4-2. IROAST Seminars

No. (invitation Program No.)	Title	IROAST Speaker
	Date	Organizer
4-2-1	The 94th & 95th IROAST Seminar - Grain Boundary Migration	**Dmitri Aleks MOLODOV** RWTH Aachen University, Germany
	94th: May 16, 2023 95th: May 18, 2023	**Sadahiro TSUREKAWA** FAST
4-2-2	The 96th IROAST Seminar - MEMS Standardization	**Makiko KOBAYASHI** FAST **Yuta NAKASHIMA** FAST
	June 23, 2023	**Kazuki TAKASHIMA** IROAST
4-2-3 (3-1-1)	The 97th IROAST Seminar - Design of Drug Delivery Guided by Molecular Imaging Technology	**Ick Chan KWON** Korea Institute of Science and Technology (KIST), Korea
	July 31, 2023	**Ruda LEE** IINa
4-2-4 (3-1-2)	The 98th IROAST Seminar - Advanced graphene-based composite materials for emerging applications	**Tung Thanh TRAN** The University of Adelaide, Australia
	August 25, 2023	**Sadahiro TSUREKAWA** FAST
4-2-5 (3-1-3)	The 99th IROAST Seminar - On the humidity dependence of highly loaded graphite contacts	**Martin DIENWIEBEL** Karlsruhe Institute for Technology (KIT), Germany
	September 19, 2023	**Yoji MINE** FAST
4-2-6	The 100th IROAST Seminar - Applications of AI for Healthcare	**U. Rajenrdra ACHARYA** University of Southern Queensland, Australia
	September 29, 2023	**Makiko KOBAYASHI** FAST
4-2-7 (3-1-4)	The 101st IROAST Seminar - Biorefinery and Bio-economy: Processes, Products and Integration	**Suttichai ASSABUMRUNGRAT** Chulalongkorn University, Thailand
	October 6, 2023	**Tetsuya KIDA** FAST **Armando T. QUITAIN** Headquarters for Admissions and Education

4-2-8 (3-1-5)	The 102nd IROAST Seminar - Environmental science and ecology for biodiversity conservation	**Daniel P. ZITTERBART** Woods Hole Oceanographic Institution, USA
	October 20, 2023	**Kei TODA** FAST
4-2-9	The 103rd IROAST Seminar - A revised model of the ER/pre-Golgi interface based on methodological advances in super-resolution microscopy	**Magali GRISON /Louise FOUGÉRE,** CNRS-University of Bordeaux, France
	October 19, 2023	**Masahiko FURUTANI** IROAST
4-2-10 (3-1-6)	The 104th IROAST Seminar - Development of Sustainable Biorefineries: Valorization of Lignin	**Maria Jose COCERO** The University of Valladolid, Spain
	October 27, 2023	**Tetsuya KIDA** FAST **Armando T. QUITAIN** Headquarters for Admissions and Education
4-2-11	The 105th IROAST Seminar - Understanding the structure of liquids: from the stone age to artificial intelligence	**László PUSZTAI** HUN-REN Wigner Research Centre for Physics, Hungary
	November 7, 2023	**Ichiro AKAI** IINA
4-2-12 (3-1-7)	The 106th IROAST Seminar - Photogenerated Spin-Correlated Radical Pairs as Molecular Qubits	**Tomoyasu MANI** University of Connecticut, USA
	November 14, 2023	**Yutaka KUWAHARA** FAST
4-2-13 (3-1-8)	The 107th IROAST Seminar - Artificial Intelligence in Health Care. Potentials, risks and ethical impact	**Josep -Lluís BARONA-VILAR** University of Valencia, Spain
	November 15, 2023	**Makoto TAKAFUJI** FAST
4-2-14 (3-1-9)	The 108th IROAST Seminar - Thermal conductivity and lattice dynamics in structurally complex materials	**Marc DE BOISSIEU** SIMaP-Grenoble Alpes University, France
	November 28, 2023	**Ichiro AKAI** IINA
4-2-15 (3-1-10)	The 109th IROAST Seminar - Recent developments in laboratory testing of geomaterials, with emphasis on imaging	**Gioacchino (Cino) VIGGIANI** Université Grenoble Alpes, France
	December 8, 2023	**Toshifumi MUKUNOKI** FAST

4-2-16 (3-1-11)	The 110th IROAST Seminar - Two-phase closed thermosyphon for artificial ground freezing and geothermal heat extraction	**Agus Pulung SASMITO** McGill University, Canada
	December 12, 2023	**Atsushi SAINOKI** FAST
4-2-17 (3-1-12)	The 111th IROAST Seminar - Data Mining in Energy Management System	**Wen-Shing LEE** National Taipei University of Technology, Taiwan
	December 21, 2023	**Makiko KOBAYASHI** FAST
4-2-18 (3-1-13)	The 112th IROAST seminar - Development of Upconversion Nanomaterials for Precision Theranostics	**Helen XU** University of Technology Sydney, Australia
	December 15, 2023	**Ruda LEE** IINa
4-2-19	The 113th IROAST Seminar - Motion Tracking of a High-Speed Humanoid Using Dynamic Measurements Fusion	**Tomonari FURUKAWA** University of Virginia, USA
	December 22, 2023	**Makoto KUMON** FAST
4-2-20	The 114th IROAST Seminar - Towards comprehensive understanding in material characterisations- Power of electron microscopy (EM) -	**Hiroto KITAGUCHI** University of Birmingham, UK
	January 10, 2024	**Yoji MINE** FAST
4-2-21 (3-1-14)	The 115th IROAST Seminar - TRC for structural repairing and strengthening - Seismic-resistant design of connections with perforated beams: RWS connections	**Amir Si LARBI** ENISE, University of Lyon, France **Konstantinos Daniel TSAVDARIDIS** City, University of London, UK **Nonna AlGOURDIN** University of Lyon, France
	January 26, 2024	**Gaochuang CAI** IROAST
4-2-22 (3-1-15)	The 116 th IROAST Seminar - Lipid-based biorefinery research aligned with Thai strategic industry alliances	**Worapon KIATKITTIPONG** Silpakorn University, Thailand
	February 1, 2024	**Tetsuya KIDA** FAST

4-2-23 (3-1-16)	The 117th IROAST Seminar - Introduction to grain boundary segregation	**Pavel LEĆEK** Institute of Physics, Czech Academy of Sciences, Czech Republic
	February 20, 2024	**Sadahiro TSUREKAWA** FAST
4-2-24 (3-1-17)	The 118th IROAST Seminar - Synthesis and integration of nanosized materials into functional devices	**Dario ZAPPA** The University of Brescia, Italy
	February 21, 2024	**Tetsuya KIDA** FAST

FAST : Faculty of Advanced Science and Technology

IINa: : Institute of Industrial Nanomaterials

IROAST Seminar Report

No.4-2-1 (Seminar)	Name	Dmitri Aleks MOLODOV	Title	Professor/IROAST Distinguished Professor
	Affiliation	RWTH Aachen University, Germany		
Host Faculty/ Organizer	Name	Sadahiro TSUREKAWA	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology		
Seminar Title	The 94th & The 95th IROAST Seminar on Grain Boundary Migration			
Venue	Room 308, Kurokami South C3 (Faculty of Engineering Research Bldg. I)			
Time & Date	The 94th: 10:25-11:55, May 16, 2023 The 95th: 8:40-10:10, May 18, 2023			
Speaker's Name/ Title/Affiliation	Dmitri MOLODOV, Professor, Institute of Physical Metallurgy and Metal Physics,RWTH Aachen University, Germany/ IROAST Distinguished Professor			
Number of Participants	Total: 39 (94th:19, 95th:20) (Int'l participants: 2 for each) Invitees: 1 (Int'l participants: 1)			
Duration of Visit	From May 9, 2023 to May 26, 2023			

-Seminar report -

1. Seminar Overview

On May 16, 2023, the 94th IROAST Seminar, organized by Prof. Sadahiro TSUREKAWA (FAST, Kumamoto University), was held and KU's students and faculty member attended. Prof. Dmitri Molodov from Germany gave an interesting talk on Grain boundary migration.
*FAST: Faculty of Advanced Science and Technology

On May 18, following the 94th meeting, Professor Tsurekawa organized the 95th seminar with a lecture on "Grain Boundary Migration". The participating students and others benefited from a lecture by Distinguished Professor Molodov, one of the world's top experts in this field.

2. Seminar Outcomes and Future Plan

Through the lectures, the participating students and young researchers were given the opportunity to learn both the fundamental issues related to the migration of grain boundaries in solids, including the mobility concept, basic theoretical models of grain boundary migration, the effects of impurities and second phase particles on grain boundary migration, etc., and the modern experimental methods for measuring grain boundary motion, which were illustrated by a number of examples of model studies on specially grown bicrystals with specific grain boundaries.
The knowledge gained can certainly be used to improve the skills and abilities of young researchers when working on their research projects and when initiating international cooperation projects relating to the evolution of microstructures in crystalline solids.

The 94th Seminar

Opening; Prof. Sadahiro TSUREKAWA

Prof. MOLODOV

The 95th Seminar

Prof. MOLODOV

At the venue

IROAST Seminar Report

No.4-2-2 (Seminar)	Name	Kazuki TAKASHIMA	Title	Professor/IROAST Distinguished Professor
	Affiliation	International Research Organization for Advanced Science and Technology (IROAST)		
Seminar Title	The 96th IROAST Seminar on MEMS Standardization			
Venue	Kumamoto City International Center			
Time & Date	9:15-12:30, June 23, 2023			
Speaker's Name/ Title/Affiliation	Makiko KOBAYASHI, Professor Faculty of Advanced Science and Technology（FAST） Yuta NAKASHIMA, Professor Faculty of Advanced Science and Technology（FAST）			
Number of Participants	Total: 31 (Int'l participants: 19) Invitees: 0 (Int'l participants: 0)			

-Seminar report –

1. Seminar Overview

The MEMS Standardization Workshop, held annually in conjunction with the IEC TC47F MEMS Standardization Committee's Summer Meeting, took place in 2023 as a joint event with IROAST, where research on MEMS devices is being promoted.

MEMS devices have been advancing in practical applications across various fields such as automotive and telecommunications, necessitating international standardization efforts. This symposium provided a platform to introduce newly developed MEMS devices and manufacturing technologies, as outlined in the program below, while also facilitating information exchange towards international standardization goals.

Presentations on cutting-edge MEMS research were delivered not only by researchers from IRAOST but also by researchers from KAIST in South Korea and Peking University in China, sparking lively discussions.

2. Seminar Outcomes and Future Plan

Professors Kobayashi and Nakashima from IRAOST delivered lectures on state-of-the-art research related to Bio-MEMS, attracting numerous questions from overseas participants, and highlighting possibilities for future international collaborations.

Additionally, young researchers from Kumamoto University actively participated, engaging in research discussions with their overseas counterparts and furthering international exchanges.

In addition, Kumamoto is expected to see further development in the semiconductor industry in the future. Given that MEMS technology is rooted in semiconductor technology, the development of MEMS in Kumamoto holds promise.

Assoc. Prof. NAKASHIMA

Prof. KOBAYASHI

Prof. TAKASHIMA

At the venue

MEMS Standardization Workshop, – The 96th IROAST Seminar – on June 23, 2023, in Kumamoto, Japan

We are pleased to inform you agenda of MEMS standardization workshop, held on June 23, 2023, in Kumamoto, Japan.

