TOHOKU UNIVERSITY ENGINEERING SUMMER PROGRAM

TESP 2019 ROBOTICS

JULY 29 - AUGUST 9
TOHOKU UNIVERSITY AOBAYAMA CAMPUS
SENDAI, JAPAN

WELCOME

Welcome to Tohoku University and the School of Engineering. We are especially excited to be hosting TESP for the 10th time.

Today's engineering challenges are far more complex than anything we could image a decade ago. To meet these challenges, engineers are expected to deepen knowledge with social responsibility and innovation ability. Tohoku University has been committed to the "Open Door", "Research First", and "Practice-Oriented Research and Education" since its foundation in 1907. It is our mission to implement a range of programs and actions that facilitate effective learning as well as empower students to engage successfully in an international research environment.

TESP is an important program to develop this mission. You will have a chance to experience cutting edge research and form a global network through co-working. In addition, the Japanese culture program and field trip will enrich your academic experience.

I hope you spend inspiring two weeks at TESP and enjoy the beautiful Aobayama campus and Sendai city.

Tetsuya Nagasaka, Dr. Eng. Professor
Dean of the School of Engineering, Tohoku University

IMPORTANT

Evaluation

Four (4) ECTS credits should be awarded to the student by his/her home university upon the completion of the required coursework and a successful assessment through an oral presentation and performance demonstration.

For JASSO Scholarship Students

JASSO requires students who get scholarship to fill out survey after the program. The survey will be sent by Email during TESP period.
Please be sure to submit by **August 16th**.

Questionnaire

Please take a few minutes to answer a brief questionnaire for a step up of TESP. We will send the questionnaire by Email during TESP period.
Thank you for your cooperation.

Campus Wi-Fi

The world-wide roaming service called **"**eduroam**"** is available for internet at campus. ID and password are written on the back side of your nameplate.

SCHEDULE

CH: Center Hall (C01)
A07: Laboratory Building Mechanical and Aerospace Engineering (A07)
AMH: Aoba Memorial Hall (C03)
IEED: 2F of Center Hall (C01)

WEEK 1

	July 28 (Sun)	July 29 (Mon)	July 30 (Tue)	July 31 (Wed)	August 1 (Thu)	August 2 (Fri)	August 3 (Sat)
8:50 10:20		9:30【CH】 Opening Ceremony	【A07】 Robotics as Systems Integration I (Kosuge)	【A07】 Neuro-Robotics I (Hayashibe)	【A07】 Molecular Robotics I (Murata)	【A07】 Robotics for Human Assistance (Hirata)	
10:30 12:00		【CH】 Space Robotics I (Yoshida)	【A07】 Robotics as Systems Integration II (Kosuge)	【A07】 Neuro-Robotics II (Owaki)	【A07】 Molecular Robotics II (Murata)	【A07】 Law & Robotics (Weng)	
12:00 13:00		【CH "DOCK"】 Welcome Lunch	Lunch	Lunch	Lunch	Lunch	Field Trip Matsushima
13:00 14:30		【A07】(13:30-) Introduction of Robotics Hands-On Activity	【AMH】 Japanese Culture 【IEED】 Japanese Hour Open Campus (Lab Visit)	【AMH】 Japanese Culture 【IEED】 Japanese Hour Open Campus (Lab Visit)	Laboratory Hands-On Activity @ each lab.	Laboratory Hands-On Activity @ each lab.	
14:40 16:10		Laboratory Hands-On Activity @ each lab.					

