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Energy intelligence
without borders
for protection of our future

KYUSHU UNIVERSITY
Energy Week 2018

Date [Mon] 29 Jan. – [Fri] 2 Feb., 2018

Venue KYUSHU UNIVERSITY Ito Campus, Chikushi Campus, ACROS FUKUOKA

744 Motooka, Nishi-ku, Fukuoka
819-0395, JAPAN

6-1 Kasuga-koen, Kasuga, Fukuoka
816-8580, JAPAN

1-1-1 Tenjin, Chuo-ku, Fukuoka
810-0001, JAPAN

<http://www.congre.co.jp/q-pit2018/>



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HYDROGENIUS
Hydrogen saves the Earth
Research Center for Hydrogen
Industrial Use and Storage



Kyushu University
The Ultramicroscopy Research Center



Research Center for
Synchrotron Light Applications, Kyushu University



Center for Co-Evolutional Social Systems
共進化社会システム創成拠点

IMCE Institute for
Materials Chemistry
and Engineering,
Kyushu University



RIAM
Research Institute
for Applied Mechanics,
Kyushu University

Research Institute for Applied Mechanics, Kyushu University
Advanced Fusion Research Center

* Departments participating in Energy Week 2018,
related to the energy research in Kyushu University

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Message



President
Kyushu University

Chiharu Kubo

First of all, I would like to express my sincere appreciation for your participation in Kyushu University Energy Week 2018.

On the occasion of the 100th anniversary of its foundation, Kyushu University established the slogan, "Lead to the Next 100 Years, Leap to the Best 100 World," aspiring to leap into the top hundred universities in the world. In line with the basic principle of "With continual and autonomous reforms, while guaranteeing educational quality at an international level, we will aim to be a top-level education and research hub marked by vitality and a willingness to address future issue," we formulated the Kyushu University Action Plan 2015-2020 in 2015, upon which various initiatives have been launched. These include the establishment of the Platform of Inter-/Transdisciplinary Energy Research.

Fukuoka, where Kyushu University is located, was one of the first places to experience the industrial revolution in Asia, and it once played a central role in Japan's energy industry as a coal-mining city. Also, as a gateway to Asia, Fukuoka has actively adopted cultures of other Asian countries and has influenced many other countries and regions as a point of transmission of Japanese culture. Against this background, various research projects on energy have been actively conducted at Kyushu University, with creative and basic academic studies underway in a wide range of fields.

In this day and age, people of all generations have become more interested in energy issues, especially because of past experiences such as the oil crises, the Chernobyl nuclear power plant accident and the Great East Japan Earthquake, to name a few. Our country in particular relies on imports for most fossil fuels, a major energy source, so a stable supply of sustainable energy that is not dependent on fossil fuels has been a long-standing goal for us. A variety of difficulties come with fossil fuel-free energy sources, in terms of technology, economy and safety, and sustainable and stable utilization is still a challenge. In order to overcome these problems, researchers and technicians from all relevant fields should work hand-in-hand to seek solutions from many different perspectives. Also, we must continue to address issues including environmental destruction and global warming, which we face in the process of new discoveries, research, development and applications, and work toward the realization of a future energy society.

In this context, we see it as vital to reconsider our mission and realize the formation of a research and education core that takes advantage of our university's unique strengths. We established the Platform of Inter-/Transdisciplinary Energy Research in October 2016 as an all-Kyushu Univ. platform to promote the energy field. It has received a praise internationally as one of our university's key strengths and features. It is expected that the diverse research activities conducted at the university will be systemized. Advanced and integrated research as well as creative and interdisciplinary research will be promoted, and research achievements of note will be shared via educational activities.

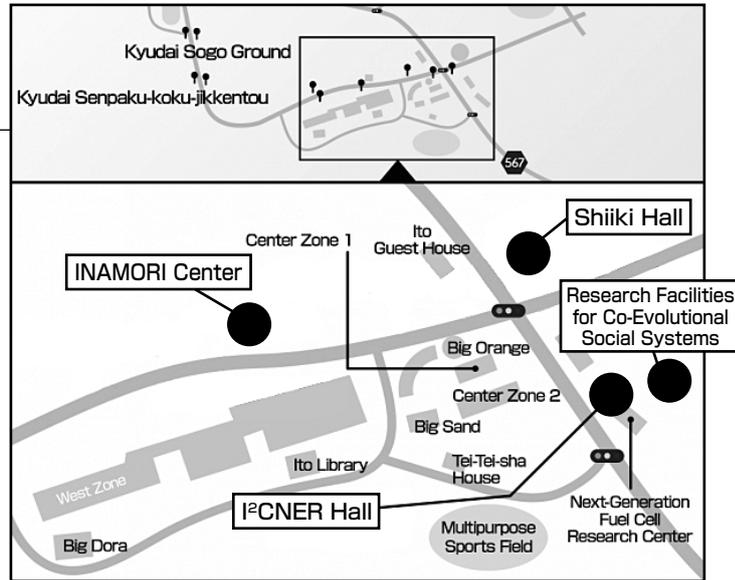
Under the theme of "Energy Intelligence without Borders for the Protection of our Future," we will host Kyushu University Energy Week 2018 this year. It will be an opportunity to publicize our university's initiatives in widely varied areas and communities both at home and abroad, and will serve as a forum to deepen exchanges among participating researchers, where they can discuss their research results. For our second Energy Week event, we have invited prominent national and international researchers in the energy field to deliver lectures. Students and young researchers from abroad will also be invited to present their research achievements in anticipation of future international joint research projects, as part of our activities to serve as a global hub of energy studies. The program will also include presentations by young researchers, and symposiums held by multiple energy-related institutions that belong to the university. These events will be held both on and off campus. Your active participation in many of these events will be gratefully welcomed.

Venue

KYUSHU UNIVERSITY Ito campus

744 Motooka, Nishi-ku, Fukuoka, 819-0395, JAPAN

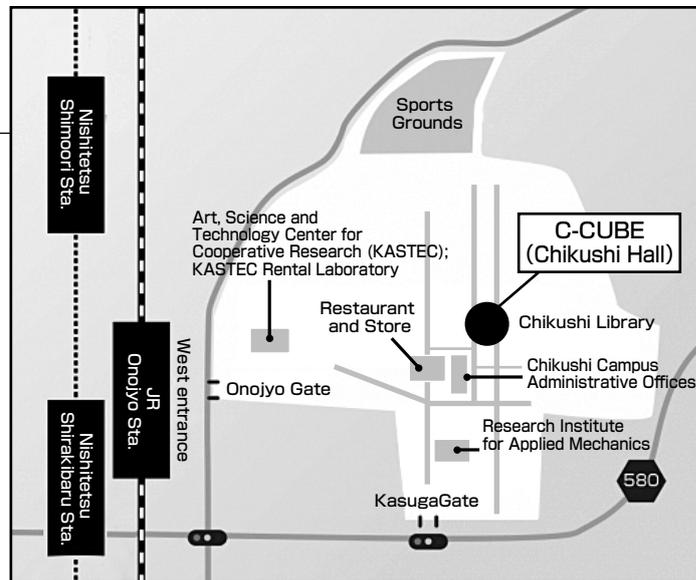
- Shiiki Hall
- I²CNER Hall
- Research Facilities for Co-Evolutional Social Systems
- INAMORI Center



KYUSHU UNIVERSITY Chikushi campus

6-1 Kasuga-koen, Kasuga, Fukuoka, 816-8580, JAPAN

- C-CUBE (Chikushi Hall)



Acros Fukuoka ● Event Hall/B2F

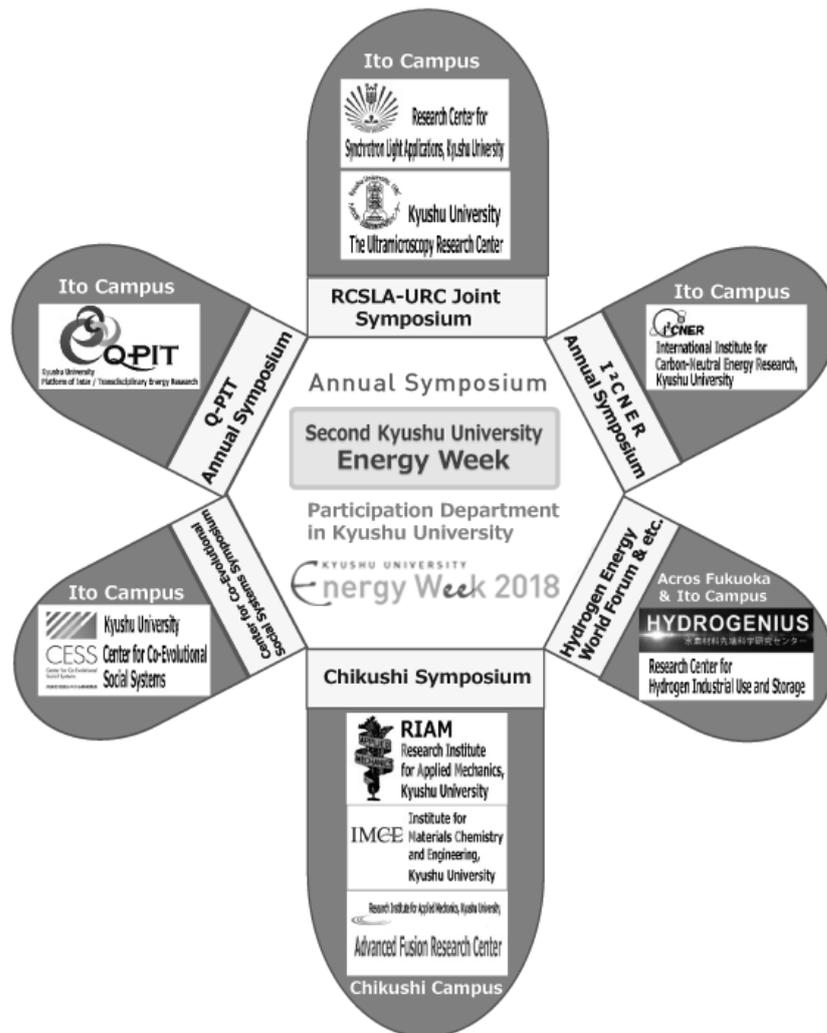
1-1-1 Tenjin, Chuo-ku, Fukuoka, 810-0001, JAPAN

About Kyushu University Energy Week

What's Kyushu University Energy Week ?

Kyushu University Energy Week hold the last week of January once a year in the starting point. Each energy-related department in Kyushu University cooperates, and this event is held. "Kyushu University energy week" holds the international workshops and industry-academia-government collaboration workshop and so on as featuring the theme of "future energy" through five days. Also it is positioning as the place of the interchange of the researchers for taking on a role to the international hub function of the energy research.

We hold the following event. Invited lectures I : by the well-known researcher of the field of energy from all over the world. Invited lectures II : by Expert about the energy from industry and municipality. Panel Discussion, Young Researcher Presentation, Poster Sessions, and etc.