2023-06-23 (FRI) 9:15 AM – 12:30 PM MEMS standardization workshop

Location: Kumamoto City International Center
International conference room on 3rd floor
4-18 Hanahata-cho, Chuo-ku, Kumamoto-city, Kumamoto, 860-0806, Japan

Micromachine Center (Organizer)
International Research Organization for Advanced Science and Technology (IROAST), Kumamoto University (Co-organizer)

Agenda

Session Chair: Mr. Kazuki Takashima, Kumamoto University (Japan)

9:15 AM – 9:30 AM **Opening of meeting**
Mr. Kazuki TAKASHIMA, Kumamoto University, Japan,

9:30 AM – 10:00 AM
Ms. Makiko KOBAYASHI, Kumamoto University, Japan,
"**Patchable piezoelectric/ultrasonic sensor development for automatic abnormal condition detection during homecare stage**"

10:00 AM – 10:30 AM
Mr. Yuta NAKASHIMA, Kumamoto University, Japan,
“**Development of microfluidic devices for bio-medical applications**”

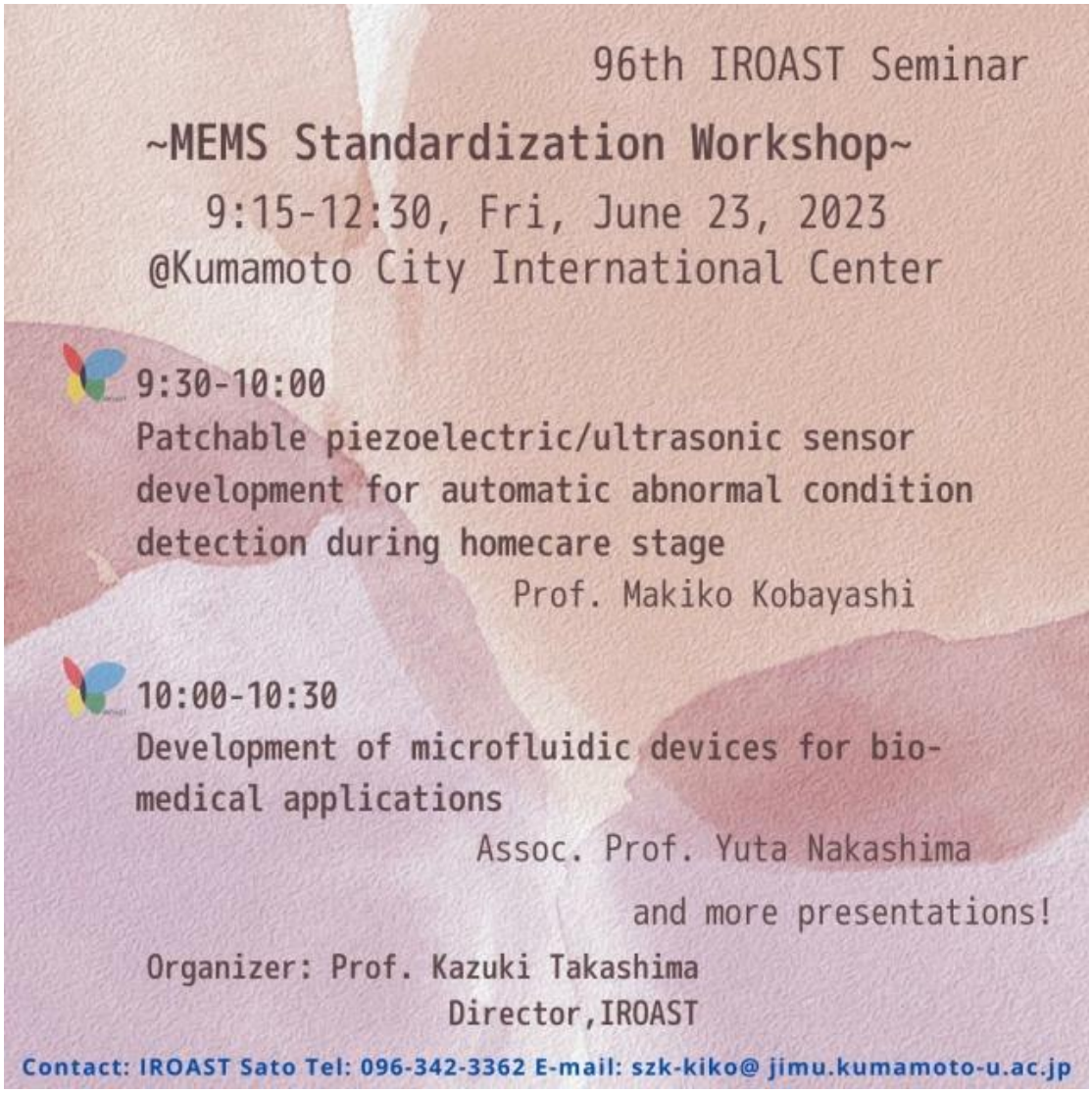
10:30 AM – 11:00 AM
Mr. Jungchul LEE, Korea Advanced Institute of Science and Technology, Korea
“**Heater-integrated fluidic resonators**”

Break 11:00 AM – 11:15 AM

11:15 AM – 11:45 AM
Mr. Wei ZHANG, Peking university, China,
“**MEMS differential pressure flowmeter**”

11:45 AM – 12:15 PM
Mr. Dacheng ZHANG, Peking university, China,
“**Discussion on material mechanical test system of micro-nano-fabricating structure**”

12:15 PM – 12:30 PM **Closing address**
Mr. Sung Hoon Choa, Seoul National University of Science and Technology, Korea



IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

No.3-1-1 (Invitation Program) No.4-2-3 (Seminar)	Name	Ick Chan KWON	Title	Professor
	Affiliation	Korea Institute of Science and Technology (KIST), Korea		
Host Faculty/ Organizer	Name	Ruda LEE	Title	Associate Professor
	Affiliation	Institute of Industrial Nanomaterials (IINa)		
Seminar Title	The 97th IROAST Seminar "Design of Drug Delivery Guided by Molecular Imaging Technology"			
Venue	Room 224, Kurokami South C8 (Faculty of Engineering Bldg. 2)			
Time & Date	10:30-11:30, July 31, 2023			
Speaker's Name/ Title/Affiliation	Ick Chan KWON, Principal Investigator, Biomedical Research Institute, Korea Institute of Science and Technology (KIST), Korea			
Number of Participants	Total: 26 (Int'l participants: 3) Invitees: 1 (Int'l participants: 1)			

-Seminar report -

1. Seminar Overview

During the seminar, Professor Kwon, renowned for his expertise in smart nanomaterials for bioimaging, shared invaluable insights into cutting-edge diagnosis and drug delivery systems. His guidance and advice have significantly bolstered our research unit, paving the way for the development of innovative therapeutic approaches. Furthermore, Professor Kwon delved into new strategies for immune therapy in cancer, highlighting the potential of antigen-presenting cell activation as a promising area for further investigation

2. Seminar Outcomes and Future Plan

Since 2019, Dr. Kwon has been providing polymers developed or patented by himself, which are further modified in the Lee lab for advanced applications. His research team continues to support the modified polymers and evaluates their properties. Additionally, Dr. Kwon advises on immune cell-mediated delivery, proposing a new paradigm in lung inflammatory disease research. Monthly discussions involving Dr. Kwon, Lee's lab, and participating students are ongoing to progress towards the final goal.

Dr. KWON and Assoc. Prof. LEE

At the venue

Group Photo

97TH IROAST SEMINAR

"DESIGN OF DRUG DELIVERY GUIDED BY MOLECULAR IMAGING TECHNOLOGY"

VENUE: ROOM 211
KUROKAMI SOUTH C8
(FACULTY OF ENGINEERING BLDG. 2)

DATE & TIME: MON, JULY 31, 2023
10:30 - 11:30

LECTURER:
DR. ICK CHAN KWON
BIOMEDICAL RESEARCH DIVISION,
KOREA INSTITUTE OF SCIENCE
AND TECHNOLOGY (KIST), KOREA

ORGANIZER: ASSOC. PROF. RUDA LEE, IINA, KU

CONTACT

IROAST
Phone: 096-342-3362 E-mail: szk-kiko@jimu.kumamoto-u.ac.jp
Website: https://iroast.kumamoto-u.ac.jp/

IROAST

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

No.3-1-2 (Invitation Program) No.4-2-4 (Seminar)	Name	Tung Thanh TRAN	Title	Lecturer
	Affiliation	The University of Adelaide, Australia		
Host Faculty/ Organizer	Name	Tetsuya KIDA	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology		
Seminar Title	The 98th IROAST Seminar "Advanced graphene-based composite materials for emerging applications"			
Venue	Conference Room, Kurokami South W4 (Faculty of Engineering Research Bldg. II)			
Time & Date	11:00-11:30, August 25, 2023			
Speaker's Name/ Title/Affiliation	Tung TRAN, Senior Researcher/Lecturer, School of Chemical Engineering and Advanced Materials, The University of Adelaide, Australia			
Number of Participants	Total: 28 (Int'l participants: 11) Invitees: 1 (Int'l participants: 1)			
Duration of Visit	From August 21, to September 13, 2023			

-Seminar report -

1. Seminar Overview

During the seminar, Dr. Tung Tran spoke about novel applications of graphene and graphene oxide in various fields. Graphene and graphene oxide have potential applications in heat-resistant films, fertilizers, conductive pastes, chemical sensors, piezoresistive films, and phosphors. Various characterization techniques have proven effective in tailoring the properties of graphene and graphene oxide to specific applications. In addition, several strategies to improve the performance of graphene-based devices are discussed. The most interesting application of graphene is in heat-resistant films. Houses and buildings coated with graphene-based films show very promising stability against fire.

2. Seminar Outcomes and Future Plan

The seminar broadened the horizons of the participating researchers and students about the completely new applications of graphene oxide and its wonderful future. Before and after the seminar, the possibility of future collaborations and international joint publications were discussed. Plans for a student exchange program were also agreed upon. Dr. Tung agreed to accept graduate students from Kumamoto University to his laboratory in Adelaide to conduct joint research.

Dr. TRAN

At the venue

Group Photo

-Activities report with visiting (associate) professor-

3.Research achievements during his/her stay in Kumamoto University.

Undergraduate and graduate students attended discussion meetings with Dr. Tran. Through active discussions with Dr. Tran, the students were able to gain knowledge on the latest trends in graphene oxide technology, which will be of great use in their future research and development.

4. Prospect for further research collaboration.

• Application to JSPS Bilateral Joint Research Project
• Application to JST-funded research project
• Student exchange (two students will have a research internship in Adelaide with The Tobitate! (Leap for Tomorrow) Young Ambassador Program)
• Related Joint Publications

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-3
(Invitation Program)
No.4-2-5
(Seminar)</td><td>Name</td><td>Martin DIENWIEBEL</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Karlsruhe Institute for Technology (KIT), Germany</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Yoji MINE</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Faculty of Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 99th IROAST Seminar
“On the humidity dependence of highly loaded graphite contacts”</td></tr>
<tr><td>Venue</td><td colspan="4">Room 308, Kurokami South C3 (Faculty of Engineering Research Bldg. I)</td></tr>
<tr><td>Time & Date</td><td colspan="4">10:30-12:00, September 19, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Martin DIENWIEBEL, Professor
Karlsruhe Institute for Technology (KIT), Germany</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 13 (Int’l participants: 3)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From September 17 to September 23, 2023</td></tr>
</table>

-Seminar report -

1. Seminar Overview

Graphite is a well-known solid lubricant that has been studied for decades. At low loads, graphite’s lubricity depends on humidity. Classical models like e.g. the adsorption model explains this by molecular water films on graphite leading to defect passivation and easy sliding of counter bodies. To explore the humidity dependence and validate the adsorption model for high loads (loads around 1 GPa as typically found in rolling bearing elements), a commercial graphite solid lubricant was studied using microtribometry. Even at very high contact pressures, a high and low friction regime is observed - depending on humidity. Transmission electron microscopy (TEM) and Electron Energy Loss spectroscopy (EELS) reveal transformation of the polycrystalline graphite lubricant into turbostratic carbon after high but also after low load (50 MPa) sliding. Quantum molecular dynamics simulations relate high friction and wear to cold welding and shear-induced formation of turbostratic carbon, while low friction originates in molecular water films on surfaces. The combined experiments and simulations lead to a novel, generalized adsorption model including turbostratic carbon formation.

2. Seminar Outcomes and Future Plan

We have started to discuss new collaborative studies on the relationship between contact fatigue and microstructural change in bearing steel in hydrogen environment.

Prof. DIENWIEBEL

Prof. MINE

Group Photo

99th IROAST seminar

September 19, 2023, 10:30～12:00

Room 308, Kurokami South C3
(Faculty of Engineering Research Bldg. I)

On the humidity dependence of highly loaded graphite contacts

Prof. Martin Dienwiebel
Karlsruhe Institute for Technology (KIT), Germany

Organizer: Prof. Yoji Mine
FAST, KU

Contact IROAST Phone: 096-342-3362 E-mail: szk-kiko@jimu.kumamoto-u.ac.jp
Website: https://iroast.kumamoto-u.ac.jp/

IROAST Seminar Report

No.4-2-6 (Seminar)	Name	U. Rajendra ACHARYA	Title	Professor/IROAST Distinguished Professor
	Affiliation	University of Southern Queensland, Australia		
Host Faculty/ Organizer	Name	Makiko KOBAYASHI	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology		
Seminar Title	The 100th IROAST Seminar "Applications of AI for Healthcare"			
Venue	Online and On-site; Room 204, Kurokami South W2 (Faculty of Engineering Core Laboratory Bldg.)			
Time & Date	10:25-11:55, September 29, 2023			
Speaker's Name/ Title/Affiliation	U. Rajenrdra ACHARYA, Professor/IROAST Distinguished Professor University of Southern Queensland, Australia			
Number of Participants	Total: 18 (Int'l participants: 5) Invitees: 1 (Int'l participants: 1)			
Duration of Visit	From September 25, to October 2, 2023			

-Seminar report -

1. Seminar Overview

I heard that various applications of disease automatic diagnosis by AI were presented, starting from the basics (Kobayashi was absent due to the prior engagement).

