

Saturday, December 13

Keynote Lecture

Saturday, December 13 8:05-8:50 Lecture Room

K Global Overview of Energy Strategy for Green Innovation in Japan

Ken Okazaki

Tokyo Institute of Technology

Invited Lecture

Saturday, December 13 8:50-9:35 Lecture Room

I1 How Far and How Fast Can Biofuels Go?

Dongke Zhang

The University of Western Australia

General Session

Material Science & Other Related Topics 1

Saturday, December 13 10:05-12:05 Room A

Chair: S. Hattori, Tokyo Institute of Technology

Co-chair: S. Takahashi, Tokyo Institute of Technology

A111 γ' Morphology and Lattice Misfit in Wrought Ni-based Superalloy with Low Volume Fraction of γ' Phase

Hiromu Hisazawa, Yoshihiro Terada*

**Tokyo Institute of Technology*

A112 Demonstration and numerical simulation of seed free pure inert gas plasma magnetohydrodynamic energy conversion

Manabu Tanaka and Yoshihiro Okuno*

**Tokyo Institute of Technology*

A113 Thermodynamics modeling of stacking fault energy of Co-base superalloy

Zhigang Yang, Chi Zhang, Wenxiang Fu, and Tria Laksana*

**Tsinghua University*

A114 Hybrid System of Solid Oxide Electrolyser Cell and Plasma Reactor to decompose Carbon Dioxide

Lin Lin Tun, Naoki Matsuura, Shinsuke Mori*

**Tokyo Institute of Technology*

A115 Stability of the L12 Crystal Structure in Co-base Superalloys

Robert K. Rhein, Philip C. Dodge, Michael S. Titus, Alessandro Mottura, Anton Van der Ven, and Tresa M. Pollock*

**University of California, Santa Barbara*

A116 A Study of Age-hardening Response of Al-Mg-Cu(-Ag) alloys with Different Alloy Compositions

M. Mihara, C. D. Marioara, S. J. Andersen, R. Holmestad, E. Kobayashi and T. Sato*

**Tokyo Institute of Technology*

Urban Environment & Fuel Cell Technology
Saturday, December 13 10:05-12:05 Room B

Chair: A. Inagaki, Tokyo Institute of Technology
Co-chair: K. Hara, Tokyo Institute of Technology

- B111 Detection of Venting of CO₂ from an Urban Street Canyon: Development of an Automated System and Results**
Alex Björkegren, Sue Grimmond*
**King's College London*
- B112 Cycling Simulator Validation for Bicycle Safety Analysis to Improve Urban Environment**
Kei Miyanoue, Mio Suzuki, Tetsuo Yai*
**Tokyo Institute of Technology*
- B113 Dissolution Behavior of Pt₅₀-Fe₅₀ Binary Alloy under Potential Cycling**
Azusa Ooi, Eiji Tada, and Atsushi Nishikata*
**Tokyo Institute of Technology*
- B114 Numerical simulation method for sensible heat flux from building external surfaces to the surrounding atmosphere using a heat balance simulation and CFD**
Kan Chen, Takashi Asawa*
**Tokyo Institute of Technology*
- B115 A Huge and High Resolution Large Eddy Simulation Domain of Tokyo Urban Area by using Lattice Boltzmann Method**
Nurul Huda Ahmad, Atsushi Inagaki, Manabu Kanda, Naoyuki Onodera, and Takayuki Aoki*
**Tokyo Institute of Technology*
- B116 Development of New Proton Exchange Membrane with Heterocyclic Ring Systems for Polymer Electrolyte Fuel Cells**
Shuntaro Amari, Shinji Ando, Takeo Yamaguchi*
**Tokyo Institute of Technology*

Solar Cell Technology & Other Related Topics
Saturday, December 13 10:05-12:05 Room C

Chair: Y. Takamura, Tokyo Institute of Technology
Co-chair: P. Weerakoon, Tokyo Institute of Technology

- C111 Innovative Emitter Concept for Silicon Heterojunction Solar Cells**
Henriette Gatz, Jatin Rath, Erwin Kessels, and Ruud Schropp*
**Eindhoven University of Technology*
- C112 Low-Cost Fully-Distributed Demand Side Management for Increased Power Grid Efficiency**
Lu Xia, Ramachandra Rao Kolluri, Julian de Hoog and Iven Mareels*
**The University of Melbourne*
- C113 Design of Triple Layer Antireflection Coating for Nanocrystalline Cubic Silicon Carbide/p-type Crystalline Silicon Heterojunction Solar cell**
Ateto Erick Omondi, Makoto Konagai, Shinsuke Miyajima*
**Tokyo Institute of Technology*
- C114 Solar Cells Based on III-V Nanowires on Silicon**
Abdennacer Benali, Jérôme Michallon, Philippe Regreny, Emmanuel Drouard, Pedro Rojo, Nicolas Chauvin, Alain Fave, Anne Kaminski-Cachopo, Michel Gendry*
**Institut des Nanotechnologies de Lyon*

