efficiency of SI-engines
Jens Achenbach, Marcus Fischer, Bastian Lehrheuer, Marco Guenther, Stefan Pischinger (RWTH Aachen University)
- A4-2** Detailed Numerical Investigation of the Influences of External Water, Lubricating Oil and Reactive EGR Components on ICE Ignition Processes
L. Wißmann, S. Crönert, S. Welscher (University of Stuttgart), M. Grill, M. Bargende (Research Institute of Automotive Engineering and Vehicle Engines Stuttgart)
- A4-3** Comprehensive Analysis of Particle Emissions from Both Exhaust and Non-exhaust Sources: A Methodological Approach
Francesco Catapano, Silvana Di Iorio, Agnese Magno, Paolo Sementa, Bianca Maria Vaglieco (STEMS-CNR)

16:40 - 17:55 B4. Thermal Efficiency of Diesel Engines (2)

Chair: Susumu Sato (Tokyo Institute of Technology), Sangkyu Kim (Mazda Motor Corporation)

- B4-1** Waste Heat Recovery from Large Marine Engine Block (Energy, Exergy, and Economical (4E) Assessment)
Luis Alfonso Díaz Secades, Rubén González Rodríguez, Noelia Rivera Rellán (University of Oviedo)
- B4-2** Achieving Higher Thermal Efficiency by Cooling Loss Reduction from a Heavy-duty Diesel Engine
Fumihiko Kawaharazuka, Kazumasa Watanabe, Manabu Nagayoshi, Noboru Uchida (New A.C.E Institute Co., Ltd.)

- B4-3** Effect of Peak Firing Pressure Constraint on Thermal Efficiency of a Sabathe-miller Engine
Shiyan Li, Xinyi Zhou, Xinpeng Guo, Run Chen, Tie Li (Shanghai JiaoTong University)

16:40 - 17:55 **C4. Advanced Measurement**

Chair: Choongsik Bae (Korean Advanced Institute of Science and Technology, KAIST), Yuichi Mori (HORIBA)

- C4-1** Infrared High-speed Thermography of Combustion Chamber Wall Impinged by Diesel Spray Flame Using Chromium-coated Silicon Window
Tetsuya Aizawa, Yuusei Miyagawa, Tatsuki Takahashi, Hiroyuki Kinoshita, Yohei Tanaka, Shoichi Motegi (Meiji University)
- C4-2** Endoscopic High-speed Particle Image Velocimetry for Flow and Turbulence Measurements in Multi-cylinder Engines
Dongchan Kim, Sanghoon Kook (The University of New South Wales), Seung Woo Lee, Hong-kil Baek (Hyundai Motor Company)
- C4-3** Correlation between Wall Heat Transfer and Flow in a Dpark-ignition Engine Evaluated with a MEMS Sensor
Kazuhito Dejima, Osamu Nakabeppu (The University of Shiga Prefecture)

Thursday, July 7 | DAY 2

9:00 - 9:50 Plenary Lecture PL-2

Chair: Noboru Uchida (New A.C.E. Institute Co., Ltd.)

- PL-2** Recent Advances and Remaining Needs for Science-based Optimization of Internal Combustion Engines
Paul Miles (Combustion Research Facility, Sandia National Laboratories)

10:00 - 11:15 A5. Combustion in SI Engines

Chair: Tsukasa Hori (Osaka University), Naoto Horibe (Kyoto University)

- A5-1** Modeling of the Turbulent Burning Velocity Considering the Effect of Fuel Composition in EGR Condition
Toshiaki Sakima, Yuji Harada, Ryohei Ono, Takeaki Kudo, Hiroyuki Yamashita (Mazda Motor Corporation)
- A5-2** Potential of 3D-CFD Simulations for the Analysis of Knocking Combustion
Michael Blomberg, Marco Günther, Stefan Pischinger (RWTH Aachen University)
- A5-3** Effects of Partial Oxidation and Octane Sensitivity on Flame Stretch Rate at Extinction under EGR Conditions
Potential of Renewable Fuels toward Higher Thermal Efficiency of Spark-ignition Engines
Kei Yoshimura, Kohei Isobe (Waseda University), Satoshi Tokuhara (SUZUKI MOTOR CORPORATION), Kyohei Yamaguchi, Ratnak Sok, Jin Kusaka (Waseda University)