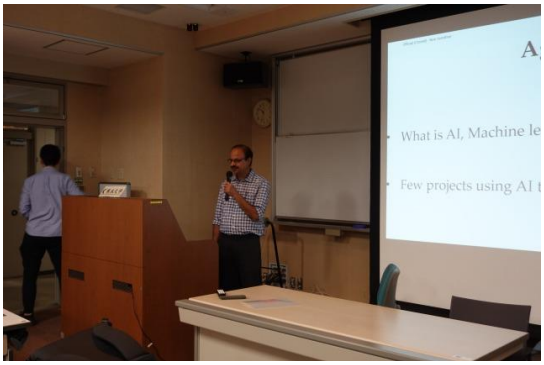
2. Seminar Outcomes and Future Plan

We exchanged views on the research structure, including Dr. Prabal, who is enrolled in the doctoral program of Kumamoto University from Australia, and discussed the current status of the development of wearable stethoscopes as well as the demand for automatic diagnosis.

Organizer: Assist.Prof. TANABE

At the venue

Online: Prof. ACHARYA



On-site: Prof. ACHARYA

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

No.3-1-4 (Invitation Program) No.4-2-7 (Seminar)	Name	Suttichai ASSABUMRUNGRAT	Title	Professor
	Affiliation	Chulalongkorn University, Thailand		
Host Faculty/ Organizer	Name	Tetsuya KIDA/ Armando T. QUITAIN	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology/ Headquarters for Admissions and Education		
Seminar Title	The 101st IROAST Seminar "Biorefinery and Bio-economy: Processes, Products and Integration"			
Style	Online and On-site : Kurokami North E6: College of Cross-Cultural and Multidisciplinary Studies (Center for International Education)			
Time & Date	13:00-14:30, October 6, 2023			
Speaker's Name/ Title/Affiliation	Suttichai ASSABUMRUNGRAT, Professor Chulalongkorn University, Thailand			
Number of Participants	Total: 118 (Int'l participants: 91) Invitees: 1 (Int'l participants: 1)			
Duration of Visit	From October 3, to October 8, 2023			

1. Seminar Overview

The seminar given by Prof. Suttichai Assabumrungrat focused on the concept of process intensification as applied to biorefinery to support the Bio-Circular-Green Economy development and the United Nation's Sustainable Development Goals (SDGs). Some key important topics were addressed including overviews of biorefinery, biomass and biobased products, conversion of biomass to high-value products, downstream recovery and separation, process creation, design and analysis, and case studies. This seminar was participated by many researchers and students (both online and on-site).

2. Seminar Outcomes and Future Plan

This seminar has broadened the knowledge of participating researchers and students on many aspects of "biorefinery". Research-related activities other than the seminar were as follows:

1. Discussion on the contents of our two joint research publications (in-preparation):
   1. "Deamination of Algal Bio-oil using Green Approach", (ACS Sustainable Chemistry and Engineering, in preparation)
   2. "Glycerol Conversion to Biofuels", (ACS Energy and Fuels, in preparation)

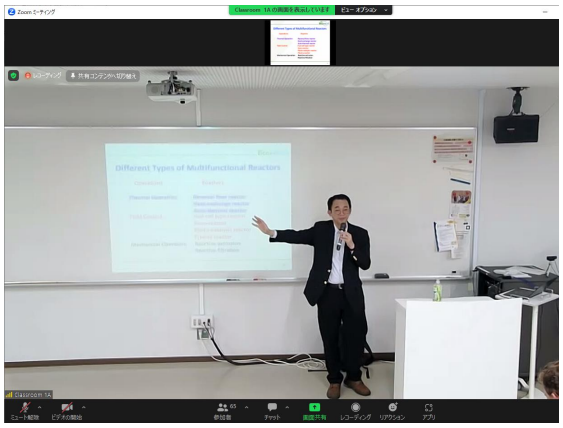
2. Discussion on our on-going JSPS-NRCT Bilateral Joint Research Project on conversion of glycerol to useful chemicals and fuels with the students working on this topic.

3. Discussion to further strengthen our future collaboration on research and academic exchanges. For this purpose, 2 professors, 1 post-doctoral fellow and about 20 students (18 Japanese students, 2 international students) went to Thailand for academic, cultural and research exchanges on 2 separate occasions in academic year 2023 hosted by Prof. Suttichai and his research team.

For IROAST and Kumamoto University, it is expected that this joint research with Prof. Suttichai Assabumrungrat of Chulalongkorn University, the leading academic institution in Thailand, will continue to yield significant results, and the seminars to be held will be able to make a significant contribution to further development of human resources, and for active promotion of international joint

research between Japan and ASEAN countries.

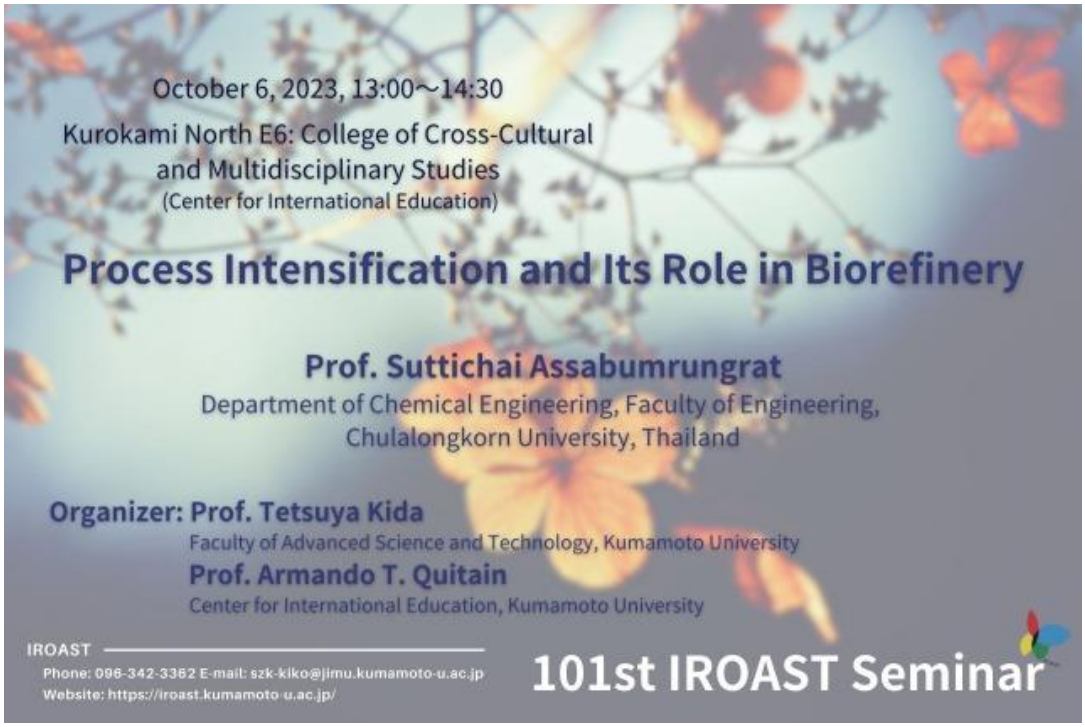
Prof. QUITAIN



Prof. ASSABUMRUNGRAT

At the venue

Group Photo



IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

No.3-1-5 (Invitation Program) No.4-2-8 (Seminar)	Name	Daniel P. ZITTERBART	Title	Associate Scientist
	Affiliation	Woods Hole Oceanographic Institution, USA		
Host Faculty/ Organizer	Name	Kei TODA	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology		
Seminar Title	The 102nd IROAST Seminar Environmental science and ecology for biodiversity conservation			
Venue	Room C226, Kurokami South E1 (Faculty of Science Bldg. 1 & 2)			
Time & Date	13:00-14:20, October 20, 2023			
Speaker's Name/ Title/Affiliation	Daniel P. ZITTERBART, Associate Sceintist, Woods Hole Oceanographic Institution, USA			
Number of Participants	Total: 24 (Int'l participants: 3) Invitees: 1 (Int'l participants: 1)			
Duration of Visit	From October 14, to November 2, 2023			

-Seminar report -

1. Seminar Overview

Dr. Zitterbart gave a presentation for our laboratory members. His PhD student, Ms. Loicka, attended this seminar together. She is a student of MIT and studying development and applications of dimethyl sulfide (DMS) measurement device in Woods Hole Oceanographic Institution under supervision of Dr. Zitterbart. Dr. Saeki, Assistant Professor, University of Ryukyus, came to Kumamoto for this seminar and collaboration. DMS is a compound giving typical sea smell. We are focusing DMS as an info-chemical for predators like whales.

Seminar title was:
Environmental Science and Ecology for Biodiversity Conservation
Contents:
Understanding and addressing the human-driven decline in biodiversity is a pressing scientific, economic, and ethical dilemma of our era. This concern becomes even more paramount when considering marine ecosystems, which not only regulate global climate but also shelter a significant portion of the planet's biomass and diversity.

The behavior of animal movements offers a window into the health of ecosystems. Using the principles of movement ecology, these movements are analyzed in relation to environmental factors. Typically, biologging, which involves attaching location-based tags to animals, has been the primary method to study these movements. While effective, this technique requires considerable effort and can be intrusive to the animals. To broaden the capabilities of ecosystem monitoring, there's a shift towards remotely sensing animal movements without the need for biologging. This approach aims to complement traditional methods like tracking animal populations and distributions. While population counts and species distributions provide insights into ecosystem health, these indicators lag very much behind real-time changes in the environment. In this presentation, I will discuss two case studies focused on Emperor Penguins and Baleen Whales which underscore how integrating remote sensing of

environmental factors with animal behaviors can establish a timely and effective early warning system for ecosystem well-being.

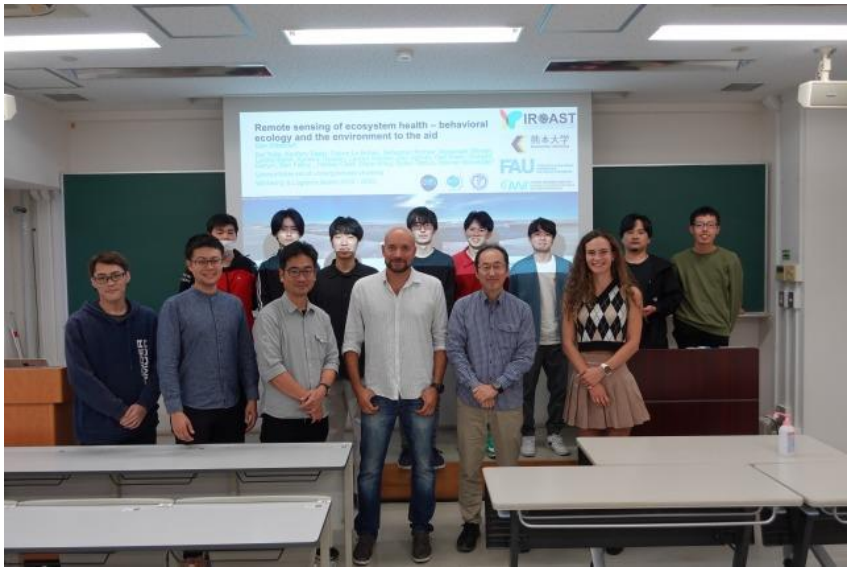
2. Seminar Outcomes and Future Plan

It was a great opportunity for laboratory members to hear about ecology and chemicals of Antarctic. Topics were beyond student's knowledge and gave them big inspirations.