- C115 Operating Inverter Interfaced Microgrids – Robustness Issues**
Ramachandra Rao Kolluri, Lu Xia, Julian de Hoog, and Iven Mareels*
**The University of Melbourne*
- C116 The Electrical Challenges of a Patterned TCO for HIT Solar Cell**
Romain Champory, Fabien Mandorlo, Alain Fave, and Christian Seassal*
**Institut des Nanotechnologies de Lyon*

Environmental Science and Engineering
Saturday, December 13 10:05-12:05 Room D

Chair: J. Fu, Tokyo Institute of Technology
 Co-chair: M. Oguchi, Tokyo Institute of Technology

- D111 The Initiation of Rain in a Shallow Cumulus Cloud**
Fabian Hoffmann, Yign Noh, and Siegfried Raasch*
**Leibniz Universität Hannover*
- D112 Modelling the effects of Climate Variability on a Weather Dependent, UK Power System**
Hannah Bloomfield, Dr David Brayshaw, Dr Len Shaffrey, Dr Phil Coker, Hazel Thornton, Dr Jason Lowe*
**University of Reading*
- D113 A Continuous Large-Eddy Simulation Covering Multiple Days and Weather Conditions in the Mid-Latitudes**
Lennart Böske, Rieke Heinze, and Siegfried Raasch*
**Leibniz Universität Hannover*
- D114 A 2-DOF Bearingless Motr Utilizing a Permanent Magnet Free Structure for Disposable Centrifugal Blood Pump**
Jun Rao, Wataru Hijikata, and Tadahiko Shinshi*
**Tokyo Institute of Technology*
- D115 Elucidation of Switching Mechanism of Metabolism By Using MazF protein in *Escherichia. coli***
Ryota Sugimoto, Tomohiro Shimada, and Kan Tanaka*
**Tokyo Institute of Technology*
- D116 Enhanced performance of multilayer MoS₂ transistors with picosecond laser annealed contacts for low power flexible display**
Hyuk-Jun Kwon, Woong Choi, Sunkook Kim, and Costas P. Grigoropoulos*
**University of California, Berkeley*

Material Science for Energy and Environment 1
Saturday, December 13 13:40-15:40 Room A

Chair: T. Iwasaki, Tokyo Institute of Technology
 Co-chair: J. Hasegawa, Tokyo Institute of Technology

- A121 Fabrication and Characterization of Semiconductor-Photoelectrodes Based on Earth-Abundant Fe₂O₃ with Various Crystalline Orientations**
Hisanori Mashiko, Kohei Yoshimatsu, Takayoshi Oshima, and Akira Ohtomo*
**Tokyo Institute of Technology*
- A122 The Effect of Spatial Heterogeneities on Transformation Kinetics in Amorphous Al Alloys**
Ye Shen, Seth Imhoff, John H Perepezko*
**University of Wisconsin-Madison*

- A123 Type-I Superconductivity in Intermetallic Compound SnAs**
Yue Wang, Hikaru Santo, Hidenori Hiramatsu, and Hideo Hosono*
**Tokyo Institute of Technology*
- A124 Interfacial Mixing of Nickel Vanadium Multilayers Induced by Cold Rolling**
Zhe Wang and John H. Perepezko*
**University of Wisconsin-Madison*
- A125 Characteristics of Fluorinated Graphene Field Effect Transistors**
Kosuke Tahara, Takayuki Iwasaki, Akihiro Matsutani, Mutsuko Hatano*
**Tokyo Institute of Technology*
- A126 Electrochemical Capacitance of Carbon Nanowalls Synthesized by Plasma Enhanced CVD**
Antonius Dimas Chandra Permana, Atsushi Kameyama, Shinsuke Mori*
**Tokyo Institute of Technology*

Global/Regional Environment & Material Science 1
Saturday, December 13 13:40-15:40 Room B

Chair: M. Nakagawa, Tokyo Institute of Technology
 Co-chair: K. Miyanoue, Tokyo Institute of Technology

- B121 Photocatalytic CO₂ Reduction in Water Using Supramolecular Photocatalysts to Achieve the Artificial Photosynthesis**
Akinobu Nakada, Kazuhide Koike, Kazuhiko Maeda, and Osamu Ishitani*
**Tokyo Institute of Technology*
- B122 Observation of HO_x enhancement induced by lightning**
Takayoshi Yamada, Yasuko Kasai, Hideo Sagawa, Toru Adachi, Kota Kuribayashi, Rue-Ron Hsu, Han-Tzong Su, Alfred Chen, Mitsuteru Sato, Yukihiko Takahashi, and Naohiro Yoshida*
**Tokyo Institute of Technology*
- B123 Steam Stability of a Poly(ethyleneimine) Impregnated γ -Alumina Adsorbent for CO₂ Capture from Ambient Air**
Miles A. Sakwa-Novak, and Christopher W. Jones*
**Georgia Institute of Technology*
- B124 Cavity Ring-down Spectroscopy of Singlet Oxygen in the Gas Phase**
Wataru Kashihara, Atsushi Shoji, Akio Kawai*
**Tokyo Institute of Technology*
- B125 Electrodeposition of IrO_x on Electroreduced TaO_x/GC for Electrochemical Applications**
Mohd Safuan, Takeyoshi Okajima, and Takeo Ohsaka*
**Tokyo Institute of Technology*
- B126 Organic Matter Removal from Saline Agricultural Drainage Water by Moving Bed Biofilm Reactor**
Mohamed Ateia, Chihiro Yoshimura, and Manabu Fujii*
**Tokyo Institute of Technology*

