Guide Book

22nd Cross Straits Symposium on

Energy and Environmental Science and Technology (22nd CSS-EEST)

Date: December 2nd (Wed.) — 3rd (Thu.), 2020

22nd CSS-EEST will be held online using the "ZOOM Video Communications" software due to COVID-19 pandemic.

Organized by	**Interdisciplinary Graduate School of Engineering Sciences (IGSES), Kyushu University, Japan**
Co-organized by	**Pusan National University, Korea** **Shanghai Jiao Tong University, China**

九州大学 KYUSHU UNIVERSITY　부산대학교 PUSAN NATIONAL UNIVERSITY　上海交通大學 SHANGHAI JIAO TONG UNIVERSITY

Welcome Message

Dear Delegates,

On behalf of the Organizing Committee of 22nd CSS-EEST (The 22nd Cross Straits Symposium on Energy and Environmental Science and Technology), I would like to warmly welcome you to this symposium.

22nd CSS-EEST will be held online using the Zoom Video Communications software due to the coronavirus (COVID-19) pandemic. Holding the symposium online for the first time is no doubt an exciting challenge for us all. The drastic measures that have had to be taken to combat COVID-19 have at least provided us with the opportunity to rethink how this symposium is promoted and organized. I therefore trust that it will provide an excellent platform for all delegates and presenters to obtain valuable information from the varied presentations on state-of-the-art science and technology in the fields of materials, energy, and the environment.

Holding the symposium online will unfortunately mean missing out on many of the benefits of a traditional conference, such as meeting old acquaintances and making new ones face-to-face at the welcome party, banquet and in between presentations. However, the core content remains unchanged, as we will again focus primarily on the three research fields of materials, energy, and the environment. I also hope that you will take advantage of the online tools available to network with other participants before, after, and during the presentations. At the very least, I hope that this symposium inspires you with new ideas for further research directions and collaborations.

Finally, I would like to express my deep appreciation to all presenters for joining us and the organizing committee of KU, PNU, and SJTU for their contributions and efforts in ensuring a successful symposium.

Welcome to 22nd CSS-EEST and I hope you have an enjoyable time!

Jang

Byung-Koog JANG, Professor

Chair of Organizing Committee (22nd CSS-EEST)

Interdisciplinary Graduate School of Engineering Sciences (IGSES), Kyushu University

Organizing Committees

■ Kyushu University

Prof. Byung Koog JANG
Prof. Dong WANG
Prof. Kungen TEII
Prof. Arihiro KANO
Prof. Yusuke KOSUGA
Prof. Takahiko MIYAZAKI
Prof. Hiroki TOKINAGA
Prof. Seigi MIZUNO
Ms. Nahoko ICHIMURA
Ms. Kazuyo NISHIYAMA

■ Pusan National University

Prof. Donggeun LEE
Prof. Bosung SHIN
Prof. Hyokwan BAE
Prof. Gyungmin CHOI
Prof. Sehun KWON
Prof. Jeongeun OH
Prof. Juhun SONG
Prof. Eunseop YEOM
Prof. Jihwan JEONG
Prof. Kuk CHO
Prof. Oi Lun Helena LI
Prof. Changyuk KIM
Prof. Sukkyun AHN
Prof. Jaehyuk KIM
Prof. Youngrae CHO
Prof. Taeho LEE
Prof. Hyungnam KIM
Prof. Heeje KIM
Prof. Gwnaghyo JEONG
Ms. Sooyoung JEONG

■ Shanghai Jiao Tong University

Prof. Yaguang WANG
Prof. Shengrong YANG
Prof. Wenfeng SHANGGUAN
Prof. Zhi JIANG
Prof. Yixin ZHAO
Prof. Tao HANG
Ms. Jia LI
Ms. Jun XU
Ms. Xiaoxu ZHANG
Ms. Chenjing BAO
Ms. Wenyu DENG
Ms. Wensha HUANG
Ms. Xiaoke HU

■ Student Organizing Committee

Akie SAKAI (KU)
Aira KAMITO (KU)
Kazuya ISHIBASHI (KU)
Naoya MINAMIURA (KU)
Tomihiko KOJIMA (KU)
Masaharu FUKUYAMA (KU)
Yukun WANG (KU)
Jihwoan LEE (KU)
Sungjae LEE (PNU)
Jinhyo PARK (PNU)
Heerim SEO (PNU)
Zichao WEI (SJTU)
Qi ZHAO (SJTU)
Chenyi ZHANG (SJTU)