10:00 - 11:15 B5. Compression Ignition Engine (1)

Chair: Toshiaki Kitagawa (Kyushu University), Takahiro Sako (Osaka Gas Group)

- B5-1** Methane Concentration Influence on Combustion in a Rapid Compression Machine under DFICE Relevant Conditions
Rafael Clemente, Andreas Peter, Sebastian Riess, Lukas Strauss, Hamidreza Fajri, Michael Wensing (FAU Erlangen-Nuremberg)
- B5-2** Effect of Natural Gas Substitution Rate on Combustion Characteristics of Natural Gas / PODEn Dual-fuel Engine
Shuzhi Chen, Guangde Zhang, Dingcheng Zhang (Wuhan University of Science and Technology)
- B5-3** A Viable Approach to Enable Low-temperature Gasoline Combustion for Medium- and Heavy-duty Transportation
Dario Lopez Pintor, John E. Dec (Sandia National Laboratories), Ram Vijayagopal (Argonne National Laboratory)

10:00 - 11:15 C5. Fuel Spray Measurement

Chair: Tetsuya Aizawa (Meiji University), Keiki Tanabe (Mitsubishi Fuso Truck and Bus Corporation)

- C5-1** Tomographic Reconstruction of Spray Evolution Considering Multiple Light Scattering Effects: Characterization of an ECN Spray G Injector
Bastian Lehnert, Lukas Weiss (Friedrich-Alexander University Erlangen-Nürnberg), Edouard Berrocal (Lund University), Michael Wensing (Friedrich-Alexander University Erlangen-Nürnberg)

- C5-2** Liquid-phase Concentration Distribution Analysis Using Simultaneous Fluorescence and Scattering Images in Single Hole Nozzle Non-evaporating Diesel Spray
Dai Matsuda, Kosuke Nagamura, Eriko Matsumura, Jiro Senda (Doshisha University)
- C5-3** Development of High-speed Laser Absorption Scattering (HS-LAS) System for Measuring Vapor and Liquid Phase Concentration Distributions in Evaporating Diesel Spray
Samir Chandra Ray (Hiroshima University, Bangabandhu Sheikh Mujibur Rahman Science & Technology University), Shinichiro Naito, Safiullah (Hiroshima University), Mats Andersson (Chalmers University of Technology), Keiia Nishida, Yoichi Ogata (Hiroshima University), Hiroyasu Sasaki (Nac Image Technology Inc.)

11:15 - 11:35

Break

11:35 - 12:50 **A6. Fuel Sprays**

Chair: Beini Zhou (Waseda University), Yoichi Ogata (Hiroshima University)

- A6-1** Spray Modelling of Diesel and OME Injection Based on Optical Investigations in a High-pressure Chamber
Niklas Prchal, Tim Beutler, Michael Guenther (University of Kaiserslautern)
- A6-2** Diesel Spray Simulation under Non-evaporating Condition with Wave and Modified Improved TAB Model
Tomohiro Yamashita, Dai Matsuda, Eriko Matsumura, Jiro Senda (Doshisha University)
- A6-3** Experimental Investigation on the Flow Development and Shock Wave Structural Characteristics of CNG Under-expanded Jet
Quangkhai Pham, Mengzhao Chang (Chonnam National University), Sungwook Park (Hanyang University), Avinash Kumar Agarwal (Indian Institute of Technology-Kanpur), Byungchul Choi (Chonnam National University), Suhan Park (Konkuk University)

11:35 - 12:50 **B6. Compression Ignition Engine (2)**

Chair: Yoshimitsu Kobashi (Okayama University), Chihiro Kondo (Okayama University of Science)

- B6-1** Optimization Study of Diesel Jet Controlled Compression Ignition (JCCI) with Dual-direct Injection System and Reentrant Type Combustion Chamber
Jian Wang, Ge Xiao, Bo Li, Heng Zhang, Longlong Jiang, Wuqiang Long (DaLian University of Technology)
- B6-2** Analysis of OH Radical Injection and Production Behavior by Pulsed Flame Jet in HCCI Combustion
Masaki Ota, Koichi Osaki, Kengo Shigematsu, Shion Ando, Osamu Moriue (Kyushu University)

