



Energy Intelligence
Beyond Borders:
Sharing Sustainable
Energy Visions

KYUSHU UNIVERSITY
Energy Week 2020

Date [Mon] 27 Jan.- [Fri] 31 Jan., 2020

Venue KYUSHU UNIVERSITY Ito Campus, Hospital Campus / Tosu SLRC / Denki Building KYOSOKAN

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

3-1-1 Maidashi, Higashi-ku, Fukuoka
812-8582, JAPAN

8-7 Yayoigaoka, Tosu, Saga
841-0005, JAPAN

Denki Building, 2-1-82 Watanabe-dori, Chuo-ku, Fukuoka
810-0004, JAPAN



* Departments participating in Energy Week 2020, related to the energy research in Kyushu University

Contacts

Date	Program	Departments	Contact
1/27(Mon)~29(Wed)	Q-PIT related programs	Administrative Office for Kyushu University Platform of Inter/ Transdisciplinary Energy Research	092-802-6672
1/29(Wed)~30(Thu)	HYDROGENIUS related programs HYDROGENIUS-I ² CNER- HydroMate Joint Research Symposium	Research Center for Hydrogen Industrial Use and Storage, Kyushu University	090-6482-2075 (available for 1/29-1/30 only)
1/31(Fri)	I ² CNER related programs	International institute for Carbon-Neutral Energy Research, Kyushu University	092-802-6935
	RCSLA Symposium	Kyushu University Research Promotion Division Project Support Section Research Center for Synchrotron Light Applications, Kyushu University	092-802-2322 092-583-7643

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Message



President
Kyushu University

Chiharu Kubo

I would like to take this opportunity to express my sincere gratitude for your participation and interest in Kyushu University Energy Week 2020.

On the occasion of the centennial anniversary of Kyushu University's founding in 2011, we adopted the slogan "Breakthrough into the Top 100 Universities," expressing our commitment to strive toward becoming recognized as one of the world's top 100 universities. Under our mission statement, "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 issues," we established the Kyushu University Platform of Inter/Transdisciplinary Energy Research based on the Kyushu University Action Plan 2015–2020 that was formulated in 2015.

Kyushu University is located in Fukuoka, among the first places in Asia to enter the industrial revolution and an area that once played a central role in Japan's energy industry through its coal mining. In addition, as Japan's gateway to Asia, Fukuoka has actively adopted the diverse cultures of neighboring Asian countries and has influenced many countries and regions across the globe as a source of Japanese culture. In light of this background, our university is actively engaged in energy research, and creative fundamental academic research is being conducted in a wide range of areas.

Meanwhile, having experienced various incidents in recent times such as the oil crisis, the Chernobyl nuclear accident, and the Great East Japan Earthquake, there is an elevated level of interest in energy issues among all generations in today's society. In particular, because Japan relies heavily on overseas countries for fossil fuels, which is our main energy source, the realization of a sustainable energy society that is not dependent on fossil fuels has remained a long-term challenge throughout the years. In terms of energy sources that are not dependent on fossil fuels, there lie various issues including technical, economic, and safety aspects, and it is still difficult to ensure sustainable and stable utilization. To seek a practical solution, researchers and engineers from all areas must work together and approach these issues from various angles. In addition, it is necessary to continuously challenge all the issues, including environmental deterioration and global warming, that we face in the process of new discovery, research, development, and practical application, in our ambition to strive to realize the sustainable development of a "future energy society."

In this environment, aligned with our belief in the importance of reexamining our mission and to realize the formation of a research and education hub that leverages on the strengths of the university, we established the Kyushu University Platform of Inter/Transdisciplinary Energy Research in October 2016, our original platform organization in the energy sector, in which we have received worldwide recognition as being a strength of our institution. Currently, together with myself as the Director General, the Deputy Director General, five professors, ten faculty members, the administrative support department, and cooperating faculty members, we are unified in endeavoring to promote cross-disciplinary energy research, and it is our hope that these excellent research results will contribute to a broad range of educational activities.

This year, under the theme "Energy Intelligence Beyond Borders: Sharing Sustainable Energy Visions," we will be holding the Kyushu University Energy Week 2020 as a forum for discussion and exchange among the participating researchers, both to deepen dialogue on research results and to serve as an opportunity for both domestic and international communities and societies to learn about the university's initiatives. This year marks the fourth annual event, and we will be focusing on renewable energy by inviting prominent lecturers from international and domestic organizations and the private sector. Moreover, in collaboration with our International Institute for Carbon-Neutral Energy Research (I2CNER), the Research Center for Hydrogen Industrial Use and Storage (HYDROGENIUS), The Research Center for Synchrotron Light Applications (RCSLA), and other related organizations within the university, we will be holding symposiums introducing the activities of various departments, having research presentations by young researchers, and as part of our activities as an international hub in the energy sector, we are scheduled to hold research presentations provided by overseas students and young researchers for the purpose of international joint research. We sincerely look forward to your participation in the various program events.

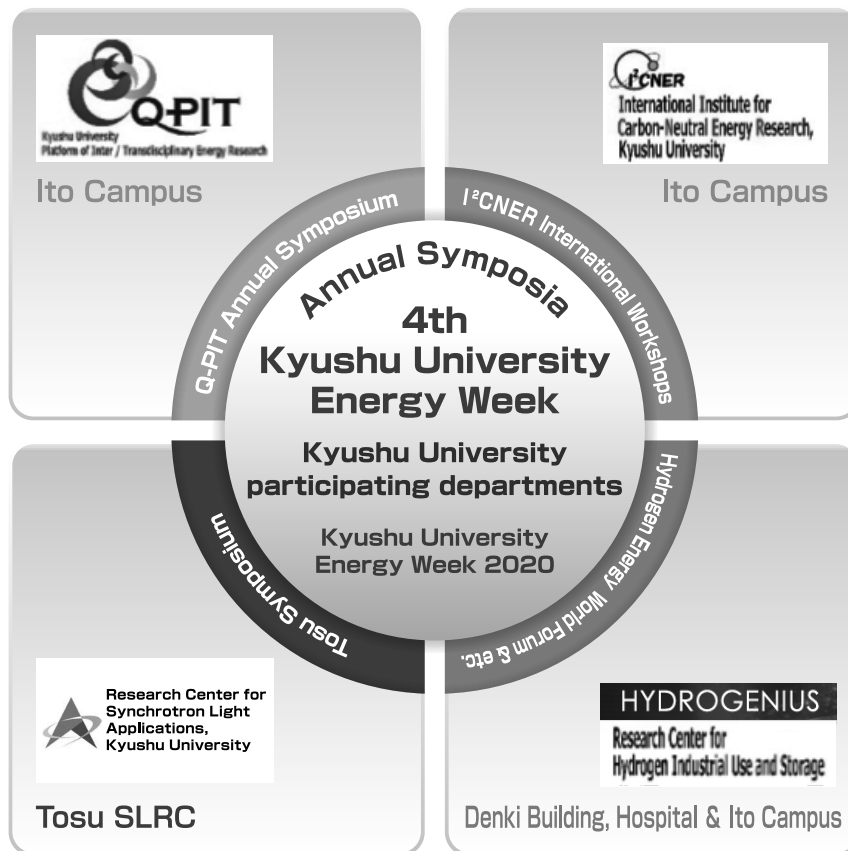
About Kyushu University Energy Week

What's Kyushu University Energy Week ?

Energy Week is an annual international conference organized by Kyushu University. With a focus on “future energy”, it features a variety of academic workshops, symposia, invited lectures from prominent energy researchers, as well as public events that bring together prominent experts from academia, industry and government.

Another aim of Energy Week is the promotion of early-career researchers through a poster session and the President's Award ceremony for the best poster presentations.

The 5-day conference is considered to be Kyushu University's main venue to promote exchange among researchers and practitioners in the energy sector, and to highlight its role as an international hub for sustainable energy research.

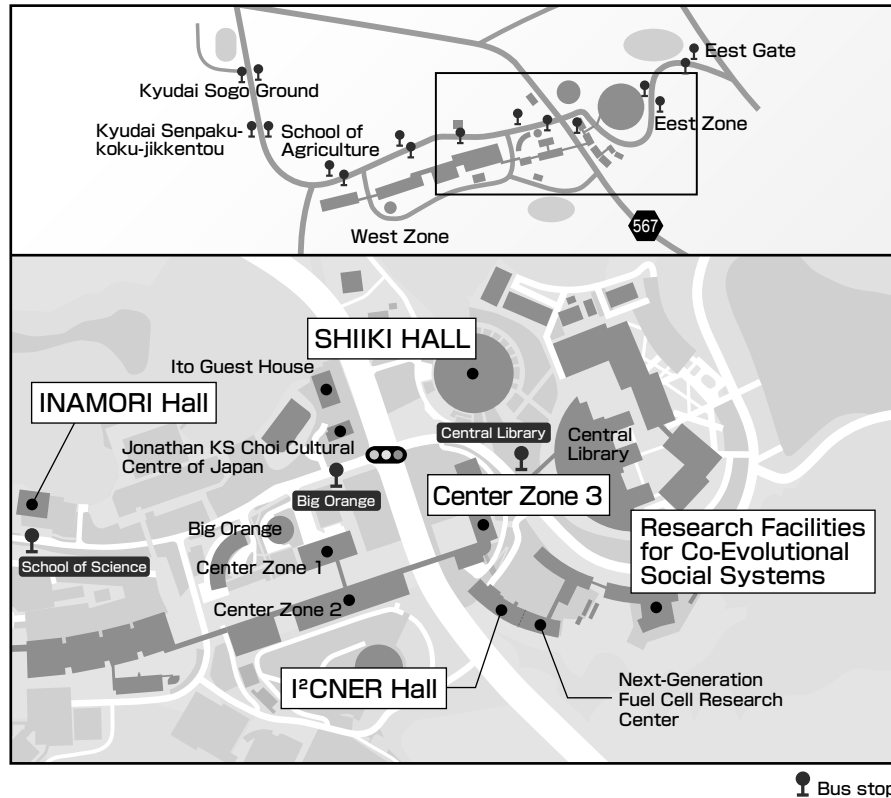


Venue

KYUSHU UNIVERSITY Ito Campus

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

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



★ From Fukuoka Airport

Fukuoka Airport → (Subway Kuko Line) → Meinohama Station (*¹ Transfer JR Chikuhi Line) → Kyudai-Gakkentoshi Station →*² Showa Bus (via Susenji or Yokohamanishi or Gakuendori) → Ito Campus

★ From Hakata or Tenjin Station

By subway

Hakata Station (Subway Kuko Line) → Tenjin → Meinohama (*¹ Transfer JR Chikuhi Line) → Kyudai-Gakkentoshi Station →*² Showa Bus (via Susenji or Yokohamanishi or Gakuendori) → Ito Campus

※ 1 Alternatively, board a train bound for Nishikaratsu or Chikuzen-Maebaru, which eliminates the need to transfer at Meinohama Station.