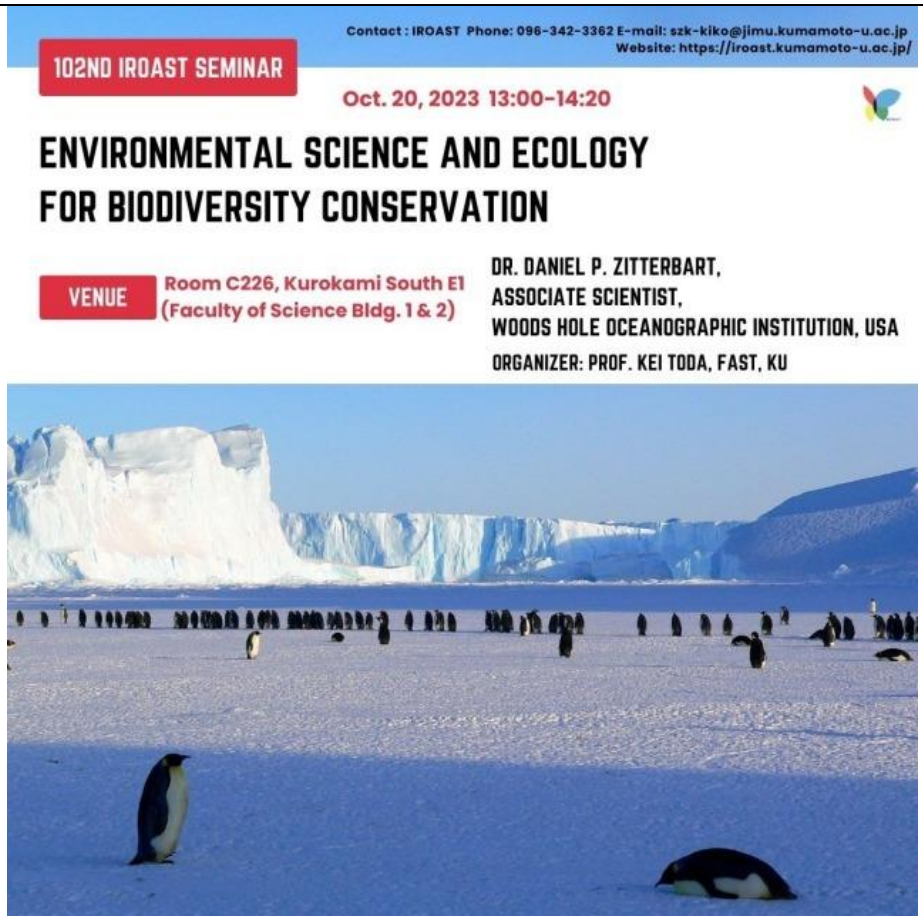
Dr. Daniel P. ZITTERBART

Organizer: Prof. TODA

At the venue



Group Photo



-Activities report with visiting (associate) professor-
3.Research achievements during his/her stay in Kumamoto University.

Dr. Saeki and Loicka worked together in their visiting Kumamoto to improve our DMS measurement instrument. Many functions were added, and intelligent analyses of oceanic parameters would be performed in Antarctic Ocean in addition to DMS data.

4. Prospect for further research collaboration.

We took the DMS measurement device, which was developed by the members of Kumamoto University and Woods Hole Oceanographic Institution, to Antarctic Ocean from Japan in December. We have measured DMS of water onsite on a boat. After our leaving the ship, two researchers of Woods Hole Oceanographic Institution visited Antarctic Ocean to perform detailed analysis of DMS using the same instrument. Data will be put together and used for the next expedition. In addition, we have measured amine compounds of Antarctic seawater, which are produced by plankton. These data can be useful information to discuss about behavior of predators in Antarctic Ocean.

IROAST Seminar Report

<table>
<tr><td rowspan="2">No.4-2-9
(Seminar)</td><td>Name</td><td>Magali GRISON /
Louise FOUGÉRE</td><td>Title</td><td>Researcher/
Ph D student</td></tr>
<tr><td>Affiliation</td><td colspan="3">French National Center for Scientific Research (CNRS),
University of Bordeaux, France</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Masahiko FURUTANI</td><td>Title</td><td>Associate Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">IROAST</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 103th IROAST Seminar
A revised model of the ER/pre-Golgi interface based on methodological advances in super-resolution microscopy</td></tr>
<tr><td>Venue</td><td colspan="4">Room C227, Kurokami South E1 (Faculty of Science Bldg. 1 & 2)</td></tr>
<tr><td>Time & Date</td><td colspan="4">14:00-15:20, October 19, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Dr. Magali GRISON and Ms. Louise FOUGÉRE,
French National Center for Scientific Research (CNRS)- University of Bordeaux, France</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 29 (Int’l participants: 4)
Invitees: 2 (Int’l participants: 2)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From October 17 to October 21, 2023</td></tr>
</table>

-Seminar report -

1. Seminar Overview

Ms. Louise Fougère gave a talk about a revised model of the ER/pre-Golgi interface, a hot topic in plant cell biology. Using a most-advanced confocal microscopy, she discovered tubular structures and doughnut-shaped structure of Golgi compartments. Her findings suggested the need to revise a model of the ER/pre-Golgi interface.
Dr. Magali Grison introduced striking performances and potential of a most-advanced confocal microscopy.

After their talks, there was a lively discussion to exchange opinions.

2. Seminar Outcomes and Future Plan

Many master and undergraduate students and young researchers attended the seminar and learned about cutting-edge researches on plant cell biology and most-advanced confocal imaging technologies. Before and after the seminar, 7 researchers including PIs and postdoc researchers introduced their works to Dr. Magali Grison and Ms. Louise Fougère and discussed with them about future collaborations. In my case, they got interested in my works and suggested a collaboration with their research group about the identification of phosphatidylinositol and phosphatidylcholines that interact with my interest proteins using their own technologies.

Organizer: Assoc. Prof. FURUTANI

Dr. Magali GRISON

Ms. Louise FOUGÉRE

At the venue

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

No.3-1-6 (Invitation Program) No.4-2-10 (Seminar)	Name	Maria Jose COCERO	Title	Professor
	Affiliation	Chemical Engineering & Environmental Technology The University of Valladolid, Spain		
Host Faculty/ Organizer	Name	Tetsuya KIDA/ Armando T. QUITAIN	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology/ Headquarters for Admissions and Education		
Seminar Title	The 104th IROAST Seminar "Development of Sustainable Biorefineries: Valorization of Lignin"			
Venue	Online and On-site：Kurokami North E6: College of Cross-Cultural and Multidisciplinary Studies (Center for International Education)			
Time & Date	12:55-14:25, October 27, 2023			
Speaker's Name/ Title/Affiliation	Maria Jose COCERO, Professor, University of Valladolid, Spain			
Number of Participants	Total: 77 (Int'l participants: 63) Invitees: 1 (Int'l participants: 1)			
Duration of Visit	From October 22, to October 29, 2023			

1. Seminar Overview

The seminar given by Prof. Maria Jose Cocero focused on the concept of the development of sustainable biorefineries focusing on valorization of lignin which can be used as raw material for various products including thermoplastics and various aromatic compounds. Other future potential applications of lignin were also discussed. Some key important topics on biomass were also addressed including overviews of biorefinery, biomass and biobased products. This seminar was participated by many researchers and students (both online and on-site).

2. Seminar Outcomes and Future Plan

This seminar has broadened the knowledge of participating researchers and students on many aspects of "sustainable biorefineries". Research-related activities other than the seminar were as follows:

1. Discussion regarding our 2 on-going projects - KAKENHI-funded International Joint Project and Bilateral Joint Research Project (Open Partnership) on the application and analysis of "CO_2-H_2O System for Biomass Valorization".
2. Consultation of graduate students on the topics related to biomass conversion technologies.
3. Discussion on the contents of our 2 papers (in preparation):
   1. "Selective Cleavage of Glycosidic Bonds Using the CO_2-H_2O Synergy", (Green Chemistry, in preparation)
   2. "Ultrafast Reactor for Selective Hydrolysis of Bioflavonoids", (ACS Sustainable Chemistry and Engineering, in preparation)
4. Discussion to further strengthen our future collaboration on research and academic exchanges.

For this purpose, 1 Japanese graduate student has been dispatched to Prof. Cocero's laboratory for a 2-month research internship in academic year 2023. Kumamoto University has also been included as an associate member institution in the recently submitted "Erasmus Mundus Academic Exchange Program" application by Valladolid University.

For IROAST and Kumamoto University, it is expected that this active joint research and academic collaboration with Prof. Maria Jose Cocero of Valladolid University, the leading academic institution in Spain, will continue to yield significant results, and the seminars to be held will be able to make a significant contribution to further development of human resources, and for active promotion of

international joint research between Japan and European countries.

Prof. COCERO

Organizer: Prof. QUITAIN

On-line

Group Photo

Held in Hybrid--Please contact IROAST for Zoom URL

104TH IROAST SEMINAR

12:55～14:25, Friday, October 27, 2023
@Kurokami North E6: College of Cross-Cultural and Multidisciplinary Studies(Center for International Education)

Development of Sustainable Biorefineries: Valorization of Lignin

Prof. Maria Jose Cocero,
University of Valladolid, Spain

Organizer: Prof. Tetsuya Kida, FAST, Kumamoto University
Prof. Armando T. Quitain, Center for International Education, Kumamoto University

IROAST
Phone: 096-342-3362 E-mail: szk-kiko@jimu.kumamoto-u.ac.jp
Website: https://iroast.kumamoto-u.ac.jp/

IROAST Seminar Report

<table>
<tr><td rowspan="2">No.4-2-11
(Seminar)</td><td>Name</td><td>László PUSZTAI</td><td>Title</td><td>Scientific advisor /
IROAST Distinguished Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">HUN-REN Wigner Research Centre for Physics, Hungary</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Ichiro AKAI</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Institute of Industrial Nanomaterials</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 105th IROAST Seminar
“Understanding the structure of liquids: from the stone age to artificial intelligence”</td></tr>
<tr><td>Venue</td><td colspan="4">Online and
On-site:Room C226, Kurokami South E1 (Faculty of Science Bldg. 1 & 2)</td></tr>
<tr><td>Time & Date</td><td colspan="4">14:00-15:30, November 7, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">László PUSZTAI, Scientific advisor
HUN-REN Wigner Research Centre for Physics, Hungary</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 22 (Int’l participants: 5)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From November 6 to November 19, 2023</td></tr>
</table>

Professor Pusztai is a visiting professor at IROAST for about ten years. He is a very famous specialist of data analysis on structures of non-crystalline materials, working at Wigner Reaearch Centre for Physics at Budapest in Hungary.

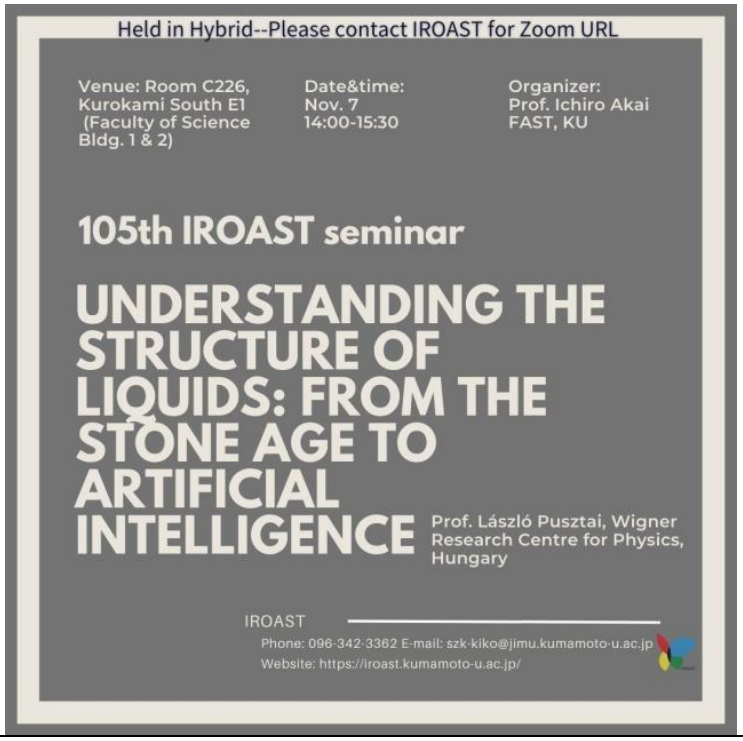
In this seminar, he firstly gave an interesting lecture to overview the history of studies of liquid structures by human from the stone age to the present. Then, he introduced his reverse Monte Carlo (RMC) analysis on typical liquid materials. Finally, he pointed out the feasibilities and disadvantages of this method.

Faculty members and students from both on-campus and overseas participated in the seminar, not only at the venue but also online. Note that many attendees joined on-line although no special advertisement were made, which shows that his RMC modeling achieves large interests from Japanese and overseas scientists. Many important questions were given from the on-site and on-line audiences, which made his talk more understandable for all the seminar attendees.