Nuclear Technology & Other Related Topics
Saturday, December 13 13:40-15:40 Room C

Chair: J. Fu, Tokyo Institute of Technology
Co-chair: J. Kariya, Tokyo Institute of Technology

- C121 Numerical Analysis on Creation of Palladium by Nuclear Transmutation of Fission Product Rhodium in Pressurized Water Reactor**
Atsunori Terashima and Masaki Ozawa*
**Tokyo Institute of Technology*
- C122 Development of New Snake-like Robot “ACM-R8” for Explorations of Disaster Buildings**
Hirotaaka Komura, Hiroya Yamada, Gen Endo, Edward F. Fukushima and Shigeo Hirose*
**Tokyo Institute of Technology*
- C123 Resonance Self-Shielding in the OpenMOC Deterministic Neutron Transport Code**
Nathan A. Gibson and Benoit Forget*
**Massachusetts Institute of Technology*
- C124 Proposal of a Long-reach Robot Arm Working in Radiation Environment of Nuclear Power Plant and the Demonstration of a Preliminary Prototype Model**
Atsushi Horigome, Hiroya Yamada, Gen Endo, Shin Sen, Shigeo Hirose, Edwardo F. Fukushima*
**Tokyo Institute of Technology*
- C125 Numerical Study on the Effect of Background Pressure on Supersonic Arc-jet Plasma Flow Along Open-field-lines**
Ampan Laosunthara and Hiroshi Akatsuka*
**Tokyo Institute of Technology*
- C126 Effect of Contact-line Drag on Behavior of Drop Impinging onto Flat Surfaces**
June Woo Kee and Sang Yong Lee*
**Korea Advanced Institute of Science and Technology*

Social Science & Engineering
Saturday, December 13 13:40-15:40 Room D

Chair: J. Park, Tokyo Institute of Technology
Co-chair: T. Phraewphiphat, Tokyo Institute of Technology

- D121 Prioritization of Renewable Energy Policies in Japanese Depopulating Municipalities**
Junichirou Ishio, Naoya Abe*
**Tokyo Institute of Technology*
- D122 A Sectoral Perspective on Knowledge Development and Diffusion in Multi-Component Technologies – The Case of Lithium-ion Batteries in the US and Japan**
Annegret Stephan, Catharina Bening, Tobias S. Schmidt, and Volker H. Hoffmann*
**Swiss Federal Institute of Technology Zurich*
- D123 Regional Tsunami Warning Systems: A Study on Indian Ocean and Pacific Ocean**
Natt Leelawat, Anawat Suppasri, Patchanok Srivihok, and Fumihiko Imamura*
**Tokyo Institute of Technology*
- D124 Critical Minerals for a Clean Future: China’s Rare Earth Dominance and its Geopolitical Implications on Global Alternative Energy Development**
*Yujia He**
**Georgia Institute of Technology*

D125 Negative Spillover Effects of Aviation Accidents to Public Safety Perception, Society and Environment

Chen-Wei Li, and Tetsuo Yai*

**Tokyo Institute of Technology*

D126 Make It “Local”: An Approach to Increasing China’ Will to Tackle Climate Change

*Yanqing Wang**

**Tokyo Institute of Technology*

Material Science for Energy and Environment 2
Saturday, December 13 16:10-18:10 Room A

Chair: J. Park, Tokyo Institute of Technology

Co-chair: K. Wakabayashi, Tokyo Institute of Technology

A131 Solid-State Solar Fuel Generation at Elevated Temperature

Madhur Boloor, Xiaofei Ye and William Chueh*

**Stanford University*

A132 Reaction Performance Enhancement of Thermochemical Energy Storage Material by mixing with Expanded Graphite for CaO/H₂O Chemical Heat Pump

Jun Kariya, Junichi Ryu, Yukitaka Kato*

**Tokyo Institute of Technology*

A133 Processing Technology of High Performance Thick Nd-Fe-B Film for Electromagnetic Energy Harvesters

Ryogen Fujiwara, Chao Zhi, Tadahiko Shinshi, and Elito Kazawa*

**Tokyo Institute of Technology*

A134 Ultrafast Time-Resolved Infrared Spectroscopy of Transition Metal Complexes Relevant to Light-Energy Conversion Materials

Tatsuhiko Mukuta, Kei Murata, Akiko Inagaki, Shin-ya Koshihara, Ken Onda*

**Tokyo Institute of Technology*

A135 In-situ Raman Spectroscopic investigation into the Pseudocapacitive Reaction of MnO_x: The Effects of Cation Sizes to Structural Transformation during Charge Storage

Dongchang Chen, Xiayi Li, Mostafa El-Sayed, and Meilin Liu*

**Georgia Institute of Technology*

~~**A136 Quantitative Analysis of Local Microstructure nearby Grain Boundaries for Creep Life Prediction**~~