Energy Week 2018 - Category for Events -

Invited Lectures >>> **Invited Lectures by The Department in relation to Energy**

Q-PIT International Institute for Carbon Neutral Energy Research, Kyushu University
 HYDROGENIUS Research Center for Hydrogen Production, Use and Storage
 CESS Center for Co-Evolutionary Social Systems
 Research Center for Spectroscopy and Optoelectronics, Kyushu University
 The Ultramicroscopy Research Center, Kyushu University
 RIAM Research Institute for Applied Mechanics, Kyushu University
 IMCE Institute for Materials Chemistry and Engineering, Kyushu University

Symposiums >>> **Symposiums by The Department in relation to Energy**

Q-PIT International Institute for Carbon Neutral Energy Research, Kyushu University
 HYDROGENIUS Research Center for Hydrogen Production, Use and Storage
 CESS Center for Co-Evolutionary Social Systems
 Research Center for Spectroscopy and Optoelectronics, Kyushu University
 The Ultramicroscopy Research Center, Kyushu University
 RIAM Research Institute for Applied Mechanics, Kyushu University
 IMCE Institute for Materials Chemistry and Engineering, Kyushu University

Workshops >>> **Workshops by The Department in relation to Energy**

Q-PIT International Institute for Carbon Neutral Energy Research, Kyushu University
 HYDROGENIUS Research Center for Hydrogen Production, Use and Storage

Panel Discussion >>> **Panel Discussion by Invited speakers, Faculties in relation to Q-PIT and etc.**

Q-PIT International Institute for Carbon Neutral Energy Research, Kyushu University

Young Researcher Presentation >>> **Lectures by Young Researchers of Q-PIT**

Q-PIT International Institute for Carbon Neutral Energy Research, Kyushu University

Poster Sessions >>> **Result Presentation and etc. for Energy Research by Young Researchers and Students**

Q-PIT International Institute for Carbon Neutral Energy Research, Kyushu University
 CESS Center for Co-Evolutionary Social Systems
 Research Center for Spectroscopy and Optoelectronics, Kyushu University
 The Ultramicroscopy Research Center, Kyushu University

Program & Schedule

Date	Dept.	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00	
Jan.29 (mon)	Q-PIT											(1) Q-PIT	
Jan.30 (tue)	Q-PIT	(2) Q-PIT Plenary Session [JPN/ENG] Opening/Keynote Speech											
											(4) Q-PIT Poster Presentation		
Jan.31 (wed)	I ² CNER										(5) 2018 I ² CNER Annual		
	CESS (COI)										(6) Center for		
Feb.1 (thu)	HYDROGENIUS METI	HYDROGENIUS Facility Tour											
	CHIKUSHI										(7) Hydrogen Energy Int'l Hydrogen Energy		
	RCSLA URC										(8) Chikushi		
Feb.2 (Fri)	Q-PIT										(9) RCSLA &		
	HYDROGENIUS I ² CNER										(10) Q-PIT		
		(11) HYDROGENIUS, I ² CNER & HYDROMATE Joint Research Symposium ①											
		(12) HYDROGENIUS & I ² CNER Tribology Symposium ②											
	I ² CNER	(13) HYDROGENIUS & I ² CNER Joint Research Symposium ③ Thermophysical											
		HYDROGENIUS									(14) HYDROGENIUS		
		(15) I ² CNER Int'l Workshop ① Molecular Photoconversion Devices Division and Electrochemical											
											(16) I ² CNER Int'l		
											(17) I ² CNER Int'l		
											(18) I ² CNER Int'l		
									(19) I ² CNER Int'l Workshop ⑤				
									(20) I ² CNER Int'l Workshop ⑥				

※Q-PIT:Kyushu University Platform of Inter/Transdisciplinary Energy Research

※I²CNER: International Institute for Carbon-Neutral Energy Research

※CESS: Center for Co-Evolutional Social Systems

※HYDROGENIUS: Research Center for Hydrogen Industrial Use and Storage

※RCSLA: Research Center for Synchrotron Light Applications

※URC: The Ultramicroscopy Research Center

* Above Program is subject to change without prior notice.

14:30 15:00 15:30 16:00 16:30 17:00 17:30 18:00 18:30 19:00										Venue	
Prologue Session [JPN]											Ito Campus Shiiki Hall
(3) Q-PIT Plenary Session [JPN/ENG] Invited Lecture/ Panel Discussion/others											Ito Campus Shiiki Hall
[JPN]										Ito Campus Shiiki Hall	
Symposium [ENG]								I ² CNER Reception		Ito Campus I ² CNER Bldg.1, I ² CNER Hall	
Co-Evolutional Social Systems (CESS) Symposium [JPN]											Ito Campus Research Facilities for Co-Evolutional Social Systems, 2F Hall
										Ito Campus	
and Fuel Cell Forum in Kyushu & Development Forum 2018 [JPN & ENG]						HYDROGENIUS Reception @TENJIN SKY HALL				ACROS Fukuoka B2 Event Hall	
Symposium [JPN/ENG]				Facility Tour						Chikushi Campus Chikushi Hall	
URC Joint Symposium [JPN]										Ito Campus Inamori Hall	
Epilogue Session [JPN]										Ito Campus Shiiki Hall	
Fatigue & Fracture / Hydrogen Materials Compatibility [ENG]										Ito Campus Shiiki Hall 3F Lecture Room	
Tribology / Hydrogen Materials Compatibility [ENG]										Ito Campus Shiiki Hall 3F Lecture Room	
Properties / Thermal Science and Engineering [ENG]										Ito Campus I ² CNER Bldg.1, 2F Conference Room	
Symposium Polymers [ENG]										Ito Campus Shiiki Hall 3F Lecture Room	
Energy Conversion Division [ENG]										Ito Campus I ² CNER Bldg.1, Hall B	
Workshop ②Catalytic Materials Transformations Division [ENG]										Ito Campus I ² CNER Bldg.1, Hall A	
Workshop ③CO ₂ Capture and Utilization Division [ENG]										Ito Campus Center Zone Bldg.3, 3105-06	
Workshop ④CO ₂ Storage Division [ENG]										Ito Campus I ² CNER Bldg.1, Hall C	
Energy Analysis Division [ENG]										Ito Campus CESS Bldg.1, 203	
Initiative on Applied Math for Energy [ENG]										Ito Campus Center Zone Bldg.3, 3213	

**Kyushu University Platform of Inter/Transdisciplinary
Energy Research (Q-PIT)**
<Prologue Session>

<Date> 13:45-17:30, 29th January 2018
 <Venue> Kyushu University Ito Campus Shiiki Hall Concert Hall
 <Language> English and Japanese (J-E simultaneous translation)
 <Theme> "Introduction of Each Unit's Activities of Q-PIT"

<Program and Speaker>

Time	Program and Speaker
13:45-13:50	Remarks Prof. Masato Wakayama, Executive Vice President, Kyushu University
13:50-14:20	Introduction of Kyushu University Platform of Inter/Transdisciplinary Energy Research Prof. Masato Wakayama, Executive Vice President, Kyushu University
14:20-14:30	Break
14:30-15:50	Lecture by Q-PIT faculty members 1 <ul style="list-style-type: none"> ● Global Energy Research Alliance Unit Global Energy Alliance Area Professor Akari Hayashi International Energy Science Research Area Associate Professor Stephen Lyth Theme : Starting activities as the international hub of the research network related to energy field - Introduction of activities associated with Hawaii State - ● Transdisciplinary Energy Science and Education Unit Science and Technology Area Professor Yoshihiro Yamazaki Theme : Transdisciplinary energy materials science and education at Q-PIT
15:50-16:00	Break
16:00-17:30	Lecture by Q-PIT faculty members 2 <ul style="list-style-type: none"> ● Renewable Energy Utilization Research Unit Renewable Energy Area Associate Professor Koichi Watanabe Hydrogen Energy Systems Area Associate Professor Li Hai-Wen Theme : Toward introduction and expansion of renewable energy ● Future Energy Society Research Unit Bio-energy Area Associate Professor Keiko Aoki Energy and Economics Area Assistant Professor Nobuyuki Takashima Theme : Social scientific approach to realization of optimal safe, secure, and stable energy society.



Remarks, Introduction of Kyushu University Platform of Inter/Transdisciplinary Energy Research

Masato Wakayama

Professor,
Executive Vice President, Kyushu University
Deputy Director General, Q-PIT

Lecture by Q-PIT faculty members 1

Starting activities as the international hub of the research network related to energy field
– Introduction of activities associated with Hawaii State –



Global Energy Research Alliance Unit

Akari Hayashi

Professor,
Global Energy Alliance Area



Global Energy Research Alliance Unit

Stephen Lyth

Associate Professor,
International Energy Science Research Area

Transdisciplinary energy materials science and education at Q-PIT



Transdisciplinary Energy Science and Education Unit

Yoshihiro Yamazaki

Professor,
Science and Technology Area

Lecture by Q-PIT faculty members 2

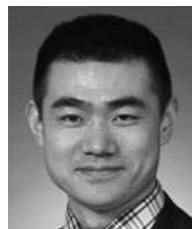
Toward introduction and expansion of renewable energy



Renewable Energy Utilization Research Unit

Koichi Watanabe

Associate Professor,
Renewable Energy Area



Renewable Energy Utilization Research Unit

Hai-Wen Li

Associate Professor,
Hydrogen Energy Systems Area

Social scientific approach to realization of safe, secure, and stable optimal energy society



Future Energy Society Research Unit

Keiko Aoki

Associate Professor,
Bio-energy Area



Future Energy Society Research Unit

Nobuyuki Takashima

Assistant Professor,
Energy and Economics Area

**Kyushu University Platform of Inter/Transdisciplinary
Energy Research (Q-PIT)**
<Plenary Session>

<Date> 09:30-18:00, 30th January 2018
 <Venue> Kyushu University Ito Campus Shiiki Hall, Concert Hall
 <Language> English and Japanese (simultaneous translation)
 <Theme> "Starting Activities as the International Hub of Energy Research and Education"

<Program and Speaker>

Time	Program and Speaker
09:30-09:40	Opening Ceremony Opening remarks Chiharu Kubo, President of Kyushu University Masato Wakayama, Executive Vice President, Kyushu University
09:40-10:20	Invited Lecture 1 ●Emission intensity and land use evolution: regional observations and analysis in China Prof. Xiangzheng Deng, Director of the External Cooperation Office, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences (CAS)
10:20-10:30	Break
10:30-11:10	Invited Lecture 2 ●Hawaii's Renewable Energy Landscape Dr. Patrick K. Takahashi, Emeritus Director of Hawaii Natural Energy Institute (HNEI), University of Hawaii, Manoa
11:10-11:20	Break
11:20-12:00	Invited Lecture 3 ●European Energy Strategy for Research and Innovation Prof. Michel Pons, University of Grenoble-Alps, Research director of French National Center for Scientific Research (CNRS)
12:00-13:00	Luncheon
13:00-14:30	Poster Presentation (Reception and viewing posters starts at 12:30) Young researchers, doctoral students, international researchers and graduate students * The award ceremony will be held in the concert hall, Shiiki hall at 17:00, January 30
14:30-15:30	Invited Lecture 4 ●Long-term CO ₂ emission reduction scenarios on the basis of a global energysystem model Prof. Yasumasa Fujii, Department of Nuclear Engineering and Management, The university of Tokyo ●Future projections and risk studies of climate change Dr. Seita Emori, Head of Climate Risk Assessment Section, Center for Global Environmental Research, National Institute for Environmental Studies
15:30-15:50	Break
15:50-16:50	Panel Discussion ●Discussion by international invited guests, researchers, Kyushu university graduates, and participants in the support program for young researchers and doctoral students "After graduation from the university, how the students can contribute to the society"
16:50-17:00	Break
17:00-17:50	Best Poster Award Ceremony
17:50-18:00	Closing Remarks Prof. Masato Wakayama, Executive Vice President, Kyushu University

Invited Lecture 1

**Emission intensity and land use evolution:
regional observations and analyses in China**

Professor
Institute of Geographic Sciences and Natural Resources Research,
Chinese Academy of Sciences (CAS)

Xiangzheng Deng

Abstract

Global mitigation of greenhouse gas (GHG) emission targets to regional solution at different scales with structural effects. Because local ecosystem service has different functions to influence regional environment, it is unclear that the land use evolution, e.g., the structural effects of land uses, on lowering emission intensity and mitigating air pollution, and it is debatable that the efficiency of mitigation of GHG emission can be improved by increasing what kind of ecological infrastructure at regional scale. In this study, we propose a systematic methodology on identification of trade-offs among structural impacts of land use evolution on emission intensity at regional scale through both qualitatively and quantitatively statistical analysis to clarify impacts of different land use on the mitigation of emission intensity. In particular to a region with some distinct constraints of natural resources, regional planning has to rely on scientific solutions for bridging the gap of emission mitigation target among multi-levels of administrations and at same time enhancing the optimal allocation of natural resource. In this case study, we qualitatively analyze the principle component among impact factors in a regional socio-economic-ecological system of Zhangye City, a region located at the middle reach of the Heihe River Basin in China, and quantitatively analyze the relationship between land use evolution and emission intensity with controlling the effects of air contaminations during 1980s–2010s. The analytical results prove that forest land has statistically significant impacts on the mitigation of emission intensity, more importantly, there are no statistical significant evidences showing that cultivated land and wetland have the same functions. It indicates that to identify key issues from those mixed impacts of land use structure at regional scale determines to promote an optimal path of natural resource allocation for reducing the GHG emission and air contaminations. It implies that mitigation of GHG sorely needs to take land use structure changes into consideration of the systematic research for scientifically improving regional planning and sustainable development.

Invited Lecture 2



Hawaii's Renewable Energy Landscape

Emeritus Director
Hawaii Natural Energy Institute (HNEI)
University of Hawaii, Manoa

Patrick K. Takahashi

Abstract

Hawaii is a group of remote and isolated islands in the middle of the Pacific Ocean with varied populations which is still heavily relying on fossil fuel as an energy source for its electrical grids. In view of the finite oil supply and variability in oil prices, Hawaii has set a goal to achieve 100 percent clean energy by 2045 and leverage its rich renewable and largely intermittent energy sources: solar, wind, wave, geothermal, and bio-fuels. However, the anticipated high penetration of intermittent energy sources into its varied size electrical grids and geography have complicated the integration of these technologies and resulted in locally diverse solutions. The Hawaii Natural Energy Institute established by statute in 2007 play a central role in accelerating the development, integration, and demonstration of renewable energy technologies in Hawaii.