Introduction to CSS-EEST

In 1998, our graduate school (*1, hereafter IGSES) proposed to the Pusan National University (PNU) and the Pohang University of Science and Technology (POSTECH) that a forum for students to interact with one another by “presenting research that integrates materials, energy and the environment in English” be established. The two schools, PNU and POSTECH, were chosen because of their long-standing relationship (*2) with IGSES and relative proximity to Fukuoka. As IGSES bases its research and education on the three pillars of “Materials, Energy and Environment”, establishing the forum was the incarnation of its ethos of “Profound, Broad and Integrated”.

The first Cross Straits Symposium on Materials, Energy and Environmental Sciences (CSS), so named to convey our desire to deepen friendship across the straits between Kyushu/Tsushima and Tsushima/South Korea, was held in November 1999, at the Chikushi Campus under the sponsorship of IGSES. The subsequent symposiums were organized and held by each of respective schools on a rotation basis. In 2013, the symposium series evolved into the Cross Straits Symposium on Energy and Environmental Science and Technology (CSS-EEST) with participation from three countries, IGSES (Japan), PNU (Korea), and SJTU (Shanghai Jiao Tong University, PRC) (*3).

*1: The Graduate School of Interdisciplinary Engineering Sciences Research Department, Kyushu University (before March 2000)/ The Interdisciplinary Graduate School of Engineering Sciences (IGSES), Kyushu University (after April 2000).

*2: PNU as an intercollegiate exchange school and POSTECH is an interdepartmental exchange school. Since 2001, POSTECH has been an intercollegiate exchange school as well.

*3: Kyushu University, PNU, and SJTU are members of the Collaborative Graduate School Program for Global Human Resources Development in Energy and Environmental Science and Technology (the CAMPUS Asia EEST program).

General Information

Oral Presentation

- Keynote: 30 minutes (25 min presentation and 5min Q / A), 3 keynote speakers (Materials for KU, Environment for SJTU and Energy for PNU)
- Student: 15 minutes (approximately < 11 min presentation, 3 min Q / A + 1 min speaker change)
- All students' presentation will be divided into three research fields of Materials, Energy and Environment.

Pre-Check of ZOOM Access

- Date; 14:00 – 15:00 (Japanese local time), November 26th (Thu.) and 27th (Fri.)
- Only One-Time Access is OK in your convenient time.
  If you can't access on November 26th, please access on November 27th.
- Pre-check; Voice, Video and PPT sharing (1~2 min/student)
- ZOOM Access:

***Notice: If you access at ZOOM room, please change your name like [University-Position-Last Name].**

ex) KU-Faculty-KATO, KU-Staff-ICHIMURA, KU-D2-SAKAI, PNU-M2-LEE, SJTU-D3-WANG

Date; 14:00 – 15:00 (Japanese local time), November 26th (Thu.) and 27th (Fri.)			
Your Presentation	**ZOOM Access**	**Chair (*Supervisor)**	
Materials	**ID: 444 430 7253 Passcode: 120203**	26th(Thu.): Aira KAMITO, Kazuya ISHIBASHI	27th(Fri.): Aira KAMITO, Kazuya ISHIBASHI
		(*Prof. Byung-Koog JANG)	
Energy	**ID: 418 804 2372 Passcode: 202012**	26th(Thu.): Tomihiko KOJIMA, Naoya MINAMIURA	27th(Fri.): Tomihiko KOJIMA, Naoya MINAMIURA
		(*Prof. Dong WANG)	
Environment	**ID: 697 502 2822 Passcode: 175303**	26th(Thu.): Yukun WANG, Akie SAKAI	27th(Fri.): Yukun WANG, Jihwoan LEE
		(*Prof. Yusuke KOSUGA)	

Contact Information

Faculty Organizing Committees

- **General Coordinator**
  Prof. Byung Koog JANG; jang.byungkoog@kyudai.jp
- **Materials Field**
  Prof. Kungen TEII; teii@asem.kyushu-u.ac.jp
  Prof. Arihiro KANO; kano@ms.ifoc.kyushu-u.ac.jp
- **Energy Field**
  Prof. Dong WANG; wangdong@kyudai.jp
  Prof. Takahiko MIYAZAKI; miyazaki.takahiko.735@m.kyushu-u.ac.jp
- **Environmental Field**
  Prof. Yusuke KOSUGA; kosuga@riam.kyushu-u.ac.jp
  Prof. Hiroki TOKINAGA; tokinaga@riam.kyushu-u.ac.jp