~~*Takahiro Kimura*, Imanuel Tarigan, Naoki Takata, and Masao Takeyama*~~

~~**Tokyo Institute of Technology*~~

Global/Regional Environment & Material Science 2
Saturday, December 13 16:10-18:30 Room B

Chair: S. Hattori, Tokyo Institute of Technology

Co-chair: E. Ateto, Tokyo Institute of Technology

B131 Determination of the Clumped Kinetic Isotope Effect of ¹³CH₃D/¹²CH₄ Reacting With OH

L. M. T. Joelsson, J. A. Schmidt, K. Sarka, E. J. K. Nilsson, S. Ono and M. S. Johnson*

**University of Copenhagen*

- B132 Nondestructive Ultrasonic Resonance Evaluation For More Efficient Lifetime Utilization of Structural Components**
Brent Goodlet and Tresa Pollock*
**University of California, Santa Barbara*
- B133 Development of a Method for the Determination of Nitrogen and Oxygen Isotope Ratios of Trace NO**
Tamaki Fujinawa, Sakae Toyoda, Shohei Hattori, and Naohiro Yoshida*
**Tokyo Institute of Technology*
- B134 Effect of N-Methyl Amide Linkage on Hydrogen Bonding Behavior and Membrane Properties of Partially N-Methylated Random Aromatic Copolyamides**
Motohiro Aiba, Hidetoshi Matsumoto, Tomoya Higashihara, and Mitsuru Ueda*
**Tokyo Institute of Technology*
- B135 Continuous Measurements of Nitrous Oxide Isotopomers During Incubation Experiments**
Malte Nordmann Winther, Thomas Blunier, David Balslev-Clausen, Bo Elberling, and Søren Christensen*
**University of Copenhagen*
- B136 Heteroepitaxial Growth of Diamond on Si Substrates via 3C-SiC buffer layer by Antenna Edge Microwave Plasma CVD for Power Electronics Application**
Junya Yaita, Takayuki Iwasaki, Meralys Natal, Stephen E. Sadow and Mutsuko Hatano*
**Tokyo Institute of Technology*
- B137 Evaluation of Fungal Contribution to N₂O Production Using Isotopomer Ratios**
Keiichi Kusunuki, Naohiro Yoshida, Sakae Toyoda, Kiwamu Minamisawa, Masato Moriuchi*
**Tokyo Institute of Technology*

Combustion & Flow Phenomena 1

Saturday, December 13 16:10-18:30 Room C

Chair: Y. Naka, Tokyo Institute of Technology

Co-chair: A. Kurachi, Tokyo Institute of Technology

- C131 Ozone-Activated Self-Sustaining Cool Flames**
Christopher B. Reuter, Sang Hee Won, and Yiguang Ju*
**Princeton University*
- C132 Numerical Simulation of Drag-Reducing Turbulent Channel Flow with Spring-Damper Chain Elements**
Masanari Fujimura, Hiroya Mamori, Kaoru Iwamoto, Akira Murata, Mitsutoshi Masuda and Hirotomo Ando*
**Tokyo University of Agriculture and Technology*
- C133 The Structure of a Turbulent Lifted Flame**
Shahram Karami, Evatt R. Hawkes, Mohsen Talei, and Hongfeng Yu*
**The University of New South Wales*
- C134 Characteristics of Rotary Compressor Performance with Compression Chamber Design under Low Speed and High Compression Ratio Conditions**
Ki Youl Noh, Byung Chae Min, Jang Sik Yang, Gyung Min Choi, Duck Jool Kim*
**Pusan National University*
- C135 Simulation of turbulent lifted jet flames**
Z. Chen, S. Ruan and N. Swaminathan*
**University of Cambridge*

C136 Numerical Simulation of Micromixers with Less Diffusive Schemes

Xi Deng, Xie Bin, Feng Xiao*

**Tokyo Institute of Technology*

C137 Optimal Sizing of Biomass Electricity with Carbon Capture and Storage (BECCS): Framework and Application to Illinois

Daniel L. Sanchez, Duncan S. Callaway*

**University of California, Berkeley*

**Solar Cell Technology & Secondary Battery
Saturday, December 13 16:10-18:30 Room D**

Chair: K. Suzuki, Tokyo Institute of Technology

Co-chair: T. Okada, Tokyo Institute of Technology

D131 Improved electrochemical performance of titanate nanotube synthesized by hydrothermal reaction using $\text{TiO}_2 \cdot n\text{H}_2\text{O}$ as titanium source

Shitong Wang, Zilong Tang, Ye Hong, Wei Quan and Zhongtai Zhang*

**Tsinghua University*

D132 Near-field Thermophotovoltaic Generation of Electricity

Naphatsorn Vongsoasup, Katsunori Hanamura*

**Tokyo Institute of Technology*

D133 New Material Search for Crystalline Lithium Ionic Conductor in $\text{Li}_2\text{S-GeS}_2\text{-P}_2\text{S}_5$ system