11:35 - 12:50 **C6. Diesel and Dual Fuel Engines**

Chair: Takayuki Fuyuto (Toyota Central R&D Labs., Inc.), Yoshiyuki Kinuzawa (Toyota Industries Corporation)

- C6-1** Factors for Decay of Diesel-engine-vibration Energy
Hitoshi Oguchi, Hugo Ogiyama, Daiki Hashimoto, Masato Mikami (Yamaguchi University), Chihiro Nishikawa (Honda Motor Co., Ltd.)
- C6-2** In-cylinder Pressure Reconstruction Via Engine Block Vibration Signal Based on the DNN Model in CNG-diesel Dual-fuel Engine
Gyeonggon Kim, Chansoo Park, Wooyeong Kim (Korea Advanced Institute of Science and Technology), Jeeyeon Jeon, Miyeon Jeon (Korea Shipbuilding & Offshore Engineering), Choongsik Bae (Korea Advanced Institute of Science and Technology)

- C6-3** A Study on Low-load Operating Limit in Stoichiometric Operation for Natural Gas/Diesel Dual Fuel Engine
Naoto Horibe, Takemu Shirota, Takahito Niimi, Hiroshi Kawanabe (Kyoto University), Takuji Ishiyama (Kyoto University), Takahiro Sako (Osaka Gas Co., Ltd.), Kenta Suzuki (Isuzu Motors Ltd.)

12:50 - 14:05

Lunch Break

14:05 - 16:10 **A7. Evaporation and Combustion**

Chair: Yasuyuki Sakai (Ibaraki University), Tsuyoshi Nagasawa (Tokyo Institute of Technology)

- A7-1** Influences of Turbulence Scale on Burning Velocity of Spherically Propagating Hydrogen-air Flames
Toshiaki Kitagawa, Hiroaki Watanabe, Chihiro Inoue, Hazim Shehab (Kyushu University)
- A7-2** Artificial Neural Network Models of Vapor-liquid Phase Equilibrium Predictions for N-dodecane/nitrogen Mixtures
Hongyan Zhu, Zongyu Yue, Jianan Wei, Hu Wang, Mingfa Yao (Tianjin University)
- A7-3** Validation of Chemical Kinetic Mechanisms in a Motored Engine for N-heptane and N-dodecane
Shuqi Cheng, André Boehman (University of Michigan)
- A7-4** Improved Correlations for the Unstretched Laminar Flame Properties of Iso-octane/Air Mixtures
Delong Li, Ron Matthews, Matt Hall (The University of Texas)

14:05 - 16:10 **B7. Carbon Neutral**

Chair: Mitsuharu Oguma (National Institute of Advanced Industrial Science and Technology (AIST)),
Tadao Okazaki (Kubota Corporation)

- B7-1** High-pressure Spray and Combustion Characteristics of Ammonia Jets under Diesel-like Conditions
Ning Wang, Tie Li, Xinyi Zhou, Zhifei Zhang, Run Chen, Shiyang Li (Shanghai Jiao Tong University)
- B7-2** Thermodynamic Analysis of a Hydrogen Reconversion System the Closed Cycle Engine
Kevin Klepatz, Robin Tempelshagen, Aristidis Dafis, Hermann Rottengruber, Johannes Oder (Otto-von-Guericke-University Magdeburg)
- B7-4** Hydrogen Jet Characteristics under Various Ambient Conditions
Sanguk Lee (Korea Advanced Institute of Science and Technology), Joonsik Hwang (Mississippi State University), Choongsik Bae (Korea Advanced Institute of Science and Technology)
- B7-5** An Investigation on Breakup Characteristics of Superheated Ammonia Fuel Spray
Shiyang Li, Ning Wang, Xinyi Zhou, Run Chen, Tie Li (Shanghai JiaoTong University)

14:05 - 16:10 **C7. Exhaust Emissions and after Treatment**

Chair: Kotaro Tanaka (Ibaraki University), Masashi Matsumoto (Japan Automobile Research Institute)

