



# 20<sup>th</sup> CSS - EEST



*Proceedings of the*  
*20<sup>th</sup> Cross Straits Symposium on*  
**Energy and Environmental Science and Technology**

**Pusan National University, Korea**  
**November 26<sup>th</sup> to 28<sup>th</sup>, 2018**

**Organized**



**부산대학교**  
PUSAN NATIONAL UNIVERSITY

**Co-organized**



**九州大学**  
KYUSHU UNIVERSITY



**Institute for Research &  
Industry Cooperation, PNU**



## Preface



**Chair of Organizing Committee**

**Prof. JEONG Ji Hwan**

It is my honor to invite you for 20th Cross Straits Symposium on Energy, Environmental Science and Technology (CSS-EEST) to be held in Busan, Korea. Busan is the second largest city in Korea and has heavy industrial and chemical industrial parks nearby. Steel, automobiles, shipbuilding, and power plant equipment companies are concentrated. In addition, Haeundae beach is attached to the city center and its scenic beauty makes Busan the best tourist destination in Korea. Considering the surrounding environment of Busan, I believe Busan is one of the best places to hold CSS.

I hope that this symposium offer good opportunities to learn and realize the crucial role you will take toward the energy and environment issues of the world, and will guide you to the new knowledge and meaningful experience of Korean culture. I am sure that your visit is essential to the success of the symposium and I would like to express my welcoming spirit and special gratitude to all participants.

A handwritten signature in blue ink, appearing to read 'JEONG Ji Hwan'.

## Organizing Committees

### Pusan National University

Prof. JEONG Ji Hwan	Prof. CHOI Gyungmin	Prof. LEE Donggeun
Prof. PARK Sang-Hu	Prof. LIM Hee-Chang	Prof. SONG Juhun
Prof. OH Jeongeun	Prof. LEE Taeho	Prof. CHO Young-Rae
Prof. CHOI Yoon Suk	Prof. LI Oi Lun Helena	Res. Prof. LEE Youngjin
Ms. YIM Wanghee		

### Kyushu University

Prof. WANG Dong	Prof. JANG Byung Koog	Prof. TEII Kungen
Prof. NAKAGAWA Takeshi	Prof. KATAYAMA Kazunari	Prof. MIYAZAKI Takahiko
Prof. OKAMURA Makoto	Prof. MIZUNO Seigi	Prof. HAGISHIMA Aya
Ms. ICHIMURA Nahoko	Ms. NISHIYAMA Kazuyo	

### Shanghai Jiao Tong University

Prof. QI Fei	Prof. GUI Lin	Prof. JIANG Zhi
Prof. LOU Ziyang	Mr. BAO Chenjing	Ms. YAN Ran

### Student Organizing committee

KIM Kiwook (PNU)	CHO Kyungil (PNU)	LEE Hyoin (PNU)
BANG Taeyang (PNU)	KWAK Yusub (PNU)	SUNG Eunsik (PNU)
KANG Youngjoon (PNU)	LEE Gaeun (PNU)	CHOI Siyoung (PNU)
KU Hyunmo (PNU)	JEON Junbum (PNU)	PARK Jungmin (PNU)
WANG Qingzhao (SJTU)	LIU Yunjie (SJTU)	SHI Jin (SJTU)
EGAWA Yusuke (KU)	ISHIBASHI Fumihiko (KU)	HASAMADA Kazunobu (KU)

## 20th CSS-EEST Purpose and Background

**Purpose:** Based on the experience accumulated in the past several years, this CAMPUS Asia program was developed jointly by SJTU, KU and PNU, as an inter-university double-degree graduate school program in science and technology, with the aim to bring up EEST global human resources, i.e., qualified researchers and engineers who can lead the world in EEST. The program will be implemented through international collaboration with mutual partnership, placing quality assurance of Master and Doctor Degrees. The aim of the CSS-EEST Symposium is to strengthen links between Kyushu University, Pusan National University and Shanghai Jiao Tong University, facilitate collaboration between Japan, Korea and China and create professional linkages between the future research leaders of the three countries.