Yuki Inoue, Kota Suzuki, Masaaki Hirayama, Ryoji Kanno*

**Tokyo Institute of Technology*

D134 Non-thermal microwave acceleration on electron transfer reaction at solid surface

Fuminao Kishimoto, Takashi Imai, Satoshi Fujii, Dai Mochizuki, Masato M. Maitani, Eiichi Suzuki and Yuji Wada*

**Tokyo Institute of Technology*

D135 Mixing condition and electrochemical properties of LiCoO_2 and $\text{Li}_{10}\text{GeP}_2\text{S}_{12}$ composite electrode for all solid-state batteries

Wen Jing Li, Masaaki Hirayama, Kota Suzuki, and Ryoji Kanno*

**Tokyo Institute of Technology*

D136 Highly Fluorescent Polyimides for Wavelength Converting Applications

Kenta Kanosue and Shinji Ando*

**Tokyo Institute of Technology*

D137 Alternative Synthesis Pathways of Electrolytes for Magnesium-Ion Batteries

Jake Herb, Carl Nist-Lund, Craig B. Arnold*

**Princeton University*

Sunday, December 14

Invited Lecture

Sunday, December 14 8:00-8:45 Lecture Room

I2 A Research Agenda for Low Carbon Mobility

Michael A P Taylor

University of South Australia

General Session

Material Science & Secondary Battery

Sunday, December 14 10:30-12:50 Room A

Chair: K. Suzuki, Tokyo Institute of Technology

Co-chair: Yue Wang, Tokyo Institute of Technology

A211 Dispersion of Carbon Nanotube by Poly(acrylic acid)-Poly(amide imide) Copolymers for the Anode Binder of Li-ion Battery

Akane Kubotera and Reiko Saito*

**Tokyo Institute of Technology*

A212 Performance Improvement of Li-Ion Batteries using Silicon as Negative Electrode

Lucille Quazuquel, Nicolas Dupré, Philippe Moreau, Christian Rudish, Julien Danet, Pascale Bayle Guillemaud and Dominique Guyomard*

**Université de Nantes*

A213 Synthesis and Applications of Polydivinylbenzene Core-Poly(acrylic acid) Corona Particles to the Negative Electrode Binder of Lithium Ion Battery

Suzuka Sumiyoshi, Akane Kubotera, Reiko Saito*

**Tokyo Institute of Technology*

A214 Analysis of the degradation phenomenon on LiCoO₂ thin films using Raman imaging during charging and discharging

Kosuke Hara, Takaaki Yano, Tomohiro Hayashi, Masaaki Hirayama, Ryoji Kanno, and Masahiko Hara*

**Tokyo Institute of Technology*

A215 Ionic Liquid Confined By Photo-Polymerization As Solid Electrolyte For All Solid State Lithium Microbatteries

Djamel Aidoud, Bernard Lestriez, Jean Lebideau, Delphine Guy-Bouyssou*

**Université de Nantes*

A216 Synthesis and Electrochemical Properties of Lithium Ion Conductors with the Pyrochlore Structure

Thanya Phraewphiphat, Iqbal Muhammad, Kota Suzuki, Masaaki Hirayama, and Ryoji Kanno*

**Tokyo Institute of Technology*

A217 Understanding mechanisms in Li-rich lamellar oxide, a promising material for positive electrode in Li-ion batteries

Alexandre Pradon, Maria Teresa Caldes, Camille La Fontaine, Stéphanie Belin, Erik Elkaim, Pierre-Emmanuel Petit, Erwan Dumont, Cécile Tessier, and Guy Ouvrard*

**Université de Nantes*

Regional Environment & Material Science
Sunday, December 14 10:30-12:30 Room B

Chair: T. Iwasaki, Tokyo Institute of Technology
Co-chair: M. Sanapi, Tokyo Institute of Technology

- B211 The distribution of the bubble's radius in the bubble dispersion mould flux**
Shunsuke Takahashi, Yoshinao Kobayashi, Rie Endo, and Masahiro Susa*
**Tokyo Institute of Technology*
- B212 Shaft Life: Probabilistic Prediction and Extension**
Ronald Ballinger, Douglas Jonart, and Alex Slocum*
**Massachusetts Institute of Technology*
- B213 Experimental evaluation of amount of soil erosion by using rainfall simulator**
*Megumi Araya**
**Tokyo Institute of Technology*
- B214 Effect of Gate Oxide Process at SiC-MOS Interface on Threshold Voltage Shift Analyzed by DLTS**
Junichi Hasegawa, Tetsuo Kodera, Takayuki Iwasaki and Mutsuko Hatano*
**Tokyo Institute of Technology*
- B215 Synthesis of polybenzoxazine-silica nanocomposites provided from perhydropolysilazane**
Joo Yeon Lee and Reiko Saito*
**Tokyo Institute of Technology*
- B216 Towards a Sustainable Human-Nature Relationship through Forest Home Gardens of Kandy, Sri Lanka**
*Patali Samya Weerakoon**
**Tokyo Institute of Technology*

Combustion & Flow Phenomena 2
Sunday, December 14 10:30-12:50 Room C

Chair: Y. Naka, Tokyo Institute of Technology
Co-chair: J. Rao, Tokyo Institute of Technology