- C7-1** Performance Evaluation of Methane Oxidation Catalyst for Marine Gas-engine in Actual Exhaust and Simulated Gas
Yoshifuru Nitta, Yasuhisa Ichikawa, Yoichi Niki, Akiko Masuda, Koichi Hirata (National Institute of Maritime, Port and Aviation Technology)

- C7-2** Comprehensive Surface Reaction Mechanism of C₂H₄/C₃H₆ Oxidation on Pt/Al₂O₃, Pd/Al₂O₃ and Rh/Al₂O₃ for Three Way Catalyst
Yuhei Matsumoto, Set Naing, I Putu Angga Kristy, Satoshi Hinokuma, Hiroshi Murakami, Michiharu Kawano, Akira Miyoshi, Daisuke Shimokuri (Hiroshima University)
- C7-3** Characterization of Soot Loading and Filtration Efficiency Performances of Gasoline Particulate Filters with Photoacoustic Sensor and Particle Number Counting Systems
Kazuki Nakamura, Yuta Sugaya, Kyohei Yamaguchi, Jin Kusaka (Waseda University), Michael Arndt, Christos Dardiotis (AVL List GmbH)
- C7-4** Detailed Surface Reaction Mechanisms of C₃H₈ Oxidation for Pt/Al₂O₃ Monolith Honeycomb Catalyst
Takuto Kagamihara, Yuhei Matsumoto, Satoshi Hinokuma, Set Naing, Tomohito Omori, Hiroshi Murakami, Michiharu Kawano, Akira Miyoshi, Daisuke Shimokuri (Hiroshima University)
- C7-5** Effect of Equivalence Ratio on Soot Formation at Cusp Area in a Premixed Cellular Flame
Takashi Ikeda, Hiroaki Watanabe (Kyushu University), Ryoichi Kurose (Kyoto University), Toshiaki Kitagawa (Kyushu University)

16:10 - 16:30

Break

16:30 - 17:20

Plenary Lecture PL-3

Chair: Yasuo Moriyoshi (Chiba University)

- PL-3** The Role of the Internal Combustion Engine in Defossilized Energy Systems
Michael Bargende (Institute of Automotive Engineering Stuttgart (IFS) University of Stuttgart)

18:30 - 20:30

Banquet: Keio Plaza Hotel Sapporo

Friday, July 8 | DAY 3

9:00 - 10:40 A8. H2 and Ammonia Combustion

Chair: Hiroshi Kawanabe (Kyoto University),

Taku Tsujimura (National Institute of Advanced Industrial Science and Technology)

- A8-1** Experimental Analysis of Co-combustion SI Engine with Gasoline/Ammonia/Air under Higher Intake Air Temperature Condition
Qinyue Zheng, Bin Guo, Kento Kajiki, Narumi Aratake, Masashi Kodaka, Mitsuhsa Ichiyanaqi, Takashi Suzuki (Sophia University)
- A8-2** A Comprehensive Study for the Identification of the Requirements for an Optimal H2 Combustion Engine
Olivier Laget, Loïc Rouleau, Matthieu Cordier, Florence Duffour, Giampaolo Maio, Vincent Giuffrida, Rajesh Kumar, Ludovic Nowak (IFP Energies Nouvelles)
- A8-3** Effect of Improvement in Thermal Efficiency and Characteristics of In-cylinder Pressure Oscillation Induced by Raised Compression Ratio in Jet Plume Controlled Direct Injection Near-zero Emission Hydrogen Engines
Masakuni Oikawa, Tatsuro Kichima, Yuki Mogi, Mami Horiguchi, Yasuo Takagi, Yuji Mihara (Tokyo City University)
- A8-4** Effect of Hydrogen Addition on Laminar Burning Velocity of Methane
Yuuki Hashimoto, Rin Takada, Tetsushi Hirai, Hidefumi Kataoka (Osaka Prefecture University), Takahiro Yamaguchi, Nobuhiro Shinmura, Sekai Miyamoto (Kawasaki Heavy Industries, Ltd.), Daisuke Segawa (Osaka Prefecture University)

9:00 - 10:40 B8. Lubrication (1)

Chair: Kazuyuki Yagi (Kyushu University), Yorimasa Tsubota (ISUZU MOTORS LTD.)