※ 2 For West zone → bus stop No.3

Get off at the bus stop "Big Orange Mae" → Inamori or I²CNER or (Research Facilities for Co-Evolutional Social Systems)

Get off at the bus stop "Kyudai Rigakubumae (School of Science)" → Inamori

※ 2 For East zone → bus stop No.4

Get off at the bus stop "Center of library" → I²CNER or Research Facilities for Co-Evolutional Social Systems

By bus

Bus stop of Hakata StationA (Nishitetsu Bus for Kyudai Ito Campus) → Bus stop of Solaria Stage →*³ Ito Campus

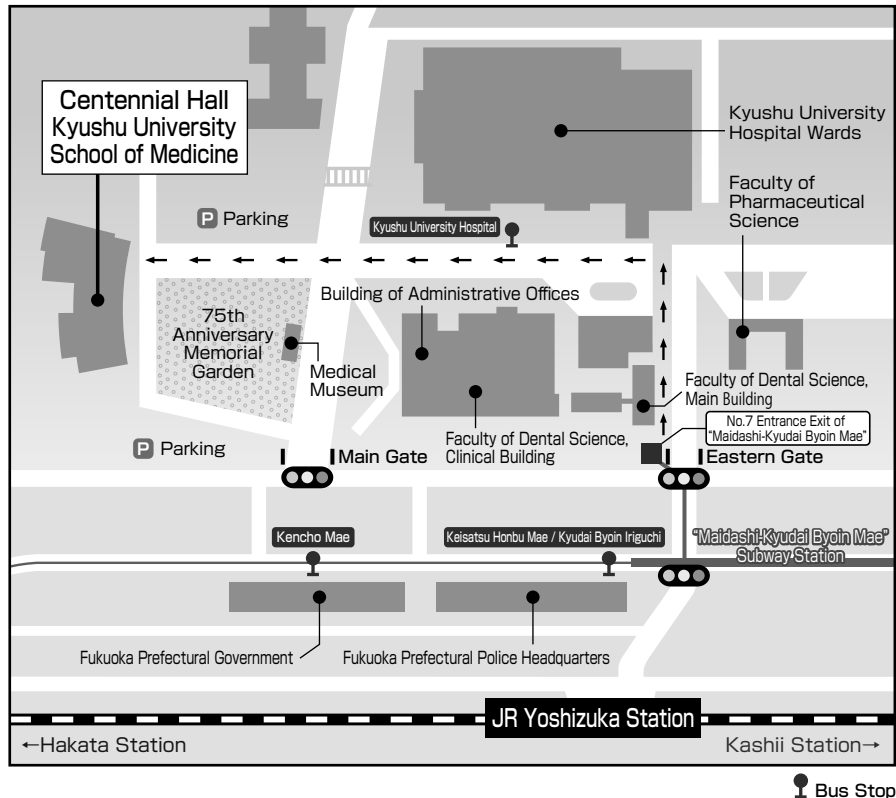
※ 3 Get off at the bus stop "Big Orange Mae" → Inamori or I²CNER or Research Facilities for Co-Evolutional Social Systems

Get off at the bus stop "Kyudai Rigakubumae(School of Science)" → Inamori

Kyushu University Hospital Campus

- Centennial Hall Kyushu University School of Medicine

1-1 Maidashi 3-chome Higashi-ku, Fukuoka 812-8582, JAPAN



★ From Fukuoka Airport

Fukuoka Airport → (Subway Kuko Line) → Nakasu Kawabata Station (Transfer Subway Hakozaki Line) → Maidashi-Kyudai Byoin Mae Station → Kyushu University Hospital Campus → Centennial Hall Kyushu University School of Medicine

★ From Hakata Station

By subway

Hakata Station (Subway Kuko Line) → Nakasu Kawabata Station (Transfer Subway Hakozaki Line) → Maidashi-Kyudai Byoin Mae Station → Kyushu University Hospital Campus → Centennial Hall Kyushu University School of Medicine

By bus

Bus stop of Hakata Center buildingE (Nishitetsu Bus for Chiyomachi) → Bus stop of Kyudai Byoin → Kyushu University Hospital Campus → Centennial Hall Kyushu University School of Medicine

★ From Tenjin Station

By subway

Tenjin Station (Subway Hakozaki Line for Kaizuka) → Maidashi-Kyudai Byoin Mae Station → Kyushu University Hospital Campus → Centennial Hall Kyushu University School of Medicine

Tosu SLRC

- Kyushu Synchrotron Light Research Center

8-7 Yayoigaoka, Tosu, Saga, 841-0005, JAPAN

Denki Building KYOSOKAN

Denki Building, 2-1-82 Watanabe-dori, Chuo-ku, Fukuoka, 810-0004, JAPAN

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.27 (Mon)	Q-PIT											
Jan.28 (Tue)	Q-PIT				Q-PIT Plenary Session: Opening Ceremony/Presentation about Q-PIT/Keynote Lecture[JPN/ENG] (simultaneous translation)							
			Poster Exhibition (@I ² CNER foyer)						Q-PIT Poster Presentation (@I ² CNER foyer)			
Jan.29 (Wed)	Q-PIT	Q-PIT Workshops : Can Scientists Make a Difference? Exploring the Potential of Transdisciplinary Collaboration for Clean Energy Development [ENG]										
	HYDROGENIUS									Hydrogen Energy and International Hydrogen		
Jan.30 (Thu)	HYDROGENIUS & I ² CNER				HYDROGENIUS, I ² CNER, and HYDROMATE HYDROGENIUS Fatigue and Fracture Division, I ² CNER Hydrogen Materials							
										HYDROGENIUS and I ² CNER HYDROGENIUS Tribology Division &		
	HYDROGENIUS									International Symposium of Hydrogen		
Jan.31 (Fri)	HYDROGENIUS & I ² CNER									HYDROGENIUS & I ² CNER HYDROGENIUS Thermophysical		
				I ² CNER International Workshop Molecular Photoconversion Devices Division &								
	I ² CNER										I ² CNER Catalytic Materials	
											I ² CNER International	
											I ² CNER CO ₂ Capture and	
	I ² CNER & IMI			I ² CNER & IMI Joint International Workshop								
	RCSLA											
Q-PIT GTC											Dr.Yoshino Special [JPN](simultaneous	

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

※I²CNER: International Institute for Carbon-Neutral Energy Research

※HYDROGENIUS: Research Center for Hydrogen Industrial Use and Storage

※RCSLA: Research Center for Synchrotron Light Applications

※GTC: Research Center for Green Technology

* 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	19:30	20:00	Venue
Q-PIT Prologue Session [JPN] Workshop: Regional CES - Think about the environment and energy-												I ² CNER Hall, Ito Campus
Poster Exhibition (@I ² CNER foyer)											I ² CNER foyer, Ito Campus	
Q-PIT Plenary Session: Invited Lecture/Panel Discussion/ Best Poster Awards Ceremony/Closing Remarks [JPN/ENG](simultaneous translation)												I ² CNER Hall, Ito Campus
												I ² CNER foyer, Ito Campus
Q-PIT Workshops : Sustainable Energy Transitions in Asia [ENG](simultaneous translation)												Shiiki Hall / Inamori Hall, Ito Campus
Fuel Cell Forum in Kyushu & Development Forum 2020 [JPN/ENG]												Denki Building KYOSOKAN
Joint Research Symposium Compatibility Division, & HYDROMATE [ENG]												Conference Room, Shiiki Hall, Ito Campus
Joint Research Symposium I ² CNER Hydrogen Materials Compatibility Division [ENG]												Hall 2, Centennial Hall Hospital Campus <small>*The venue is different from last year</small>
Polymers Team, HYDROGENIUS [ENG]												Hall 3, Centennial Hall Hospital Campus <small>*The venue is different from last year</small>
Joint Research Symposium Properties/I ² CNER Thermal Science and Engineering Division [ENG]												Conference Room #914, West BLDG., Ito Campus
Electrochemical Energy Conversion Division [ENG]												I ² CNER Hall C, I ² CNER Bldg.1, Ito Campus
International Workshop Transformations Division [ENG]												I ² CNER Hall A, I ² CNER Bldg.1, Ito Campus
Workshop CO ₂ Storage Division [ENG]												I ² CNER Hall B, I ² CNER Bldg.1, Ito Campus
International Workshop Utilization Division & Energy Analysis Division [ENG]												Conference Room 203, Co-Evolutional Social Systems, Ito Campus
Applied Math for Energy [ENG]												Room 419, I ² CNER Bldg.1, Ito Campus
RCSLA Synchrotron Symposium [JPN/ENG]												Tosu SLRC
Lecture translation)												Concert Hall, Shiiki Hall, Ito Campus

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

<Date> 13:30-16:00, 27th January 2020
 <Venue> I²CNER Hall, I²CNER Bldg. 1, Ito Campus, Kyushu University
 <Language> Japanese
 <Theme> Workshop : Regional CES - Think about the environment and energy -