: Ceremony, Student Activity : Lecture : Laboratory

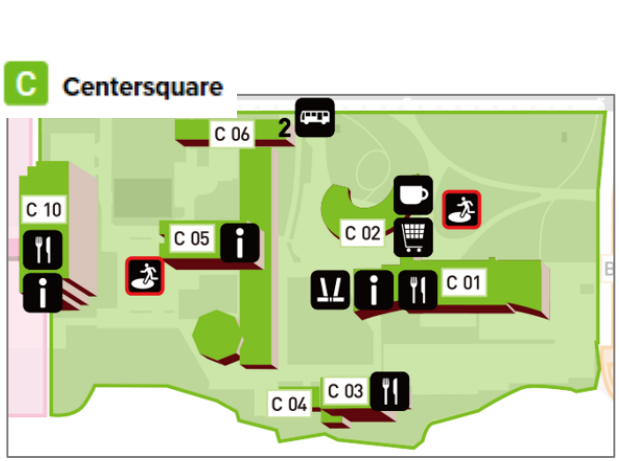
WEEK 2

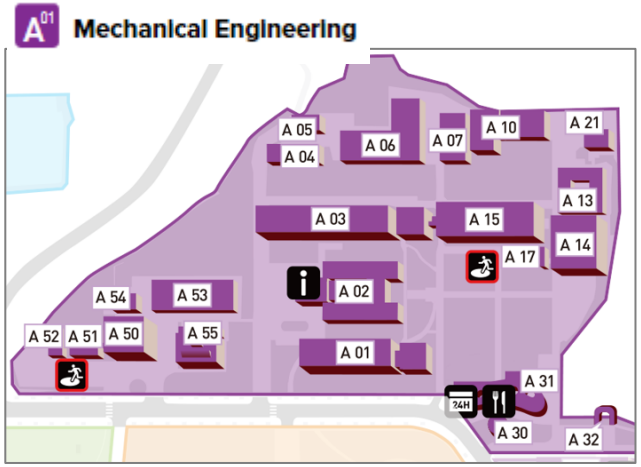
	August 4 (Sun)	August 5 (Mon)	August 6 (Tue)	August 7 (Wed)	August 8 (Thu)	August 9 (Fri)	August 10 (Sat)
8:50 10:20		【A07】 Disaster Robotics (Tadokoro)	【A07】 Visual Servo and Its Application in Robotics (Hashimoto)	【A07】 Computer Vision I (Okatani)	【A07】 Space Robotics II (Yoshida)	Hands-On Activity (Preparation for Final Presentation) @ each lab	Hotel Check-Out (-11:00)
10:30 12:00		【A07】 Haptic Interfaces (Konyo)	【A07】 Cameras and Image Sensors (Kagami)	【A07】 Computer Vision II (Okatani)	【A07】 Space Robotics III (Yoshida)		
12:00 13:00		Lunch	Lunch	Lunch	Lunch	Lunch	
13:00 14:30		Laboratory Hands-On Activity @ each lab.	Laboratory Hands-On Activity @ each lab.	Laboratory Hands-On Activity @ each lab.	Laboratory Hands-On Activity @ each lab.	13:00-16:30 【CH】 Final Presentation	
14:40 16:10						16:30 【CH】 Closing Ceremony	
						19:00 - 21:00 【Downtown】 Farwell Party	

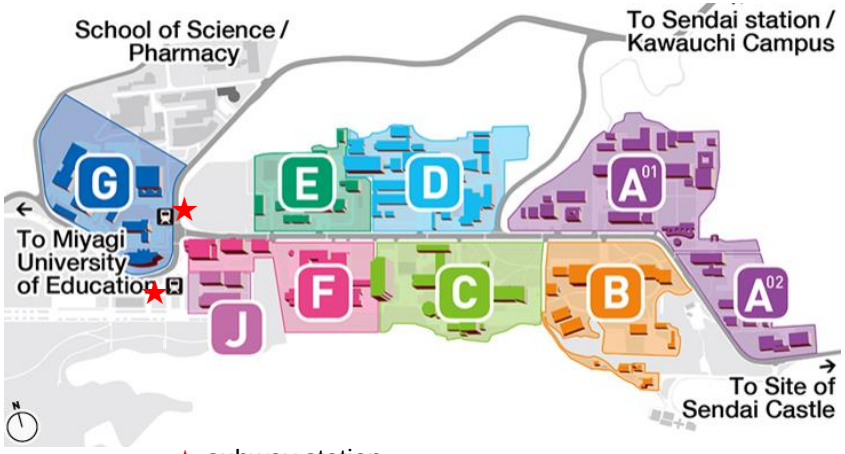
: Ceremony, Student Activity : Lecture : Laboratory

Aobayama CAMPUS MAP

TOHOKU UNIVERSITY
INTERACTIVE CAMPUS MAP







Ceremonny & Event

C01 Center Hall

C03 Aoba Memorial Hall

Lecture Room

A07 Laboratory Building
Mechanical & Aerospace Engineering

Store & Cafeteria

C01 “Aoba Shokudo” (Main Cafeteria)

C02 “BOOOK” (Book + Café), Co-op

C03 “Shikisai” (Restaurant)

A30 “Daily Yamazaki” (Convenience Store)

A31 “Komorebi Café”