Invited Lecture 3



European Energy Strategy for Research and Innovation

Research director, French National Center for Scientific Research(CNRS)
Professor
University of Grenoble-Alps

Michel PONS

Abstract

The European Energy Strategy is built on the ambition to achieve, in a cost-effective way, a fundamental transformation of Europe's energy system, moving to more sustainable, secure and competitive ways of delivering energy affordably to consumers. Research and Innovation (R&I) constitute a crucial pillar to fulfil this objective. According to European experts, it will be necessary to increase the amount of low-carbon energy in electricity production to 80% by 2050 in order to comply with the greenhouse gas emissions reduction. Currently, renewable energies (wind, solar, hydroelectricity, etc.) account for about 20% of the electricity mix, but barely 5% of total energy consumption, dominated by coal and oil.

The Horizon 2020 work program for 2018-2020, on secure, clean and efficient energy, deploys more than EUR 2 billion to support Research and Innovation (R&I) (<https://ec.europa.eu/programmes/horizon2020/en/h2020-section/secure-clean-and-efficient-energy>). A special focus is put on decarbonizing the European Union (EU) building stock by 2050 (-40 % in 2030), strengthening EU leadership on renewables, and developing affordable and integrated energy storage solutions. The context for operationalizing and implementing these priorities, as well as other relevant issues addressed in this work program part, is the Strategic Energy Technology Plan (SET Plan <https://setis.ec.europa.eu/>). It seeks to maximize synergies between EU and national public R&I support for clean energy and to leverage private funding, for priorities across 10 key actions. For 2020, the SET-Plan provides a framework to accelerate the development and deployment of cost-effective low carbon technologies. With such comprehensive strategies, the EU is on track to reach its 20-20-20 goals of a 20% reduction of CO₂ emissions, a 20% share of energy from low-carbon energy sources and 20% reduction in the use of primary energy by improving energy efficiency by 2020. For 2050, the SET-Plan is targeted at limiting climate change to a global temperature rise of no more than 2 °C , in particular by matching the vision to reduce EU greenhouse gas emissions by at least 80 %.

In France, different scenarios have been made by ADEME, the French Environment and Energy Management Agency (<http://ademe.fr>). These scenarios identify a possible pathway for the energy transition in France taking into account its particularities. They are based, as the SET Plan, on two time horizons and two separate methodologies. The different aspects of the R&I strategy and transition scenarios will be presented.

Kyushu University Platform of Inter/Transdisciplinary Energy Research (Q-PIT)

<Poster Presentation>

<Date> 13:00-14:30, 30th January 2018

<Venue> Kyushu University Ito Campus Shiiki Hall Conference Room

* The award ceremony will be held in the concert hall, Shiiki hall at 17:00, January 30

<Language> English and Japanese

<Session name> Poster presentation

- Poster presentation by young researchers, doctoral students, international researchers and graduate students (Reception and viewing posters starts at 12:30)

【学内応募者】

ポスター番号	所属	氏名	研究タイトル
①-1	システム情報科学研究所	黒川 雄一郎	GdFe 薄膜を用いたスピン熱電変換の膜厚依存性
①-2	システム情報科学府	谷田 知史	非平衡プラズマを用いたカーボンリサイクルによるエネルギー貯蔵
①-3	カーボンニュートラル・エネルギー国際研究所(工学府)	Wang Zhenying	Vapor absorption/desorption phenomena of sessile liquid desiccant droplets on solid surfaces
①-4	共進化社会システム創成拠点	George Frederick Harrington	Electro-chemo-mechanics at the nanoscale: Potential for next-generation electrochemical devices
①-5	工学研究院	田中 学	新規な熱プラズマ場「多相交流アーク」による金属窒化物ナノ粒子の創成
①-6	工学府	馮 世演	Development of polymer electrolyte blend membrane with charge transfer complex structure
①-7	工学府	NGUYEN THI GIANG HUONG	Coking tolerant (Ce, Zr)O ₂ -dispersed structured-catalyst material for direct-hydrocarbon fuel cell
①-8	工学府	Liana Christiani	Development of charge-transfer complex hybrid films as polymer electrolyte membranes for high temperature fuel cell application
①-9	工学府	喜多 由拓	超撥水テフロン面による濡れ性制御を利用した液滴輸送
①-10	工学府	武藤 穂佳	再生可能エネルギーの高効率利用に向けたカーボンフリー水電解電極触媒の開発
①-11	工学府	二村 聖太郎	将来の超高効率エネルギーシステム実現に向けた燃料電池の開発
①-12	工学府	黒瀬 築	不均一熱負荷場における並列ミニチャンネル内沸騰流に関する実験的研究
①-13	工学府	HAN HOON	隣接酸基を持つポリマーからなる広温低加湿用プロトン伝導性膜の開発
①-14	工学府	Albert Mufundirwa	Oxygen-reduction Electrochemical Measurements of Pt-free Electrocatalysts for Efficient Hydrogen Utilization
①-15	工学府	黄 亭維	水素の高効率利用に向けた電界紡糸法による燃料電池用メソポーラスカーボンファイバーの開発
①-16	工学府	宮本 英昌	水素利用の高効率化に向けた燃料電池の高温作動化 -電極触媒劣化メカニズムの解明-
①-17	工学府	片上 正隆	高効率水素貯蔵に向けたカーボン材料の吸着特性の基礎研究
①-18	工学府	傅 博	水素の高効率利用に向けた燃料電池のカーボン細孔構造制御
①-19	工学府	宇田 圭佑	水素の高効率利用に向けた自動車用燃料電池の低白金化の検討
①-20	工学府	喜多 修士	炭素析出耐性を高めた固体酸化物形燃料電池用燃料極材料の開発
①-21	工学府	川内野 大樹	Ti 系多孔体を担体とした PEFC 電極触媒・GDL 一体シートの開発
①-22	工学府	村本 朱	次世代火力発電の実現に向けた熱力学平衡燃料組成に関する研究
①-23	工学府	瀧野 恵介	高効率燃料電池システムの開発に向けた研究 ~交換電流密度に着目した内部特性の可視化~
①-24	工学府	長嶺 優	SnO ₂ 担持 PEFC 電極触媒の光化学法による調製に関する研究
①-25	工学府	田仁 裕也	固体酸化物形燃料電池における電解質材料の酸素イオン伝導挙動と相転移
①-26	工学府	石橋 健太郎	マグネシウム置換ガリウム酸ランタンにおける相変態と局所構造変化
①-27	稲盛フロンティア研究センター	兵頭 潤次	イオン・電子ビームを用いた固体酸化物型燃料電池カソード材料表面におけるストロンチウム濃化現象の観測
①-28	統合新領域学府	峯崎 航希	膜分離法によるバイオガスからの水素製造プロセスのカーボンフリー化
①-29	総合理工学府	Muhammad Faisal Hasan	Honeycomb solar air heating system
①-30	人間環境学府	李 学成	再生可能エネルギーを利用した空気循環型室温制御システム -省・蓄・配エネルギーの最適化制御-

ポスター番号	所属	氏名	研究タイトル
②-1	共進化社会システム創成拠点	山口 尚哉	電力需要予測精度に応じた最適な電力調達
②-2	工学府	CHEN TING	Impact of microstructure and crystallinity on surface exchange kinetics of strontium titanium iron oxide perovskite by in situ optical transmission relaxation approach
②-3	工学府	ADI SAPUTRA	Design and thermodynamics analysis of high performance membrane-based CO ₂ capture technology in light integrated coal gasification fuel cell plant
②-4	先端物質化学研究所	長島 一樹	ナノスケール時空間熱輸送制御による超省エネルギー室温駆動ナノワイヤ分子認識センサデバイスの創成
②-5	農学研究院	Ta Viet Ton	Robust Consensus for Multi-Agent Dynamics
③-1	工学府	Ebrahim Aly	Sustainability evaluation of energy infrastructure:A hybrid simulation approach to inclusive wealth
④-1	カーボンニュートラル・エネルギー国際研究所	Orejon Daniel	Environment Optimization for Enhanced Coalescence-Induced Droplet-Jumping Condensation Heat Transfer
④-2	カーボンニュートラル・エネルギー国際研究所(工学府)	福田 未央	高強度材料における疲労限度とその滑りに及ぼす水素の影響
④-3	カーボンニュートラル・エネルギー国際研究所(工学府)	吉田 修一	水素ぜい化防止に関する研究
④-4	カーボンニュートラル・エネルギー国際研究所(工学府)	崔 雪松	異種材溶接継手の引張強度特性に及ぼす水素の影響
④-5	工学研究院	瀧中 晃弘	カーボンサイクルを目指した石炭地下ガス化システムによる未利用石炭資源の開発
④-6	工学研究院	長谷川 丈二	高電圧マグネシウム二次電池の実現に向けた NASICON 型正極材料の開発
④-7	工学府	北村 利彦	日本のエネルギー-安全保障-エネルギー-資源供給途絶のシミュレーション-
④-8	工学府	志賀 雅巨	次世代エネルギーデバイス実現のための高スピン分極率材料の探索
④-9	工学府	伊川 萌黄	Impacts of Renewable Energy on Sustainability —Empirical Analysis with Inclusive Wealth —
④-10	工学府	麻生 浩平	ナノ粒子の異方形状に由来する局所格子ひずみの精密測定 (Local lattice strain induced by shape anisotropy of nanoparticles)
④-11	工学府	松川 祐子	多孔性コバルト硫化物の新規合成法の開発とエネルギー貯蔵デバイスへの応用
④-12	最先端有機光エレクトロニクス研究センター	嘉部 暁太	世界初の有機蓄光を用いた光エネルギーの有効利用
④-13	総合理工学府	前蔵 貴行	低消費電力社会に向けた ULSI 内光配線用 G e 光子子の作製と評価
④-14	総合理工学府	Miksik Frantisek	Adsorption heat storage for small scale application and material selection
④-15	総合理工学府	Marzia Khanam	Performance investigation of sorption based cooling system by CFD analysis
④-16	総合理工学府	Indri Yaningsih	Dehumidification using an alternative adsorption system for air conditioner
④-17	総合理工学府	M L Palash	Implementing direct imaging technique for quantitative analysis of surface prosoidy of mesoporous adsorbents
④-18	総合理工学府	江川 雄亮	キャビティリングダウン分光法を用いたホールスラストの損耗調査
④-19	総合理工学府	中野 敬太	長寿命核分裂生成物 Zr-93 の短寿命化・再資源化に向けた核反応データ測定
④-20	総合理工学府	西川 尚史	Study on minority-carrier lifetime in ultrananocrystalline diamond/hydrogenated amorphous carbon composite films
④-21	総合理工学府	荒田 浩輔	水蒸気改質法における透過材を用いた水素の製造と分離に関する研究
④-22	数理学府	和田 啓吾	予混合火災のグロウ・ラングウ不安定性に対する M ² 展開による圧縮性の効果
④-23	経済学府	西嶋 大輔	動的離散選択分析を通じた耐久財の買い替え政策導入による経済効果および CO ₂ 排出削減効果に関する研究：家電エコポイント制度を研究対象として
④-24	経済学府	高藪 広隆	世界の金属産業の生産技術の改善が気候変動緩和に果たす役割

【海外招へい者】

ポスター番号	大学名(国名)	氏名	研究概要
G-1	KAIST (韓国)	Bonjae Koo	Enhanced Oxygen Exchange of Perovskite Oxide Surfaces through Strain-driven Chemical Stabilization
G-2	ハワイ大学 (USA)	Jing Qi	新規触媒としてカーバイドベースのナノ材料を開発し、エネルギーデバイス用電極材料への応用を試みる
G-3	オーフス大学 (デンマーク)	Yigang Yan	金属ホウ素水素化合物を用いた水素貯蔵
G-4	ルーバンカトリック大学 (ベルギー)	Xiao LI	ポーラス構造を有する水素化合物における水素吸着挙動の解明を図る
G-5	リーズ大学 (イギリス)	Roxburgh Nicholas David	エネルギー供給に、外生的なショックが発生する際のことまで考えた適切な計画を立てる必要がある。これまでの共同研究に更にエネルギー構成要素を詳細に考慮したモデル化を行う
G-6	同済大学 (中国)	HE Yang	循環型社会や環境負荷の少ない低炭素社会の構築など、環境問題を解決するために、グローバルな視点に立脚した都市・建築環境の改善対策について検討する
G-7	シェフィールド大学 (イギリス)	Peng Luo	シリコンおよび化合物半導体を活用し、電力変換をつかさどるパワーデバイスの限界突破技術、次世代パワーモジュールの提案を行う
G-8	ハワイ大学 (USA)	Diamond Tachera	A Hydrogeochemical Assessment of Geothermal Resources in the State of Hawaii
G-9	ハワイ大学 (USA)	Anthony Christe	Comparing and Contrasting Power Quality Issues between Kyuhsu University and the University of Hawaii at Manoa
G-10	ハワイ大学 (USA)	Imelda	Variable Pricing and the Social Cost of Renewable Energy

Invited Lecture 4



Long-term CO₂ emission reduction scenarios on the basis of a global energy system model

Professor
Department of Nuclear Engineering and Management,
The University of Tokyo

Yasumasa Fujii

Abstract

A global energy system model of optimization type, of which the objective function is the total energy system cost over the 21st century, was used as an analytical tool. The model involves various components of energy production, conversion, transportation, and storage. It is formulated as a linear optimization model, of which the number of the variables is more than one million. The recent version of the model incorporates a nuclear module which takes account of the availability of nuclear fuel cycles. A new PV module is also incorporated so that the regional and seasonal intermittent characteristics of PV can be taken into account.