< Program and Speaker >

Time	Program and Speaker	
13:30-13:35	Opening Remarks Prof. Kentaro YOSHIDA, Kyushu University Platform of Inter/Transdisciplinary Energy Research	
13:35-13:55	Ministry of the Environment's Lecture ● Introduction of the Ministry of the Environment's efforts to create a regional CES - Decarbonization and SDGs concept from Japan - Mr. Yuki IZUMI, Assistant manager , Environmental Strategy Division, Minister's Secretariat, Ministry of the Environment “ Concurrent post : Kyushu Regional Environmental Office ”	
13:55-14:25	Research Lecture 1 ● Marine plastic pollution's monitoring and future prediction Prof. Atsuhiko ISOBE, Research Institute for Applied Mechanics, Kyushu University	
14:25-14:55	Exhibition tour / Break	
14:55-15:15	Research Lecture 2 ● Use of hydrogen derived from renewable energy Prof. Etsuo AKIBA, International Research Center for Hydrogen Energy, Kyushu University	
15:15-15:20	Break	
15:20-15:40	Research Lecture 3 ● SDGs Native and Tokyo Olympics/Paralympics Prof. Kentaro YOSHIDA, Kyushu University Platform of Inter/Transdisciplinary Energy Research	
15:40-	Closing Remarks Prof. Akari HAYASHI, Kyushu University Platform of Inter/Transdisciplinary Energy Research	

Poster Exhibition / Foyer, I²CNER Bldg.1
 By Doctoral/graduate students & young researchers, international doctoral students/researchers



Opening Remarks

Kentaro YOSHIDA

Professor,
Kyushu University Platform of Inter/Transdisciplinary Energy Research



Lecture by Ministry of the Environment

Introduction of the Ministry of the Environment's efforts to create a regional CES
- Decarbonization and SDGs concept from Japan -

Yuki IZUMI

Assistant manager,
Environmental Strategy Division, Minister's Secretariat, Ministry of the Environment



Research Lecture 1

Marine plastic pollution monitoring and future prediction

Atsuhiko ISOBE

Professor,
Research Institute for Applied Mechanics, Kyushu University



Research Lecture 2

Use of hydrogen derived from renewable energy

Etsuo AKIBA

Professor,
International Research Center for Hydrogen Energy, Kyushu University



Research Lecture 3

SDGs Native and Tokyo Olympics/Paralympics

Kentaro YOSHIDA

Professor,
Kyushu University Platform of Inter/Transdisciplinary Energy Research



Closing Remarks

Akari HAYASHI

Professor,
Kyushu University Platform of Inter/Transdisciplinary Energy Research

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

<Date> 10:00-17:30, 28th January 2020
 <Venue> I²CNER Hall, I²CNER Bldg. 1, Ito Campus, Kyushu University
 <Language> English and Japanese (simultaneous translation)
 <Theme> Sustainable Energy Visions for Asia-Pacific - The contribution of science -

< Program and Speaker>

Time	Program and Speaker
10:00-10:10	Opening Ceremony Welcome Address, Dr. Chiharu KUBO, President of Kyushu University
10:10-10:30	Presentation about Q-PIT Prof. Yoshihiro YAMAZAKI, Kyushu University Platform of Inter/Transdisciplinary Energy Research
10:30-11:00	Keynote Lecture 1: Energy Transition through ASEAN Plan of Action for Energy Cooperation (APAEC) Dr. Nuki Agya UTAMA, Executive Director, ASEAN Centre for Energy
11:00-11:30	Keynote Lecture 2: Application of Sustainable Energy Innovations in Asia Mr. Toru KUBO, Principal Climate Change Specialist, Asian Development Bank
11:30-12:50	Break
12:50-14:30	Poster Presentation(Registration starts at 12:20~) (Venue: Foyer, I²CNER Bldg.1) By Doctoral/graduate students & young researchers, international doctoral students/researchers *The award ceremony will be held on the same day in the I ² CNER hall, at 17:10.
14:30-14:50	Invited Lecture 1: Transitioning to Sustainable Power Systems in Asia Mr. Matthew WITTENSTEIN, Independent Consultant, FTI consulting
14:50-15:10	Invited Lecture 2: Renewables in an Interconnected Energy System Ms. Mika OHBAYASHI, Director, Renewable Energy Institute
15:10-15:30	Invited Lecture 3: Overview of Geothermal Energy in Hawaii Dr. Nicole C. LAUTZE, Associate Specialist, University of Hawaii at Manoa
15:30-15:50	Invited Lecture 4: Shizen Energy -Developing renewable energy projects in South East Asia Dr. Uli GOELTENBOTT, Senior Technical Manager, Shizen Energy Inc.
15:50-16:05	Break
16:05-16:55	Panel Discussion <u>Theme</u> : Sustainable Energy Visions for Asia-Pacific - The contribution of science - Moderator : Prof. Adrian BEJAN, Duke University Panelists : Invited speakers, Q-PIT faculty members
16:55-17:10	Break
17:10-17:25	Best Poster Award Ceremony
17:25-17:30	Closing Remarks Prof. Tomofumi TADA, Kyushu University Platform of Inter/Transdisciplinary Energy Research

Keynote Lecture 1**Energy Transition through ASEAN Plan of Action for Energy Cooperation (APAEC)**

Executive Director,
ASEAN Centre for Energy

Nuki Agya UTAMA

Abstract

World is continuously developing with many challenges and highly vulnerable to risks. ASEAN is one of the regions with fastest growth, projected to be the fourth largest economy globally by 2050. In the meantime, the sequence of rapid growth leads to congestion in urban area, bigger gap of inequality, and surging energy demand. Hence, increasing energy supply capacity is a key driver to accelerate ASEAN's development and people livelihoods. The ASEAN Plan of Action for Energy Cooperation (APAEC) (2016-2025) is the regional energy policy framework in ASEAN.

With the theme of APAEC, "Enhancing energy connectivity and market integration in ASEAN to achieve energy security, accessibility, affordability and sustainability for all", this is clear that the vision of ASEAN in energy development is in line with the SDG7 on Affordable and Clean Energy. Since the adoption of APAEC, AMS achieved several notable results that push the region towards collective resilience such as 24% energy intensity reduction in 2018 comparing to 2005 level, outstanding growth of renewable energy power plants, higher penetration rate of cleaner alternative fuel vehicle, growth of electrification from grid expansion and decentralized power system, shifting to clean cooking fuel in rural households, and number of renowned power interconnectivity between several AMS. This also indicates that realizing the goals of APAEC will indeed contribute to the Paris Agreement's aim of limiting the temperature rise of 1.5°C, whilst also securing its energy supply in the region with affordable manners.

Keynote Lecture 2



Application of Sustainable Energy Innovations in Asia

Principal Climate Change Specialist,
Asian Development Bank

Toru KUBO

Abstract

Energy sector dynamics are rapidly changing. Renewable electricity costs have reached grid parity in many countries and the rise of “prosumers” is challenging the traditional utility model. Transport fuel is quickly shifting from oil to electricity and other alternatives. Climate change, seen as a future generation issue not so long ago, is wreaking havoc worldwide and we are precariously close to the point of no return. All while more than 700 million people still suffer in extreme poverty mostly with no access to basic energy services. The time to realize our sustainable energy vision is now, this decade, with no time to spare.

This presentation will focus on Asia, which remains home to a large share of the world's poor, and where the battle against climate change will be won or lost. We'll discuss the challenges and opportunities in the sustainable energy space in the region with real examples of projects supported by the Asian Development Bank (ADB) incorporating innovations to shift towards sustainable energy. ADB is a multilateral development institution committed to achieving a prosperous, inclusive, resilient, and sustainable Asia and the Pacific. ADB's Clean Energy Program is a multipronged, umbrella program that seeks to help developing Asian countries meet their energy security needs, facilitate a transition to a low-carbon economy, and bring about universal access to energy to achieve a region free of poverty. The Clean Energy Program pursues these goals by supporting improved efficiency in the energy, transport, urban, and water sectors; aiding countries with the adoption and deployment of renewable energy sources; and improving access to energy for the poor, especially those in remote, rural areas. Asia's high economic growth drives an equally high demand for energy. Meeting this demand yet keeping in mind the risks of even greater dependence to fossil fuels is one of the great challenges facing the region. Innovation will be key, whether in technology, business model, or policy. ADB has deployed a number of financing instruments to promote clean energy which has gradually increased from \$1 billion in 2008 to \$2 billion in 2013 and now to \$3 billion per year. In supporting its developing member countries ADB works with many partners, including research institutions, and a few examples of such collaboration will be highlighted in the presentation.

Invited Lecture 1



Transitioning to Sustainable Power Systems in Asia

Independent Consultant,
FTI consulting

Matthew WITTENSTEIN

Abstract

Power systems around the world are undergoing a rapid and profound transformation. The rise of low-cost renewables, in particular wind and solar PV, and flexible demand are changing the way power systems operate. At the same time, the need to fully decarbonize power systems in order to meet Paris Agreement goals means this transformation will only accelerate. The Asia-Pacific region is particularly critical, as it is home to nearly a third of the world's population, as well as many countries that are, or will be, directly impacted by the effects of climate change.

This presentation will give an overview of the current state of the power sector in Asia and, drawing on work by the IEA and others, future trends for its development. It will discuss how policy and power market design can support the secure transition to low carbon power systems, and how countries in Asia can work together to accelerate this transformation.

Invited Lecture 2



Renewables in an Interconnected Energy System

Director,
Renewable Energy Institute

Mika OHBAYASHI

Abstract

The world is now undergoing a major transformation. The accelerating energy shift is about to change even the world geopolitics. Its mainstay is the explosive expansion of renewables, especially their rapid expansion in major developing countries that hold the key to future greenhouse gas reductions.

The basis is that renewables are already the cheapest power source of any energy in many parts of the world and countries. According to the report of the International Renewable Energy Agency, since 2010, the average power generation cost of photovoltaic power generation has been reduced by 70%, and wind power has been reduced by 20%. Both solar and wind power are said to be the cheapest by 2020 compared to any fossil fuel.