Student Organizing Committees & Volunteers

- **General Coordinator**
  Akie SAKAI (D2); akie.sakai@riam.kyushu-u.ac.jp
- **Materials Field**
  Aira KAMITO (D2); kamito.aira.753@s.kyushu-u.ac.jp
  Kazuya ISHIBASHI (D2); k.ishibashi.567@s.kyushu-u.ac.jp
- **Energy Field**
  Tomihiko KOJIMA (D2); t.kojima.500@s.kyushu-u.ac.jp
  Masaharu FUKUYAMA (D2); fukuyama@triam.kyushu-u.ac.jp
- **Environmental Field**
  Yukun WANG (D2); ou@esst.kyushu-u.ac.jp
  Akie SAKAI (D2); akie.sakai@riam.kyushu-u.ac.jp

CAMPUS ASIA EEST Office

- Ms. Nahoko ICHIMURA; nahoko@kyudai.jp
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  6-1 Kasuga-koen, Kasuga-shi, Fukuoka, 816-8580, Japan

Schedule

Day 1, December 2nd (Wed.)

*Notice: Japanese local time below!

Time	Event		Chair	ZOOM Room	
9:30 - 10:00	Opening Ceremony	KU (Dean, Prof. Hideharu NAKASHIMA)	Prof. Byung-Koog JANG	Main room ID: 444 430 7253 Passcode: 120203	
		SJTU (Prof. Shengrong YANG)			
		PNU (Prof. Donggeun LEE)			
10:00 - 10:30	Keynote - #1 (KU) Prof. Andrew M. SPRING, Title: Living Polymerizations for Engineering Applications		Prof. Arihiro KANO		
10:30 - 11:00	Keynote - #2 (SJTU) Prof. Mingce LONG, Title: Sustainable Photocatalytic and Piezocatalytic Production of H_2O_2 and Its in-situ Environmental Applications		Prof. Hiroki TOKINAGA		
11:00 - 11:15	Break				
11:15 - 12:15	Oral Session - #1 (Evaluation: One faculty from each KU, PNU, SJTU and all students)		Students	Materials	ID: 444 430 7253 Passcode: 120203
				Energy	ID: 418 804 2372 Passcode: 202012
				Environment	ID: 697 502 2822 Passcode: 175303
12:15 - 13:45	Lunch				
13:45 - 17:00	Oral Session - #2 & 3 (Evaluation: One faculty from each KU, PNU, SJTU and all students)		Students	Materials	ID: 444 430 7253 Passcode: 120203
				Energy	ID: 418 804 2372 Passcode: 202012
				Environment	ID: 697 502 2822 Passcode: 175303

*Notice: If you access at ZOOM room, please change your name like [University-Position-Last Name].

ex) KU-Faculty-KATO, KU-Staff-ICHIMURA, KU-D2-SAKAI, PNU-M2-LEE, SJTU-D3-WANG

Schedule

Day 2, December 3rd (Thu.)

*Notice: Japanese local time below!

Time	Event		Chair	ZOOM Room	
9:30 - 10:00	**Keynote - #3 (PNU)** Prof. Sangmin PARK, Title: Fabrication of freestanding and patterned nanoporous junctions in 3D micro-nanofluidic devices		Prof. Takahiko MIYAZAKI	**Main room** **ID: 444 430 7253** **Passcode: 120203**	
10:00 - 12:15	**Oral Session - #4 & 5** (Evaluation: One faculty from each KU, PNU, SJTU and all students)		Students	Materials	ID: 444 430 7253 Passcode: 120203
				Energy	ID: 418 804 2372 Passcode: 202012
				Environment	ID: 697 502 2822 Passcode: 175303
12:15 - 13:50	**Lunch**				
12:50 - 13:50	PDCA Meeting by only CA Faculty & Staffs from KU, PNU and SJTU		Prof. Byung-Koog JANG & Prof. Dong WANG	PDCA meeting room ID: 971 2238 4067 Passcode: 389514	
13:50 - 15:50	**Oral Session - #6 & 7** (Evaluation: One faculty from each KU, PNU, SJTU and all students)		Students	Materials	ID: 444 430 7253 Passcode: 120203
				Energy	ID: 418 804 2372 Passcode: 202012
				Environment	Nothing
15:50 - 16:30	**Break**				
16:30 - 17:00	**Closing Ceremony**	KU (Vice Dean, Prof. Seigi MIZUNO)	Prof. Dong WANG	**Main room** **ID: 444 430 7253** **Passcode: 120203**	
		SJTU (Prof. Shengrong YANG)			
		PNU (Prof. Donggeun LEE)			