In the analysis for the presentation, two policy cases were assumed. One case is no CO₂ regulation case (Base case) and the other is CO₂ regulation case (REG case). REG Case is the scenario to halve CO₂ emissions by the year 2050 for the world as a whole, and thereafter the emission was assumed to be regulated so that atmospheric CO₂ concentrations would be maintained at the level avoiding around 2° C increase of average global temperature from pre-industrial levels until the year 2100.

Under the great deal of uncertainty, the simulation results of the mathematical programming model suggest that rather stringent CO₂ mitigation targets can be satisfied under the large-scale deployment of innovative technologies, highlighting the essential roles of renewable and nuclear energies, and the advanced use of fossil fuel with CCS (CO₂ Capture and Storage) in the long run. The result supports the strategy of pursuing multiple technologies simultaneously, rather than focusing on one single technological option.

Invited Lecture 4

**Future projections and risk studies of climate change**

Head
Climate Risk Assessment Section,
Center for Global Environmental Research,
National Institute for Environmental Studies

Seita EMORI

Abstract

Over the past 150 years, global average temperature has increased around 1 degree C. The main causes are very likely to be increased human-induced greenhouse gases (GHGs) in the atmosphere. With the rise of global temperature, various risks have been posed against human society and ecosystem; the sea level rise, the ice sheet melt, extreme weather such as heat waves and heavy rains growing both in frequency and scale.

At the end of 2015, the 21st session of the Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) was held in Paris and adopted the 'Paris Agreement on Climate Change' which set path to keep global temperature rise well below 2 degrees C and to make efforts to limit the temperature increase even further to 1.5 degrees C above pre-industrial levels. It was also agreed to cut global CO₂ emissions to almost net-zero by the end of this century to achieve the goal. The energy-related CO₂ being the main part of GHGs, the agreement represents a determination by global community to realize a society which ends dependence on fossil fuels (decarbonized society) within this century.

Will it be possible to realize such goals? Why do we need to aim 1.5 degrees C or 2 degrees C?

In this talk, I will overview the scientific analyses about present situations and future projections of climate change as well as its risks. Then I would like to discuss what choices humankind should make to challenge the decarbonization. Finally, I will mention the role that energy system innovation is expected to play in this transformation of our society.

International Institute for Carbon-Neutral Energy Research (I²CNER) 2018 I²CNER Annual Symposium

<Date> 9:30 – 18:30, Wednesday, 31st January 2018
 <Venue> I²CNER Hall, I²CNER Bldg. 1, Ito Campus, Kyushu University
 <Language> English
 <Theme> Challenges in Thermal Science and Engineering towards a Sustainable Society
 <Program and Speaker>

Time	Program and Speaker
9:30-10:00	<p>Opening Remarks Prof. Masato Wakayama, Executive Vice President, Kyushu University Dr. Akira Ukawa, WPI Program Director, Japan Society for the Promotion of Science Mr. Ross Matzkin-Bridger, Energy Attaché, U.S. Embassy Tokyo, and Director, U.S. Department of Energy's Japan Office Prof. Petros Sofronis, Director, I²CNER, Kyushu University Prof. Bidyut Baran Saha, I²CNER, Kyushu University</p>
10:00-10:50	<p>Keynote Lecture① Prof. Takao Kashiwagi, International Research Center of Advanced Energy Systems for Sustainability, Tokyo Institute of Technology Theme: Thermal Waste Heat Utilization for Achieving Super Smart Community</p>
10:50-11:10	Coffee Break
11:10-11:40	<p>Prof. Anutosh Chakraborty, School of Mechanical and Aerospace Engineering, Nanyang Technological University Theme: Water Adsorption on Various MOFs for Next Generation Cooling Applications</p>
11:40-12:10	<p>Prof. Pega Hrnjak, Air Conditioning and Refrigeration Center/Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign Theme: Using Carbon Dioxide in Efficient Energy Conversion Systems as the Way to Carbon-Neutral Society</p>
12:10-13:10	Group Photo Session, Lunch & Poster Session
13:10-14:00	<p>Keynote Lecture② Prof. Gautam Biswas, Indian Institute of Technology, Guwahati Theme: Different Regimes of Pool Boiling</p>
14:00-14:30	<p>Prof. Benjamin McLellan, Graduate School of Energy Science, Kyoto University Theme: Renewable Energy and the Minerals Industry: Focus on Thermal Energy Applications</p>
14:30-15:00	<p>Prof. Koji Takahashi, I²CNER, Kyushu University Theme: Thermophysical Measurement Methods for Individual Nanomaterials and Control of Nanoscale</p>
15:00-15:30	Thermal Transport
15:30-16:00	<p>Prof. Takahiko Miyazaki, I²CNER, Kyushu University Theme: Potential of an Ambient Air for Energy Saving Technologies through the Maisotsenko Cycle</p>
16:00-16:20	<p>Prof. Liwei Wang, Institute of Refrigeration and Cryogenics, Shanghai Jiao Tong University Theme: Efficient Electricity Generation Cycles Driven by Low Grade Heat</p>
16:20-16:50	<p>Prof. J. Steven Brown, School of Engineering, The Catholic University of America Theme: Low Global Warming Potential Working Fluids</p>
16:50-17:20	<p>Prof. Yukihiro Higashi, I²CNER, Kyushu University Theme: Thermodynamic Property Measurements of Low-GWP Refrigerant Mixtures</p>
17:20-17:50	<p>Prof. Naoya Sakoda, I²CNER, Kyushu University Theme: Thermophysical Property Measurements of High-Pressure Hydrogen up to 100 MPa and</p>
17:50-18:20	<p>Applications of the Database to Design for Hydrogen Infrastructure Prof. Akio Miyara, Department of Mechanical Engineering, Saga University/I²CNER, Kyushu University Theme: Effects of Condensate Flow and Thickness on Heat Transfer of Film-wise Condensation</p>
18:20-18:30	<p>Closing Remarks Prof. Yasuyuki Takata, I²CNER, Kyushu University</p>
18:30-20:00	Reception (Venue: I ² CNER Lounge)

Keynote Lecture 1



Different Regimes of Pool Boiling

Director
Indian Institute of Technology, Guwahati

Gautam Biswas

Abstract

Boiling is an intricate phenomenon exhibiting various regimes from bubble generation over the surface during nucleate boiling to bubble generation through a vapor film during film boiling. In the present study, we incorporated a numerical technique (CLSVOF) to simulate the bubble generation, growth and its departure during pool boiling. In the film boiling regime, the bubble growth is governed by the instabilities at the liquid-vapor interface. The instability mode transforms from Rayleigh-Taylor at the low wall-superheat temperature to Taylor-Helmholtz at the higher superheat values, governing the bubble-separation distance. The bubble morphology varies from discrete bubbles at low superheat to vapor columns at the higher superheat values. The heat transfer rate during film boiling therefore depends on the degree of superheat. The application of electric field across the interface intensifies the bubble growth rate, reducing the critical wavelength and enhancing the heat transfer rate. A threshold intensity of applied electric field is required to achieve a significant effect in bubble morphology and heat transfer rate. In the reduced gravity condition, the electrohydrodynamic forces are the dominant reason for the instability at the interface. Hence, the electric field can be utilized to acquire the same heat transfer rate during boiling as in the earth's condition. The vapor generation rate can also be controlled.

When the wettability of the solid surface is considered during film boiling, the vapor film ruptures for the high wettability surfaces leading to the transition from the film boiling to nucleate boiling regime. For the low wettability surface where the liquid-solid contact does not occur, the application of electric field is found to result in increased vapor generation rate and eventually the transition to nucleate boiling.

Unlike to the bubble growth in film boiling where the heat transfer occurs solely from the heated surface to the vapor film, in nucleate boiling the growth of bubble is due to the combined effect of heat transfer from superheated liquid and microlayer evaporation. Through the numerical simulations, the effect of surface superheat on the growth rate and heat transfer is analyzed. The effect of liquid subcooling on the bubble growth and after its departure is also studied.

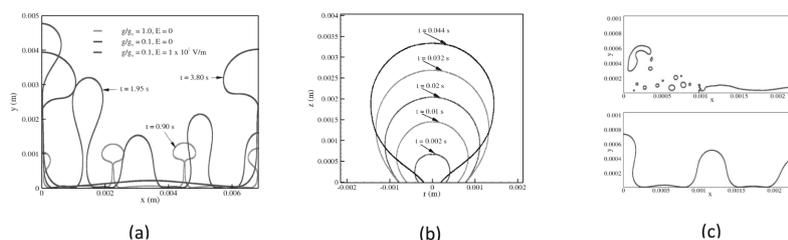


Figure 1. (a) Effect of EHD and buoyancy during film boiling (b) Growth of a single bubble during nucleate boiling and (c) transition due to surface wettability (top = $\psi = 30^\circ$, bottom = $\psi = 120^\circ$).

Keynote Lecture 2



Thermal Waste Heat Utilization for Achieving Super Smart Community

Director
International Research Center of Advanced Energy Systems for Sustainability,
Tokyo Institute of Technology

Takao Kashiwagi

Abstract

Paris agreement has made a great impact on the existing energy and environment systems. In the year 2050, oil will be restricted to transportation sector and chemical usages whilst fuel cells and renewable energy technologies start realizing their full commercialization potential. On the other hand, residential sector can be synergistically synchronized with the transport sector, thus, zero-energy and low-carbon emission housing will be realized in major parts of the world. Still in Japan, the Great East Japan Earthquake followed by the nuclear plant accidents in March, 2011, has huge impact on the Japan's energy systems. Therefore, it is imperative to develop and demonstrate new energy technologies including waste heat utilization as well as system applications, and propose a grand design and energy policy plan.

Taking full consideration of these matters and forward guidance, Japanese government undertakes the creation of advanced energy systems for sustainability. In order to contribute to environmental protection and energy security, future energy systems should introduce not only a large amount of renewable but also the development of innovative technologies such as higher utilization of waste thermal energy in smart energy network systems based on existing base load power stations. This presentation examines the recent advances of Japanese thermal energy policy focusing on the integrated thermal infrastructure. Smart society will be built around three key features: integrated mega-structure, renewable power production, and mobile energy storage with rapid charging. Figure 1 shows such smart society where the residential buildings are interconnected with micro-grid features. Power generation fully employs renewable energy potential whilst electric and plug-in hybrid vehicles will be employed for transportation as well as mobile energy storage and carriers by exploiting rapid charging facilities.

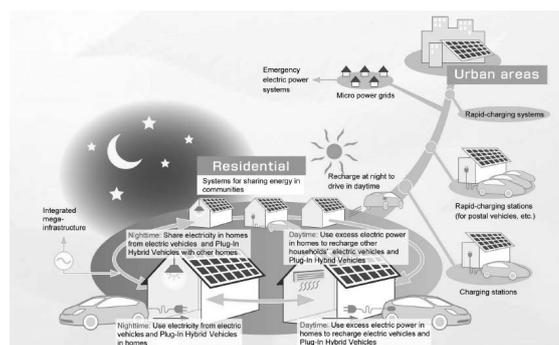


Figure 1. Renewable energies, electric vehicles, and plug-in hybrid vehicles in residential communities.