**Background:** Under the Concept of Global Human Resource Development Focusing on the East Asian Region, Governments of China, Japan and Korea have agreed to establish ‘China-Japan-Korea Committee for Promoting Exchange and Cooperation among Universities’. And the committee has concluded that developing exchange among universities with quality assurance in Japan, China and Korea is of great importance in implementing human resources development on a scale of the whole East Asian region as the economic activities in this region are becoming more and more interrelated, and accordingly universities in China, Japan and Korea will become places where students and professors from diverse cultural and regional backgrounds will be able to come together, and the merits of each university will be realized. For this, the project named ‘CAMPUS-Asia’ was started and student exchange program named, CAMPUS-Asia EEST, ‘Collaborative Graduate School Program for Global Human Resources Development in Energy and Environmental Science and Technology’, aiming double degree among three universities (Shanghai Jiao Tong University(SJTU, China), Kyushu University(KU, Japan) and Pusan National University(PNU, Korea)) was approved and started at 2013.

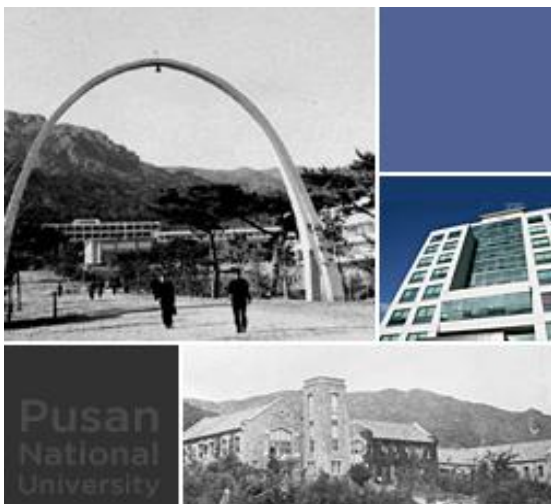
## Pusan National University



### Educational Philosophy

PNU, the true university that lives up to the values of truth, freedom and service, is creating a new value system based on a humanitarian spirit and its insights on the trends of the times. PNU provides and realizes a future vision for society through academic research and HR development, contributing to the development of humanity and society.

### History



**Pusan National University was founded in May 1946 with the establishment ideology of truth liberty and devotion.**

Although the University started initially with just two faculties, the Faculty of Humanities and the Faculty of Fisheries, since then, it has grown into a major research level institution covering all the major disciplines within academia. Today, the University enjoys its reputation as one of top universities in Korea.

The University is now comprised of fifteen colleges, one independent division, one general graduate school, four professional graduate schools and five special graduate schools, and contributes to the development of the nation by producing prominent experts and talented leaders.

As of March 2008 graduates of PNU totaled 127,542 bachelor's degree holders, 28,411 master's degree holders, and 5,152 doctoral scholars, many of whom are playing central roles as community, national and world leaders.

## General Information

### Date:

November. 26(Mon.) - 28. (Wed.), 2018

### Venue:

Haeundae Grand Hotel (Day 1) : Sky Hall, 22F (Keynote speech, Banquet)  
(Day 2) : 2F (Oral Session) / Sky Hall, 22F (Lunch, Poster)

### Registration:

Sky Hall, 22F, Haeundae Grand Hotel  
Free for the KU, SJTU and PNU students

All of organization fund except accommodation fee and air ticket for KU, SJTU and PNU students and staffs, supported as below institute and research fund.

### Funding:

CAMPUS ASIA-EEST (Director : Prof. JEONG J.H.)  
Brain KOREA 21<sup>+</sup> (NRF, Director: Prof. MOON Y.H., Vice-director : Prof. JEONG J.H.)  
Human Resource Program (KETEP, Director: Prof. JEONG J.H.)  
- Grant no.20184010201660, Advanced track for large-scale heat exchanger of industrial plants  
Center for Advanced air-conditioning, Refrigeration & Energy (Director : Prof. CHOI G.)

### Banquet:

Sky Hall, 22F, Haeundae Grand Hotel

### Presentation Guideline:

Plenary Lectures (Sky Hall, 22F, 25min. presentation, 5min. Q&A)  
Oral Presentations (Studio 1-3, 2F, 10min. presentation, 4min. Q&A)  
Posters (Sky Hall, 22F, 50min. presentation and Q&A)  
- The size of poster is A0 is best to fit. (In this conference, not present flash talk)

## General Information

### Accommodations:

Haeundae Grand Hotel, Busan, KOREA

Address : Haeundae-Beach Road 217, Haeundae-gu, Busan

Tel: +82-51-740-0114

Transportation : Shuttle bus will provide from Gimhae airport to Haeundae Grand Hotel

### Internet Service:

Free-Wifi connection will be available for participants at the conference site.