We believe that the scientific collaborations with him is very important to understand the details of structures of new materials, not only non-crystalline but also complex crystals. In fact, many coauthoring papers with him appear from Kumamoto University as well as other institutes such as NIMS, Kyoto University, J-PARC, and SPring-8.

Fig. 1. Prof. PUSZTAI talking in the seminar

Fig. 2. Photograph of Prof. PUSZTAI and some seminar attendees



IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-7
(Invitation Program)
No.4-2-12
(Seminar)</td><td>Name</td><td>Tomoyasu MANI</td><td>Title</td><td>Associate Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Department of Chemistry, University of Connecticut, USA</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Yutaka KUWAHARA</td><td>Title</td><td>Assistant Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Faculty of Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 106th IROAST Seminar -Photogenerated Spin-Correlated Radical Pairs as Molecular Qubits-</td></tr>
<tr><td>Venue</td><td colspan="4">International Seminar room, Kurokami South W4 (Faculty of Engineering Research Bldg. II)</td></tr>
<tr><td>Time & Date</td><td colspan="4">11:15-12:15, November 14, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Tomoyasu MANI, Associate Professor, Department of Chemistry, University of Connecticut, USA</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 18 (Int’l participants: 4)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From November 12, to November 19, 2023</td></tr>
</table>

-Seminar report -

We invited Dr. Tomoyasu Mani as a speaker of the 106th IROAST seminar held on November 14, 2023. He is an associate professor at the University of Connecticut, USA, and is also a visiting associate professor of IROAST. About 20 students and faculty members joined the seminar and discussed his talk entitled ‘Photogenerated Spin-Correlated Radical Pairs as Molecular Qubit’. In this seminar, Dr. Mani demonstrates the strategies of designing optically addressable SCRPs-based molecular qubits and the implications of his study in quantum sensing applications. (SCRPs: photogenerated spin-correlated radical pairs)

His talk strongly impressed young students and researchers who were not familiar with the scientific fields associated with the talk. I believe the audience could recognize the importance of our collaboration. Recently, a partial study correlated with this seminar has been reported as a result of collaboration with Kumamoto Univ. (in 2023).

We had a discussion on the application of new research projects for a grant supported by a US research funding agency in the near future.


At the venue

106th IROAST Seminar

November 14, 2023, 11:15～

International Seminar Room, 2F, Kurokami South W4 (Faculty of Engineering Research Bldg. II)

Photogenerated Spin-Correlated Radical Pairs as Molecular Qubits

Assoc. Prof. Tomoyasu Mani
University of Connecticut/Brookhaven National Laboratory, USA

Organizer: Assist. Prof. Yutaka Kuwahara
Faculty of Advanced Science and Technology, Kumamoto University

IROAST
Phone: 096-342-3362 E-mail: szk-kiko@jimu.kumamoto-u.ac.jp
Website: https://iroast.kumamoto-u.ac.jp/

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-8
(Invitation Program)
No.4-2-13
(Seminar)</td><td>Name</td><td>Josep-Lluís BARONA-VILAR</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Institute of History of Medicine and Science López Piñero (IHMC), University of Valencia, Spain</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Makoto TAKAFUJI</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Faculty of Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 107th IROAST Seminar
“Artificial Intelligence in Health Care. Potentials, risks and ethical impact”</td></tr>
<tr><td>Venue</td><td colspan="4">Room 203, 2F, Kurokami South W3
(Academic Commons Kurokami Bldg. 1)</td></tr>
<tr><td>Time & Date</td><td colspan="4">16:00-17:15, November 15, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Josep-Lluís BARONA-VILAR, Professor, University of Valencia, Spain</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 23 (Int’l participants: 9)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From November 12, to November 19, 2023</td></tr>
</table>

-Seminar report -

1. Seminar Overview
   Artificial Intelligence (AI) refers to the ability of algorithms to learn from data and perform automated tasks without explicit programming by humans at each step of the process. In this seminar, Prof. Josep BARONA focused particularly on the use of AI in healthcare, discussing its application areas and major contributions to clinical practice, biomedical research, public health, and public administration. He also addressed the types of AI relevant to healthcare, their potential contributions, risks, and policy options. The lecture was intended to stimulate awareness and critical approaches to the capabilities and societal uses of AI.
2. Seminar Outcomes and Future Plan
   Members of the research cluster of “Nano-organics and Nano-hybrids” (Prof. Makoto TAKAFUJI and Dr. Nanami HANO) visited University of Valencia on July, 2023, and discussed on the reserch topics including nano-hybrid materials with Prof. Josep BARONA and Prof. Eugenio CORONADO. We discussed extending our exchange activities to include mutual visits and exchange activities between students of both universities. We agreed to proceed with preparations for the conclusion of a student exchange agreement in the future. During Prof. Josep BARONA's visit, we again discussed student and academic exchanges and consulted concrete action plans for the future.

-Activities report with visiting (associate) professor-

3. Research achievements during his/her stay in Kumamoto University.
   *We visited KM Biologics, Co. Ltd. to observe the influenza vaccine production process and to exchange views with the company's researchers on vaccine development and historical background.
   *He exchanged views with visiting graduate students (international students) from Turkey, Djibouti, and Ethiopia, as well as Japanese graduate students.
   *We exchanged views with Prof. Sims Lander of the Center for International Education on student exchange (Kumamoto University GLC students visiting the University of Valencia) and asked Prof. Barona to consider the possibility of accepting them at the University of Valencia.

Prof. BARONA

Organizer: Prof. TAKAFUJI

At the venue

4. Prospect for further research collaboration.
   In 2024, we will organize a exchange with the University of Valencia to discuss the evaluation of photo-functions of supramolecular assemblies with complexation ability, and to discuss the policy of joint research activities. We will also prepare for the conclusion of a student exchange agreement (an academic exchange agreement has already been concluded).

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-9
(Invitation Program)
No.4-2-14
(Seminar)</td><td>Name</td><td>Marc DE BOISSIEU</td><td>Title</td><td>Senior Scientist
(Research Director)</td></tr>
<tr><td>Affiliation</td><td colspan="3">SIMaP-Grenoble Alpes University, France</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Ichiro AKAI</td><td>Title</td><td>Director</td></tr>
<tr><td>Affiliation</td><td colspan="3">Institute of Industrial Nanomaterials (IINA)</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 108th IROAST Seminar
Thermal conductivity and lattice dynamics in structurally complex materials</td></tr>
<tr><td>Venue</td><td colspan="4">Room C122, Kurokami South E1 (Faculty of Science Bldg. 1 & 2)
Online via Zoom</td></tr>
<tr><td>Time & Date</td><td colspan="4">16:25-17:55, November 28, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Marc DE BOISSIEU, SIMaP-Grenoble Alpes University, France</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 32 (Int’l participants: 4)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From November 22 to November 29, 2023</td></tr>
</table>

Dr. de Boissieu was a visiting professor at IROAST until recently. He is a specialist of materials science on complex crystals, particularly quasicrystal. He is invited as a speaker of Materials Research Meeting 2023 held in Kyoto in December 2023, and he visited Kumamoto University on that occasion.

In this seminar, he gave a broad view of his research findings and experiences on thermal conductivity and lattice dynamics in structurally complex materials. He introduced experimental techniques of thermal and dynamic properties of some typical complexed crystals and explained detailed relations between these results.

Faculty members and students from both on-campus and overseas participated in the seminar, not only at the venue but also online. His talk included some different levels for the qualities of comprehension levels of the audiences. Several important questions were given from the on-site and on-line audiences, which made his talk more understandable for all the seminar attendees.

He is working at Grenoble in France, where a large synchrotron facility ESRF and a strong neutron source ILL provide high qualities of experimental data on materials science. Accordingly, it is very important for staffs and students of Kumamoto University to continuously connect with him for conducting Japan-France international collaborations using these facilities.

Dr. DE BOISSIEU at the IROAST seminar

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-10
(Invitation Program)
No.4-2-15
(Seminar)</td><td>Name</td><td>Gioacchino VIGGIANI</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Solid Mechanics and Civil Engineering,
Université Grenoble Alpes, France</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Toshifumi MUKUNOKI</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Faculty of Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 109th IROAST Seminar
Recent developments in laboratory testing of geomaterials, with emphasis on imaging</td></tr>
<tr><td>Venue</td><td colspan="4">Room 223, Kurokami South C8 (Faculty of Engineering Bldg. 2)</td></tr>
<tr><td>Time & Date</td><td colspan="4">12:55-14:25, December 8, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Gioacchino VIGGIANI, Professor, Université Grenoble Alpes, France</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 31 (Int’l participants: 5)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From December 6, to December 10, 2023</td></tr>
</table>

-Seminar report -

1. Seminar Overview

Prof. Cino Viggiani has been serving as the Head of Laboratoire 3SR in Grenoble since 2013. Under his leadership, the laboratory has seen the development of various groundbreaking projects, including the creation of a neutron CT scanner by one of his talented young researchers. Prof. Viggiani's research encompasses both experimental investigations and theoretical and numerical modeling of geomaterial behavior, focusing on aspects such as localized failure and hydro-mechanical coupling.

His recent endeavors have expanded into scanning hydromechanical issues using tomography technology. On the experimental front, he has been instrumental in the development and utilization of a diverse array of soils and rock testing apparatus. Advanced methods, such as X-ray tomography and Digital Image Correlation, have been integral to his research.

During a seminar, Prof. Viggiani provided an introduction to the basic concepts of X-ray tomography for new students. He illustrated these concepts with compelling examples utilizing his original micro-X-ray CT scanner. Following this, he posed a crucial question to the students: 'So What?' This challenge aimed to encourage critical thinking about the relevance and implications of their research.

Prof. Viggiani emphasized the importance of not relying blindly on X-ray CT scanners and urged caution. This message is particularly significant for young students who may be tempted to interpret images without considering the broader context. He deliberately encouraged students to pause, reflect on the meaning of their research, and avoid hasty conclusions.

In sharing his own research journey, Prof. Viggiani highlighted the role of water in the deformation of clay due to water movement and loading. While X-ray CT scanners faced limitations in visualizing water within the clay samples, he recognized that neutron technology could overcome this challenge. The seamless flow of his presentation captivated the audience and left a lasting impact, inspiring a drive to explore new avenues of discovery.

2. Seminar Outcomes and Future Plan

Most of the students who attended today's seminar were users of X-ray CT for their research. Inspired by the impressive outcomes of Prof. Viggiani's research, some of them have found increased motivation for their own projects. This was one of the anticipated outcomes of the seminar for me.

Prof. VIGGIANI

Organizer: Prof. MUKUNOKI

At the venue

Group Photo

Given Prof. Viggiani's increasingly busy schedule, it may be challenging for him to return to Kumamoto next year. However, as part of our collaborative research efforts, we have devised a plan to invite one of his young researchers as the next speaker in Kumamoto.

-Activities report with visiting professor-
3.Research achievements during his/her stay in Kumamoto University.

After the seminar, Prof. Viggiani visited the X-ray CT room, and we engaged in discussions on advancing collaborative research with the younger generation. Currently, trustee of Kumamoto

University, Dr. Otani looks for new collaborator and we are in the process of developing a research consortium that includes Italy, Germany, and France. Prof. Viggiani proposed the inclusion of Associate Professor Claudia Vitone in our collaboration. Based on his recommendation, Prof. Vitone specializes in Geoenvironmental engineering and is known for her open-minded approach. As a first step towards establishing the Quadrilateral consortium, we tried to create a research map to guide our collaborative efforts.

4. Prospect for further research collaboration.

My master's student has been conducting research at Laboratoire 3SR in Grenoble since last September, marking the commencement of our collaborative efforts. Prof. Viggiani's lecture has also sparked a new idea related to viscous fingering in porous media—a topic I am currently focusing on. One of my PhD candidates has been exploring this area using the micro-focused X-ray CT system at the X-Earth Center in Kumamoto University.

Recognizing the potential for fresh insights offered by neutron CT, I am eager to submit a new research proposal to JSPS funding next year. The proposal aims to invite a younger researcher from Prof. Viggiani's team. Furthermore, Prof. Viggiani's role as a co-organizer of the International Symposium 'Geomechanics from Micro to Macro' within the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) has added to our motivation. As a result, our team is now enthusiastically planning to attend the symposium in Grenoble in 2024.