***Notice: If you access at ZOOM room, please change your name like [University-Position-Last Name].**

ex) KU-Faculty-KATO, KU-Staff-ICHIMURA, KU-D2-SAKAI, PNU-M2-LEE, SJTU-D3-WANG

Time Table

*Notice: Japanese local time below!

Day 1: December 2nd (Wed.), 2020							
Time		Content		Speaker		Chair / ZOOM Room	
09:30 – 10:00		Opening Ceremony		KU (Dean, Prof. Hideharu NAKASHIMA) SJTU (Prof. Shengrong YANG) PNU (Prof. Donggeun LEE)		Prof. Byung-Koog JANG Main room ID: 444 430 7253 Passcode: 120203	
10:00 – 10:30		Keynote - #1 (KU)		Prof. Andrew M. SPRING		Prof. Arihiro KANO (ZOOM: Same above)	
10:30 – 11:00		Keynote - #2 (SJTU)		Prof. Mingce LONG		Prof. Hiroki TOKINAGA (ZOOM: Same above)	
11:00 – 11:15		Break					
Three rooms (Parallel Session) *Name: Time keeper →		Materials ID: 444 430 7253 Passcode: 120203 Chair: Kazuya ISHIBASHI (KU) *Kentaro NAKAMURA (KU)		Energy ID: 418 804 2372 Passcode: 202012 Chair: Jeonggeon KIM (PNU) *Shingo HIRATA (KU)		Environment ID: 697 502 2822 Passcode: 175303 Chair: Yukun WANG (KU) *Naoya MINAMIURA (KU)	
Oral Session #1	11:15 – 11:30	M-1	Wenjun LI (KU)	E-1	Sampad GHOSH (KU)	EN-1	Nishat Tasnim TOOSTY (KU)
	11:30 – 11:45	M-2	Yang ZHAO (SJTU)	E-2	Yanjun ZHU (SJTU)	EN-2	Chen CHEN (SJTU)
	11:45 – 12:00	M-3	Sung Jae LEE (PNU)	E-3	Tahee HAN (PNU)	EN-3	Suin PARK (PNU)
	12:00 – 12:15	M-4	Md Khalid HOSSAIN (KU)	E-4	Khaoula BENSAIDA (KU)	EN-4	Tatsuya HINOKUMA (KU)
12:15 – 13:45		Lunch					
*Name: Time keeper →		Chair: Wenjun LI (KU) *Kentaro NAKAMURA (KU)		Chair: Jialin ZHENG (SJTU) *Hayato TAKESHITA (KU)		Chair: Suyeon LEE (PNU) *Saki SHIGENOBU (KU)	
Oral Session #2	13:45 – 14:00	M-5	Kazuya ISHIBASHI (KU)	E-5	Yemanebirhan Tadesse ABIRHAM (KU)	EN-5	Yukun WANG (KU)
	14:00 – 14:15	M-6	Qiongyan WANG (SJTU)	E-6	Satoko KAMEI (KU)	EN-6	Hirotomo KOHNO (KU)
	14:15 – 14:30	M-7	Hyunseok CHOE (PNU)	E-7	Yaoyu HE (SJTU)	EN-7	Geunyoung KIM (PNU)
	14:30 – 14:45	M-8	Shuhei MORITA (KU)	E-8	Jeonggeon KIM (PNU)	EN-8	Uthpala Amoda PERERA (KU)
	14:45 – 15:00	M-9	Shahadat HOSSAIN (KU)	E-9	Relebohile MOKETE (KU)	EN-9	Yusuke DOI (KU)
	15:00 – 15:15	M-10	Wang HU (SJTU)	E-10	Vikrant Siddharudh CHALGERI (PNU)	EN-10	Minsu SONG (PNU)