Opening Remarks

Executive Vice President,
Kyushu University

Prof. Masato Wakayama

Opening Remarks

WPI Program Director,
Japan Society for the Promotion of Science

Dr. Akira Ukawa

Opening Remarks

Energy Attaché, U.S. Embassy Tokyo /
Director, U.S. Department of Energy's Japan Office

Mr. Ross Matzkin-Bridger

Opening Remarks

Director,
I²CNER, Kyushu University

Prof. Petros Sofronis

Opening Remarks

I²CNER,
Kyushu University

Prof. Bidyut Baran Saha

Water Adsorption on Various MOFs for Next Generation Cooling Applications

School of Mechanical and Aerospace Engineering,
Nanyang Technological University

Prof. Anutosh Chakraborty

Using Carbon Dioxide in Efficient Energy Conversion Systems as the Way to Carbon-Neutral Society

Air Conditioning and Refrigeration Center/Department of Mechanical Science and Engineering, University of Illinois at Urbana-Champaign

Prof. Pega Hrnjak

Renewable Energy and the Minerals Industry: Focus on Thermal Energy Applications

Graduate School of Energy Science,
Kyoto University

Benjamin McLellan

Thermophysical Measurement Methods for Individual Nanomaterials and Control of Nanoscale Thermal Transport

I²CNER,
Kyushu University

Prof. Koji Takahashi

Potential of Wet Air for Energy Saving Technologies

I²CNER,
Kyushu University

Prof. Takahiko Miyazaki

Efficient Electricity Generation Cycles Driven by Low Grade Heat

Institute of Refrigeration and Cryogenics,
Shanghai Jiao Tong University

Prof. Liwei Wang

Low Global Warming Potential Working Fluids

School of Engineering,
The Catholic University of America

Prof. J. Steven Brown

Thermodynamic Property Measurements of Low-GWP Refrigerant Mixtures

I²CNER,
Kyushu University

Prof. Yukihiro Higashi

Thermophysical Property Measurement of High-Pressure Hydrogen up to 100MPa and Application of the Database to Design for Hydrogen Infrastructure

I²CNER,
Kyushu University

Prof. Naoya Sakoda

Effects of Condensate Flow and Thickness on Heat Transfer of Film-wise Condensation

Department of Mechanical Engineering,
Saga University/I²CNER, Kyushu University

Prof. Akio Miyara

Closing Remarks

I²CNER,
Kyushu University

Prof. Yasuyuki Takata

Center for Co-Evolutional Social Systems (CESS) Symposium

<日時> 2018年 1月31日 (水曜日) 13:00-17:30
 <場所> 九州大学伊都キャンパス 共進化社会システムイノベーション施設 ホール (2階)
 <言語> 日本語
 <テーマ> 「エネルギー脱炭素化施策が描く未来社会」

<プログラム及び講演者>

時間	プログラム・講演者
13:00-13:15	開会挨拶 九州大学共進化社会システム創成拠点 プロジェクトリーダー 石原 晋也 来賓挨拶 文部科学省 来賓挨拶 COIプログラムビジョン3 ビジナリーリーダー 佐藤 順一
13:15-13:45	九州大学 COI におけるエネルギーの取組 九州大学 副学長 九州大学共進化社会システム創成拠点 エネルギー部会リーダー 佐々木 一成
13:45-14:05	エネルギーシステムの脱炭素化のためのイノベーション 東京大学大学院工学系研究科 客員研究員 吉岡 剛
14:05-14:25	電気自動車への適用を目指した SOFC 基盤技術開発 九州大学水素エネルギー国際研究センター 教授 谷口 俊輔
14:25-14:45	未来の理想的なエネルギーサービスの技術課題について 九州大学水素エネルギー国際研究センター 教授 土肥 英幸
14:45-14:55	休憩
14:55-15:15	メタン燃料 SOFC の革新的低炭素・高効率発電 九州大学 客員教授 東京ガス株式会社 基盤技術部 主席研究員 松崎 良雄
15:15-15:35	春日エリアにおけるエネルギー面的利用の取り組み 九州大学炭素資源国際教育研究センター 教授 原田 達朗
15:35-15:55	エネルギービッグデータを用いた電力需要予測技術 九州大学マス・フォア・インダストリ研究所 准教授 廣瀬 慧
15:55-16:15	エネルギービッグデータ活用のための情報プラットフォーム構築 九州大学大学院システム情報科学研究院情報知能工学部門 教授 九州大学共進化社会システム創成拠点 市民サービス部会リーダー 谷口 倫一郎
16:15-16:20	閉会挨拶 九州大学 理事・副学長 九州大学共進化社会システム創成拠点 リサーチリーダー 若山 正人
16:20-17:30	ポスターセッション (場所: 3階 セミナー室)

九州大学 COI におけるエネルギーの取組



九州大学 副学長
九州大学共進化社会システム創成拠点
エネルギー部会リーダー
佐々木 一成

エネルギーシステムの脱炭素化のための
イノベーション



東京大学大学院工学系研究科
客員研究員
吉岡 剛

電気自動車への適用を目指した
SOFC 基盤技術開発



九州大学水素エネルギー国際研究センター
教授
谷口 俊輔

未来の理想的なエネルギーサービスの
技術課題について



九州大学水素エネルギー国際研究センター
教授
土肥 英幸

メタン燃料SOFCの
革新的低炭素・高効率発電



九州大学 客員教授
東京ガス株式会社 基盤技術部 主席研究員
松崎 良雄

春日エリアにおける
エネルギー面的利用の取り組み



九州大学炭素資源国際教育研究センター
教授
原田 達朗

エネルギービッグデータを用いた
電力需要予測技術



九州大学マス・フォア・インダストリ研究所
准教授
廣瀬 慧

エネルギービッグデータ活用のための
情報プラットフォーム構築



九州大学大学院システム情報科学研究院
情報知能工学部門 教授
九州大学共進化社会システム創成拠点
市民サービス部会リーダー
谷口 倫一郎

Kyushu Bureau of Economy, Trade and Industry/HYDROGENIUS etc.
Hydrogen Energy and Fuel Cell Forum in Kyushu &
International Hydrogen Energy Development Forum 2018

<Date> 13:00 - 16:45, 1st February 2018

<Venue> ACROS Fukuoka B2 Event Hall (1-1-1 Tenjin, Chuo-ku, Fukuoka City, Japan)

<Language> English and Japanese (simultaneous translation)

<Program and Speaker>

Time	Program and Speaker
13:00-13:10	Opening Remarks METI Kyushu Bureau of Economy, Trade and Industry, Director-General Mr. Naoto Takahashi Fukuoka Strategy Conference for Hydrogen Energy, Advisor (Fukuoka Prefectural Government, Governor) Mr. Hiroshi Ogawa
13:10-13:30	Title: Industrial-academic-governmental-regional collaboration for realization of low-carbon hydrogen society and future projection Kyushu University, Senior Vice President International Research Center for Hydrogen Energy, Director Mr. Kazunari Sasaki
13:30-13:50	Title: Strategies and issues towards the realization of hydrogen society METI Agency for Natural Resources and Energy Energy Efficiency and Renewable Energy Department Advanced Energy Systems and Structure Division Mr. Nobuya Kawamura
13:50-14:10	Title: Towards the construction of hydrogen related platform in Kyushu Deloitte Tohmatsu Consulting LLC Public Sector, Partner Mr. Issui Ihara
14:10-14:30	Title: Saga Prefecture's measures related to hydrogen energy Saga Prefectural Government Department of Industry and Labor New Energy Industries Division, Deputy Director Mr. Nobuhiro Ohno
14:30-14:55	Title: Huis Ten Bosch - "Future city" initiatives HUIS TEN BOSCH Co.,Ltd., Director and General Manager HTB ENERGY Co.,Ltd., Representative Director and Chief Technology Officer Mr. Masahiko Hayasaka
14:55-15:05	Break
15:05-15:30	Title: Toyota Tsusho's initiatives for low-carbon energy Toyota Tsusho Corporation New Business Development Department Mr. Raiko Suzuki
	Facilitator : Kyushu University , Professor & Research Center for Hydrogen Industrial Use and Storage (HYDROGENIUS) , Director Joichi Sugimura
15:30-15:55	Title: Overview of U.S. Department of Energy's Materials R&D Activities for Hydrogen and Fuel Cells U.S. Dept. of Energy Fuel Cell Technologies Office, Technology Manager Ms. Neha Rustagi
15:55-16:20	Title: Stainless steels for high pressure gaseous hydrogen systems Nippon Steel & Sumitomo Metal Corporation , Research & Development Steel Research Laboratories , Leading Researcher Mr. Tomohiko Omura
16:20-16:45	Title: Development of Hydrogen-disoensing hose Yokohama Rubber Co.,LTD , Hose and Couplings Engineering Dept. Manager , Head of Development Group Mr. Naoshi Yamaguchi
16:45-17:30	Break
17:30-19:30	Social Meeting (¥ 4,500) TENJIN SKY HALL West room (16F 1-4-1 Tenjin, Chuo-ku, Fukuoka City, Japan)

Industrial-academic-governmental-regional collaboration for realization of low-carbon hydrogen society and future projection



Kyushu University, Senior Vice President
International Research Center for Hydrogen
Energy, Director

Kazunari Sasaki

Strategies and issues towards the realization of hydrogen society METI Agency for Natural Resources and Energy



Energy Efficiency and Renewable Energy
Department
Advanced Energy Systems and Structure
Division

Nobuya Kawamura

Towards the construction of hydrogen related platform in Kyushu



Deloitte Tohmatsu Consulting LLC Public
Sector, Partner

Issui Ihara

Saga Prefecture's measures related to hydrogen energy



Saga Prefectural Government
Department of Industry and Labor
New Energy Industries Division, Deputy
Director

Nobuhiro Ohno

Huis Ten Bosch - "Future city" initiatives



HUIS TEN BOSCH Co.,Ltd., Director and
General Manager
HTB ENERGY Co.,Ltd., Representative
Director and Chief Technology Officer

Masahiko Hayasaka

Toyota Tsusho's initiatives for low-carbon energy



Toyota Tsusho Corporation
New Business Development Department

Raiko Suzuki

Overview of U.S. Department of Energy's Materials R&D Activities for Hydrogen and Fuel Cells



U.S. Dept. of Energy Fuel Cell
Technologies Office,
Technology Manager

Neha Rustagi

Stainless steels for high pressure gaseous hydrogen systems



Nippon Steel & Sumitomo Metal Corporation
Research & Development
Steel Research Laboratories , Leading
Researcher

Tomohiko Omura

Development of Hydrogen-disoensing hose



Yokohama Rubber Co.,LTD.
Hose and Couplings Engineering Dept.
Manager, Head of Development Group

Naoshi Yamaguchi

Chikushi Symposium

<Date> 13:00 – 17:20, 1st February 2018 (Opening time 12:30)

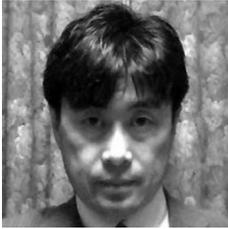
<Venue> Kyushu University Chikushi Campus Chikushi Hall 1F, C-Cube(6-1 Kasuga-Koen Kasuga-Shi, Fukuoka)

<Language> English and Japanese (simultaneous translation)

<Program and Speaker>

時間	Program and Speaker
13:00-13:10	Opening Remarks Dr. Shigeo Yoshida, Professor, Research Institute for Applied Mechanics, Kyushu University
13:10-14:10	Invited Lecture 1 Birth of Japanese version of “Stadtwerke” – The aims and social economic significance Prof. RAUPACH SUMIYA JORG, College of Economics, Ritsumeikan University, Chief director of Japan Stadtwerke Network
14:10-14:15	Break
14:15-15:15	Invited Lecture 2 “Regional activation” and “energy conversion” performed by local energy companies Dr. Kotaro Kawamata, Counsellor of Embassy of Japan in Germany
15:15-15:20	Break
15:20-16:20	Invited Lecture 3 Shared use of renewable energy and enhancement of disaster protection function of public facilities around Kasuga park Prof. Tatsuro Harada Research and Education Center of Carbon Resources, Kyushu University
16:20-16:25	Closing Remarks Dr. Junichiro Hayashi, Director of Institute for Materials Chemistry and Engineering, Kyushu University
16:25-16:30	Break
16:30-17:20	Tour to QUEST, Advanced Fusion Research Center

Opening Remarks



Professor, Research Institute for Applied Mechanics,
Kyushu University

Shigeo Yoshida

Invited Lecture 1



**Birth of Japanese version of “Stadtwerke”
– The aims and social economic significance**

Professor, College of Economics, Ritsumeikan University
Chief director of Japan Stadtwerke Network

RAUPACH SUMIYA JORG

Invited Lecture 2



**“Regional activation” and “energy conversion”
performed by local energy companies**

Counsellor of Embassy of Japan in Germany

Kotaro Kawamata

Invited Lecture 3



**Shared use of renewable energy and enhancement of disaster
protection function of public facilities around Kasuga park**

Professor, Research and Education Center of Carbon Resources,
Kyushu University

Tatsuro Harada

Closing Remarks



Professor, Director of Institute for Materials Chemistry and Engineering,
Kyushu University

Junichiro Hayashi

**<Research Center for Synchrotron Light Applications
& the Ultramicroscopy Research Center >**
<Joint Symposium>

<Date> 13:30-18:00, 1st February 2018

<Venue> Kyushu University Ito Campus, INAMORI Hall, 1st floor of the INAMORI CENTER

<Language> Japanese

<Program and Speaker>

Time	Program and Speaker
13:30-13:50	<u>Opening Ceremony</u>
13:50-14:20	<u>Special Lecture</u> Prof. Osamu TERASAKI (ShanghaiTech University)
14:20-14:30	Break
14:30-14:55	<u>Invited Lecture①</u> Prof. Atsushi NAKAGAWA (Osaka University)
14:55-15:20	<u>Invited Lecture②</u> Prof. Hiroshi KITAGAWA (Kyoto University)
15:20-15:30	Break
15:30-16:30	<u>Users' Report from each center</u>
16:30-18:00	<u>Poster Session</u>
18:00	<u>Closing</u>

Special Lecture



Nanoporous crystals: Structure characterisation by electrons and X-ray

Professor,
School of Physical Science and Technology,
ShanghaiTech University

Osamu Terasaki

Various nanoporous crystals have been attracting a lot of attention for the capture, storage, delivery of gas molecules and conversion them into valuable compounds because of their large surface area and pore volume, and of ease and diversity in surface functionalisation.