Wifi service related name 'grand hotel', freely use without any password.

### Tour:

Haedong Yonggungsa Temple

- Date : 10:00AM~12:30PM, Nov. 28<sup>th</sup> (Wed), 2018

### Contact Information

CAMPUS ASIA EEST Office

Room 112, RIMT Bldg, 2, 63beon-gil, Busandaehakro, Geumjeong-gu, 46241, KOREA

Tel +82-51-510-3769 / Fax +82-51-518-3769

### Secretary General

Coordinator	Ms. YIM Wanghee (Ella)	whyim@pusan.ac.kr	+82-10-2874-0380
Res. Prof.	Dr. LEE youngjin	yj5763@pusan.ac.kr	+82-10-6880-5721
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Material	Bang Taeyang	sunshine5825@naver.com	+82-10-4028-4853



# 20<sup>th</sup> Cross Straits Symposium on Energy, Environmental Science and Technology

## Time Table

Day 1, Nov. 26 (Monday), 2018	
15:00 ~ 15:30	Registration
15:30 ~ 16:00	<b>Opening Speech</b> (Sky Hall, 22F) Prof. JEONG Ji Hwan (PNU) Prof. GUI Lin (SJTU) Prof. MIZUNO Seigi (KU)
16:00 ~ 16:30	<b>Plenary Lecture #1</b> (Sky Hall, 22F) Chair: Res, Prof. Youngjin Lee <b>Prof. CHOI Yoon Suk</b> , Pusan National University (30 min) Title: Metal Additive Manufacturing: Materials Science Perspectives
16:30 ~ 16:45	Break time
16:45 ~ 17:15	<b>Plenary Session 2</b> (Sky Hall, 22F) Chair: Res, Prof. Youngjin Lee <b>Prof. HAGISHIMA Aya</b> , Kyushu University (30 min) Title: Flow natures observed in urban built-environments
17:15 ~ 17:30	Break time
17:30 ~ 18:00	<b>Plenary Session 3</b> (Sky Hall, 22F) Chair: Res, Prof. Youngjin Lee <b>Prof. JIANG Zhi</b> , Shanghai Jiao Tong University (30 min) Title: Design Cocatalyst in Photocatalytic Water Splitting Reaction
18:00 ~ 20:00	<b>Reception (Banquet)</b> (22F, Sky Hall)
20:30 ~	Free time

Day 2, Nov. 27 (Tuesday), 2018						
Oral Session #1						
Material (Room A: Studio 1, 2F) Chair: TOMOYA Kaneko(KU)		Energy (Room B: Studio 2, 2F) Chair: ZHANG Yannan(SJTU)			Environment (Room C: Studio 3, 2F) Chair: Lee Heonjoon (PNU)	
09:00 ~ 09:15	MS 01	KISHIMOTO Kazuki (KU)	EY 01	AHN Taehwan (PNU)	ET 01	HAN Deming (SJTU)
09:15 ~ 09:30	MS 02	XIANG Qian (SJTU)	EY 02	MIKSKI Frantisek (KU)	ET 02	JEONG Indeok (PNU)
09:30 ~ 09:45	MS 03	HONG Eunpyo (PNU)	EY 03	DENG Yifan (SJTU)	ET 03	ALAM Muntasir (KU)
09:45 ~ 10:00	MS 04	IKEE Yusuke (KU)	EY 04	RASTI Mehdi (PNU)	ET 04	AO Junjie (SJTU)
10:00 ~ 10:15	MS 05	WANG Qingzhao (SJTU)	EY 05	NAYAK Ajaya ketan (KU)	ET 05	KIM Junghyeon (PNU)
10:15 ~ 10:30	MS 06	LEE Haklae (PNU)	EY 06	LIU Mengqi (SJTU)	ET 06	KABIR KM (KU)
10:30 ~ 10:50	Coffee Break					