Time Table

15:15 – 15:30		Break					
*Name: Time keeper →		Chair: Hyunseok CHOE (PNU) *Toshiaki MORI (KU)		Chair: Vikrant Siddharudh CHALGERI (PNU) *Hayato TAKESHITA (KU)		Chair: Jindi GUO (KU) *Saki SHIGENOBU (KU)	
Oral Session #3	15:30 – 15:45	M-11	Takeru HAMASAKI (KU)	E-11	Daisuke HENZAN (KU)	EN-11	Ryoki FUJITA (KU)
	15:45 – 16:00	M-12	Zichao WEI (SJTU)	E-12	Yinglei QU (KU)	EN-12	Yeonju KIM (PNU)
	16:00 – 16:15	M-13	Juhwan BAEG (PNU)	E-13	Weineng LIAO (SJTU)	EN-13	Toshiki SANEMITSU (KU)
	16:15 – 16:30	M-14	Seunghyeon KIM (KU)	E-14	Seungwook LEE (PNU)	EN-14	Kazuma NAGATA (KU)
	16:30 – 16:45	M-15	Farhana Jesmin TULI (KU)	E-15	Shintaro FUJISAKI (KU)	EN-15	Kyungil CHO (PNU)
	16:45 – 17:00	M-16	Jialin ZHENG (SJTU)	E-16	Mahmoud NASEF (KU)	EN-16	Sungjin KIM (KU)

***Notice: Japanese local time below!**

Day 2: December 3rd (Thu.), 2020

Time		Content		Speaker		Chair / ZOOM Room	
09:30 – 10:00		Keynote - #3 (PNU)		Prof. Sangmin PARK		Prof. Takahiko MIYAZAKI ID: 444 430 7253, Pass: 120203	
Three rooms (Parallel Session)		Materials		Energy		Environment	
		ID: 444 430 7253 Passcode: 120203		ID: 418 804 2372 Passcode: 202012		ID: 697 502 2822 Passcode: 175303	
*Name: Time keeper →		Chair: Juhwan BAEG (PNU) *Toshiaki MORI (KU)		Chair: Uthpala Amoda PERERA (KU) *Katsumi AOKI (KU)		Chair: Kyungil CHO (PNU) *Satoko KAMEI (KU)	
Oral Session #4	10:00 – 10:15	M-17	Hongseok KIM (PNU)	E-17	Leiyun WANG (KU)	EN-17	Chenyi ZHANG (SJTU)
	10:15 – 10:30	M-18	Hideki OHUE (KU)	E-18	Sota IWAKI (KU)	EN-18	Jindi GUO (KU)
	10:30 – 10:45	M-19	Hiroki KANAKOGI (KU)	E-19	Jiawei FENG (SJTU)	EN-19	Suyeon LEE (PNU)
	10:45 – 11:00	M-20	Biyu CHEN (SJTU)	E-20	Jinhyo PARK (PNU)		
11:00 – 11:15		Break					

Time Table

*Name: Time keeper →		Chair: Zichao WEI (SJTU) *Akira NISHIO (KU)		Chair: Yemanebirhan Tadesse ABIRHAM (KU) *Katsumi AOKI (KU)			
Oral Session #5	11:15 – 11:30	M-21	Noboru SHIMIZU (KU)	E-21	Jin ZHANG (KU)		
	11:30 – 11:45	M-22	Jihwoan LEE (KU)	E-22	Akito IPPONSUGI (KU)		
	11:45 – 12:00	M-23	Yu HAN(KU)	E-23	Jinsub KIM (PNU)		
	12:00 – 12:15	M-24	Saki SHIGENOBU (KU)	E-24	Sitti Subaedah SAHABUDDIN (KU)		
12:15 – 13:50		Lunch (PDCA meeting by only CA faculty & staffs from KU, PNU and SJTU; 12:50-13:50)					
*Name: Time keeper →		Chair: Qi ZHAO *Akira NISHIO (KU)		Chair: Yukun WANG (KU) *Naoya MINAMIURA (KU)			
Oral Session #6	13:50 – 14:05	M-25	Jinyuan MA (SJTU)	E-25	Keisuke IWASAKI (KU)		
	14:05 – 14:20	M-26	Tsubasa AYUKAWA (KU)	E-26	Heerim SEO (PNU)		
	14:20 – 14:35	M-27	Zanhui CHEN (KU)				
	14:35 – 14:50	M-28	Delu KONG (SJTU)				
14:50 – 15:05		Break					
*Name: Time keeper →		Chair : Delu KONG (SJTU) *Shingo HIRATA (KU)					
Oral Session #7	15:05 – 15:20	M-29	Qi ZHAO (SJTU)				
	15:20 – 15:35	M-30	Keisuke SUGATA (KU)				
	15:35 – 15:50	M-31	Xiaoqian HE (SJTU)				
15:50 – 16:30		Break					
16:30 – 17:00		Closing Ceremony		KU (Vice Dean, Prof. Seigi MIZUNO) SJTU (Prof. Shengrong YANG) PNU (Prof. Donggeun LEE)		Prof. Dong WANG Main room ID: 444 430 7253 Passcode: 120203	