- B8-1** Influence of DLC-coated Journal on Seizure Resistance of Plain Bearing
Takumi Iwata, Riki Chida, Yuta Ishibashi, Masakuni Oikawa, Daijiro Ishii, Makoto Kano, Yuji Mihara (Tokyo City University)
- B8-2** Tribological Properties of Various DLC Coatings under Boundary Lubrication Conditions
Su-Min Bae, Riki Hoshiya, Shoko Horibata, Kentaro Kawaguchi, Yuma Miyauchi, Junho Choi (The University of Tokyo)
- B8-3** Development of Triboelectric Nanogenerator under Oil Lubricated Conditions
Soo-Bin Kim, Junho Choi (The University of Tokyo)
- B8-4** Running-in for Low Friction between Silicon-containing Aluminum Alloy and Bearing Steel in Engine Oil
Kento Ihara, Koshi Adachi (Tohoku University)

9:00 - 10:40 C8. Gas Engines

Chair: Sekai Miyamoto (Kawasaki Heavy Industries, Ltd.),
Kenichi Hanamoto (DAIHATSU DIESEL MFG. CO., LTD.)

- C8-1** Research on Dynamic Performance of Gas Engine Power Systems for Marine Applications under the Background of Energy Diversion — A Review
Shen Wu, Tie Li, Run Chen, Xinyi Zhou, Shuai Huang, Bin Wang (Shanghai Jiao Tong University)

- C8-2** Evaporative Charge Cooling Capabilities of Liquefied Natural Gas (LNG)
Joshua Finneran (University of Cambridge), Colin P Garner, François Nadal (Loughborough University)
- C8-3** Study on the Similarity of Ignition and Combustion in Pre-chamber Ignition System
Kantetsu Omae, Shota Ozawa, Yuki Oka, Fumio Shimada, Kimitoshi Tanoue, Yasuo Moriyoshi (Oita University)
- C8-4** Study of Pre-chamber Lean Burn Natural Gas Engine with Very High BMEP
Shin Kimura (Sustainable Engine Research Center Co.,Ltd.), Koji Morikawa, Jaeok Bae, Run Chen, Tatsuya Kuboyama, Yasuo Moriyoshi (Chiba University)

10:40 - 11:00

Break

11:00 - 12:40 **A9. Enhanced Ignition**

Chair: Minoru Iida (Yamaha Motor Co., Ltd.), Kunihiko Suzuki (Hitachi Astemo, Ltd.)

- A9-1** Advanced Ignition Strategies for Gasoline Engine Clean Combustion
Xiao Yu, Linyan Wang, Ming Zheng (University of Windsor)
- A9-2** A Numerical Methodology Based on CFD and Plasma Chemical Kinetics Simulations: A Focus on the Cyano Radical
Valerio Mariani, Giorgio La Civita, Giulio Cazzoli, Stefania Falfari, Emanuele Ghedini (University of Bologna), Simona Merola, Adrian Irimescu, Christian Antetomaso (CNR Science and Technology Institute for Sustainable Energy Mobility)
- A9-3** Analysis of the Spark Discharge Evolution and Plasma Temperature in High Flow Velocity Conditions by Applying CFD Simulation and Optical Methodologies
J. Zembi, M. Battistoni, F. Mariani (Università degli Studi di Perugia), A. Irimescu, S. S. Merola (CNR - STEMS)
- A9-4** Influence of Gas Ejected from Sub-chamber on Combustion of Ammonia/Oxygen/Argon Mixture Using a Constant Volume Combustor
Bin Guo, Qinyue Zheng, Keita Aihara, Takuma Ohashi, Mitsuhsa Ichiyanagi, Takashi Suzuki (Sophia University)

11:00 - 12:40 **B9. Lubrication (2)**

Chair: Kenji Matsumoto (Tokyo City University), Yuji Mihara (Tokyo City University)