# 20<sup>th</sup> Cross Straits Symposium on Energy, Environmental Science and Technology

## Time Table

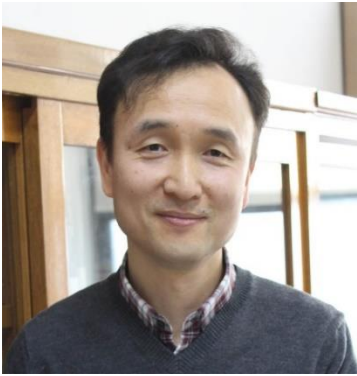
Day 2, Nov. 27 (Tuesday), 2018						
Oral Session #2						
Material (Room A: Studio 1, 2F) Chair: YAO Wenhui (PNU)		Energy (Room B: Studio 2, 2F) Chair: KAZUYA Ishibashi(KU)			Environment (Room C: Studio 3, 2F) Chair: HAN Deming (SJTU)	
10:50 ~ 11:05	MS 07	YANG Cheng (SJTU)	EY 07	NILIAHMADABADI Mahdi (Isfahan Univ.)	ET 07	Lee Heonjun (PNU)
11:05 ~ 11:20	MS 08	JEON Byeongjun (PNU)	EY 08	ZHANG Yannan (SJTU)	ET 08	LIU-Xin (KU)
11:20 ~ 11:35	MS 09	LEE Ji-Hwoan (KU)	EY 09	JIANG Chenxu (SJTU)	ET 09	YASUTAKE Ryosuke (KU)
11:35 ~ 11:50	MS 10	ZHENG Zhifeng (SJTU)	EY 10	MURAMATSU Masakazu (KU)	ET 10	WIDYANINSIH Evy (PNU)
11:50 ~ 12:05	MS 11	PANDEY Deepak Kumar (PNU)	EY 11	SAGHAFIAN Mohsen (Isfahan Univ.)	ET 11	LI Juexiu (SJTU)
12:05 ~ 12:20	MS 12	KANEKO Tomoya (KU)	EY 12	EGAWA Yusuke (KU)	ET 12	KANG Yujin (KU)
12:20 ~ 14:00	Lunch (Sky Hall, 22F) / PDCA meeting with Lunch (Grand Table room, 1F)					
Oral Session #3						
Material (Room A: Studio 1, 2F) Chair: XIANG Qian (SJTU)		Energy (Room B: Studio 2, 2F) Chair: MEHDI Rasti (PNU)			Environment (Room C: Studio 3, 2F) Chair: YASUTAKE Ryosuke(KU)	
14:00 ~ 14:15	MS 13	KIM Taewoo (PNU)	EY 13	HAN Jaebang (PNU)	ET 13	LI Youping (SJTU)
14:15 ~ 14:30	MS 14	YOSHIDA Yuki (KU)	EY 14	WEI Zhidong (SJTU)	ET 14	NAKAHARA Koki (KU)
14:30 ~ 14:45	MS 15	LIU Yanming (SJTU)	EY 15	KUNIYOSHI Mario (KU)	ET 15	DIRESTIYANY Lucky Caesar (PNU)
14:45 ~ 15:00	MS 16	CHANG Chao (SJTU)	EY 16	LIN Chen (SJTU)	ET 16	LIU Yunjie (SJTU)
15:00 ~ 15:15	MS 17	SU Li-Wen (KU)	EY 17	CHOUDHURY Raihan (PNU)	ET 17	KIM Kunwon (PNU)
15:15 ~ 15:30	MS 18	SUN Boya (SJTU)	EY 18	URAKAWA Koichiro (KU)	ET 18	JEONG Soyeon (PNU)
15:30 ~ 15:45			EY 19	ZIMMER Laurent (CNRS)	ET 19	ALAM. Md. Sarwar (Jagannath Univ.)
15:45 ~ 16:00	Coffee break					

## Time Table

Day 2, Nov. 27 (Tuesday), 2018			
16:00 ~ 17:40	Poster Session 1 (Sky Hall, 22F)		
	<b>Material</b> MSP01 – MSP25	<b>Energy</b> EYP01 - EYP27	<b>Environment</b> ETP01- ETP14
17:40 ~ 18:00	Break time		
18:00 ~ 18:30	Award & Closing ceremony (Sky Hall, 22F)		
18:30 ~	<b>Free time for students</b> Dinner for Professors and staffs (PNU, SJTU, KU)		