Keynote Speakers #1 (KU)

Associate Professor, Andrew M. SPRING

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Tel: +81-92-583-8901
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Educational and Professional Career (Biography or CV)

- Master of Chemistry (MChem): University of Hull (UK) 2006
- PhD in Materials Chemistry: University of Manchester (UK) 2010
- Postdoctoral Research Associate: University of Florida (USA) 2010-2011
- Postdoctoral Research Associate: Institute of Materials Chemistry and Engineering (IMCE) Kyushu University (Japan) 2012-2014
- Assistant Professor: Green Asia Education Centre Kyushu University (Japan) 2014-2018
- Associate Professor: Department of Molecular and Material Science (MMS) Kyushu University (Japan) 2018-present

Research Interests

- Electro-optic Polymers
- Conjugated Polymers
- Carbon Nanotube Inks
- Functional Polymers for Wastewater Treatment

Lecture Title

- “Living Polymerizations for Engineering Applications”

Abstract

Well-controlled living polymerization mechanisms allow a fine tuning of bulk polymer properties to suit a range of high-tech engineering applications. Ring Opening Metathesis Polymerization (ROMP) is one of the most versatile and interesting of these techniques. The key requirement is that monomers must be cyclic alkenes which exhibit a large degree of ring strain. Typically, Grubbs catalysts are utilized to afford the narrow dispersity homopolymers, random copolymers, block copolymers and other more complex macromolecules.

Keynote Speakers #2 (SJTU)

Professor, Mingce LONG

School of Environmental Science and Engineering,
Shanghai Jiao Tong University,
Dongchuan Road No.800, Min Hang District,
Shanghai 200240, China

Educational and Professional Career (Biography or CV)

- Dr. Mingce Long received his Ph.D. degree in Environmental Engineering from Shanghai Jiao Tong University in 2007. He joined the same University in 2008 and was promoted to professor in 2018. He did research on photoelectrocatalysis at University of Erlangen-Nuernberg, and environmental photocatalysis at Rice University as a Visiting Scholar. He was a member of Chinese Chemical Society, Chines Society for Environmental Science, Chinese Materials Research Society and American Chemical Society. He has been a member of Editorial Board of Nano-Micro Letters since 2016, and a young member of Editorial Board of Chinese Journal of Catalysis since 2017. He has more than 80 peer-reviewed papers with more than 4400 SCI citations, and his H-index is 31. He coauthored one book chapter in English and one edited book in Chinese. He has been awarded as the "Tang Lixin Excellent Scholar" in 2018 and "Thermo Fisher Young Researcher Academic New Artist" in 2010.

Research Interests

1) Environmental functional materials
2) Environmental catalysis
3) Advanced oxidation technologies

Keynote Speakers #3 (PNU)

Assistant Professor, Sang Min PARK

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Pusan National University
Email: sangmin.park@pusan.ac.kr
Tel: +82-51-510-2892

Educational and Professional Career (Biography or CV)

- Aug. 2012, B.S Degree in Mechanical Engineering, Pohang University of Science and Technology (POSTECH)
- Aug. 2014, M.S Degree in Mechanical Engineering, Pohang University of Science and Technology (POSTECH)
- Aug. 2018, Ph.D. Degree in Mechanical Engineering, Pohang University of Science and Technology (POSTECH)