- B9-1** Tribological Properties of Oval Shaped Convex Texture for Sliding Surface of Internal Combustion Engine
Ryo Tsuboi, Hatsuhiko Usami, Tomomi Honda, Yuji Mihara (Daido University)
- B9-2** Tribological Behaviors of Textured Liner Considering Enclosed Cavitation in Starved Lubrication
Ke Zhang, Kazuyuki Yagi, Joichi Sugimura (Kyushu University)
- B9-3** Applicability of Dissolving Fullerene into Engine Oil as Friction Modifier Acting at Low Temperature Condition
Hatsuhiko Usami, Kosuke Yasuda (Meijo University)
- B9-4** Surface Modification Using Shot Peening for Timing Chain System of Internal Combustion Engine
Hideaki Seki, Yuma Osaka, Shinpei Ige (Daido Kogyo Co., Ltd.), Nanami Matsuo, Hatsuhiko Usami (Meijo University)

11:00 - 12:40 **C9. Dual Fuel Engines**

Chair: Kiyoshi Kawasaki (The University of Shiga Prefecture), Sadao Nakayama (IHI Power Systems Co., Ltd.)

- C9-1** Converting a Production 6-cylinder Heavy Duty Engine to Dual-fuel Mode Operation Using Supervisory Calibration and Manifold Injection
Clément Emerique (Imperial College London), Trevor Jasper (CMB.Tech), Yannis Hardalupas, Alex MKP Taylor (Imperial College London)
- C9-2** Effect of Ignition Timing on H₂ Enriched CH₄ Combustion
Hongliang Luo, Yu Jin, Yoichi Ogata, Yukihiro Matsumura, Takayuki Ichikawa, Wookyung Kim, Yutaka Nakashimada, Keiya Nishida (Hiroshima University)
- C9-3** Visualization of End-gas Auto-ignition during PREMIER Combustion in a Dual-fuel Gas Engine
Nobuyuki Kawahara, Eiji Tomita (Okayama University)
- C9-4** Improvements in Thermal Efficiency and Exhaust Emissions with Ozone Addition in a Natural Gas Dual-fuel Engine
Yoshimitsu Kobashi, Ryuya Inagaki, Gen Shibata, Hideyuki Ogawa (Hokkaido University)

12:40 - 13:55

Lunch Break

13:55 - 15:15 **A10. Modeling and Simulation**

Chair: Noritaka Kimura (Honda R&D CO., Ltd.), Kyohei Yamaguchi (Kokushikan University)

- A10-1** Energy Management-oriented Engine Thermal Model in Hybrid Powertrains
Wei Wang, Tielong Shen (Sophia University)
- A10-2** Modeling and Simulation of Regenerative Energy Utilization Method for Mild Hybrid Electric Vehicle
Norifumi Mizushima (National Institute of Advanced Industrial Science and Technology), Kentaro Kishida, Kiito Ogishima, Kyohei Yamaguchi, Jin Kusaka (Waseda University), Mitsuharu Oguma (National Institute of Advanced Industrial Science and Technology)
- A10-3** Reaction Mechanism Development and Investigation on the Convergence Influence in a 1D Catalyst Model for a γ -alumina Stabilized Three-way Catalyst
Jana Richter (Brandenburg University of Technology), Vivien Günther (LOGE Deutschland GmbH), Fabian Mauss (Brandenburg University of Technology)

13:55 - 15:35 **B10. Lubrication (3)**

Chair: Yuji Mihara (Tokyo City University), Ryo Tsuboi (Daido University)

- B10-1** Development and Validation of a Mathematical Model for Predicting Oil Transport around Oil Control Rings
Shun Takahashi, Yuki Kawamoto (Tokai University), Shuzo Sanda (Tokyo City University), Hideshi Hitosugi (Nippon Piston Ring Co., Ltd.), Yuji Mihara, Masakuni Oikawa (Tokyo City University), Masayuki Ochiai, Akihiko Azetsu (Tokai University)
- B10-2** Multi-physics Simulation Approach to Analyze Viscosity Index Improver of Engine Oil
Hitoshi Washizu, Gentaro Sawai, Deboprasad Talukdar, Kosar Khajeh (University of Hyogo)
- B10-3** Three-dimensional Mixed Lubrication Analysis of Marine Fuel Supply Cam-roller Pair
Deliang Hua, Xiujiang Shi, Wen Sun (Harbin Engineering University), Xiqun Lu (University of Leeds), Anne Neville (Harbin Engineering University, University of Leeds)