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-11
(Invitation Program)
No.4-2-16
(Seminar)</td><td>Name</td><td>Agus Pulung SASMITO</td><td>Title</td><td>Associate Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">McGill University, Canada</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Atsushi SAINOKI</td><td>Title</td><td>Associate Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Faculty of Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 110th IROAST Seminar
Two-phase closed thermosyphon for artificial ground freezing and geothermal heat extraction</td></tr>
<tr><td>Venue</td><td colspan="4">Room 422, Kurokami South C2 (Faculty of Engineering Bldg. I)</td></tr>
<tr><td>Time & Date</td><td colspan="4">13:00-14:30, December 12, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Agus Pulung SASMITO, Associate Professor, Department of Mining and Materials Engineering, McGill University, Canada</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 14 (Int’l participants: 8)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From December 8, to December 21, 2023</td></tr>
</table>

Prof. Sasmito gave a lecture on two-phase closed thermosyphon for artificial ground freezing and geothermal heat extraction. The application of the system to the ground freezing is the underground storage of arsenic in permafrost ground in Canada. When arsenic was deposited dozens of years ago, the ground was permafrost, so that there was no risk for the toxic material to leak-off. However, due to the effect of global warming, there is a possibility that permafrost thawing is taking place. Hence, to prevent leak-off, the ground needs to be frozen.

The thermosyphon applied to the ground employs carbon dioxide and take an advantage of the extremely low temperature in Canada in winter. The carbon is injected a closed borehole and cooled down at the top that has a contact with the atmosphere of which temperature goes down below minus 30 degrees during winter, so that the carbon dioxide is liquefied and moves downward in the borehole. The ground temperature decreases with the depth, while the pressure of liquefied carbon dioxide increases as the depth increases. When a certain condition is satisfied, the liquefied carbon dioxide is gasified, hence absorbing the heat of the ground. Then, the gaseous carbon dioxide goes upward due to convection. When the gas goes up to the level above the ground surface, it is cooled down and liquefied, starting to go down to the underground. In this way, the ground is frozen.

Prof. Sasmito improved the numerical simulation method of the thermosyphon system by considering the gasification of carbon dioxide at the depth whilst generating very dense meshes of which size is as small as 1.0 mm to consider bubbles of carbon dioxide. In addition to that, various constitutive models have been nearly implemented to improve the accuracy of the simulation and consider the behaviour of carbon dioxide in the borehole. The result was compared to empirical methods that are commonly used in the field.

In addition to that, Prof. Sasmito is proposing a new thermosyphon system that be an alternative solution to the conventional hybrid thermosyphon system using electric energy to cool down carbon dioxide during summer. The idea is to construct another thermosyphon system to store the energy during winter, which can be used to cool down the ground during summer. In this way, there is no need to use electric energy during summer.

The lecture was impressive and attracted the audience. During question time, keen discussions were made regarding the mechanism of the system and validation method. Also, a professor conducting similar research at Kumamoto University attended this lecture and seems to have enjoyed the lecture.

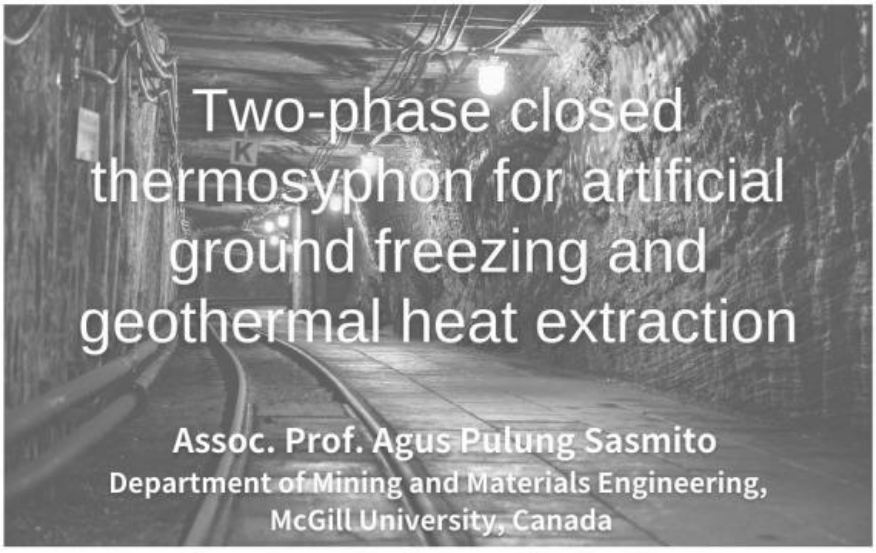
Assoc. Prof. SASMIT

Organizer: Assoc. Prof. SAINOKI

At the venue

110th IROAST Seminar

December 12, 2023, 13:00～
Room422, Kurokami South C2
(Faculty of Engineering Bldg. I)



Organizer: Assoc. Prof. Atsushi Sainoki
Faculty of Advanced Science and Technology,
Kumamoto University

IROAST
Phone: 096-342-3362 E-mail: szk-kiko@jimu.kumamoto-u.ac.jp
Website: https://iroast.kumamoto-u.ac.jp/

During his stay in Japan, he participated into two research meetings: oil sand and geothermal. The first one is collaborating research project with Prof. Mukunoki and me. The PhD student of Prof. Mukunoki gave a presentation about the experimental result of fluid injection to sand specimen saturated with syrup whilst showing CT images and other parameters, such as injection pressure and weight of syrup dissolved in the injected water. A fruitful discussion was made on the mechanism governing fluid permeation into the syrup present in pores in the sand specimen, based on the rise and drop of fluid pressure during the experiment. It was concluded that a further discussion would be needed to clarify the mechanism after conducting another test with low fluid injection rates in order to control advection during the experiment and focus more on diffusion. Then, a simulation will be performed whilst considering the constitutive behaviour of the injected water and the syrup. This is a new collaborative study, and the research group of The University of British Columbia, Prof. Ali Madiseh and Dr. Parham Samea, plays a pivotal role in this project to perform the simulation. Hence, this research project will continue, and a couple of papers are expected to be published in the future.

As for the project on geothermal, Prof. Sasmito visited a new hydrogen generation plan in Oita. The interesting point of the plan is that geothermal energy is used to generate electricity and generate hydrogen. This is a new way to use geothermal-based electricity and has a huge potential in the future because fossil fuel can be replaced with hydrogen. In addition to this, Prof. Sasmito made a visit to Obayashi corporation in Tokyo and made a discussion in order to present what has been done about the numerical simulation of coaxial heat exchanger. This is a research project that Prof. Sasmito, Prof. Madiseh and I have been working together since 2018. New simulation results considering the advection of geothermal fluid were presented, and a discussion was made on further research collaboration whilst introducing geothermal research projects in Canada and its potential.

At the Geological Museum, National Institute of Advanced Industrial Science and Technology (AIST)

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

No.3-1-12 (Invitation Program) No.4-2-17 (Seminar)	Name	Wen-Shing LEE	Title	Professor
	Affiliation	National Taipei University of Technology, Taiwan		
Host Faculty/ Organizer	Name	Makiko KOBAYASHI	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology		
Seminar Title	The 111th IROAST Seminar Data Mining in Energy Management System			
Venue	Room 204, Kurokami South W2 (Faculty of Engineering Core Laboratory Building)			
Time & Date	10:25-11:55, December 21, 2023			
Speaker's Name/ Title/Affiliation	Wen-Shing LEE, Professor, National Taipei University of Technology, Taiwan			
Number of Participants	Total: 13 (Int'l participants: 2) Invitees: 1 (Int'l participants: 1)			
Duration of Visit	From October 25 to December 29, 2023			

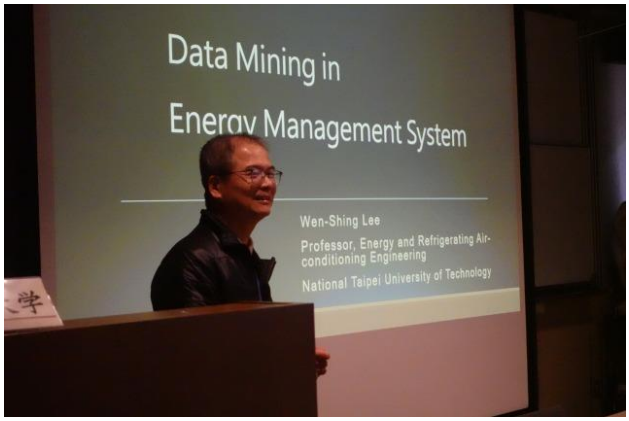
-Seminar report -

1. Seminar Overview

The content was about estimating air conditioning malfunctions, optimal temperature settings, and the number of units based on trends in power consumption.

2. Seminar Outcomes and Future Plan

Our team member learned effectiveness of data mining technique. Discussion for collaborated research with Taipei Tech was started. In 2024, IEEE IUS Symposium will be held in Taipei, thus we will meet there for future discussion.



Prof. LEE

Organizer: Prof. KOBAYASHI

At the venue

-Activities report with visiting (associate) professor-
3.Research achievements during his/her stay in Kumamoto University.

Unfortunately, health condition of Kobayashi was not perfect at that moment due to the sickness, there was no collaborated research progress, though he submitted some papers.

4. Prospect for further research collaboration.

Kobayashi and Tanabe will visit Taipei in Sep. 2024, and we will discuss about collaboration possibility.

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-13
(Invitation Program)
No.4-2-18
(Seminar)</td><td>Name</td><td>Helen XU</td><td>Title</td><td>Senior Lecturer</td></tr>
<tr><td>Affiliation</td><td colspan="3">School of Biomedical Engineering,
University of Technology Sydney, Australia</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Ruda LEE</td><td>Title</td><td>Associate Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Institute of Industrial Nanomaterials</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 112th IROAST Seminar
Development of Upconversion Nanomaterials for Precision Theranostics</td></tr>
<tr><td>Venue</td><td colspan="4">Room 306, 3F, Kurokami South S6
(Venture Laboratory, Shock Wave and Condensed Matter Research Building)</td></tr>
<tr><td>Time & Date</td><td colspan="4">10:30-11:30, December 15, 2023</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Helen XU, Lecturer, School of Biomedical Engineering, University of Technology Sydney, Australia</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 12 (Int’l participants: 2)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From December 11, to December 18, 2023</td></tr>
</table>

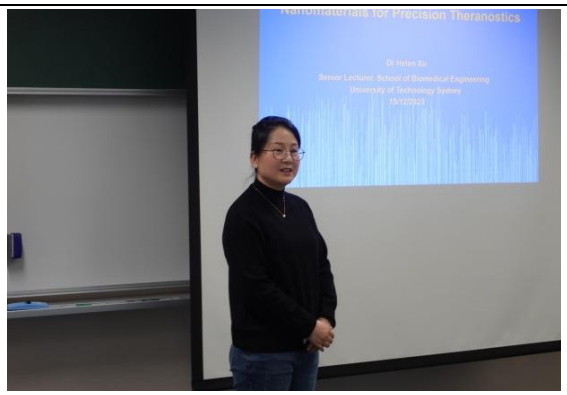
-Seminar report -

1. Seminar Overview

Dr. Helen Xu is one of the leading researchers in the field of upconversion nanoparticles. Upconversion nanoparticle (UCNPs) have a photoluminescent ability to emit higher energy emissions at UV and visible range after absorption of two or more photons from lower energy wavelength. Lanthanide ions doped UCNPs (Ln-UCNPs) is one of the most promising candidates for biomedical imaging diagnosis and biophotonics therapy. The Ln-UCNPs present unique optical, electronic and magnetic properties which have attracted broad biomedical applications. This seminar will focus on the development of UCNPs for precision theranostics including the programmed fabrication of UCNPs, the optical and magnetic properties tailoring for super-resolution optical imaging, surface functionalization for cell labelling, multimodal biomedical imaging and light triggered drug delivery. This seminar will also briefly introduce the recent work on biodegradable copper and zinc alloys employed for biomedical implants and devices.

2. Seminar Outcomes and Future Plan

During the visiting period, Dr. Helen and I discussed about the grant application for Australia-Japan in FY2024. We have plan to prepare MTA for the cell line shipment and on October 2024, I have plan to visit UTS for experimental collaboration. One of Dr. Helen Xu’s Ph.D. student will co-supervising from 2024 and prepare research paper. We plan to submit the research paper by the end of 2025 to Bioactive Materials (IF 18.90) and one review paper for 2024.