Research Interests

- Advanced nano/microfabrication techniques (e.g. electrospinning, 3D printing)
- Nano-microfluidic device for energy and environmental fields
- Nanofiber scaffolds for tissue engineering and organ-on-a-chip

Lecture Title

- “Fabrication of a freestanding and patterned nanoporous junctions in a 3D micro-nanofluidic devices”

Abstract

In the field of micro-nanofluidics, a freestanding configuration of a nanoporous junction is highly demanded to increase the design flexibility of the microscale device and the interfacial area between the nanoporous junction and microchannels. This work reports direct fabrication and incorporation of a freestanding nanoporous junction in a microfluidic device. Electrolyte-assisted electrospinning process could fabricate a freestanding nanofiber membrane, and subsequently, the nanofiber membrane was impregnated with a nanoporous precursor material followed by a solidification process. Given that this process can readily control the geometry of the nanoporous junction, vertically stacked 3D micro-nanofluidic devices with complex configurations are easily achieved. To demonstrate the broad applicability of this process in various research fields, a reverse electrodialysis-based energy harvester and an ion concentration polarization-based preconcentrator are produced. Besides, 3D multiplexed and multi-stacked preconcentrators accumulate multiple preconcentrated plugs that can increase the operating sample volume and the degree of freedom of handling.

Student List of Oral Presentation

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TBA

Student List of Oral Presentation

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Student List of Oral Presentation

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TBA

Day 2: December 3rd (Thu.), 2020				
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Student List of Oral Presentation

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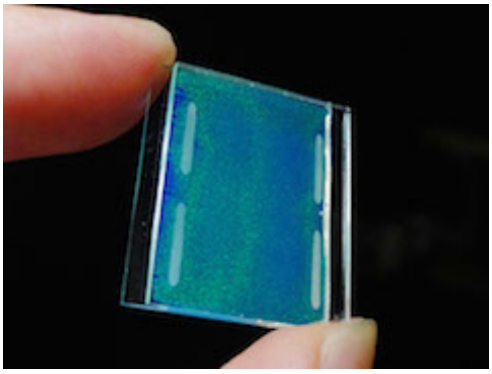
Introduction to Chikushi Campus, Kyushu University

Interdisciplinary Graduate School of Engineering and Science (IGSES) in Kyushu University

The Interdisciplinary Graduate School of Engineering and Sciences (IGSES) consists of 5 departments, and their focus is divided across the three main fields, namely, materials, energy, and the environment. All graduate students of IGSES belong to one of these five departments and conduct their research under the supervision of professors of IGSES.

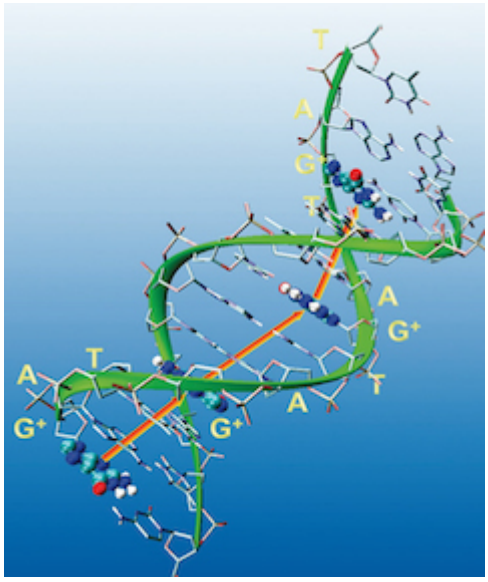
1. Applied Science for Electronics and Materials (ASEM)



Scientific technology that utilizes the quantum effect has advanced rapidly and the base of advanced scientific technology typified by electronics is ever-expanding. Advanced materials and devices, and underlying scientific technology of their processes are sought for the resolution of the various issues of modern society, and the development of a society with harmony between man and nature in the 21st Century.

This major is for the training of engineers and researchers who can profoundly and comprehensively understand the synthesis, the structure, the property, and the value of materials, the integration technology of the production process and system of fine devices, and the applied technology of light, plasma and electromagnetic fields by organically combining the understanding at a micro and macro level.