- B10-4** Study on Lubricating Oil Transport around Oil Control Ring by Two-phase CFD Simulation with Level Set Method
Yuki Kawamoto, Takuto Suzuki, Hayato Tachi, Rina Osada, Shun Takahashi, Masayuki Ochiai, Akihiko Azetsu (Tokai University)

13:55 - 15:35 **C10. Engine Control**

Chair: Mitsuo Hirata (Utsunomiya University), Yui Nishio (Honda Motor Co., Ltd.)

- C10-1** Output Predictive Control with Estimator of EGR Transfer Delay for Engine Air Path Systems
Yuto Kawamoto, Ryo Nozaki, Ikuro Mizumoto (Kumamoto University)
- C10-2** RL-based Control Design for Combustion Engines with EGR-observer
Zhenhui Xu, Kai Zhao, Tielong Shen (Sophia University)
- C10-3** Feedback Error Learning Control for Airpath System by Using Oxygen Concentration Adaptive Observer
Yuhki Hashimoto, Hiromitsu Ohmori (Keio University)
- C10-4** Flatness-based Feedforward Controller Design of Gasoline Engine Air-path System Using Neural Network
Kyle Takeda, Mitsuo Hirata, Masayasu Suzuki (Utsunomiya University)

15:35 - 15:55

Break

15:55 - 17:10 **B11. Oil Dilution**

Chair: Hitoshi Washizu (University of Hyogo), Koichiro Nakatani (TOYOTA MOTOR CORPORATION)

- B11-1** Effect of Post-injection Timing and Ring Gap Position on the Lubricating Oil Dilution Rate at Oil Tank around Piston Ring.
Haruto Nakakouji, Seikou Kyuu, Masakuni Oikawa, Daijiro Ishii, Yuji Mihara, Shuzo Sanda (Tokyo City University)
- B11-2** Observation of Behavior of Lubricating Oil and Diesel Fuel in Post-injection by Photochromism and Correlation between Diesel Fuel Dilution Ratio by Direct Oil Sampling in Piston Ring Groove and Piston Land
Seikou Kyuu, Haruto Nakakouji, Masakuni Oikawa, Daijiro Ishii, Yuji Mihara, Shuzo Sanda (Tokyo City University), Naoki Inoue, Yuto Ito, Akihiko Azetsu, Shun Takahashi, Masayuki Ochiai (Tokai University)
- B11-3** Observation and Quantification of Movement of Post-injected Fuel on Piston and Cylinder Surface Using Photochromism Visualization Technique
Naoki Inoue, Yuto Ito, Yuki Kawamoto (Tokai University), Seikou Kyuu, Haruto Nakakouji (Tokyo City University), Akihiko Azetsu, Shun Takahashi, Masayuki Ochiai (Tokai University), Masakuni Oikawa, Daijiro Ishii, Yuji Mihara, Shuzo Sanda (Tokyo City University)

15:55 - 17:35 **C11. Modeling and Engine Control**

Chair: Yudai Yamasaki (The University of Tokyo), Hironori Yumura (Subaru)

- C11-1** The Outlook for Machine Learning Application in the Problem of Propulsion Engine Monitoring and Diagnostics
Oleksiy Bondarenko, Tetsugo Fukuda, Ken Miyachi (National Maritime Research Institute)

- C11-2** Borderline Knock Limit Control based on Online Updated Machine-learned Surrogate Model
Jian Tang, Guoming G. Zhu (Michigan State University)
- C11-3** Study on Design Method of Combustion Reference Values Considering NOx for Model-based Control of Advanced Diesel Engine
Jihoon Kim, Yudai Yamasaki (The University of Tokyo)
- C11-4** Neural Network based ECU Software Function Representation and Optimization for Base Calibration of Internal Combustion Engines
Matteo Meli, Stefan Pischinger, Joshua Gärtner (RWTH Aachen University)

17:40 - 17:50 **Closing Remark (Room C)**