- C211 The Influence of In-cylinder Swirl Flow on a Wall-Interacting Fuel Jet in a Light-Duty Diesel Engine**
Minh Khoi Le, Sanghoon Kook, Evatt Hawkes*
**The University of New South Wales*
- C212 Parametric Study on Sinusoidal Riblet Shape for Drag Reduction in Turbulent Channel Flow**
Monami Sasamori, Oozora Iihama, Mamori Hiroya, Kaoru Iwamoto and Akira Murata*
**Tokyo University of Agriculture and Technology*
- C213 Fractal Characteristics of Hydrogen-Air Turbulent V-shape Premixed Flames**
Katsuhiro Hiraoka, Masayasu Shimura, Yoshitsugu Naka, Naoya Fukushima and Mamoru Tanahashi*
**Tokyo Institute of Technology*
- C214 An Investigation of Operational Mechanism of Pulsating Heat Pipe**
Jaeyeong Jo, Sung Jin Kim*
**Korea Advanced Institute of Science and Technology*

- C215 LES of Turbulent Premixed Combustion Using Unstrained and Strained Flamelets**
Ivan Langella and Nedunchezian Swaminathan*
**University of Cambridge*
- C216 Fine Scale and Large Scale Turbulence Structures in the Friction Drag Recovering Regime in a Surfactant Added Pipe Flow**
Shogo Ito, Yoshitsugu Naka, Masayasu Shimura, Naoya Fukushima and Mamoru Tanahashi*
**Tokyo Institute of Technology*
- C217 In-cylinder Characteristics of a Gasoline Direct Injection Compression Ignition Engine Using Computational Fluid Dynamics**
Donghoon Kim, Choongsik Bae*
**Korea Advanced Institute of Science and Technology*

Fuel Cell Technology & Other Related Topics
Sunday, December 14 10:30-12:50 Room D

Chair: H. Ogihara, Tokyo Institute of Technology
 Co-chair: W. Ua-amnueychai, Tokyo Institute of Technology

- D211 Scanning Electron Microscopic Visualization of Particulate Matter Trapping**
Ryoko Sanui, Katsunori Hanamura*
**Tokyo Institute of Technology*
- D212 Effect of Decomposition Gases of Fuels on Electrochemical Reactions in Direct Carbon Fuel Cells Using Molten Carbonate**
Seongyong Eom, Jaemin Cho, Gwangseop Lee, Gyungmin Choi, and Duckjool Kim*
**Pusan National University*
- D213 Theoretical Analysis of Transient State of Temperature Distribution by Point Contact Current**
Kazuki Wakabayashi, Pasomphone Hemthavy, Shigeki Saito, and Kunio Takahashi*
**Tokyo Institute of Technology*
- D214 Development of Hydrogen electrode for the Alkaline Hydrogen-Bromine Fuel Cell**
Dhrubajit Konwar, Trung Van Nguyen*
**The University of Kansas*
- D215 Evaluation method of thermal damage to heat-sensitive materials in tip-enhanced Raman spectroscopy**
Masahito Mochizuki, Azuho Tsunoi, Taka-aki Yano, Masahiko Hara, and Tomohiro Hayashi*
**Tokyo Institute of Technology*
- D216 Sorption-Enhanced CHAMP Reactor for Distributed Steam Methane Reforming**
David M. Anderson, Mohammed Nasr, Thomas M. Yun, Peter A. Kottke, and Andrei G. Fedorov*
**Georgia Institute of Technology*
- D217 Electrochemical and Spectroscopic Study on the Reduction Current for the Trivalent Lanthanide Ions in Room Temperature Ionic Liquid**
Akifumi Kurachi, Fusao Kitamura*
**Tokyo Institute of Technology*

Monday, December 15

University Energy Clubs and Student Leadership Panel Discussion

8:00-10:00 Lecture Room

Chair: J. S. Cross, Professor, Tokyo Institute of Technology, Opening Remarks

Co-chair: B. Woodall, Professor, Georgia Institute of Technology, Closing Remarks

Format: each panelist speaks for 10 min on their club activities and leadership, then the floor opens for questions and answers.

Panelists:

Madhur Bolor, Stanford University



Co-President for the Stanford Energy Club whose mission is to foster an interdisciplinary energy community that is well-informed, close-knit, and prepared to make an impact. Prior to enrolling at Stanford to pursue a Ph.D. in Materials Science and Engineering with an emphasis on solar water splitting for hydrogen fuel generation, Madhur graduated from UC Berkeley and worked at Primus Power, a flow-battery startup in the Bay Area. Madhur's primary objective as Co-President this year is to improve member and officer engagement for students representing all parts of campus, ranging from Law and MBA students to undergrads with technical majors.