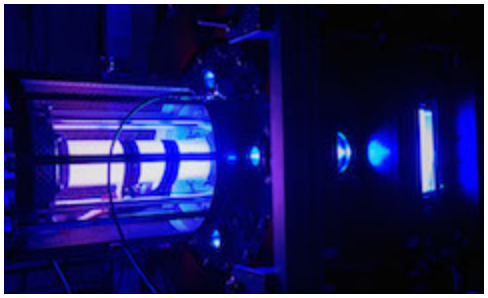
2. Molecular and Material Science (MMS)



The Department of Molecular and Material Sciences (MMS) aims to provide comprehensive education and research by integrating the disciplines of physics, materials, and chemistry based on an overall view of science and engineering related to materials, and to train the next-generation of researchers and highly specialized engineers.

In the laboratories, the original objectives of materials science are deeply explored by measuring and analyzing higher-order structures. Furthermore, unique reactions and material functions are also explored and new functional materials are developed. The systemization of a new materials science in order to ensure prosperous life activities on earth is also promoted.

3. Advanced Energy Engineering Science (AEES)



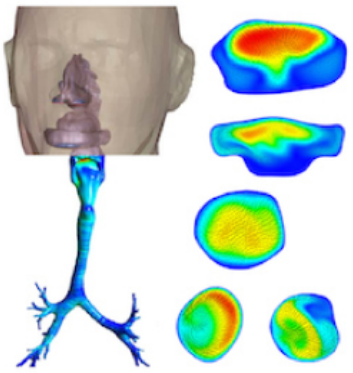
Now that we have entered the 21st Century, the issues of energy on a global scale are about to face a major turning point. The population growth and the boom in energy consumption due to the improvement of living standards indicate that the progress of human civilization must face challenges in the not-so-distance future, if it continues to depend on fossil resource, and there is an urgent need for the development of an extensive energy source that will support a wide range of daily activities based on environmental conservation.

The Department of Advanced Energy Engineering Science (AEES) is training researchers and engineers with a broad perspective and creative ability who would undertake a leadership role for the resolution of the energy issues of the 21st Century by carrying out the development of advanced nuclear energy that utilizes nuclear fusion and fission, the development of advanced energy such as hydrogen and solar energy for multiple uses, and interdisciplinary education and research on its basic theory.

Introduction to Chikushi Campus, Kyushu University

4. Energy and Environmental Engineering (EEE)

The department of Energy and Environmental Engineering (EEE) was established in 1998 as a cross-disciplinary graduate school of mechanical engineering and building environmental engineering aiming for the development of human resources to address environmental issues and energy conservation as engineers in the fields of industry, government, and academia.

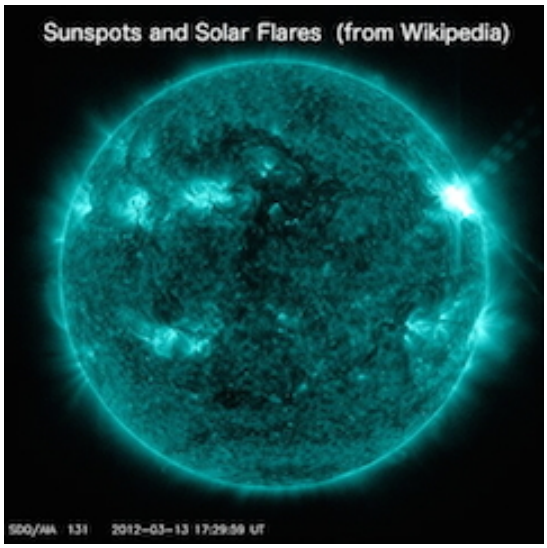


Simulation of Human Respiratory Airflow provided by Prof.Ito

In spite of the diversity of research activity of each laboratory, EEE has constructed a well-organized education unit for more than a decade on a basis of common academic disciplines, such as fluid dynamics, thermo dynamics, heat and mass transfer engineering, and other related mathematics.

5. Earth System Science and Technology (ESST)

The study of the department of Earth System Science and Technology (ESST) is an integrated academic area based on natural fluid science, which is common in both geo-environmental science for acquiring, analyzing and measuring information on the universe, the atmosphere and the sea for working out the mechanism of climate change and environmental conservation, and atmospheric and marine technologies for an orderly development of the earth's undeveloped resources and space. The department was founded for the purpose of establishing measures against the greatest crisis since the beginning of our species faced by the air and sea that are maintaining our life-environment, and for training human resources.



Main Entrance of Chikushi Campus

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