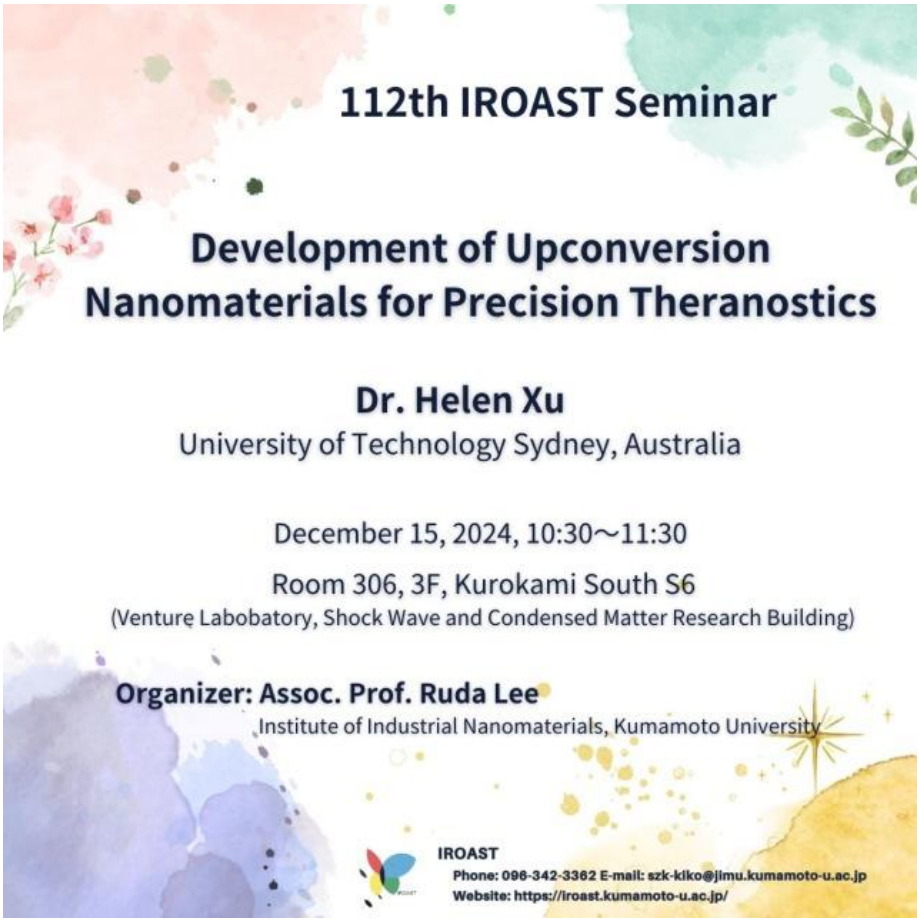


Dr. XU

Organizer: Assoc. Prof. LEE

At the venue

Group Photo



IROAST Seminar Report

No.4-2-19 (Seminar)	Name	Tomonari FURUKAWA	Title	Professor
	Affiliation	University of Virginia, USA		
Host Faculty/ Organizer	Name	Makoto KUMON	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology		
Seminar Title	The 113th IROAST Seminar Motion Tracking of a High-Speed Humanoid Using Dynamic Measurements Fusion			
Venue	Room 231, Kurokami South C8 (Faculty of Engineering Bldg. 2)			
Time & Date	8:40-10:10, December 22, 2023			
Speaker's Name/ Title/Affiliation	Tomonari FURUKAWA, Professor, Department of Mechanical and Aerospace Engineering, University of Virginia, USA			
Number of Participants	Total: 33 (Int'l participants: 1) Invitees: 1 (Int'l participants: 0)			
Duration of Visit	From December 20, to December 27, 2023			

-Seminar report -

1. Seminar Overview

The seminar focused on the topic of high-speed motion of multi-link systems to analyze human body deformation in a car crash. It was a very timely topic as the safety verification of automobiles by car companies was a big concern in Japan. Integration of SLAM technology which is one of Prof. Furukawa's fields of expertise to attenuate distortion by the camera ego-motion in observing the car-chassis deformation was explained with various experimental results.
Other current research projects organized by Prof. Furukawa were also introduced.

2. Seminar Outcomes and Future Plan

The seminar could attract more than 30 students and some faculty members even in the morning. As the organizer recognized that some attended students were taking the Robotics course, it was good for such students to know that the fundamentals of the multi-link system model that was taught in the class formed the basis of the cutting-edge technology.
Two graduate students of the Graduate School of Science and Technology (GSST) who attended the seminar visited Prof. Furukawa's site from Feb. 6 to Mar. 8 of 2024 to conduct collaborative research with partial financial support of GSST. Prof. Furukawa advertised their visit in his seminar to the audience including undergraduate students, which motivated them to work or study internationally.
The achievement by the two GSST students includes the work on the escort robot project that is currently one of the collaborative projects between Prof. Furukawa and me. As the platform to conduct further experiments has been well-established thanks to the students' efforts, this collaborative project will be continued, and the outcomes will be reported as academic papers in the future.

Prof. FURUKAWA

Organizer: Prof. KUMON

At the venue

IROAST Seminar Report

4-2-20 (Seminar)	Name	Hiroto KITAGUCHI	Title	Senior Professor
	Affiliation	University of Birmingham, UK		
Host Faculty/ Organizer	Name	Yoji MINE	Title	Professor
	Affiliation	Faculty of Advanced Science and Technology		
Seminar Title	The 114th IROAST Seminar Towards comprehensive understanding in material characterisations - Power of electron microscopy (EM) −			
Venue	Room 203, Kurokami South C3 (Faculty of Engineering Research Bldg. I)			
Time & Date	10:30-11:30, January 10, 2024			
Speaker's Name/ Title/Affiliation	Hiroto KITAGUCHI, Senior Research Fellow, School of Metallurgy and Materials, University of Birmingham, UK			
Number of Participants	Total: 18 (Int'l participants: 1) Invitees: 1 (Int'l participants: 0)			
Duration of Visit	From January 9, to January 10, 2024			

-Seminar report -

1. Seminar Overview

Following over 15 years of a journey in the UK, started as a student, then becoming a professional in both academia and industry, he has a great appreciation for the fundamental characterisation technique of EM for comprehensive understanding in material characterisations to understand physical properties in metallic materials. It is also becoming apparent they may have started pushing the limitations of these techniques. Multiple solutions for these issues can be sought, such as correlative analyses with theoretical calculations/simulations. In this talk, he discussed above using polycrystalline Ni based superalloys.

2. Seminar Outcomes and Future Plan

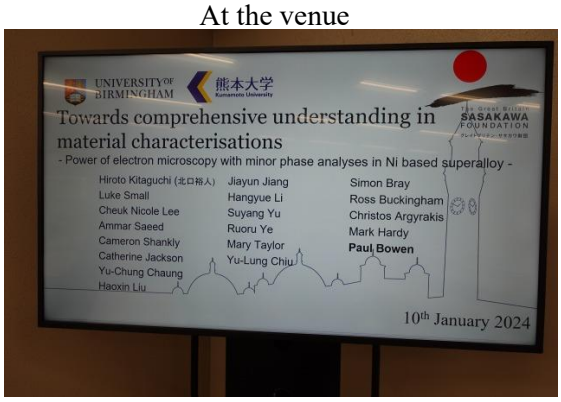
We have started to discuss new international collaborative researches on two topics: (1) Intergranular fracture mechanisms in advanced steel and nickel super alloy, (2) Mechanical characterisation of additively manufactured alloy.

Dr. KITAGUCHI

Organizer: Prof. MINE

At the venue

Interaction with participants over light meals



Group photo

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-14
(Invitation Program)
No.4-2-21
(Seminar)</td><td>Name</td><td colspan="2">Amir Si LARBI
Konstantinos Daniel TSAVDARIDIS</td><td>Title</td><td>Professor
Professor</td></tr>
<tr><td>Affiliation</td><td colspan="4">ENISE, University of Lyon, France
City, University of London, UK</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Gaochuang CAI</td><td>Title</td><td colspan="2">Associate Professor</td></tr>
<tr><td>Affiliation</td><td colspan="4">International Research Organization for Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="5">The 115th IROAST Seminar</td></tr>
<tr><td>Venue</td><td colspan="5">Conference Room B, Kurokami South C2 (Faculty of Engineering Bldg. 1)</td></tr>
<tr><td>Time & Date</td><td colspan="5">13:30-16:30, January 26, 2024</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="5">Amir Si LARBI, Professor, ENISE, University of Lyon, France
Konstantinos Daniel TSAVDARIDIS, Professor, City, University of London, UK
Nonna AlGOURDIN, Associate Professor, University of Lyon, France</td></tr>
<tr><td>Number of
Participants</td><td colspan="5">Total: 15 (Int’l participants: 14)
Invitees: 2 (Int’l participants: 2)</td></tr>
<tr><td>Duration of Visit</td><td colspan="5">From January 21, to January 29, 2024</td></tr>
</table>

-Seminar report -

1. Seminar Overview

The theme of this seminar is Structural Safety and Rehabilitation. Mainly students from our school, doctoral students and master's students from France and the UK participated, and some very meaningful discussions were held. In the seminar, Prof. Amir SI LARBI and Prof. Konstantinos Daniel TSAVDARIDIS, Dr. Nonna Algourdin (ENISE, University of Lyon, France), and Dr. Cai presented their research on earthquake-resistant structure and design from their respective research fields.

This seminar was held as part of the JST Sakura Science Exchange Program in FY2023. The students from France and the U.K., as well as those from Kumamoto University, listened with great interest to the research results of their respective universities.

2. Seminar Outcomes and Future Plan

>>Contribution to the development of young researchers

An agreement has been signed by Prof. Amir Si Larbi and Dr. Cai to send one Japanese postgraduate student to the University of Lyon each year after FY2025 for at least one month of academic stay.

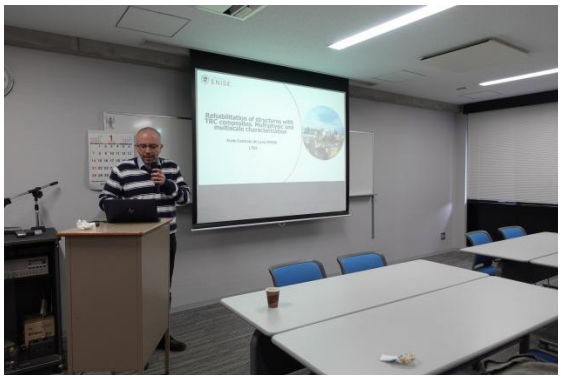
>>Publication of international collaborative papers:

Based on the collaboration with the visitors, the following journal papers are UNDER REVIEW,

[1] Cai, G.*, Wen, Y.*, Malla, P., Fujinaga, T., Si Larbi, A. (2024). Effect of axial load and shear span on seismic performance of CFT columns reinforced with end-fixed ultra-high strength rebars, *Bulletin of Earthquake Engineering.*

[2] Su, Q., Qi, W., Liu, Y., Cai, G.*, Si Larbi A. (2024) Cracking Damage Analysis of Bridge-Railway Station RC Structures Considering Concrete Shrinkage, Creep, and Environmental Temperature.

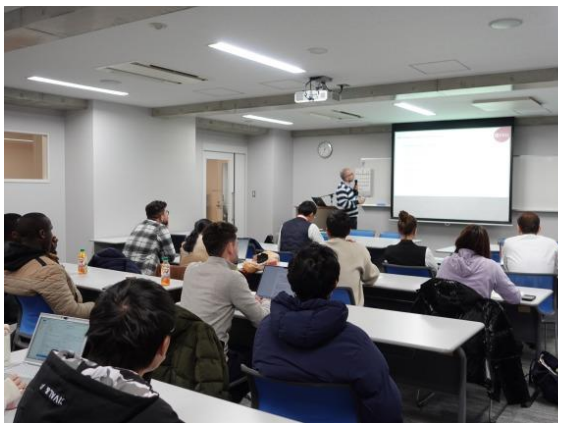
Engineering, Construction and Architectural Management.
[3] Khan, J.*, Si Larbi, A., Algourdin, N., Mesticou, Z., Aggelis, G., Cai, G. (2024). A holistic study on the mechanical behavior and acoustic emissions of textile reinforced mortar (TRM) strengthened reinforced concrete beams in flexure. *Construction and Building Materials.*
[5] Khan, J.*, Si Larbi, A., Algourdin, N., Mesticou, Z., Aggelis, G., Cai, G. (2024). Monitoring of acoustic emissions (AE) in TRM composites, and the use of supervised learning for bifurcation of cracking & non-cracking major damage based on AE-features. *Construction and Building Materials.*
[6] Deng, X., Zhao, J.*, Cai, G.*, Si Larbi, A. (2024) Shear behavior of reinforced concrete beams with high-strength reinforcements after high temperatures. *Construction and Building Materials.*
[7] Khan, J.*, Algourdin, N., Mesticou, Z., Cai, G., Si Larbi, A. (2024). The influence of high temperature exposure on the tensile and cracking behavior of crimped-textile reinforced mortar composites (TRMs). *Construction and Building Materials.*


Prof. Si LARBI


Prof. TSAVDARIDIS


Assoc. Prof. AlGOURDIN


Organizer. Assoc. Prof. CAI


At the venue


Group Photo

-Activities report with visiting (associate) professor-
3. Research achievements during his/her stay at Kumamoto University.
(1) Guidance of students at Kumamoto University side:
-Machine learning model development (PhD student Wen)
-FEM simulation of composite structures (visiting PhD student Deng, Master student Xie)
-Structural repairing and strengthening of concrete structures (PhD student He)
- Data analysis of composite structure (Master student Xie)
(2) Academic writing lecture: Yes. Both done.