Lecture Titles

	Time	Title	Place	Professors
1	July 29,Mon 10:30-12:00	**Space Robotics I**	Center Hall 2F Conf. Room	Prof. Kazuya Yoshida
2	July 30,Tue 8:50-10:20	**Robotics as Systems Integration I**	Building A07	Prof. Kazuhiro Kosuge
3	July 30,Tue 10:30-12:00	**Robotics as Systems Integration II**	Building A07	Prof. Kazuhiro Kosuge
4	July 31,Wed 8:50-10:20	**Neuro-Robotics I**	Building A07	Prof. Mitsuhiro Hayashibe
5	July 31, Wed 10:30-12:00	**Neuro-Robotics II**	Building A07	Assoc. Prof. Dai Owaki
6	August 1,Thu 8:50-10:20	**Molecular Robotics I**	Building A07	Prof. Satoshi Murata
7	August 1, Thu 10:30-12:00	**Molecular Robotics II**	Building A07	Prof. Satoshi Murata
8	August 2, Fri 8:50-10:20	**Robotics for Human Assistance**	Building A07	Prof. Yasuhisa Hirata
9	August 2, Fri 10:30-12:00	**Law and Robotics**	Building A07	Assist. Prof. Y-H Weng
10	August 5, Mon 8:50-10:20	**Disaster Robotics**	Building A07	Prof. Satoshi Tadokoro
11	August 5, Mon 10:30-12:00	**Haptic Interfaces**	Building A07	Assoc. Prof. Masashi Konyo
12	August 6, Tue 8:50-10:20	**Visual Servo and Its Application in Robotics**	Building A07	Prof. Koichi Hashimoto
13	August 6, Tue 10:30-12:00	**Cameras and Image Sensors**	Building A07	Assoc. Prof. Shingo Kagami
14	August 7, Wed 8:50-10:20	**Computer Vision I**	Building A07	Prof. Takayuki Okatani
15	August 7, Wed 10:30-12:00	**Computer Vision II**	Building A07	Prof. Takayuki Okatani
16	August 8, Thu 8:50-10:20	**Space Robotics II**	Building A07	Prof. Kazuya Yoshida
17	August 8,Thu 10:30-12:00	**Space Robotics III**	Building A07	Prof. Kazuya Yoshida

Lecturer Profile and Outline of Classes

(in the alphabetic order of lecturer's family name)

Koichi HASHIMOTO, Professor, Graduate School of Information Sciences

"Visual Servo and Its Application in Robotics"

Abstract

Visual servo is a feedback control framework useful for robot motion generation. It can also be used for robust image processing. Using with high-speed cameras image processing algorithms with feedback structure presents outstanding robustness. A parallel processing algorithm suitable for GPU architecture will be introduced. In this lecture, many visual servo applications of robot manipulation systems including robotic manufacturing, visual inspection and microscope robots are presented.

Research Interests

(1) Theoretical issues in visual servo
(2) High-speed vision systems and high-speed image processing algorithms
(3) GPU programming
(4) Visual servo microscope
(5) Optgenetic motion control of micro bio-systems
(6) Fluorescent 3D measurement of neural activity from freely moving animals.

Honors and Awards

2013 Vice-Dean of GSIS

2013 Fellow, SICE

2011 Assistant for University President

2011 Best Contribution Award, Society of Instrument and Control Engineers (SICE)

2010 Best Paper Award, Journal of Institute of Systems, Control and Information Engineering

2009 Best Paper, IEEE Int. Conf. Mechatronics and Automation

2006 Best Biomimetics Paper, IEEE Int. Conf. Robotics and Biomimetics

2005 Best Mechatronics Paper, IEEE Int. Conf. Mechatronics and Information Technology

2004 Best Vision Paper Finalist, IEEE Int. Conf. Robotics and Automation

1994 Young Investigator Excellence Award, Robotics Society of Japan

Mitsuhiro HAYASHIBE, Professor, Graduate School of Engineering

“Neuro-Robotics I”

Abstract

The current era is recently referred as a century of robotics and AI. However, there are still a lot of things we need to deeply learn from advanced and robust human motor control and sensory functions which humans only own. Under the known rule and predefined environment, robot and AI can outperform the capability of human thanks to its computation and memory performance. But it is obvious human can revenge once the unknown or new rule is applied or the new dynamics environment is introduced.

Robotics is effective as a computational tool to understand human motor learning mechanism. Then, it can be used to understand human sensory motor system, and it can be also used as an augmenting technology for neuro-rehabilitation. Neuroscience is useful to provide new insights to improve the current robotics function. In our lab, we study on neuroscience for robotics and robotics for neuroscience as “Neuro-Robotics”. In this lecture, relevant topics regarding Neuro-Robotics and Neuroprosthetics will be introduced.

[reference article]

E. Demircan, D. Kulic, D. Oetomo, M. Hayashibe, "Human Movement Understanding", IEEE Robotics and Automation Magazine, vol.22, no.3, pp.22-24, 2015.