Day 3, Nov. 28 (Wednesday), 2018		
~ 12:30	Plan. A : Free time	Plan. B. Tour
	Hotel check-out until 11:00	~ 10:00 Hotel Check-out 10:00 ~ 12:00 Yongkunga (temple) tour 12:00 ~ 12:30 Arrive at Hotel
12:30 ~ 13:30	Lunch with free time	
13:30 ~ 14:00	Personnel check	
14:00 ~	From Gimhae international airport	
a. 17:50 b. 18:00	a. FM830 (SJTU) arrive at Shanghai b. KE797 (KU) arrive at Fukuoka	

## Plenary Lecture #1



- **Name** : CHOI Yoon Suk, Ph.D.
- **Affiliation** : School of Materials Science and Engineering, Pusan National University, Busan, Korea
- **Position** : Professor
- **E-mail** : choiys@pusan.ac.kr

### Educational and Professional Career

Prof. Choi received Ph.D. in Materials Science & Engineering from Carnegie Mellon University, Pittsburgh, PA, USA in 2001 after his M.S. and B.S. degrees in Metallurgical Engineering at Pusan National University (PNU), Korea. Upon completion of the Ph.D. degree, he spent about a year as a postdoctoral researcher at the department of Civil and Environmental Engineering, Carnegie Mellon University. In 2002, he joined UES, Inc., Dayton, OH, USA and spent about 11 years as an on-site contract researcher at U.S. Air Force Research Laboratory, before returning back to his hometown in 2013 to join PNU with an associate professorship. In 2018, he was tenured with a full professorship and currently serves as an Associate Dean in College of Engineering, PNU.

### Field of Expertise

- 1) Advanced high temperature metallic materials for energy and aerospace applications
- 2) Metal additive manufacturing: microstructure-defect-property modeling

### Lecture Title

Metal Additive Manufacturing: Materials Science Perspectives

### Abstract

Metal additive manufacturing (AM) opens a new era in manufacturing industries and leads the front line of the fourth industrial revolution worldwide. In general, metals and alloys can be additively manufactured by the powder bed fusion (PBF) technique or the direct energy deposition (DED) technique. Some alloys are readily processible with the AM, compared to others, which often form micro-cracks at the onset of the solidification of molten powders. In the current talk, the metal AM techniques will be reviewed briefly, followed by the numerical techniques to simulate the AM process. The two alloys, nickel-base alloy 718 and titanium aluminide (TiAl), which show completely different AM responses, were processed with the PBF technique, and their melt-pool scale characteristics were compared each other experimentally and numerically. An extra effort was made to understand the formation of micro-scale defects during the metal AM process.

## Plenary Lecture #2



- **Name** : HAGISHIMA Aya, Ph.D.
- **Affiliation** : Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, Fukuoka, Japan
- **Position** : Professor
- **E-mail** : ayahagishima@kyudai.jp

### Educational and Professional Career

Prof. Hagishima graduated from Kyushu University, and in 1995 received a Master of Engineering. She then worked as a government officer in the construction division of the University of Tokyo for two years. After this term, she started her academic career as a research associate in Kyushu University in 1997. She obtained Doctor of Engineering from Kyushu University, and was appointed as associate professor at Kyushu University in 2005. She promoted to professor in 2015.

### Field of Expertise

- 1) Sustainable urban and architectural environment
- 2) urban climate
- 3) low carbon and energy saving in building sectors
- 4) smart and adaptive architectures tailored to local context of developing countries.

### Lecture Title

Flow natures observed in urban built-environments

### Abstract

The urban built-environment is a place where most people spends a long time, thus, the flow nature of this urban built space have a significant effect on the people's health and comfort. In addition, introducing fresh outdoor air into rooms, namely natural ventilation is one of effective passive cooling strategies to reduce the dependency of mechanical cooling devices in summer, hence, features of airflow filed of naturally-ventilated have attracted researchers' interest. This paper will introduce the measured flow features inside a cube arranged in both lattice and staggered layouts under two setting of openings based on a novel technique of particle image velocimetry. The unsteady inflow associated with the canopy flow as well as the impact of the urban building layout on the ventilation performance will be also discussed.

## Plenary Lecture #3



- **Name** : JIANG Zhi, Ph.D.
- **Affiliation** : School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai, China
- **Position** : Associate Professor
- **E-mail** : zhijiang@sjtu.edu.cn

### Educational and Professional Career

Prof. Jiang received the Bachelor and Ph.D. degree in physical chemistry from University of Science and Technology of China. He has ever worked at Hong Kong Polytechnic University, New Jersey Institute of Technology, Purdue University (West Lafayette) and Aston University (UK). His research interests include solar fuel, environmental catalysis and combustion. He has published 50 peer reviewed paper, including journals such as ACS catalysis, Journal of Catalysis, Journal of Materials Chemistry A etc. Dr. Jiang is a young committee member of IEHB for Chinese Society for Environmental Sciences.