Gas adsorption isotherm is robust approach for characterising porous materials and gives essential information of pore features assuming pore geometry and pore surface flatness. However it does not give so simple “push a button” outcomes as being believed. Using in-situ powder XRD measurements at SPring-8, we have directly observed changes in electron charge distribution introduced with gas molecules as a function of gas pressure for study of nitrogen physisorption process on silica mesoporous MCM-41(1,2) and SBA-16(3) from the initial to the saturated state. We have obtained stand-alone information of the “pore structure”, such as the mesopore size, the silica-matrix density, the intra-wall porosity, and pore surface roughness, together with the nitrogen film evolution in the primary mesopores and the intra-wall pore-filling in the matrix.

Furthermore complex porous materials with flexible frameworks and multiple types of pore such as MOFs require us more careful structural study. We have set-up laboratory base in situ small angle X-ray scattering (SAX) instrument combined with gas adsorption isotherm instrument for different gases at different temperatures. The system enables us precise measurement of (i) peak position and width, and (ii) integrated intensity, for each reflection. We have already reported a new Ar gas adsorption behavior observed in IRMOF-74(4).

In this presentation, I will discuss advantage of our approach “diffraction combined with gas adsorption” and present our recent trial “Gas adsorption crystallography”. I will also touch upon apparent structure differences observed in nanoporous crystals by different approaches, TEM and SEM(5, 6) in addition to X-ray diffraction.

References:

- 1) Argon Adsorption on MCM-41 Mesoporous Crystal Studied by In Situ Synchrotron Powder X-ray Diffraction, N. Muroyama, A. Yoshimura, Y. Kubota, K. Miyasaka, T. Ohsuna, R. Ryoo, P. Ravikovitch, A.V. Neimark, M. Takata & O. Terasaki, *J. Phys. Chem. C* 112, 2008, 10803-10813.
- 2) Density Functional Theory of in-situ Synchrotron Powder X-ray Diffraction on Mesoporous Crystals: Argon Adsorption On MCM-41, K. Miyasaka, A.V. Neimark & O. Terasaki, *J. Phys. Chem. C* 113, 2009, 791-794.
- 3) A Stand-Alone Mesoporous Crystal Structure Model from in situ X-ray Diffraction: Nitrogen Adsorption on 3D Cagelike Mesoporous Silica SBA-16, K. Miyasaka, H. Hano, Y. Kubota, Y. Lin, R. Ryoo, M. Takata, S. Kitagawa, A V. Neimark and O. Terasaki, *Chem. Eur. J.*, 18, 2012, 10300-10311.
- 4) Extra adsorption and adsorbate superlattice formation in metal-organic frameworks, HS Cho, H. Deng, K. Miyasaka, Z. Dong, MH Cho, AV. Neimark, JK Kang, OM. Yaghi, and O. Terasaki, *Nature*, 2015, 527, 503-507.
- 5) Large pore apertures in a series of metal-organic frameworks, H Deng, S Grunder, KE. Cordova, C Valente, H Furukawa, M Hmadeh, FGándara, A C. Whalley, Z Liu, S Asahina, H Kazumori, M O’Keeffe, O Terasaki, JF Stoddart, OM. Yaghi, *Science* 336, 2012, 1018-1023.
- 6) Direct Observation of the Outermost Surfaces of Mesoporous Silica Thin Films by High Resolution Ultralow Voltage Scanning Electron Microscopy M Kobayashi, K Susuki, H Otsuji, Y Sakuda, S Asahina, N Kikuchi, T Kanazawa, Y Kuroda, H Wada, A Shimojima, and K Kuroda, *Langmuir*, 33, 2148-2156 (2017)

Invited Lecture ①



Structure determination of biological macromolecules using synchrotron radiation

Professor,
Osaka University

Atsushi Nakagawa

Invited Lecture ②



DOS Engineering by Inter-element Fusion

Professor,
Kyoto University

Hiroshi Kitagawa

MEMO

**Kyushu University Platform of Inter/Transdisciplinary
Energy Research (Q-PIT)
<Epilogue Session>**

<Date> 13:00-16:30, 2nd February 2018
 <Venue> Kyushu University Ito Campus Shiiki Hall Conference Room
 <Language> Japanese (simultaneous translation)
 <Theme> "Future Energy and Industry-academia Collaboration"

<Program and Speaker>

Time	Program and Speaker
13:00-13:05	<p>Remarks Dr. Shinichi Nishizawa, Professor, Research Institute for Applied Mechanics, Kyushu University</p>
13:05-14:05	<p>Corporate Speak ● Honda's approach to future energy Mr. Takashi Moriya, Senior research fellow, Automobile R&D center, Honda R&D Co., Ltd. ● Approach to industry-academia-government collaboration targeting the society utilizing hydrogen energy Mr. Yoshimasa Tani, President of Tani Green Energy Institute Co., Ltd.</p>
14:05-14:20	Break
14:20-15:20	<p>Corporate Speak ● Energy system for the future society New electronics creation for highly efficient electrified society Mr. Hiromichi Ohashi, President, NPERC-J (New-generation Power Electronics and System Research Consortium Japan) ● Energy system for the future society Dream of paradigm shift of power grid by power electronics Mr. Takeo Kanai, Chief engineer, Power electronics systems division, Toshiba Mitsubishi-Electric Industrial Systems Corporation</p>
15:20-15:40	Break
15:40-16:30	<p>Summary Forum Open discussion by corporate speakers and faculty members of Kyushu University "For protection of our future – from the point of view of energy education and research"</p>
16:30-	<p>Closing Remarks Prof. Masato Wakayama, Executive Vice President, Kyushu University</p>



Remarks

Shinichi Nishizawa

Professor
Research Institute for Applied Mechanics, Kyushu University
Q-PIT



Corporate Speak

Honda's approach to future energy

Takashi Moriya

Senior research fellow,
Automobile R&D center, Honda R&D Co., Ltd.



Corporate Speak

Approach to industry-academia-government collaboration targeting the society utilizing hydrogen energy

Yoshimasa Tani

President
Tani Green Energy Institute Co., Ltd.



Corporate Speak

**Energy System for The Future Society
New electronics creation for highly efficient electrified society**

Hiromichi Ohashi

President
NPERC-J(New-generation Power Electronics and System Research Consortium Japan)



Corporate Speak

**Energy System for The Future Society
Dream of paradigm shift of power grid by power electronics**

Takeo Kanai

Chief engineer, Power electronics systems division
Toshiba Mitsubishi-Electric Industrial Systems Corporation



Summary Forum

"For protection of our future - from the point of view of energy education and research"

Hideyuki Dohi

Professor
International Research Center for Hydrogen Energy, Kyushu University

**< HYDROGENIUS Fatigue and Fracture Division /
I²CNER Hydrogen Materials Compatibility Division / HYDROMATE >
<HYDROGENIUS, I²CNER & HYDROMATE Joint Research Symposium >**

<Date> 9:20-17:20, Friday, February 2, 2018
 <Venue> Lecture Room 3F, Shiiki Hall, Ito Campus, Kyushu University
 <Language> English

<Program and Speaker>

Time	Program and Speaker
9:20-9:30	Opening remarks Prof. Hisao Matsunaga (Kyushu University)
	Chair Dr. Brian Somerday (Southwest Research Institute)
9:30-10:00	Invited talk Prof. Eiji Akiyama (Tohoku University) Electrochemical hydrogen permeation tests to study hydrogen embrittlement
10:00-10:30	Invited talk Prof. Abdelali Oudriss (University of La Rochelle) Some advances on the implication of crystalline defects on hydrogen diffusion and trapping mechanisms in fcc materials : Experimental and modelling approaches
10:30-11:00	Invited talk Prof. Ryosuke Matsumoto (Kyoto University) Atomistic Study of Hydrogen Effects on Stability and Mobility of Vacancy and Vacancy-Clusters
11:00-11:20	Break
	Chair Prof. Junichiro Yamabe (HYDROGENIUS, Kyushu University & HydroMate, AIST)
11:20-11:50	Invited talk Prof. Shuai Wang (University of Wisconsin) Collective dislocation behavior in the presence of hydrogen
11:50-12:20	Invited talk Prof. Bai An (AIST) Application of SPM-related nanotechnology in hydrogen embrittlement studies
12:20-13:20	Lunch
13:20-14:20	Poster Session
	Chair Prof. Arnaud Macadre (I ² CNER, Kyushu University)
14:20-14:50	Invited talk Prof. Michal Lewandowski (TWI) Influence of high-pressure hydrogen atmospheres on mechanical performance of austenitic stainless steels at low temperatures
14:50-15:20	Invited talk Prof. Masanobu Kubota (I ² CNER, Kyushu University) Effect of impurities added to hydrogen environment on fracture toughness of Cr-Mo steels with different strength levels
15:20-15:50	Invited talk Prof. James Burns (University of Virginia) The effect of microstructure on the hydrogen environment assisted cracking susceptibility of a precipitation hardened Ni-Cu alloy
15:50-16:10	Break
	Chair Dr. Akihide Nagao (JFE Steel)
16:10-16:40	Invited talk Mr. Yuhei Ogawa (Kyushu University) Interpretation of hydrogen-assisted fatigue crack propagation in a pure BCC iron based on crack tip plasticity evolution
16:40-17:10	Invited talk Prof. Osamu Takakuwa (HYDROGENIUS, Kyushu University) Compatibility of Type 304 stainless steel to high-pressure hydrogen gas
17:10-17:20	Closing remarks Dr. Brian Somerday (Southwest Research Institute)

HYDROGENIUS Tribology Division & I²CNER Hydrogen Materials Compatibility Division <2018 HYDROGENIUS & I²CNER TRIBOLOGY SYMPOSIUM>

<Date> 10:00-18:00, Friday, 2nd February 2018
 <Venue> Lecture Room 3F, Shiiki Hall, Ito Campus, Kyushu University
 <Language> English
 <Theme> Various Aspects of Hydrogen-related Processes at Tribo-interface