Fossil fuels have shaped the basis for global energy use and economic growth. The uneven distribution of resources has had a major impact on world security, and has become the foundation of national political dynamics. As more renewables expand, countries that have exerted influence over the international community against the backdrop of abundant resources will gradually lose their voice and the number of conflicts over fossil fuel resources will decrease.

These changes will bring geopolitical transformation to countries that have so far been limited to fossil fuels and uranium resources and have relied on foreign imports. Japan is the first of such countries. However, if the expansion of renewables is successful, a country that has been called a resource-poor country will become a leading “energy-rich country” in the world.

Realizing 100% renewable electricity is essential for a decarbonized society. In order to expand and efficient renewable integration, it is necessary to increase the flexibility of the power grid over a wide area. Europe's efforts to strategically expand renewables while connecting multiple countries with interconnectors and mutually utilizing hydropower and wind power on a large scale are an important precedent. Northeast Asia is not only a big demand center with a large potential of renewables, as well as a large energy/economy, compared to Europe. On the other hand, Japan and Korea are rare countries that are not interconnected at all with other countries. The introduction of international transmission systems in Northeast Asia and deployment of renewables through interconnectors bring not only economic benefits, but also a stable supply of energy, security, and interdependence in the region.

Invited Lecture 3**Overview of Geothermal Energy in Hawaii**

Associate Specialist,
University of Hawaii at Manoa

Nicole C. LAUTZE

Abstract

The State of Hawaii has had one producing geothermal facility, located along the volcanically active East Rift Zone of Kilauea Volcano, since the 1980s. In 2017, this facility – Puna Geothermal Venture - met 30% of the energy demand for the Big Island of Hawaii. Outside of Kilauea’s East Rift Zone, the extent of the State of Hawaii’s geothermal resource is largely uncharacterized. This is despite the facts that i) the islands are volcanic in origin, ii) Hawaii’s electricity prices are the highest in the nation, and iii) Hawaii has a policy objective to be 100% renewable by 2045. Currently ~75% of the state’s electricity is produced from imported petroleum.

A statewide geothermal resource assessment published in 1985 found a potential resource on all islands. Since then, little additional geothermal exploration was conducted, until a current U.S. Department of Energy-funded geothermal “Play Fairway” project that has been active since 2014 and progressed over 3 phases. In Phase 1 of the project, existing geologic, groundwater, and geophysical datasets relevant to subsurface heat, fluid and permeability were identified, compiled, and ranked. A statistical methodology to integrate these data into a resource probability map was developed. Phase 2 of the project involved the collection of new groundwater data in 10 locations across the state, and new geophysical data on Lanai, Maui, and central Hawaii Island, as well as modeling of topographically induced stress - the last to better characterize permeability. Now in Phase 3, the project is deepening a water well on Lanai Island. Results of this current “Play Fairway” project have provided a major step forward for the State of Hawaii through providing an updated resource assessment, a roadmap for additional exploration activities, and the identification of target sites for drilling. Drilling results on Lanai suggest that Hawaii’s shield volcanoes can maintain heat on timescales of hundreds of thousands possibly to a million plus years. This presentation will provide an overview of the status of geothermal in Hawaii and the Hawaii Play Fairway project, as well as briefly describe some of the outreach efforts of the Hawaii Groundwater and Geothermal Resources Center (www.higp.hawaii.edu/hggrc).

Invited Lecture 4



Shizen Energy -Developing renewable energy projects in South East Asia

Senior Technical Manager,
Shizen Energy Inc.

Uli GOELTENBOTT

Abstract

Shizen Energy is a renewable energy company based in Japan. Established in 2011 after the great eastern earthquake, tsunami and nuclear crisis in the Tohoku Region, Japan, Shizen Energy grew to a significant size achieving a total capacity of 1 GW developed projects. Using the momentum from the Japanese business, Shizen Energy started to expand overseas around 2017. Since then Solar and Wind energy projects have been developed and constructed in South East Asia, South America and most recently in Africa.

The landscape for renewable energy in South East Asia is diverse. Power purchase agreements (PPAs) range from Feed in Tariffs to Net Energy metering to corporate (behind the meter) PPAs. Shizen Energy emphasizes the need for good collaboration with local partners to develop renewable energy projects, which was the key to success for a quick growth in Japan. Brazil has a remote net energy metering scheme which allows for power plants being built in different locations than the off takers. For the African market both utility size power plants and micro grids are currently under development.

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

<Poster Presentation >

<Date> 12:50-14:30, 28th January 2020

<Venue> I²CNER Foyer, I²CNER Bldg. 1, Ito Campus, Kyushu University

* Award Ceremony 17 : 10 28th January 2020 at I²CNER Hall

<Language> English and Japanese

- Poster Presentation : Young Researchers, Doctoral Students/Kyushu University and Overseas students, Overseas researchers

[Kyushu University]

No. of Poster	Affiliation	Name	Title of Research
①-1	Faculty of Engineering	喜多 由拓	滴状凝縮のマルチスケール観察とエネルギー輸送最適化の検討
①-2	Graduate School of Engineering	周 子涵	配位子還元体を活性種とするポルフィセンコバルト錯体を用いた水素発生反応の開拓
①-3	Graduate School of Engineering	Hwang Byungchan	Development of high durability silicone polymer electrolytes with Nafion-like structure for PEFC application
①-4	Graduate School of Engineering	Albert Mufundirwa	Understanding the roles of different iron salts in the formation of oxygen reduction reaction (ORR) active sites in Fe-N-C electrocatalysts
①-5	Graduate School of Engineering	内山 雄貴	水蒸気によるCO酸化触媒反応の著しい促進効果
①-6	Graduate School of Engineering	星野 健太	高濃度ドーパント導入による高プロトン伝導性燃料電池電解質の開発
①-7	Graduate School of Engineering	松川 祐子	金属チオラートを介する硫化物ナノ粒子の作製
①-8	Graduate School of Engineering	宮川 一慶	トンネル効果に起因した液体水素から金属内部への水素侵入過程の解明
①-9	Graduate School of Engineering	山下 優	植毛伝熱面の蒸発熱交換に及ぼす液位変化の影響
①-10	Graduate School of Engineering	江原 駿太	光分解反応における律速過程と欠陥濃度の影響
①-11	Graduate School of Engineering	黒岩 誠	マグネシウム置換ガリウム酸ランタンの薄膜化が酸化物イオン伝導に及ぼす影響
①-12	Graduate School of Engineering	MA Zhongliang	Constructing ultrastable carbon encapsulated nano-nickle to elucidate multistep reaction mechanism of MgH ₂
①-13	Graduate School of Engineering	澁谷 光一郎	複数風車のウエイク干渉に関する研究
①-14	Graduate School of Engineering	北林 康喜	高濃度スカンジウム置換ジルコン酸バリウムにおける会合エネルギーとプロトン濃度の関係
①-15	Graduate School of Engineering	村本 幸央	複雑地形における風況予測に関する研究
①-16	Graduate School of Engineering	Muhammad Irfan Maulana Kusdhany	High Surface Area MOF-derived Hierarchically Porous Carbon for Energy Storage Applications
①-17	Graduate School of Engineering	吉永 健	再生可能エネルギーの有効利用を目的とした水電解・燃料電池ハイブリッド触媒の開発
①-18	Graduate School of Engineering	TU HOAN PHUC	Development of paper-structured catalyst for hydrogen production by dry reforming of methane
①-19	Graduate School of Engineering	吉積 翼	SnO ₂ ナノ粒子を担体に用いた PEFC 電極触媒の研究
①-20	Graduate School of Engineering	牛島 怜	SOFC の緩和時間分布と各種依存性に関する研究

①-21	Graduate School of Engineering	森 滉稀	固体酸化物形燃料電池の性能評価とシミュレーション手法
①-22	Graduate School of Engineering	的場 太一	再エネ有効利用を目的とした高耐久 PEFC のカソード触媒層設計—イオノマーの検討—
①-23	Graduate School of Engineering	殿迫 徹也	固体高分子型燃料電池用の Pt-酸化物ナノコンポジット電極触媒の開発
①-24	Graduate School of Engineering	武井 翔太	再エネ有効利用を目的とした PEFC の低 Pt 化に向けた研究 -濃度過電圧とカーボン担体の相関性の検討-
①-25	Graduate School of Engineering	高田 正太郎	バイオガス直接内部改質 SOFC の改質反応に関する研究
①-26	Graduate School of Engineering	黄 亭維	再エネ利用を目的とした PEFC の高効率化に向けたメソポーラスカーボンファイバー電極の開発
①-27	Faculty of Engineering	Kayoung Park	Improvement of cell performance in catalyst layers with optimal design for polymer electrolyte fuel cells
①-28	Graduate School of Engineering	山下 翼	機械学習を用いた固体酸化物燃料電池におけるカソードの開発方法の探索
①-29	Graduate School of Engineering	大神 沙姫	ウインドソーラータワーによる太陽光と風力の同時取得発電
①-30	Faculty of Engineering Center for Small Molecule Energy	吉川 光寛	太陽電池と燃料電池を融合した新電池の創成
①-31	Graduate School of Integrated Frontier Sciences	Suzuki Shoyo	Fundamental Insights into Platinum-Free Electrocatalysts
①-32	Graduate School of Integrated Frontier Sciences	ZHU HUAN	Effect of rapid thermal annealing on fabricating pn-junction device by Si paste
①-33	Graduate School of Integrated Frontier Sciences	Enes Muhammet CAN	Superhydrophobic Fluorinated Carbons for Water Management in PEFCs
①-34	Graduate School of Integrated Frontier Sciences	Selyanchyn Olena	Nanocellulose Crosslinked with Sulfonic Acid as an Alternative Proton Conductive Membrane for Hydrogen Fuel Cells
①-35	Graduate School of Science	Suda Keiju	Two dimensional crystallization of bacteriorhodopsin by depletion force of lipid
①-36	Graduate School of Science	多伊良 夏樹	ストップフロー法および DFT 計算に基づくポリオキソメタレート酸素発生触媒の機構的研究
①-37	Graduate School of Science	脇山 史彬	白金(II)単核錯体を触媒とした水素生成反応の活性制御因子の解明
①-38	Interdisciplinary Graduate School of Engineering Sciences	坂本 遼	全固体塩化物シャトル電池の創製
①-39	Interdisciplinary Graduate School of Engineering Sciences	Yousefian Ali	Ion Density Analysis in a Miniature Neutralizer Utilizing PIC Simulation with Respect to Inlet Configuration
①-40	*I ² CNER, Interdisciplinary Graduate School of Engineering Sciences	TAHMID HASAN RUPAM	Theoretical performance analysis of potential adsorbent/refrigerant pairs for next generation cooling applications
①-41	*I ² CNER, Graduate School of Engineering	Zhang Nan	Effect of addition of ammonia to hydrogen gas on hydrogen embrittlement in JIC test
①-42	*I ² CNER, Graduate School of Engineering	高崎 大裕	大規模水素利用技術の安全性確保のための高温水素中のクリーブ損傷に関する研究
①-43	*I ² CNER, Graduate School of Engineering	山田 和輝	O ₂ および CO による水素助長疲労き裂進展の加速に対する抑制効果律速機構の違い
①-44	*I ² CNER, Interdisciplinary Graduate School of Engineering Sciences	M L Palash	Functionalization of porous material for developing adsorption-based portable passive water harvester
①-45	*I ² CNER, Graduate School of Engineering	Tetsuya Miwa	Oxygen evolution reaction on Au/Nickel-Iron layered double hydroxide nanosheet
①-46	International Institute for Carbon-Neutral Energy Research	Qing Wang	Oxygen-Deficient Silica Quartz: A New Material for Photocatalysis
①-47	Interdisciplinary Graduate School of Engineering Sciences	David Carrillo-Canizalez	Power Output Enhancement of Diffuser Augmented Wind Turbines used in a multi rotor system