### Field of Expertise

- 1) Photocatalysis
- 2) Environmental Catalysis

### Lecture Title

Design Cocatalyst in Photocatalytic Water Splitting Reaction

### Abstract

Co-catalysts play a critical role in promoting the photocatalytic hydrogen evolution performance of inorganic semiconductors, yet despite intensive investigation, the elucidation of active platinum species and rational synthesis remains a challenge. Understanding the complicated synthesis-structure-performance relationship will help to address the above challenge. This talk will discuss the current status in this area.



## Tour

**Nov. 28<sup>th</sup> (Wed.) 10:00 ~ 12:30 : Haedong Yonggungsa Temple**

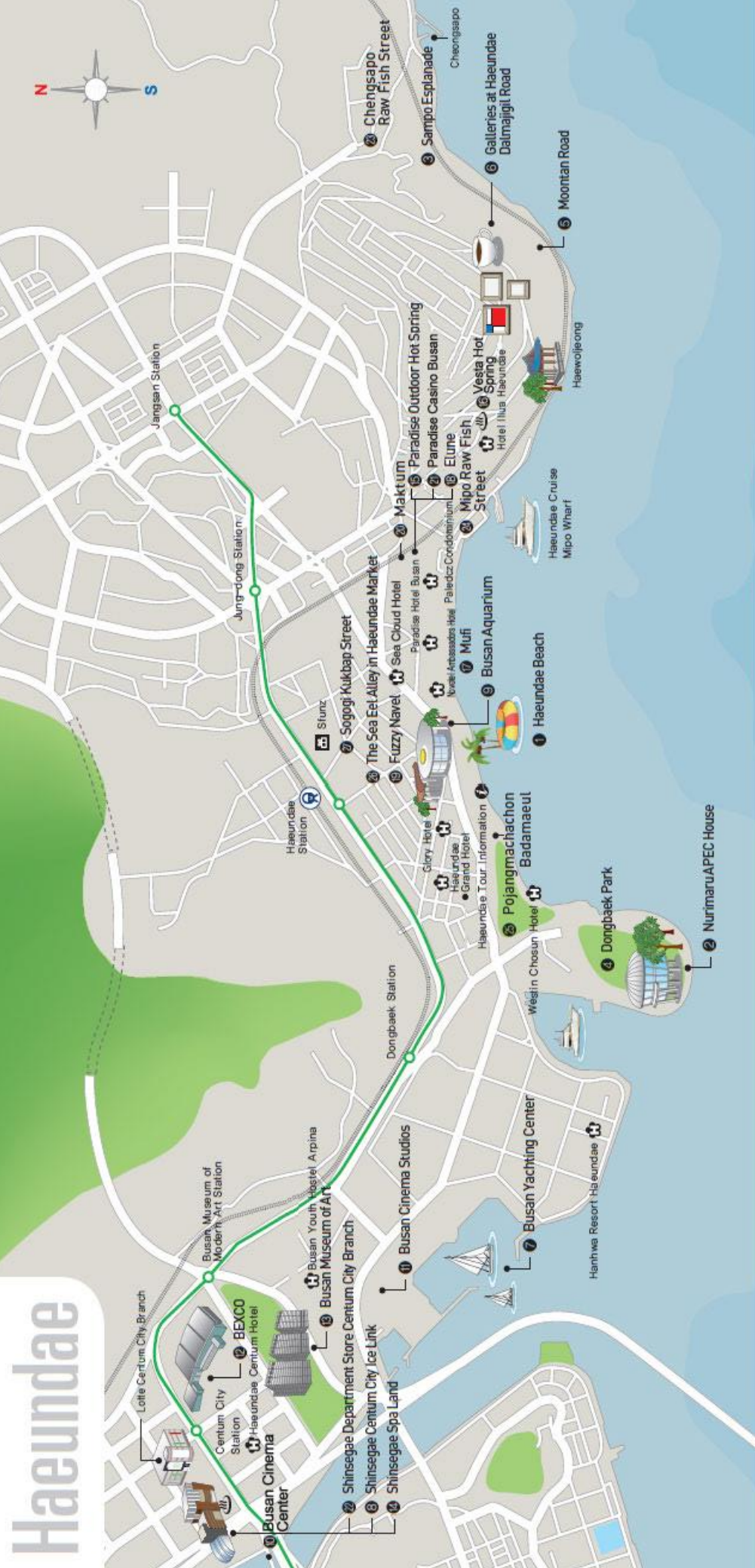


Haedong Yonggungsa Temple is situated on the coast of the north-eastern portion of Busan. This superb attraction offers visitors the rare find of a temple along the shore line; most temples in Korea are located in the mountains. Haedong Yonggungsa Temple was first built in 1376 by the great Buddhist teacher known as Naong during the Goryeo Dynasty. Haesu Gwaneum Daebul (Seawater Great Goddess Buddha), Daeungjeon Main Sanctuary, Yongwangdang Shrine, Gulbeop Buddhist Sanctum (enclosed in a cave), and a three-story pagoda with four lions can all be seen looking out over the ocean.

The main sanctuary of the temple was reconstructed in 1970 with careful attention paid to the colors that were traditionally used in such structures. On the right-hand side, inside the a cave, is a uniquely designed Buddhist sanctum, while situated just in front of the main sanctuary is a three-story pagoda with four lions. The four lions are symbolizing joy, anger, sadness, and happiness. Other special sites at the temple are the 108 stairs and stone lanterns lining the rocky landscape. After going down the 108 steps, one will be delighted with the beauty of the temple. Midway down the 108 steps one can stop and enjoy the calming sounds of the waves, and view the majestic sunrise.