Daniel Sanchez, University of California, Berkeley



Daniel is the Co-President of Berkeley Energy and Resources Collaborative (BERC) and a Ph.D. Candidate in the Energy and Resources Group at the University of California-Berkeley. BERC is a multidisciplinary network of UC Berkeley students, alumni, faculty, industry professionals, and advisors who seek to turn world-leading research into world-changing solutions by tackling tough and timely energy and environmental challenges. More specifically, BERC's mission is to connect, educate, and engage its members in order to foster innovation and action. Daniel has previously held positions with the Advanced Research Projects Agency-Energy (ARPA-E), Green for All, and the California Public Utilities Commission. He holds an M.S. in Energy and Resources and a B.S.E. in Chemical and Biomolecular Engineering from the University of Pennsylvania.

Enes Kaya, The University of Western Australia



I am currently in my final year of my Bachelors of Mechanical Engineering at The University of Western Australia. Stepping into the role of President at the Society of Petroleum Engineers UWA chapter within 6 months of joining shows my dedication and passion to the oil and gas industry. Our mission at UWA is to bridge the gap between university and the industry by facilitating the development of students to create future leaders. We hold various professional events to develop the student body and equip them with the required technical and soft skills to secure work out of university.

Throughout the summer break, I will be working with Schlumberger as an intern in the area of Drilling and Measurements.

Junichirou Ishio, Tokyo Institute of Technology



Junichirou Ishio is a Doctor's Degree Candidate (D2) studying international development engineering in Tokyo-Tech. He has been a head of a student-led organization: International Development Academy Tokyo-Tech (IDA) since 2011. The mission of the organization is to promote student awareness and participation in international social development activities. His team has conducted projects for several aims around the world. His current project is fighting rooster robot competition in Fukushima for science education and community vitalization.

Tuesday, December 16

Invited Lecture

Tuesday, December 16 8:00-8:45 Lecture Room

I4 Recent Advances In Computational Combustion Modelling For Low-Emissions IC-Engines

Evatt R. Hawkes

The University of New South Wales

General Session

Material Science & Other Related Topics 2

Tuesday, December 16 9:15-11:55 Room A

Chair: M. Nakagawa, Tokyo Institute of Technology

Co-chair: N. Leelawat, Tokyo Institute of Technology

A411 An Ultrastable Surface-Enhanced Raman Scattering Substrate synthesized by Low-temperature Atomic Layer Deposition of Alumina on A Silver nanorods Film

Lingwei Ma and Zhengjun Zhang*

**Tsinghua University*

A412 The Effects of Rotational Barrier on β Relaxation Behaviors Among the Isomeric Polyimides

Tomohiro Okada, Shinji Ando*

**Tokyo Institute of Technology*

A413 Light-transmittable Ultrasoother Gold Film for Gap-mode Tip-enhanced Raman Scattering Spectroscopy

Masahiro Oguchi, Masahito Mochizuki, Taka-aki Yano, Masahiko Hara, and Tomohiro Hayashi*

**Tokyo Institute of Technology*

A414 Effect of Cross-sectional Configuration on Fiber Formation Behavior in Bicomponent Melt Spinning Process

Y. Chen, W. Takarada, T. Kikutani*

**Tokyo Institute of Technology*

A415 Molecular Alignment Induced by Photopolymerization with Moving Light

Kyohei Hisano, and Atsushi Shishido*

**Tokyo Institute of Technology*

A416 The role of interfacial water molecules in anti-biofouling of self-assembled monolayers investigated by surface force measurements

Taito Sekine, Chikako Sato, Masaru Tanaka, Taka-aki Yano, Masahiko Hara and Tomohiro Hayashi*

**Tokyo Institute of Technology*

A417 Pyridine-catalyzed CO₂ Reduction on p-GaP Electrodes: New Mechanistic Insights from Theoretical Investigations

Martina Lessio, Christoph Riplinger, Ana B. Muñoz-García and Emily A. Carter*

**Princeton University*

A418 n-Channel Organic Field-Effect Transistors Based on Dithienodicyanoquinonediimine

Kodai Iijima, Tomofumi Kadoya, Pitayatanakul Oratai, Toshiki Higashino and Takehiko Mori*

**Tokyo Institute of Technology*

Material Science & Combustion Technology
Tuesday, December 16 9:15-11:55 Room B

Chair: A. Inagaki, Tokyo Institute of Technology
Co-chair: H. Mashiko, Tokyo Institute of Technology

- B411 Hot Corrosion Attack of Mo-Si-B Coating**
Matthew Taylor, John Perepezko*
**University of Wisconsin-Madison*
- B412 Laminar Premixed Flames of Gasoline Near The Auto-Ignition Limit**
Golnoush Ghiasi, Irfan Ahmed, Nedunchezian Swaminathan*
**University of Cambridge*
- B413 Development of Protective Al₂O₃ Scale on Fe-Cr-Al Alloys**
Suzue Yoneda, Shigenari Hayashi*
**Tokyo Institute of Technology*
- B414 Auto-Ignition Studies of a Fuel Jet Propagating into Hot Air Generated by a Novel Plasma Heater**
Jhon Pareja, Felix Eitel, Dirk Geyer, Andreas Dreizler*
**Technische Universität Darmstadt*
- B415 Arc Jet Testing and Evaluation of Mo-Si-B Coated Mo and SiC-ZrB₂ Ceramics**
Patrick J. Ritt, Peter A. Williams, Scott C. Splinter, and John H. Perepezko*
**University of Wisconsin-Madison*
- B416 Vortical Motions and Thermoacoustic Oscillation Characteristics of Turbulent Swirling Premixed Flame in a Cuboid Combustor**
Kozo Aoki, Masayasu Shimura, Yoshitsugu Naka and Mamoru Tanahashi*
**Tokyo Institute of Technology*
- B417 The Role of Bond Coats in Sustained Peak Low-Cycle Fatigue**
Marissa Lafata, Luke Rettberg, Tresa Pollock*
**University of California, Santa Barbara*
- B418 TDLAS based NH₃ Mole Fraction Measurement for Exhaust Diagnostics during SCR-Treatment using a fiber-coupled 2.2 μm DFB Diode Laser**
Felix Stritzke, Oliver Diemel, Steven Wagner*
**Technische Universität Darmstadt*