②-1	Graduate School of Engineering	徳永 大悟	人体構造に準じたインテリジェントロボット義手の研究 - 表面筋電位による人型指ロボットの制御 -
②-2	Graduate School of Engineering	澤野 賢太	SOFC の発電電力と排熱を用いたメタン発酵消化液濃縮システムの設計に向けた基礎研究
②-3	*I ² CNER, Graduate School of Engineering	Rocky Kaiser Ahmed	Synthesis of zeolite based consolidated composite adsorbents for the next generation cooling and heating systems
②-4	*I ² CNER, Interdisciplinary Graduate School of Engineering Sciences	Sampad Ghosh	Toward Sustainable Energy Harvesting Using Hybrid Nanostructured Cement Composites
②-5	Interdisciplinary Graduate School of Engineering Sciences	池谷 智陽子	省エネ建築に資する自然換気・通風現象メカニズム解明に関する研究
②-6	Interdisciplinary Graduate School of Engineering Sciences	Lyu Jiajun	Optimal planning and design of a hybrid renewable energy system for a residential region in Osaka, Japan
③-1	Graduate School of Engineering	Hwndrik Setiawan	Biochar-Metal Composite Biogas Impurities Adsorbent for Stable Energy Production in Solid Oxide Fuel Cell
③-2	Faculty of Social and Cultural Studies	三島 達也	分子生物学的手法(RNA-Seq)を用いたヒメオクワガタ <i>Dorcus montivagus</i> 幼虫の腸内微生物におけるリグニセルロース分解酵素遺伝子の種類と発現量解析
③-3	Interdisciplinary Graduate School of Engineering Sciences	Colombatanirige Uthpala Amoda Perera	Cool, Green and Comfortable: A Sustainable Future for the HVAC&R Industry
③-4	Interdisciplinary Graduate School of Engineering Sciences	UelunUjin Purev	Development of a prototype of insulated Ger for urban settlement area of Ulaanbaatar, Mongolia
④-1	Faculty of Engineering	津川 修一	Optimal redistributive policy under climate change: individual adaptation and social mitigation
④-2	Interdisciplinary Graduate School of Engineering Sciences	Ayas Mahr Abdelrahman Shaqour	Urban Sustainable Development Index for comparative analysis of low emission policies in urban areas
⑤-1	Graduate School of Engineering	古賀 大貴	応力応答性光エネルギー-変換材料を指向した機能性色素含有ポリマーの創生
⑤-2	Graduate School of Engineering	澤山 和貴	シールドオイルの原位置燃焼による熱水貯留層の造成： 二酸化炭素地中貯留の可能性と経済性評価
⑤-3	Graduate School of Information Science and Electrical Engineering	Ahmed Nasser Ahmed Ahmed Ismail	Energy and Spectrum Efficient Power Allocation in Downlink NOMA HetNets
⑤-4	Graduate School of Information Science and Electrical Engineering	景山 知哉	次世代無線通信における無線基地局の低消費電力化のための適応信号処理に関する研究
⑤-5	Interdisciplinary Graduate School of Engineering Sciences	Yemanebirhan Tadesse Abirham	Development of hybrid PV-T solar thermal pumping system
⑤-6	Interdisciplinary Graduate School of Engineering Sciences	Chairunnisa	Development of Low Cost Activated carbon from Biomass for Dehumidification Application
⑤-7	Interdisciplinary Graduate School of Engineering Sciences	竹下 隼人	加速器駆動核変換システム高度化のための核種生成断面積測定

【Overseas】

No. of Poster	Affiliation	Name	Title of Research
G-1	Jomo Kenyatta University of Agriculture and Technology	Milton Utwolo Alwanga	Regulatory Reforms and access to Electrification in Rural Kenya
G-2	Reiner Lemoine Institut gGmbH	Paul Bertheau	Exploratory study of Japanese, Korean and Chinese development assistance to the Energy Sector of Southeast Asian countries
G-3	University of Malaya	Mahdi Tousizadeh	EV adoption in Malaysia: Potential and Impacts Considering Large Scale Solar and Energy Storage
G-4	University of Technology Sydney	Joseph Wyndham	Stochastic modelling for risk assessment in electricity generation portfolios
G-5	Université Catholique de Louvain	Jian Wang	High Yield Selective Synthesis of Na ₂ B ₁₂ H ₁₂ with Autoclave Method
G-6	The University of Sheffield	Peng Luo	Comparison of 4H-SiC IGBT and CIGBT devices for Ultra-High Power Applications

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

<Date> 9:00-12:30, 29th January 2019
 <Venue> Conference Room, Shiiki Hall, Ito Campus, Kyushu University
 <Language> English
 <Theme> Can Scientists Make a Difference? Exploring the Potential of Transdisciplinary Collaboration for Clean Energy Development

< Program and Speaker>

Time	Program and Speaker
9:00-9:10	Introduction & Welcoming Remarks
9:10-9:50	<p>Session 1: Science-Policy Collaboration in Practice: Experiences from Kyushu University (Moderator: Robert LINDNER)</p> <ul style="list-style-type: none"> ● Input Presentation 1: Sustainable Development of Rural Area by Effective Utilization of Bio-wastes with Highly Efficient Fuel Cell Technology (Vietnam) Associate Prof. Yusuke SHIRATORI, Faculty of Engineering / International Research Center for Hydrogen Energy, Kyushu University ● Input Presentation 2: Comprehensive Solutions for Optimum Development of Geothermal Systems in East African Rift Valley (Kenya) Professor Yasuhiro FUJIMITSU, Faculty of Engineering, Kyushu University
9:50-10:00	<p>Discussion (Moderator: Robert LINDNER)</p>
10:00-10:15	Short break
10:15-11:30	<p>Session 2: How to Engage in Clean Energy Development? Experiences from Practitioners in Asia-Pacific (Moderator: Tatsuya WAKEYAMA)</p> <ul style="list-style-type: none"> ● Invited lecture Trends, observations and policy transitions in renewable energy deployment in Southeast Asia Mr. Winston CHOW, Clean Power Asia Program, USAID ● Invited lecture Overview of ASEAN-German Engagement on Clean Energy Sector Mr. Rizky FAUZIANTO, ASEAN-German Energy Programme (AGEP), GIZ ● Invited lecture ADB's engagement in clean energy development: highlights and lessons learned Mr. Toru KUBO, Asian Development Bank
11:30-12:00	<p>Discussion (Moderator: Tatsuya WAKEYAMA)</p>
12:00-12:30	Session 3: Matchmaking
12:30	End of Workshop

Session 1 : Science-Policy Collaboration in Practice: Experiences from Kyushu



Input Presentation 1

Sustainable Development of Rural Area by Effective Utilization of Bio-wastes with Highly Efficient Fuel Cell Technology (Vietnam)

Yusuke SHIRATORI

Associate Professor, Faculty of Engineering / International Research Center for Hydrogen Energy, Kyushu University



Input Presentation 2

Comprehensive Solutions for Optimum Development of Geothermal Systems in East African Rift Valley (Kenya)

Yasuhiro FUJIMITSU

Professor, Faculty of Engineering, Kyushu University



Moderator

Robert LINDNER

Associate Professor, Q-PIT, Kyushu University

Session 2 : How to Engage in Clean Energy Development? Experiences from Practitioners in Asia-Pacific



Invited lecture

Trends, observations and policy transitions in renewable energy deployment in Southeast Asia

Winston CHOW

Clean Power Asia Program, USAID



Invited lecture

Overview of ASEAN-German Engagement on Clean Energy Sector

Rizky FAUZIANTO

ASEAN-German Energy Programme, (AGEP), GIZ



Invited lecture

ADB's engagement in clean energy development: highlights and lessons learned

Toru KUBO

Principal Climate Change Specialist, Asian Development Bank



Moderator

Tatsuya WAKEYAMA

Associate Professor, Q-PIT, Kyushu University

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

<Date> 14:00-18:30, 29th January 2020
 <Venue> Inamori Hall, Ito Campus, Kyushu University
 <Language> English (simultaneous translation)
 <Theme> Expert workshop on Sustainable Energy Transitions in Asia
 (Constructal Theory and Sustainable Energy Transitions)