Many people often come to this spot on New Year's Day to make a wish for the new year as they watch the sun come up. April is an especially beautiful time of year with cherry blossoms in full bloom. The birth of Buddha is also celebrated in the fourth month of the lunar calendar and offers a spectacular night view as the temple area is aglow with lit lanterns.

# Haeundae



## MAP NUMBER

- 1 Haeundae Beach
- 2 Nurimaru APEC House
- 3 Sampo Esplanade
- 4 Dongbaek Park
- 5 Moomtan Road
- 6 Galleries at Haeundae Dalmajigi Road
- 7 Busan Yachting Center
- 8 Shinsegae Centum City Ice Link
- 9 Busan Aquarium
- 10 Busan Cinema Center
- 11 Busan Cinema Studios
- 12 BEXCO
- 13 Busan Museum of Art
- 14 Shinsegae Spa Land
- 15 Paradise Outdoor Hot Spring
- 16 Haeundae Beach
- 17 Nurimaru APEC House
- 18 Sampo Esplanade
- 19 Dongbaek Park
- 20 Moomtan Road
- 21 Galleries at Haeundae Dalmajigi Road
- 22 Shinsegae Centum City Ice Link
- 23 Busan Aquarium
- 24 Busan Cinema Center
- 25 Busan Cinema Studios
- 26 BEXCO
- 27 Busan Museum of Art
- 28 Shinsegae Spa Land
- 29 Paradise Outdoor Hot Spring
- 30 Vesta Hot Spring
- 31 Muji
- 32 Elune
- 33 Fuzzy Navel
- 34 Maktum
- 35 Paradise Casino Busan
- 36 Shinsegae Department Store
- 37 Centum City Branch
- 38 Chongsapo Raw Fish Street
- 39 Mipo Raw Fish Street
- 40 Pojangmachachon Badamaeul
- 41 The Sea Eel Alley in Haeundae Market
- 42 Sogogi Kukbap Street

### Getting there

From Busan Airport : Airport Limousine Bus No. 2 → Novotel Ambassador Hotel Bus Stop  
 From Busan Station : transfer to Metro Line 2 at Seomyeon → Get off at Haeundae (Exit 3 & 5)  
 From Busan Bus Terminal : transfer to Metro Line 3 at Yeomisan → transfer to Line 2 at Suyeong → Get off at Haeundae (Exits 3 & 5)

Metro : Line 2 Haeundae Station (Exits 3 & 5) → Walk 600m in the direction of Haeundae Beach  
 By car : Gyeongbu Expressway → Busan City Expressway → Wondong IC → Haeundae Beach

### Contact

Haeundae-gu Office : ☎ 051)749-4081  
 Haeundae Tourist Information Center : ☎ 051)749-5700