Urban/Regional Environment & Solar Cell Technology
Tuesday, December 16 9:15-11:35 Room C

Chair: Y. Takamura, Tokyo Institute of Technology
Co-chair: A. Nakada, Tokyo Institute of Technology

- C411 Implementation of the WRF-Urban Canopy Model to Istanbul, Turkey**
Meral Yucel, Alvin Christopher Galang Varquez, and Manabu Kanda*
**Tokyo Institute of Technology*
- C412 Influence by Inserting Wide Gap Material at CdS/CIGS Interface for Cu(In,Ga)Se₂ Solar Cells**
T. Nishimura, Y. Hirai, Y. Kurokawa, and A. Yamada*
**Tokyo Institute of Technology*
- C413 Emission Rates of Vehicle Classes Applicable to the Australian Light Vehicle Fleet**
Ivan Iankov, Rocco Zito and Michael Taylor*
**University of South Australia*

- C414 IV hysteresis of solution-processed hybrid metal halide perovskite solar cells**
Ye Zhang, Mingzhen Liu, Giles Eperon, Tomas Leijtens, David McMeekin, Michael Saliba, Laura M. Herz, Michael B. Johnston, Henry J. Snaith, Hong Lin*
**Tsinghua University*
- C415 Study on Climate Changes using Urban Parameterization and Pseudo Global Warming (PGW) Method in Kanto during Summer season**
Natsumi Kawano, Alvin C.G. Varquez, Manabu Kanda, Makoto Nakayoshi, Masayuki Hara and Sachiko Adachi*
**Tokyo Institute of Technology*
- C416 Flexible Cu(In,Ga)Se₂ Solar Cells Fabricated on Polyimide-coated Soda-lime Glass**
Adiyudha Sadono, Masashi Hino, Mitsuru Ichikawa, Kenji Yamamoto, Yasuyoshi Kurokawa, Makoto Konagai, and Akira Yamada*
**Tokyo Institute of Technology*
- C417 Estimating Rural Crash Risk during Bushfires using Rare-Event Logistic Regression**
*Alex G. Sims**
**University of South Australia*

Fuel Cell Technology & Secondary Battery
Tuesday, December 16 9:15-11:55 Room D

Chair: H. Ogihara, Tokyo Institute of Technology
 Co-chair: A. Horigome, Tokyo Institute of Technology

- D411 In-situ Localized Current Distribution of Vanadium Redox Flow Batteries**
Jason T. Clement, Thomas A. Zawodzinski, and Matthew M. Mench*
**The University of Tennessee*
- D412 Metal Supported Solid Oxide Fuel Cell Based on Interconnect Coating**
Kunho Lee, Joongmyeon Bae*
**Korea Advanced Institute of Science and Technology*
- D413 Impact of Flow Field Design on Convective Mass Transport and Pressure Drop in High Performance Redox Flow Batteries**
Jacob Houser, Alan Pezeshki, Matthew Mench*
**The University of Tennessee*
- D414 An Analysis of Overpotential Curve by SOFC Anode Reaction Model based on Species Territory Adsorption around Triple Phase Boundary**
Tsuyoshi Nagasawa and Katsunori Hanamura*
**Tokyo Institute of Technology*
- D415 All-solid-state batteries using 5V LiNi_{0.5}Mn_{1.5}O₄ spinel electrode and Li₁₀GeP₂S₁₂ electrolyte**
Gwangseok Oh, Ohmin Kwon, Masaaki Hirayama, Kota Suzuki, Ryoji Kanno*
**Tokyo Institute of Technology*
- D416 Engineering the Solid Oxide Fuel Cell Electrocatalyst Infiltration Technique for Industrial Use**
*Regis P. Dowd Jr. *, Shiwoo Lee, Yueying Fan, and Kirk Gerdes*
**The University of Kansas*
- D417 Impact of Vanadyl Sulfate Source on Beginning-of-Lifetime Performance of All-Vanadium Redox Flow Batteries**
Andy W. Burch, Erin L. Redmond, and Matthew M. Mench*
**The University of Tennessee*

D418 Asymmetric Membrane with Proton Conductivity and Hydrogen Separation Capability for Solid Oxide Fuel Cell

Warit Ua-amnueychai and Katsunori Hanamura*

**Tokyo Institute of Technology*