< Program and Speaker >

Time	Program and Speaker
14:00–14:10	Welcoming remarks Prof. Yoshihiro Yamazaki, Kyushu University, Japan
14:10–15:40	Session 1: Constructal theory and sustainability Keynote Speaker: Prof. Adrian Bejan, Duke University, USA <i>Moderator: Assoc. Prof. Hooman Farzaneh, Kyushu University, Japan</i>
15:40–16:00	Short break
16:00–16:30	Session 2 : Book launch session <i>“The Physics of Life, A. Bejan (Japanese translation)”</i> Panelists: <ul style="list-style-type: none"> ▪ Prof. Adrian Bejan, Duke University, USA ▪ Prof. Yukitaka Kato, Tokyo Institute of Technology, Japan ▪ Prof. Hitoshi Matsushima, Nihon University, Japan ▪ Mr. Hitoshi Izumi, Kinokuniya, Tokyo, Japan <i>Moderator: Prof. Takahiko Miyazaki, Kyushu University, Japan</i>
16:30–16:50	Short break
16:50–18:20	Session 3: Research projects on energy transitions in Asia Keynote Speakers: <ul style="list-style-type: none"> ▪ Prof. Shigeo Kimura, Komatsu University, Japan ▪ Prof. Keiichi N. Ishihara, Kyoto University, Japan ▪ Prof. Yukitaka Kato, Tokyo Institute of Technology, Japan <i>Moderator: Assoc. Prof. Robert Lindner, Kyushu University, Japan</i>
18:20-18:30	Closing Remarks Prof. Kentaro Yoshida, Kyushu University, Japan

Welcoming remarks

**Yoshihiro Yamazaki**Professor,
Q-PIT, Kyushu University

Session 1 : Constructal theory and sustainability



Keynote Speaker

Adrian BejanJ. A. Jones Distinguished
Professor,
Duke University

Adrian Bejan is J. A. Jones Distinguished Professor of Mechanical Engineering at Duke University who is the recipient of the Benjamin Franklin Medal for “Thermodynamics and Constructal theory”, which predicts natural design and its evolution in engineering, scientific, and social systems”. All his degrees are from MIT. Prof. Bejan authored 30 books and 650 peer-refereed journal articles, and was awarded 18 honorary doctorates from universities in 11 countries. He is a member of the academies of Europe, Mexico, Romania, and Moldova. His recent books include “*Design in Nature*” (Doubleday 2012) and “*The Physics of Life*” (St. Martin's Press 2016).

Constructal theory is the thought that the generation of flow configurations is a phenomenon of physics. Flow configuration, such as the trees of river basins, lungs and city traffic unite the natural with the engineered, and the animate with the inanimate. The similarity of the solution to the branching structures seen in multiple inanimate and living things led to Prof. Bejan’s statement of what he calls a new law of nature: “*For a finite-size flow system to persist (to survive) it must morph in time such that it provides easier access to the currents that flow through it*”.

On 27 June 2019, in Berlin, the Humboldt Foundation awarded Prof. Bejan the Humboldt Research Award for lifetime achievement. He was cited for “for his pioneering contributions to modern thermodynamics and “Constructal Law” – a law of physics that predicts natural design and its evolution in biology, geophysics, climate change, technology, social organization, evolutionary design and development, wealth and sustainability.



Moderator

Hooman FarzanehAssociate Professor,
Q-PIT,
Kyushu University

Session 2 : Book launch session “*The Physics of Life, A. Bejan (Japanese translation)*”



Panelists

Adrian Bejan

J. A. Jones Distinguished
Professor ,
Duke University



Panelists

Yukitaka Kato

Professor,
Laboratory for advanced nuclear energy,
Tokyo Institute of Technology



Panelists

Hitoshi Matsushima

Professor,
Department of Mechanical Engineering,
College of Industrial Technology,
Nihon University



Panelists

Hitoshi Izumi

Deputy Manager,
Publishing Department,
Kinokuniya Company Ltd.



Moderator

Takahiko Miyazaki

Professor,
Interdisciplinary Graduate School of
Engineering Sciences,
Kyushu University

Session 3 : Research projects on energy transitions in Asia



Keynote Speaker

Shigeo Kimura

Professor, Dean,
Faculty of production systems engineering
and sciences, Komatsu University



Keynote Speaker

Keiichi N. Ishihara

Professor, Dean,
Graduate school of energy science,
Kyoto University



Keynote Speaker

Yukitaka Kato

Professor,
Laboratory for advanced nuclear energy,
Tokyo Institute of Technology



Moderator

Robert Lindner

Associate Professor,
Q-PIT, Kyushu University

Closing Remarks



Kentaro Yoshida

Professor,
Q-PIT, Kyushu University

**Hydrogen Energy and Fuel Cell Forum in Kyushu &
International Hydrogen Energy Development Forum 2020**
~Looking ahead to various utilization models of renewable energy~

<Date> 13:00-17:00 , 29th January 2020

<Venue>Mirai Hall, Denki Building, Kyosokan

(4F Kyosokan Denki Building, 2-1-82 Watanabedori, Chuo-ku, Fukuoka-shi, Fukuoka)

<Program and Speaker>

Time	Program	Speaker
13:00~13:10	Opening	Mr. Kenzo Yoneda Director, Kyushu Bureau of Economy, Trade and Industry , Ministry of Economy, Trade and Industry Mr. Hiroshi Ogawa Governor of Fukuoka Prefecture Fukuoka Hydrogen Energy Strategy Council Advisor
13:10~13:40	Realization of a hydrogen energy society Industry-academia-government regional collaboration and future prospects	Professor Kazunari Sasaki Vice President, Kyushu University Director of International Research Center for Hydrogen Energy
13:40~14:10	Ministry of Economy, Trade and Industry's efforts to realize a low-carbon society -Looking forward to realizing a hydrogen society-	New Energy System Division, Energy Saving / New Energy Department, Agency for Natural Resources and Energy, Ministry of Economy, Trade and Industry
14:10~14:20	Break	

14:20~15:00	Trends and international collaboration for realizing a low-carbon society -Role of renewable energy-derived CO ₂ -free hydrogen-	Professor Ken Okazaki Professor Emeritus and Specially Appointed Professor Global Hydrogen Energy Research Unit Leader, Science and Technology Research Institute, Tokyo Institute of Technology
15:00~15:30	Carrying renewable energy stored in a hydrogen carrier ~ Aggregation of renewable energy-related industries through technology development and efforts for reconstruction of the affected areas ~	Mr. Hirohide Furuya Center Director, Renewable Energy Research Center, AIST
	Kyushu University session (Facilitator: Prof. Joichi Sugimura, Director, Research Center for Hydrogen Industrial Use and Storage (HYDROGENIUS), Kyushu University)	
15:30-16:00	Recent developments in hydrogen energy in China	Dr. Guangli He Manager, Hydrogen Energy R&D Department, National Institute of Clean-and-Low-Carbon Energy, China
16:00-16:30	Review of regulations on metal materials used at hydrogen stations and future directions	Mr. Hiroshi Kobayashi General Manager, Hydrogen Use Promotion Office, Automotive & New Fuel Department, Institute of Petroleum Energy Technology Center
16:30-17:00	Development status of rubber polymer materials for high-pressure hydrogen International standards	Professor Shin Nishimura Kyushu University
17:00~17:10	Break	
17:10~18:40	Banquet	

- HYDROGEN-MATERIALS INTERACTIONS -
HYDROGENIUS, I²CNER, AND HYDROMATE JOINT RESEARCH SYMPOSIUM
HYDROGENIUS FATIGUE AND FRACTURE DIVISION,
I²CNER HYDROGEN MATERIALS COMPATIBILITY DIVISION,
& HYDROMATE

DATE: THURSDAY, JANUARY 30, 2020

TIME: 10:00-16:50

VENUE: CONFERENCE ROOM, SHIKI HALL

Time	Speaker	Affiliation	Title
10:00-10:10	Hisao Matsunaga	Kyushu University	Opening Remarks
10:10-10:45	Mohsen Dadfarnia	Seattle University	Toward Mechanistic Modeling of Hydrogen Induced Crack Propagation
10:45-11:20	Hong Luo	University of Science and Technology Beijing	Hydrogen Embrittlement of High Entropy Alloys
11:20-11:55	Aur�lie Laureys	Gent University	Microscopic Evaluation of Hydrogen Induced Crack Initiation and Propagation in Multiphase Steels
11:55-13:20	Lunch		
13:20-13:55	Shenghu Chen	Chinese Academy of Sciences	Internal Hydrogen Effects on the Deformation and Fracture Behavior of Precipitation-hardened Fe-Ni-Cr Alloy
13:55-14:30	Thanh Tuan Nguyen	KRISS	Hydrogen-induced Fracture in X70 Pipeline Steel under Low Partial Hydrogen in a Mixture with Natural Gas
14:30-15:05	Brian Kagay	Sandia National Laboratories	Investigating Hydrogen-assisted Deformation of Oligocrystalline Austenitic Stainless Steel
15:05-15:30	Break		
15:30-16:05	Zhengli Hua	Zhejiang University	Kelvin Probe Force Microscopy Study on Hydrogen Distribution in Austenitic Stainless Steel
16:05-16:40	Daisuke Takazaki	Kyushu University	Effect of Hydrogen on Creep Properties of SUS304
16:40-16:50	Brian Somerday	I ² CNER	Closing Remarks

**-2020 HYDROGENIUS & I²CNER TRIBOLOGY
SYMPOSIUM -
HYDROGENIUS AND I²CNER JOINT RESEARCH SYMPOSIUM
HYDROGENIUS TRIBOLOGY DIVISION
& I²CNER HYDROGEN MATERIALS COMPATIBILITY DIVISION**