<Program and Speaker>

Time	Program and Speaker
10:00-10:05	Opening remarks Joichi Sugimura, Kyushu University
10:05-11:55	Session 1 Chairperson: Yoshinori Sawae, Kyushu University
10:05-10:45	Keynote Lecture 1 Tribology of Polymers Materials in Cryogenic Hydrogen and Methane Géraldine Theiler, BAM, Germany
10:45-11:10	Invited Talk Technological trends of high pressure hydrogen compressor - Approach of KOBELCO Group - Naofumi Kanei, Kobe Steel, Ltd.
11:10-11:35	Invited Talk Influences of sulfur-containing additives on grease decomposition and hydrogen generation by nascent metal surface Go Tatsumi ¹ , Yuji Shitara ¹ , Peng Yao ² , Toshiaki Wakabayashi ² ¹ JXTG Nippon Oil & Energy Corporation, ² Kagawa University
11:35-11:55	Invited Talk Inhibiting hydrogen permeation in bearing steel by controlling tribofilm growth in the contact Vlad B. Niste, Hiroyoshi Tanaka, Joichi Sugimura, Kyushu University
11:55-12:50	Lunch
12:50-14:45	Session 2 Chairperson: Kanao Fukuda, Universiti Teknologi Malaysia
12:50-13:30	Keynote Lecture 2 The role of hydrogen in carbon tribology: A mechanistic overview Ali Erdemir, Argonne National Laboratory, USA
13:30-13:55	Invited Talk Super-low friction mechanism of diamond-like carbon lubricated with an environmentally friendly ester based oil Shinya Sasaki, Hiharu Okubo, Tokyo University of Science, Japan
13:55-14:20	Invited Talk Tribochemical wear of silicon-based materials mediated by proton transfer: Molecular dynamics sliding simulation analysis Yusuke Ootani, Tohoku University, Japan
14:20-14:45	Invited Talk Visualization of real contact area of rubber materials sliding on hard substrates Satoru Maegawa, Tottori University, Japan
14:45-15:00	Break
15:00-16:25	Joint Symposium of Hydrogen Tribology Team and Hydrogen Polymers Team Chairperson: Dr. Neha RUSTAGI, Fuel Cell Technologies Office, DOE, USA
15:00-15:40	Invited Talk Hydrogen Compatible Polymeric Materials Dr. Kevin Simmons, Pacific Northwest National Laboratory, USA
15:40-16:20	Tribology of rubbers in hydrogen Joichi Sugimura, Kyushu University, Japan
16:20-16:25	Closing Remarks of Oral Session
16:25-16:30	Prof. Shin Nishimura, Kyushu University
16:25-16:30	Break
16:30-18:00	Poster Session

Poster Session

- PT01 Frequency modulation atomic force microscopy (FM-AFM) observation of adsorbed films on diamond-like carbon (DLC) surfaces
Hikaru Okubo, Shinya Sasaki, Tokyo University of Science, Japan
- PT02 Tribology of polyethylenimine / molybdenum disulphide (PEI/MoS₂)₁₅ films in dry atmospheres
Prabakaran Saravanan, Roman Selyanchyn, Hiroyoshi Tanaka, Joichi Sugimura, Kyushu University, Japan
- PT03 Effect of environmental gas on friction and wear of various ceramics
Kohei Shirahama¹, Hiroyoshi Tanaka¹, Takeshi Maeda², Joichi Sugimura¹
¹ Kyushu University, ² Kyocera Corporation, Japan
- PT04 Effects of oxygen and water on friction and wear of DLC slid against pure metals
Keisuke Manabe, Hiroyoshi Tanaka, Joichi Sugimura, Kyushu University, Japan
- PT05 Friction and wear of polymer composites in hydrogen environment at low temperature
Naotoshi Shimizu¹, Yoshinori Sawae², Takehiro Morita², Shugo Onitsuka², Joichi Sugimura²
¹ IHI Corporation, ² Kyushu University, Japan
- PT06 Effect of trace moisture content on low friction mechanism of carbon fiber filled PTFE in high purity hydrogen
Reona Umei, Keiji Sakaki, Takehiro Morita, Yoshinori Sawae, Joichi Sugimura, Kyushu University, Japan
- PT07 Friction and wear of polymer composites in high pressure hydrogen
Yoshinori Sawae, Eiichi Miyakoshi, Shunichiro Doi, Takehiro Morita, Joichi Sugimura, Kyushu University, Japan
- PT08 Effects of environmental gases on friction and wear of stainless steels
Shotaro Koizumi¹, Hiroyoshi Tanaka¹, Yuuya Hayashi², Naruhiko Inayoshi², Joichi Sugimura¹
¹ Kyushu University, ² DENSO Corporation, Japan
- PT09 Hydrogen generation from cyclic compounds in rolling contact of steel
Daisuke Takekawa¹, Yoji Sunagawa¹, Hiroyoshi Tanaka², Joichi Sugimura²
¹ Idemitsu Kosan Co., Ltd., ² Kyushu University, Japan
- PT10 Evaluation of new type bearing retainer for liquid rocket engine turbopump
Hiromitsu Kakudo, Satoshi Takada, Makoto Yoshida, Japan Aerospace Exploration Agency, Japan

HYDROGENIUS Thermophysical Properties Division
& I²CNER Thermal Science and Engineering Division
< HYDROGENIUS & I²CNER Joint Research Symposium >

<Date> 9:50-16:55, Friday, 2nd February 2018
 <Venue> Conference Room, 2F, I²CNER Bldg.1, Ito Campus, Kyushu University
 <Language> English
 <Theme> Thermal Issues for Hydrogen and New Refrigerants for Energy Systems

<Program and Speaker>

Time	Program and Speaker
9:50-10:00	<u>Opening remarks</u> Yasuyuki Takata (Kyushu University)
10:00-10:40	Shalabh C. Maroo (Syracuse University) Experimental and Molecular Study of Microlayer in Pool Boiling and Thin-Film Evaporation
10:40-11:20	Prashant Valluri (The University of Edinburgh) Watching Sessile Droplets Evaporate: Beautiful (and Never Boring) Phenomena
11:20-11:40	Alexandros Askounis (Kyushu University) Can Ultrathin Water Films Remain Stable in Nanoconfinement?
11:40-12:00	Daniel Orejon (Kyushu University) Coalescence-induced Droplet-jumping Suppression by Microstructures on Superhydrophobic Surfaces
12:00-13:20	Lunch
13:20-14:00	Emadabathuni Anil Kumar (Indian Institute of Technology Tirupati) Effective Thermal Conductivity of Metal Hydride Beds: Measurement, Simulation and Augmentation
14:00-14:40	Khairul Habib (Universiti Teknologi Petronas (UTP)) Photo Thermoelectric Air Duct Systems for Self-Sustainable Buildings
14:40-15:00	Biao Shen (Kyushu University) Boiling on Surfaces with Heterogeneous Wettability
15:00-15:10	Break
15:10-15:40	Kenji Takizawa (National Institute of Advanced Industrial Science and Technology (AIST)) Evaluation of Low Flammability for Next Generation Refrigerants
15:40-16:10	Ryo Akasaka (Kyushu Sangyo University) Current Status and Future Development of a New Fundamental Equation of State for cis-1,1,1,4,4,4-Hexafluoro-2-butene (R-1336mzz(Z))
16:10-16:30	Yutaku Kita (Kyushu University) Drop Mobility on Microtextured Surfaces with Wettability Contrasts
16:30-16:50	Taichi Kuroki (Kyushu University) Temperature Rise of Hydrogen Storage Cylinders by Thermal Radiation from Fire at Hydrogen-Gasoline Hybrid Refueling Stations
16:50-16:55	<u>Closing remarks</u> Naoya Sakoda (Kyushu University)

HYDROGENIUS Polymers Division
<International Symposium of Hydrogen
Polymers Team, HYDROGENIUS>

<Date> 11:00–18:00, Friday, February 2, 2018
 <Venue> Lecture Room 3F, Shiiki Hall, Ito Campus, Kyushu University
 <Language> English

<Tentative Program and Speaker>

Time	Program and Speaker
11:00-11:40	Session 1
11:00-11:40	Opening Remarks/ Polymeric Materials for Hydrogen Devices Prof Shin NISHIMURA, Kyushu University (Japan)
11:40-13:10	Lunch
13:10-14:30	Session 2 Chairperson: Dr Hiroaki ONO, Kyushu University
13:10-13:50	High-Pressure Hydrogen Dispensing Hoses Ikuma Yusa, The Yokohama Rubber Co., Ltd. (Japan)
13:50-14:30	Behavior of Polymers in High Pressure Environments as Applicable to the Hydrogen Infrastructure Dr Nalini Chulliyil MENON, Sandia National Laboratory (USA)
14:30-15:00	Coffee Break
15:00-16:25	Session 3 Joint Symposium of Hydrogen Tribology Team and Hydrogen Polymers Team Chairperson: Neha RUSTAGI, Fuel Cell Technologies Office, DOE (USA)
15:00-15:40	Hydrogen Compatible Polymeric Materials Dr Kevin Simmons, Pacific Northwest National Laboratory (USA)
15:40-16:20	Tribology of rubbers in hydrogen Prof Joichi SUGIMURA, Kyushu University (Japan)
16:20-16:25	Closing Remarks of Oral Session Prof Shin NISHIMURA, Kyushu University (Japan)
16:25-16:30	Break
16:30-18:00	Poster Session

Poster Session (TBD)

- PP01 "Activities of Research Group on Elastomers for Hydrogen Equipment"
Shin NISHIMURA, Kyushu University
- PP02 "High-pressure Hydrogen Hose Evaluation Method"
Shin NISHIMURA, Kyushu University
- PP03 "Influence of Dissolved Hydrogen on the Bending Modulus of Polyamide 11"
Yohei FUJII, Kyushu University
- PP04 "Cavitation during Tensile Deformation of a Hydrogen-Saturated Polyamide 11 Tube"
Kazuyuki ENOMOTO, Kyushu University
- PP05 "Cavitation during Tensile Deformation of a Hydrogen-Saturated Polyamide 11 Tube:
A SAXS Study "
Kazuyuki ENOMOTO, Kyushu University
- PP05 Using Radiation Modification of Amorphous Phase in Polyethylene to Develop
Hydrogen Compatible Resins Used in High-Pressure Hydrogen
Kazuyuki ENOMOTO, Kyushu University
- PP06 "Effect of high-pressure hydrogen gas exposure on internal damage of high-density
polyethylene"
Hiroaki ONO, Kyushu University
- PP07 TBD
Mitsuteru MUTSUDA, Daicel Evonik Ltd.
- PP08 "High-pressure Hydrogen Gas Permeation Test of Polymeric Materials"
Hirota FUJIWARA, Kyushu University
- PP08 "Influence of Types of Fillers on Hydrogen Solubility in Acrylonitrile Butadiene Rubber"
Hirota FUJIWARA, Kyushu University
- PP09 "The Investigation on Testing Methods for Rubber Materials Used in High-Pressure
Hydrogen Gas"
Kazumi NAKAYAMA, Chemicals Evaluation and Research Institute, Japan
- PP10 High-Pressure Hydrogen Sealability of EPDM rubber O-ring
Atsushi KOGA, NOK Corporation
- PP11 "Wear of O-ring Exposed to Cyclic Pressurized Hydrogen"
Kiyohiro SUZUKI, NOK Corporation
- PP12 TBD
Yoshihisa TAKEYAMA, Zeon Corporation
- PP13 "Effect of Crosslink on Hydrogen Properties of NBR Evaluated by Gas Permeation
Test"
Shinya YAMASAKI, Kyushu University
- PP14 "Durability evaluation of hydrogen-resistant EPDM O-ring by high pressure hydrogen"
Ryo TAKAISHI, Takaishi Industry Co. Ltd.
- PP15 "Study on higher order structure change of NBR rubber and the interaction between
rubber and hydrogen molecules under the high-pressure hydrogen exposure by ab
initio molecular orbital calculations"
Kentarou GOMA, Kogakuin University
- PP16 "On the Inhomogeneity in Acrylonitrile Butadiene Rubber during Hydrogen
Elimination Process by Small Angle X-ray Scattering"
Keiko OHYAMA, Kyushu University

<Molecular Photoconversion Devices and Electrochemical Energy Conversion Divisions>
<I²CNER International Workshop>