4. Prospect for further research collaboration.

Collaboration projects:
Based on our research cluster, according to the current process and results, the following research projects will be conducted next year. These projects will be conducted by two post-doctoral researchers, four Ph.D. students, two master students, and 4 research students at Kumamoto University, and three PhD students from France, and one researcher from the UK. Based on the projects, more than 6 journal articles will be published or submitted to international journals.
(1) Constitutive behavior of RC short columns with textile mesh as transverse reinforcement (France)
(2) Modelling of fire-spalling of TRC repairing layer on old concrete (France)
(3) Numerical analysis of resilient RC (RRC) shear walls under strong earthquakes (KU)
(4) Experimental study on seismic performance of square RRC columns under strong earthquakes (KU)
(5) Numerical study on seismic performance of CFRP-repaired square RRC columns under strong earthquakes (KU)
(6) Modeling of the degradation of TRC-repaired RC beams under a chloride-rich environment. (France)
(7) Performance and model of 3D printed eco-fiber concrete (France)

About funding application:
The following applications are being considered.
(1). JSPS, Bilateral Programs, France and Japan
(2). JSPS, Invitational Fellowships for Research in Japan, U.K. Prof. TSAVDARIDIS.
(3). JSPS, Postdoctoral Fellowships for Research in Japan, U.K. Prof. TSAVDARIDIS recommend

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-15
(Invitation Program)
No.4-2-22
(Seminar)</td><td>Name</td><td>Worapon KIATKITTIPONG</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Silpakorn University, Thailand</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Tetsuya KIDA</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Faculty of Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 116th IROAST Seminar
Lipid-based biorefinery research aligned with Thai strategic industry alliances</td></tr>
<tr><td>Venue</td><td colspan="4">Online/ Conference Room, Kurokami South W4 (Faculty of Engineering Research Bldg. II)</td></tr>
<tr><td>Time & Date</td><td colspan="4">14:00-15:30, February 1, 2024</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Worapon KIATKITTIPONG / Professor / Silpakorn University, Thailand</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 24 (Int’l participants: 11)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From Jan. 30, to Feb 7, 2024</td></tr>
</table>

-Seminar report -

1. Seminar Overview

Dr. Worapon Kiatkittipong is a Professor in the Department of Chemical Engineering, Silpakorn University, Thailand. His research focuses on the implications of biofuel and biochemical production integrated with biorefinery and process intensification concepts. He has published more than 150 ISI/SCOPUS-indexed journal articles, receiving total citations of 4000+ and an H-index of 35. He has been a Guest Editor for many journals and proceedings such as Biomass and Bioenergy, Energies, and Processes. His lecture focused on three bioresource feedstock platforms - amorphous sugars, lipids and lignocellulose - in the context of 'bioresources and biofuels'. A comprehensive scheme was proposed for various possibilities of biofuel production in the three feedstock platforms already commercialized or under development.

2. Seminar Outcomes and Future Plan

Kumamoto University and Silpakorn University have academic and student exchange agreements. Welcoming Professor Worapon to Kumamoto University as a visiting professor will bring this collaboration even closer. Cooperation with Thailand's top university can make a significant contribution to the internationalization of Kumamoto University

Prof. KIATKITTIPONG

Organizer : Prof. KIDA

Group photo

IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-16
(Invitation Program)
No.4-2-23
(Seminar)</td><td>Name</td><td>Pavel LEJĆEK</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Institute of Physics, Czech Academy of Sciences of the Czech Republic, Czech Republic</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Sadahiro TSUREKAWA</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Faculty of Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 117th IROAST Seminar
Introduction to grain boundary segregation</td></tr>
<tr><td>Venue</td><td colspan="4">Room 308, Kurokami South C3 (Faculty of Engineering Research Bldg. I)</td></tr>
<tr><td>Time & Date</td><td colspan="4">13:00-14:20, February 20, 2024</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Pavel LEJĆEK, Professor, Institute of Physics, Czech Academy of Sciences Czech Republic</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 32 (Int’l participants: 2)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From February 15, to February 29, 2023</td></tr>
</table>

1. Seminar Overview

Prof. Pavel Lejček gave a special lecture on “*Introduction to grain boundary segregation*” on February 20, 2024. His lecture was attended by more than 30 people including academic staff and graduate students of Kumamoto University. The abstract of his lecture is as follows:

Grain boundary segregation is one of the important materials properties which may substantially affect their behavior. On one hand, it can cause extended and quick degradation of the material due to the brittle intergranular fracture. On the other hand, it can contribute to stabilization of the nanocrystalline structure of materials due to substantial reduction of the mobility of the grain boundaries. In this lecture, we briefly describe experimental as well as theoretical methods of the study of solute segregation at grain boundaries, derive the basic expressions of interfacial segregation - Gibbs approach and Langmuir–McLean based segregation isotherm - and discuss the important parameters of the grain boundary segregation including the grain size and anisotropy. Finally, we introduce a phenomenological method to prediction the thermodynamic parameters of grain boundary segregation – enthalpy, entropy and binary interaction parameter - and compare the experimental results with calculated data and predicted values of these parameters for example of the grain boundary segregation in bcc iron.

2. Seminar Outcomes and Future Plan

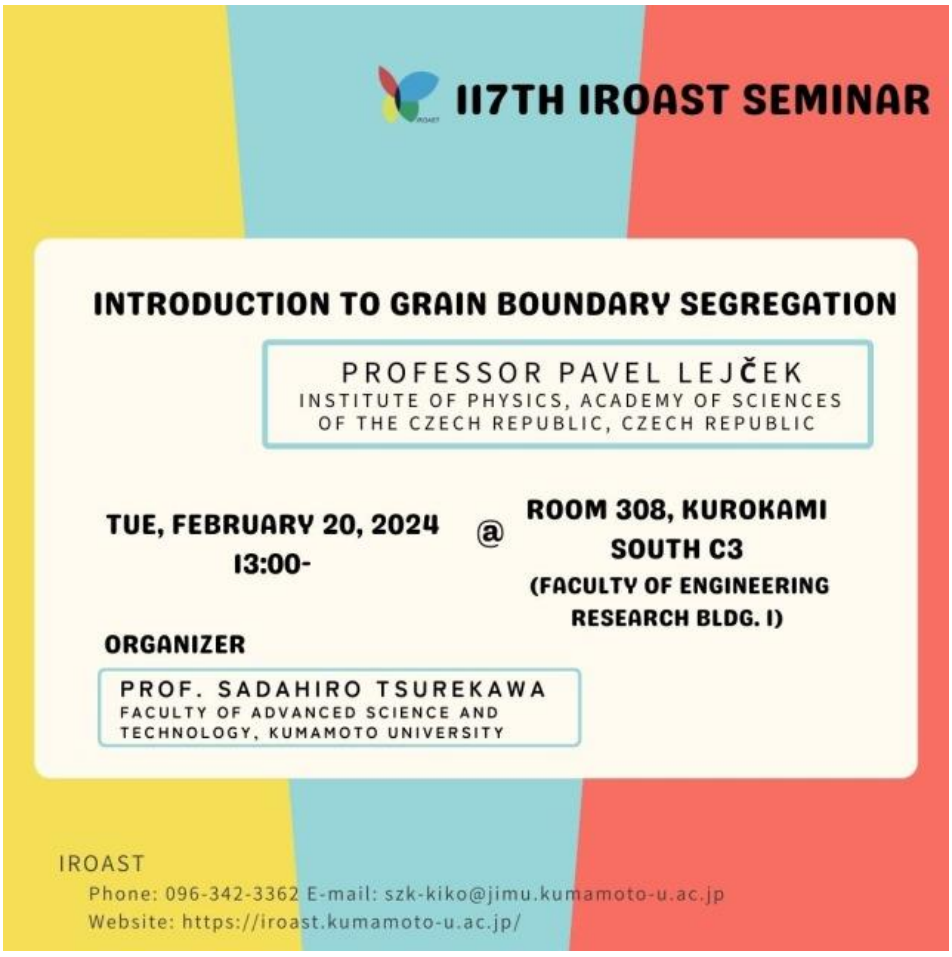
During his stay at Kumamoto University, Prof. Pavel Lejček discussed with undergraduate and graduate students of Prof. Tsurekawa's group about their individual research and provided useful comments. In addition, PL and ST confirmed to continue collaborative research on the high-entropy alloy, with special focus on grain boundary segregation.

Prof. LEJĆEK

Organizer: Prof. TSUREKAWA

At the Venue

Group Photo



IROAST Seminar & Research Activity Report by IROAST Visiting (Associate) Professor Invitation

<table>
<tr><td rowspan="2">No.3-1-17
(Invitation Program)
No.4-2-24
(Seminar)</td><td>Name</td><td>Dario ZAPPA</td><td>Title</td><td>Associate Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">The University of Brescia, Italy</td></tr>
<tr><td rowspan="2">Host Faculty/
Organizer</td><td>Name</td><td>Tetsuya KIDA</td><td>Title</td><td>Professor</td></tr>
<tr><td>Affiliation</td><td colspan="3">Faculty of Advanced Science and Technology</td></tr>
<tr><td>Seminar Title</td><td colspan="4">The 118th IROAST Seminar
“Synthesis and integration of nanosized materials into functional devices”</td></tr>
<tr><td>Style</td><td colspan="4">Conference Room, 2F, Kurokami South W4
(Faculty of Engineering Research Bldg. II)</td></tr>
<tr><td>Time & Date</td><td colspan="4">16:00- 17:30, February 21, 2024</td></tr>
<tr><td>Speaker’s Name/
Title/Affiliation</td><td colspan="4">Dario ZAPPA, Associate Professor
The University of Brescia, Italy</td></tr>
<tr><td>Number of
Participants</td><td colspan="4">Total: 34 (Int’l participants: 11)
Invitees: 1 (Int’l participants: 1)</td></tr>
<tr><td>Duration of Visit</td><td colspan="4">From February 17, to February 27, 2023</td></tr>
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-Seminar report -

1. Seminar Overview

Dario Zappa has been an Associate Professor at the Department of Information Engineering, University of Brescia since 2022. His research activities focused on the synthesis and characterization (morphological, structural, and functional) of nanostructured materials, including metal oxides and dichalcogenides, for different applications, ranging from chemical sensors, e-noses, solid oxide fuel cells (SOFC), and thermoelectric devices.

In the seminar, He talked on the synthesis and integration of some of these nanomaterials into novel and high-performance functional devices, more specifically gas and chemical sensors, fuel cells, batteries and many more. Comprehensive characterization will be presented, highlighting the thrilling performance of fabricated devices.

2. Seminar Outcomes and Future Plan

Many undergraduate and graduate students attended his lecture and discussion meeting. Through active discussions with the professor, the participants were able to gain knowledge on the latest trends in gas sensor technology, which will be of great use in their future research and development.

-Activities report with visiting (associate) professor-

3.Research achievements during his/her stay in Kumamoto University.

Kumamoto University and Brescia University have academic and student exchange agreements. Welcoming Professor Zappa to Kumamoto University as a visiting professor will strengthen this collaboration. Cooperation with one of the Italy's top universities can make a significant contribution to the internationalization of Kumamoto University.

4. Prospect for further research collaboration.

- Application to JSPS Bilateral Joint Research Project
- Graduate student exchanges
- Related Joint Publications

Assoc. Prof. ZAPPA

Prof. KIDA

At the venue

Group Photo

118th IROAST Seminar

Feburary 21, 2024, 16:00～17:30

Conf. Rm., 2F, Kurokami South W4
(Faculty of Engineering Research Bldg. II)

Synthesis and integration of nanosized materials into functional devices

Assoc. Prof. Dario Zappa
University of Brescia, Italy

Organizer: Prof. Tetsuya Kida
Faculty of Advanced Science and Technology,
Kumamoto University

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