DATE: THURSDAY, JANUARY 30, 2020

TIME: 11:00-18:00

VENUE: CENTENNIAL HALL, HOSPITAL CAMPUS, KYUSHU UNIVERSITY

Time	Speaker	Affiliation	Title
11:00~ 12:00	Makoto Yoshida	JAXA	Tribology of Reusable Rocket Engine
	Shunsuke Maekawa	JXTG	JXTG's Efforts toward the Realization of Hydrogen-utilized Society
13:00~ 15:00	Dr. František Lofaj	Institute of Materials Research of SAS	A review of mechanical and tribological properties of hydrogenated W-C:H coatings prepared by different sputtering techniques
	Assoc. Prof. Takayuki Tokoroyama	Nagoya University	The effect of Mo related particles on the wear acceleration of hydrogenated amorphous carbon
	Prof. Kanao Fukuda	University Technology Malaysia	Effects of trace humidity in atmospheric gas on the tribological behaviors of metallic materials
15:00~ 18:00	Joint Session with Hydrogen Polymers Team (Oral Session)		
	Dr Kevin Simmons	Pacific Northwest National Laboratory	TBD
	Prof. Yoshinori Sawae	Kyushu University	Tribological behavior of PTFE composites in hydrogen
	Joint Session with Hydrogen Polymers Team (Poster Session)		

International Symposium of Hydrogen Polymers Team, HYDROGENIUSDate: **Thursday, 30th January 2020**Venue: **Centennial Hall, Kyushu University School of Medicine****Oral Session**

Time	Program and Speaker
	Update of Hydrogen Compatible Polymeric Materials Chairperson: Dr Hiroaki ONO, Kyushu University
11:00-11:40	Opening Remarks/ Polymeric Materials for Hydrogen Devices Prof Shin NISHIMURA, Kyushu University (Japan)
11:40-13:10	Lunch Break
13:10-13:50	Effect of Hydrogen Pressure Cycle Condition on the Damage of Rubber Materials Dr Hiroaki ONO, Kyushu University (Japan)
13:50-14:30	TBD Dr Nalini MENON, Sandia National Laboratory (USA)
14:30-15:00	Coffee Break
	Joint Symposium of Hydrogen Tribology Team and Hydrogen Polymers Team Chairperson: Dr Hiroaki ONO, Kyushu University
15:00-15:40	TBD Prof Yoshinori SAWAE, Kyushu University (Japan)
15:40-16:20	TBD Dr Kevin SIMMONS, Pacific Northwest National Laboratory (USA)
16:20-16:25	Closing Remarks of Oral Session Prof Shin NISHIMURA, Kyushu University (Japan)
16:30-18:00	Poster Session

- THERMAL ISSUES FOR HYDROGEN AND NEW REFRIGERANTS
FOR ENERGY SYSTEMS –
HYDROGENIUS AND I²CNER JOINT RESEARCH SYMPOSIUM
HYDROGENIUS THERMOPHYSICAL PROPERTIES DIVISION
& I²CNER THERMAL SCIENCE AND ENGINEERING DIVISION

DATE: FRIDAY, JANUARY 31, 2020

TIME: 13:00-17:20

VENUE: WEST 4 BUILDING-914

Time	Speaker	Affiliation	Title
13:00-13:50	Roland Span	Ruhr University	The German Hydrogen Strategy and the Status of the Description of Thermodynamic Properties of Hydrogen and Hydrogen-Rich Mixtures
13:50-14:20	Sanehiro Muromachi	AIST	Gas Capture Properties of Semiclathrate Hydrates – Water Based Materials
14:20-14:50	Sho Fukuda	Kyushu Sangyo University	Experimental Study of Condensation and Evaporation on Horizontal Tube
14:50-15:10	Hideaki Teshima	Kyushu University	Experimental Study on Adsorbed Gas Layers by Using Frequency Modulation Atomic Force Microscopy
15:10-15:20	Break		
15:20-16:10	Jiangtao Wu	Xi'an Jiaotong University	Thermophysical Properties Research of Alternative Refrigerants in XJTU
16:10-16:40	Koji Hasegawa	Tokyo Urban Tech.	Lab-in-a-drop: Transport Phenomena of Droplet in Acoustic Levitation
16:40-17:00	Naoya Sakoda	Kyushu University	Thermophysical Property Measurements of High-Pressure Hydrogen and Low-GWP New Refrigerants
17:00-17:20	M.L. Palash	Kyushu University	Surface Energy Characterization of Various Porous Adsorbents



INTERNATIONAL INSTITUTE FOR CARBON-NEUTRAL ENERGY RESEARCH

-ADVANCED TECHNOLOGY FOR EFFICIENT ELECTRIC
AND PHOTO ENERGY CONVERSION-
I²CNER INTERNATIONAL WORKSHOP
MOLECULAR PHOTOCONVERSION DEVICES DIVISION
& ELECTROCHEMICAL ENERGY CONVERSION DIVISION

DATE: FRIDAY, JANUARY 31, 2020

TIME: 9:30-17:15

VENUE: I²CNER HALL C

Time	Speaker	Affiliation	Title
9:30	Hiroshige Matsumoto	I²CNER, Kyushu University	Opening Remarks
9:30-9:50	Kaveh Edalati	I²CNER, Kyushu University	High-pressure torsion for active photocatalysts
9:50-10:10	Toshinori Matsushima	I²CNER, Kyushu University	Organic-Inorganic Perovskite for Efficient and Stable Solar Cell
10:10-10:30	Minkyu Son	I²CNER, Kyushu University	Solar water splitting: challenges and perspectives
10:30-10:45	Coffee		
10:45-11:30	Kentaro Yoshida	Q-PIT, Kyushu University	Consumer preferences for alternative fuel vehicles and autonomous driving technology
11:30-12:00	Harry Tuller	I²CNER, Kyushu University/MIT	Measuring Oxygen Ion Mobility Down to Room Temperature in Mixed Ionic Electronic Conductors
12:00-13:00	Lunch		
13:00-13:45	Hitoshi Takamura	Tohoku University	N-type mixed conductors for low-temperature SOFC
13:45-14:45	San Ping Jang	Curtin University	Development of high temperature polymer electrolyte membrane fuel cells - from membrane to non-Pt electrocatalysts
14:45-15:00	Coffee		
15:00-15:45	John Druce	I²CNER/ Laboratorio Enoliva	Ion Beam Analysis at I²CNER: SIMS, Scattering and Strontium-rich Surfaces
15:45-16:30	Yoshihisa Yamazaki	Q-PIT, Kyushu University	Machine learning: towards materials discovery for proton-conducting electrochemical devices
16:30-17:15	Yasunobu Mizutani	AIST/ Toho Gas	Challenges in Protonic Ceramic Cell toward ultra-high efficiency fuel cells
17:15	Tatsumi Ishihara	Kyushu University	Concluding Remarks



INTERNATIONAL INSTITUTE FOR CARBON-NEUTRAL ENERGY RESEARCH

-CATALYSIS FOR FUTURE ENERGY TECHNOLOGIES-
I²CNER INTERNATIONAL WORKSHOP
CATALYTIC MATERIALS TRANSFORMATIONS DIVISION

DATE: FRIDAY, JANUARY 31, 2020

TIME: 13:00 -17:30

VENUE: I²CNER HALL A

Time	Speaker	Affiliation	Title
13:00-13:05	Prof. Miho Yamauchi	I ² CNER, Kyushu University	Opening Remarks
	Chair: Prof. Miho Yamauchi (I ² CNER, Kyushu University)		
13:05-13:40	Prof. Kohei Uosaki	National Institute for Materials Science	Electrochemical Surface Science and Energy Conversion/Storage
13:40-14:00	Prof. Nobutaka Maeda	I ² CNER, Kyushu University	Modulation Excitation Infrared Spectroscopy: Application to Heterogeneous Catalysis
14:00-14:20	Dr. Takashi Fukushima	I ² CNER, Kyushu University	Electrosynthesis of Amino Acids from Biomass-Derivable Acids on Titanium Dioxide
14:20-14:35	Break		
	Chair: Prof. Takahiro Matsumoto (I ² CNER, Kyushu University)		
14:35-14:55	Prof. Tatsuya Uchida	I ² CNER, Kyushu University	Non-heme type robust ruthenium(BPGA) complex catalyzed C–H oxidation
14:55-15:15	Prof. Miho Isegawa	I ² CNER, Kyushu University	The role of TEOA in photocatalytic conversion of CO ₂ to CO by Re complex: A DFT Study
15:15-15:35	Prof. Takeshi Yatabe	I ² CNER, Kyushu University	A future energy technology based on H ₂ activation
15:35-15:55	Dr. Tatsuya Ando	I ² CNER, Kyushu University	What's the Next of Molecular Fuel Cell ?
15:55-16:10	Break		
	Chair: Prof. Ki-Seok Yoon (I ² CNER, Kyushu University)		
16:10-16:45	Prof. Yoshiki Higuchi	University of Hyogo	Structural study on [NiFe]-hydrogenases
16:45-17:05	Prof. Yukina Takahashi	I ² CNER, Kyushu University	Development of Novel Plasmon-induced Charge Separation System for Analytical and Photoelectrochemical Applications
17:05-17:25	Dr. Takuo Minato	I ² CNER, Kyushu University	Hydrogenase model systems with a [NiRu] complex and redox active mediators
17:25-17:30	Prof. Seiji Ogo	I ² CNER, Kyushu University	Closing Remarks