<Date> 8:50 am- 5:30 pm, 2nd February 2018

<Venue> I²CNER Hall B, Ito Campus, Kyushu University

<Language> English <Theme> Highly Efficient Energy Conversion Materials

<Program and Speaker>

Time	Program and Speaker
8:50-9:00	Opening remarks Prof. John A. Kilner (Imperial College London)
9:00-10:00	Prof. Ugur Pasaogullari (Center for Clean Energy Engineering [C2E2], University of Connecticut) Title: Introduction of C2E2 activity and advanced analysis of PEFC
10:00-10:30	Prof. Kondo-Francois Aguey-Zinsou (University of New South Wales [UNSW]) Title: Hydride materials for hydrogen storage and CO ₂ catalysis
10:30-11:00	Dr. Mariya Ivanova (Forschungszentrum Jülich) Title: Hydrogen separation Membranes
11:00-11:30	Dr. Wilhelm A. Meulenber (Forschungszentrum Jülich) Title: Ceramic Gas Separation Membranes – From Microstructural Aspects to Application
11:30-11:50	Prof. Thomas Lippert (Paul Scherrer Institut [PSI]) Title: Thin films by Pulsed Laser Deposition
11:50-1:00	Lunch
1:00-1:20	Prof. Colin Atkinson (Imperial College London) Title: Mathematical Methods for Solving Tracer Diffusion Equations
1:20-1:40	Prof. Taner Akbay (ACE2, Kyushu University) Title: Back-exchange Tracer Diffusion Problem
1:40-2:00	Dr. Vincent Thoréton (I ² CNER, Kyushu University) Title: How steam and CO ₂ influence the oxygen transport kinetics of IT-SOFC cathodes
2:00-2:20	Dr. Kwati Leonard (I ² CNER, Kyushu University) Title: Application of Proton conductor for steam electrolysis
2:20-2:40	Dr. Nuttavut Kosem (I ² CNER, Kyushu University) Title: Hydrogen evolution from water using GaN:ZnO coupled to hydrogenase-producing Escherichia coli
2:40-3:00	Prof. Songmei Sun (I ² CNER, Kyushu University) Title: Inorganic Photocatalyst for CO ₂ conversion
3:00-3:20	Dr. Gabseok Seo (I ² CNER, Kyushu University) Title: Understanding the performance limitation factors; Deep level trapped defect in perovskite solar cells
3:20-3:40	Coffee break
3:40-4:00	Prof. Toshinori Matsushima (I ² CNER, Kyushu University) Title: High performance from extraordinarily thick organic light-emitting diodes
4:00-4:20	Dr. Wei Ma (I ² CNER, Kyushu University) Title: Halloysite nanotubes based hybrid coating with both superhydrophobic and superoleophobic properties
4:20-4:40	Prof. Hironobu Ozawa (Faculty of Science, Kyushu University) Title: Molecular-Based Photoelectrochemical Cells for Visible-Light-Driven Hydrogen Production from Water
4:40-5:00	Prof. Motonori Watanabe (I ² CNER, Kyushu University) Title: Anchor effect of dye in dye-sensitized photocatalytic water splitting for effective hydrogen production reaction
5:00-5:20	Prof. Aleksandar Staykov (I ² CNER, Kyushu University) Title: Oxygen Reduction Reaction on Carbon-coated Iron Nanoparticles
5:20-5:30	Closing remarks Prof. Tatsumi Ishihara (I ² CNER, Kyushu University)

<Catalytic Materials Transformations Division>
<I²CNER International Workshop>

<Date> 12:55 pm- 5:15 pm, 2nd February 2018
 <Venue> I²CNER Hall A, Ito Campus, Kyushu University
 <Language> English
 <Theme> Hydrogen Activation for Efficient Materials Transformation

<Program and Speaker>

Time	Program and Speaker
12:55-1:00	Opening remarks Prof. Miho Yamauchi (I ² CNER, Kyushu University)
1:00-1:35	Prof. Chang Ho Chol (Chuo University) Title : Photo-induced Hydrogen Transfer <i>via</i> Redox-active Ligand
1:35-1:50	Prof. Tatsuya Uchida (I ² CNER, Kyushu University) Title: Catalytic Dehydrogenation using Oxygen as a Hydrogen Acceptor
1:50-2:25	Prof. Kyungsu Na (Chonnam National University) Title: Catalytic Conversion of C1 Feedstocks to Value-Added Chemicals using Nanostructured Catalysts
2:25-2:40	Coffee Break
2:40-3:15	Prof. Hideaki Ogata (Hokkaido University) Title : Hydrogen activation by hydrogenases
3:15-3:30	Dr. Miho Isegawa (I ² CNER, Kyushu University) Title: DFT Study on Fe(IV)-Peroxo Formation and H-Atom Transfer Triggered O ₂ Activation in a Bio-Inspired Model of [NiFe]-Hydrogenase
3:30-4:05	Dr. Takanori Shima (Riken) Title : Molecular Multimetallic Polyhydrides: Activation and Functionalization of Dinitrogen and Aromatics
4:05-4:20	Coffee Break
4:20-4:35	Prof. Yukina Takahashi (I ² CNER, Kyushu University) Title : Site-selective Nanoscale-photopolymerization on Gold Nanoparticles <i>via</i> Plasmon Induced Charge Separation
4:35-5:10	Dr. Yong Nam Choi (KAERI) Title : Hydrogen Storage by Catalytic Ionic Hydrogenation
5:10-5:15	Closing remarks Prof. Ki-Seok Yoon (I ² CNER, Kyushu University)

<CO₂ Capture and Utilization Division>
<I²CNER International Workshop>

<Date> 1:00 pm - 5:25 pm, 2nd February 2018
 <Venue> Seminar room 3105-6, Center Zone Building 3, Ito Campus, Kyushu University
 <Language> English
 <Theme> Challenges in Membrane Science

<Program and Speaker>

Time	Program and Speaker
1:00-1:10	Opening remarks Prof. Shigenori Fujikawa (I ² CNER, Kyushu University)
1:10-2:00	Prof. Jong Hak Kim (Yonsei University) Title: POEM-based graft copolymers: Synthesis, Nanostructure and Applications
2:00-2:35	Prof. Masakoto Kanezashi (Hiroshima University) Title: Pore size controllability and gas permeation properties of sol-gel derived amorphous silica membranes
2:35-3:10	Prof. Masamichi Nishihara (Kyushu University) Title: Charge-transfer complex hybrid films as a ionic conductive membrane for fuel cell application
3:10-3:30	Coffee break
3:30-4:00	Prof. Satoshi Kodama (Tokyo Institute of Technology) Title: Process analysis for CO ₂ capture technology
4:00-4:30	Dr. Masahiro Seshimo (Research Institute for Innovative Technology for the Earth) Title: Inorganic membranes and its applications
4:30-4:55	Dr. Roman Selyanchyn (I ² CNER, Kyushu University) Title: Creation of size sieving domains in polydimethylsiloxane for higher selectivity and permeability gas separation membranes
4:55-5:20	Prof. Ikuo Taniguchi (I ² CNER, Kyushu University) Title: Polymeric membranes for negative carbon emission
5:20-5:25	Closing remarks Prof. Shigenori Fujikawa (I ² CNER, Kyushu University)

<CO₂ Storage Division>

<I²CNER International Workshop>

<Date> 1:00 pm- 5:12 pm, 2nd February 2018
 <Venue> I²CNER Hall C, Ito Campus, Kyushu University
 <Language> English
 <Theme> Molecular- to field-scale CO₂ Behavior for Optimized Storage

<Program and Speaker>

Time	Program and Speaker
1:00-1:15	Prof. Takeshi Tsuji (Kyushu University) Title: Activity in CO ₂ Storage Division
1:15-1:35	Prof. Kazuya Ishitsuka (Hokkaido University) Title: Field-scale temperature estimation based on resistivity using neural network: Application to the Kakkonda geothermal field
1:35-1:50	Prof. Tatsunori Ikeda (I ² CNER, Kyushu University) Title: Monitoring of CO ₂ storage sites using a controlled and continuous seismic source system
1:50-2:20	Dr. Osamu Takano (JAPEx) Title: Tectonic and depositional system transition of the Cretaceous to Neogene Sanriku-Shimokita-Hidaka-oki forearc to foreland basin: transformation scenario from coal-bearing fluvio-deltaic forearc to deeper-marine foreland
2:20-2:32	Mr. Chandoeun Eng (Kyushu University) Title: Hydrocarbon characterization using seismic attributes for Sanriku-Oki Forearc basin, northeast Japan
2:32-2:44	Ms. Chanmaly Chhun (Kyushu University) Title: Characterization of hydrate and gas reservoirs using automatic seismic velocity analysis and rock physics: Example from Kumano forearc basin of the Nankai Trough, Japan
2:44-3:00	Coffee Break
3:00-3:30	Prof. Diogo Bolster (University of Notre Dame) Title: Comparison of micromodel experiments and numerical simulations of multiphase displacement flows under CO ₂ sequestration relevant conditions
3:30-3:50	Prof. Fei Jiang (Yamaguchi University and I ² CNER, Kyushu University) Title: Effect of wettability alternation on multiphase flow behavior in porous media
3:50-4:10	Mr. Kazuki Sawayama (Kyushu University) Title: Numerical investigation about the effect of aperture closure on fluid behavior in digitalized fracture
4:10-4:40	Prof. Yunfeng Liang (the University of Tokyo) Title: Recent Progresses in Molecular Scale Investigation of CO ₂ -Brine-Clay Interactions for CO ₂ Geo-Sequestration
4:40-5:00	Dr. Jihui Jia (China University of Petroleum) Title: Ab Initio Molecular Dynamics Study of Carbonation and Hydrolysis of Quartz and Basalt Andesine Reactive Surface
5:00-5:12	Mr. Hiroki Matsui (Kyushu University) Title: Influence of the addition of H ₂ S on replacement reaction of CH ₄ and CO ₂

<Energy Analysis Division>

<I²CNER International Workshop>

<Date> 9:30 am- 4:00 pm, 2nd February 2018
 <Venue> Seminar room 203, Center for Co-Evolutional Social Systems, Ito Campus, Kyushu University
 <Language> English
 <Theme> Energy Transition Pathways for Japan

Time	Program and Speaker
9:30 – 9:40	Opening remark: Low-Carbon and Sustainable pathway considerations and modelling approaches Prof. Kenshi Itaoka (I ² CNER, Kyushu University)
9:40 – 10:00	A brief review of transition theory and the Japanese energy policy approach and targets Prof. Andrew Chapman (I ² CNER, Kyushu University)
10:00 – 11:00	DOMESTIC landscape: Factors, problems, barriers, policies and analytical approaches on energy transition pathways Presentations by invited speakers Prof. Benjamin McLellan (Kyoto University) Dr. Atsushi Kurosawa (Institute of Applied Energy) Dr. Makoto Akai (National Institute of Advanced Industrial Science and Technology)
11:00 – 11:10	Coffee Break
11:10 – 11:50	DOMESTIC landscape: Open discussion on the pathway and modelling inputs and approach. Notes taken to guide Exercise 2 Prof. Andrew Chapman (I ² CNER, Kyushu University)
11:50 – 1:00	Lunch
1:00 – 1:40	DOMESTIC landscape: Gathering input from members on a timeline for “potential transition pathways” including policy, technology and exogenous impact inputs Prof. Kenshi Itaoka (I ² CNER, Kyushu University)
1:40 – 2:10	INTERNATIONAL landscape: Factors, problems, barriers, policies and analytical approaches on energy transition pathways: Presentations by invited speakers Dr. Monterey Gardiner (BMW group) Prof. James Stubbins (University of Illinois Urbana-Champaign)
2:10 – 2:20	Coffee Break
2:20 – 3:00	INTERNATIONAL landscape: Open discussion on the pathway and modelling inputs and approach. Notes taken to guide Exercise 4 Prof. Andrew Chapman (I ² CNER, Kyushu University)
3:00 – 3:40	INTERNATIONAL landscape: Gathering input from members on a timeline for “potential transition pathways” including policy, technology and exogenous impact inputs Prof. Kenshi Itaoka (I ² CNER, Kyushu University)
3:40 – 4:00	Closing and future steps, collaboration opportunities Prof. Andrew Chapman

**<Initiative on Applied Math for Energy>
<I²CNER International Workshop>**

<Date> 9:30 am- 5:30 pm, 2nd February 2018
 <Venue> Seminar room 3213, Center Zone Building 3, Ito Campus, Kyushu University
 <Language> English
 <Theme> Landscape of Applied Mathematics in Energy Problem

<Program and Speaker>

Time	Program and Speaker
9:30 - 9:35	Opening remarks Prof. Kaname Matsue (IMI/ I ² CNER, Kyushu University)
9:35 - 10:15	Prof. Kong Joo Shin (Dept. of Urban and Environmental Engineering, Kyushu University) Title: Liberalisation of retail electricity market: Household switching behaviour and consumer satisfaction in Japan
10:25 - 11:10	Speaker: Dr. Atsushi Kawamoto (Toyota Central R&D Labs., Inc.) Title: Topology Optimization in Multiphysics Problems
11:20 - 12:00	Prof. Hiroaki Watanabe (Dept. of Mechanical Engineering, Kyushu University) Title: Recent R&D on Combustion Simulation for Energy Industry
12:00-1:00	Lunch
1:00 - 1:45	Prof. Ippei Obayashi (AIMR, Tohoku University) Title: Theory and application of persistent homology
2:00 - 2:45	Speaker: TBD Title: TBD
3:05 - 3:45	Prof. Jun'ichi Murata (Dept. of Electrical Engineering, Kyushu University) Title: Maths-ish techniques in electrical power management
3:55 - 4:40	Dr. Daniel Packwood (iCeMS, Kyoto University) Title: Mathematical modeling and dissimilarity analysis for nanomaterial assembly
4:50 - 5:30	Prof. Kei Hirose (IMI, Kyushu University) Title: Statistical analysis of energy consumption data