INTERNATIONAL INSTITUTE FOR CARBON-NEUTRAL ENERGY RESEARCH

-CO₂ MANAGEMENT USING THE EARTH-
I²CNER INTERNATIONAL WORKSHOP
CO₂ STORAGE DIVISION

DATE: FRIDAY, JANUARY 31, 2020

TIME: 13:00-17:20

VENUE: I²CNER HALL B

Time	Speaker	Affiliation	Title
13:00-13:20	Takeshi Tsuji	Kyushu University	Activity of CO ₂ storage division
13:20-13:40	Hiro Nimiya	AIST	Estimation of 3D S-wave velocity model by using ambient noise surface-wave tomography
13:40-14:00	Arata Kioka	Kyushu University	A coupled geochemical and geophysical approach for quantifying CH ₄ deep inside submarine mud volcanoes
14:00-14:20	Tatsunori Ikeda	Kyushu University	Continuous monitoring of seismic velocity in high lateral resolution
20 min	Break		
14:40-15:00	Anna Suzuki	Tohoku University	Characterization of relationships between flow and fracture structures by persistent homology
15:00-15:20	Andri Hendriyana	Kyushu University	Monitoring of induced seismicity due to pore pressure perturbation
15:20-15:40	Chanmaly Chhun	Kyushu University	Pore pressure variation to distinguish between CO ₂ injection induced earthquake and natural earthquake
20 min	Break		
16:00-16:20	Osamu Nishizawa	Kyushu University	Development of a high-pressure cell incorporated into an x-ray CT for in-situ simultaneous measurements of seismic velocity and CO ₂ saturation in a porous rock
16:20-16:40	Fei Jiang	Yamaguchi University	An improved empirical model for hydraulic conductance of three-phase flow in pore network modeling
16:40-17:00	Jihui Jia	China University of Petroleum	Molecular dynamics simulation on AOS and IOS at oil-water interface: effect of molecular architecture
17:00-17:20	Yukiko Ozaki	Kyushu University	Persistent homology analysis of pore-configurations in sintered iron during ductile deformation



INTERNATIONAL INSTITUTE FOR CARBON-NEUTRAL ENERGY RESEARCH

– CO₂ MANAGEMENT IN ENERGY TRANSITION –
Transitions toward net-zero emissions energy systems
I²CNER INTERNATIONAL WORKSHOP
CO₂ CAPTURE AND UTILIZATION DIVISION & ENERGY ANALYSIS DIVISION

DATE: FRIDAY, JANUARY 31, 2020

TIME: 13:00 –17:45

VENUE: CONFERENCE ROOM 203, CENTER FOR CO-EVOLUTIONAL SOCIAL SYSTEMS

Time	Speaker	Affiliation	Title
13:00-13:10	Prof. Kenshi Itaoka	I ² CNER, Kyushu University	Opening Remarks CCUS and energy transition
13:10-13:45	Katsuhiro Yoshizawa	Kawasaki Heavy Industries	Development of an Adsorption Process for Energy-Saving CO ₂ Capture Utilizing Waste Heat
13:45-14:20	Dr. Eiji Kamio	Kobe University	Ionic Liquid-based Gel Membrane for CO ₂ Separation
14:20-14:45	Prof. Andrew Chapman	I ² CNER, Kyushu University	Impacts of CCS & hydrogen energy: world energy model
14:45-15:05	Coffee Break		
15:05-15:30	Dr. Hadi Farabi-Asl	Research Institute for Humanity and Nature	Impacts of CCS: domestic energy model
15:30-16:05	Hideo Kitamura	TOSHIBA Energy Systems & Solutions	Prospect of CO ₂ utilization for fuel production
16:05-16:40	Dr. Etsushi Kato	The Institute of Applied Energy	Transitions toward net-zero emissions energy systems
16:40-17:40	Guided discussion		
17:40-17:45	Prof. Ikuo Taniguchi	I ² CNER, Kyushu University	Closing Remarks



INTERNATIONAL INSTITUTE FOR CARBON-NEUTRAL ENERGY RESEARCH

APPLIED MATH FOR ENERGY: FUTURE DIRECTIONS
I²CNER-IMI JOINT INTERNATIONAL WORKSHOP
APPLIED MATH FOR ENERGY

DATE: FRIDAY, JANUARY 31, 2020

TIME: 9:30 – 17:30

VENUE: ROOM 419, I²CNER BLDG. 1

Time	Speaker	Affiliation	Title
Combustion Session			
9:30 – 9:35	Kaname Matsue	IMI & I ² CNER	Opening address
9:35 – 10:05	Panlong Yu	KU	Direct numerical simulation and large-eddy simulation for a three-feed non-premixed combustion system
10:05 – 10:35	Kaname Matsue	IMI & I ² CNER	On numerical and mathematical description of premixed flame dynamics
10:35 – 10:55	Discussion (Chair: Kaname Matsue)		
Energy System Session			
11:00 – 11:30	Nguyen Dinh Hoa	KU	A unified distributed approach for various energy optimization problems
11:30 – 12:00	Andrew Chapman	I ² CNER	The Quantification of Social Equity Impacts in Energy Systems: Current Approaches and Future Directions
12:00 – 13:00	Lunch Break		
13:00 – 13:30	Junichi Murata	I ² CNER & IMI	Multi-level optimization for energy management
13:30 – 13:50	Discussion (Chair: Nguyen Dinh Hoa)		

Randomness and Machine Learning toward Materials and Energy Research Session			
13:55 – 14:25	Tomoyuki Shirai	IMI	Persistent homology and its applications
14:25 – 14:55	Yoshinobu Kawahara	IMI	Operator-theoretic data analysis for dynamic processes
14:55 – 15:35	Daniel Packwood	iCeMS, Kyoto University	Structure prediction and control for functional surface materials
15:35 – 16:15	Ryo Yoshida	The Institute of Statistical Mathematics	Materials Informatics: State-of-the-Art and Future Perspectives
16:15 – 16:35	Discussion (Chair: Kaname Matsue)		
16:35 – 16:45	Break		
16:45 – 17:25	Discussion among all participants on possible future directions of applied math for energy and workshop summary (Chair: Nguyen Dinh Hoa)		
17:25 – 17:30	Nguyen Dinh Hoa	I ² CNER & IMI	Summary

MEMO

Synchrotron Symposium

<Date> 13:30-17:20, 31st January 2020

<Venue> Kyushu Synchrotron Light Research Center : Seminar Room (2nd Floor)
(Yayoiga-oka 8-7, Tosu-shi, Saga)

<Language> Japanese and English

<Theme> "Synchrotron Researches-for Social Contribution by Efforts Toward Academia-Industry Cooperation -"

<Program and Speaker>

Time	Program and Speaker
13:30-13:40	Opening Remarks
13:40-13:50	Greetings of the guest Mr. Hitoshi SAWADA (Director of Industrial Labor Relations Division, Saga Prefecture)
13:50-14:00	Greetings of the guest Mr. Atsushi OKU (General Manager of Scientific Research Institutes Division, MEXT)
14:00-14:45	Keynote Lecture Dr. Atsushi URAKAWA (Professor, Delft University of Technology)
14:45-15:15	Invited Lecture① Dr. Yoshikazu TAKEDA (Director of Aich Synchrotron Radiation Center)
15:15-15:45	Invited Lecture② Dr. Tetsuya NAKAMURA (Institute of Multidisciplinary Research for Advanced Materials, Tohoku Univ. (IMRAM) / PhoSIC)
15:45-16:05	Coffee Break
16:05-16:30	Invited Lecture③ Dr. Toshiki SENOO (Director of SAGA Light Source)
16:30-16:55	Invited Lecture④ Dr. Koji YAMAGUCHI (Director of Sumitomo Electric Data Solution Center)
16:55-17:20	Invited Lecture⑤ Dr. Atushi TAKAHARA (Professor, Institute for Materials Chemistry and Engineering, Kyushu University)
	Closing Remarks Dr. Yuji SOEJIMA (Director of Research Center for Synchrotron Light Applications, Kyushu University)

Greetings of the guest

Hitoshi SAWADA

Director of Industrial Labor Relations Division, Saga Prefecture

Atsushi OKU

General Manager of Scientific Research Institutes Division, MEXT

Keynote Lecture



Atsushi URAKAWA

Professor,
Delft University of Technology

Invited Lecture



Yoshikazu TAKEDA

Director of Aich Synchrotron Radiation
Center



Testuya NAKAMURA

Professor,
Institute of Multidisciplinary Research
for Advanced Materials, Tohoku Univ.
(IMRAM) /PhoSIC



Toshiki SENOO

Director of SAGA Light Source



Hiroshi YAMAGUCHI

Director of Sumitomo Electric Data
Solution Center



Atushi TAKAHARA

Professor,
Institute for Materials Chemistry and
Engineering, Kyushu University

Closing Remarks

Yuji SOEJIMA

Director of Research Center for Synchrotron Light Applications, Kyushu University



未来に。パワーを。

ノーベル化学賞を受賞した吉野彰氏が
「リチウムイオン電池と環境問題」をテーマに九州大学で講演。
リチウムイオン二次電池の開発とノーベル賞受賞に至る経緯、
そして持続可能な社会の実現に向けた考えについてお話しいただきます。

九州大学エネルギーウィーク 筑紫シンポジウム | ノーベル化学賞受賞記念
吉野彰 九州大学 栄誉教授 **特別講演会**

2020年 1/31 [金] 13:30-15:00 (13:00 開場)
椎木講堂コンサートホール (九州大学伊都キャンパス)

入場無料 要事前申込

Profile
1948年1月30日生まれ。大阪府吹田市出身。旭化成株式会社名誉フェローで、リチウムイオン二次電池の発明者の一人として、2019年ノーベル化学賞、文化勲章を受章。2015年九州大学客員教授を経て、2018年に九州大学グリーンテクノロジー研究教育センターの訪問教授として就任。

[アクセス] ※できる限り公共の交通機関をご利用ください。
博多駅・西鉄福岡(天神)駅からは西鉄バス「九大総合グラウンド」行、
九大学研都市駅からは昭和バス「九大総合グラウンド」または「伊都営業所」行、
「九大ビッグオレンジ」または「九大中央図書館」で下車。

[事前のWeb申し込みが必要です]
<https://site2.convention.co.jp/qpit2020/index.html>
※入力情報は各種連絡・情報提供のために利用させていただきます。
※定員になり次第締め切らせていただきます。



主催 / エネルギー研究教育機構、グリーンテクノロジー研究教育センター、高等研究院
お問合せ / 特別講演会事務局(株)セレスポ内 9:30-17:00 (土日祝、12/28~1/5 除く)
TEL:092-663-5558 E-mail:q-kouenkai@cerespo.co.jp