Research Interests

Human motor control

Learning mechanism

Neuroprosthetics

Neurorehabilitation

Honors and Awards

2016 Swiss National Science Foundation fellowship for Short Visits. (EPFL)

2015 Habilitation degree (Professor qualification) at University of Montpellier, France.

2008 Academic Tenure with INRIA (Institut National de Recherche en Informatique et en Automatique), France.

2005 CAS Young Investigator Award, Gold Prize from Hitachi Medical Systems

2005 Best Paper Award, Journal of Japanese Society for Computer-Aided Surgery

2003 MMVR (Medicine Meets Virtual Reality) Best Poster Presentation Award

Yasuhisa HIRATA, Professor, Graduate School of Engineering

"Robotics for Human Assistance"

Abstract

Most of robots have been used as industrial robots in factories to replace humans doing tasks, which humans do not want to do or could not do, and have been isolated from humans. Recently, however, we expect to utilize robot systems not only the industrial fields but also the fields such as home, office and hospital in cooperation with human. For realizing the physical supports for human being by using the robot systems, we have to consider two main points: achieving high performance and user safety. In this lecture, the human-robot cooperation systems for augmenting the human performance will be given. In addition, the passive robotics concept, which can realize the high-safety robot, will be introduced, and the motion control methods of several passive robots will be lectured.

Research Interests

Human-Robot Cooperation

Assistive Robot

Passive Robot

Multiple Robots Coordination

Honors and Awards

Young Investigator Excellence Award, Robotics Society of Japan in 2001

Best Paper in Robotics Award of ROBIO in 2004

JSME Award for best paper, Japan Society of Mechanical Engineers in 2005

Best Paper Award, Robotics Society of Japan in 2005

Original Paper Award, FANUC FA and Robot Foundation in 2006

Young Scientists' Prize, The Commendation for Science and Technology, Minister of Education, Culture, Sports, Science and Technology in 2014

Shingo KAGAMI, Associate Professor, Graduate School of Information Sciences

"Cameras and Image Sensors"

Abstract

In order to investigate and develop advanced technologies for robot vision, image-based control and vision-based intelligent systems, it is important to understand how cameras acquire images, and how obtained images are affected by sensor structures and dynamic aspects of sensor operations. This lecture describes the principles, structures and operations of CCD/CMOS image sensors and camera systems. It also mentions related advanced topics such as high-speed imaging and exposure control as well as their applications.

Research Interests

(1) High-speed vision systems and real-time vision processing

(2) Vision application in robotics and human interfaces

(3) Real-time sensory information processing

Honors and Awards

2011 Research Incentive Award, M. Ishida Foundation

2010 Frontier Paper Award, Meeting on Image Recognition and Understanding

2009 Best Conference Paper Award, IEEE International Conference on Mechatronics and Automation

2004 Young Investigator Excellence Award, Robotics Society of Japan

2000 Incentive Award, IEEE Solid-State Circuits Society Japan Chapter

Masashi KONYO, Associate Professor, Graduate School of Information Sciences

“Haptic Interfaces”

Abstract

Haptics is all things related to our sense of touch. Creating haptic feedback for human interfaces contributes to enhancing our communication and physical capabilities. In this lecture, the recent topics and the state-of-art on haptic interfaces are introduced, especially from the aspect of cutaneous sensations. Advanced vibration feedback technologies, which produce force-like sensations, such as friction, inertia, and viscosity sensations for mobile information devices and motion support system are also introduced.

Research Interests

Haptics, Tactile Display, Tactile Sensor, New Actuators, Virtual Reality

Honors and Awards

Young Scientists Prize, the Commendation for Science and Technology by MEXT (2015)

Kisoi Motohiro Award (2015)

Best Paper Award, Journal of Robotics and Mechatronics (2010)

Best Paper Award. Advanced Robotics (2016)

Best Paper Award, Transaction of Virtual Reality Society of Japan (2002, 2007)

Best Paper Award (Actuators), IEEE/ASME AIM (2018)

Most Innovative Paper Award, IEEE SSRR (2015)

Best Poster Award, IEEE World Haptics Conference (2007, 2013)

Best Poster Award, EuroHaptics (2018)

Best Hands on Demo Award at the EuroHaptics (2008)

Best Demo Award of IEEE Haptics Symposium (2014)

Best Demonstration Award Gold Winner, AsiaHaptics (2018)

Kazuhiro KOSUGE, Professor, Graduate School of Engineering

"Robotics as Systems Integration"

Abstract

First, two issues for robot systems integration are discussed. One is related to how to integrated devices and unit technologies into robot systems and the other is related to how the robotic systems are integrated into society. Both issues are very important for bringing the robotics into the real world. Then, the systems integration issues are discussed using examples of robots and RT systems having physical interactions with humans which include robot helpers, passive robotic systems, and walking helpers. The dance partner robot, PBDR, is also discussed as a research platform for the future robot and RT systems for quality of life.

Research Interests

Robotics

New Robots Design

Intelligent Systems Design

Control Engineering

Honors and Awards

Director & Delegate, Division X, IEEE (2015-2016)

Member, Board of Directors, IEEE (2015-2016)

President, IEEE Robotics and Automation Society (2010-2011)

IEEE Fellow

RSJ Fellow

JSME Fellow

SICE Fellow

JSAE Fellow

JSME Awards for the best papers, Japan Society of Mechanical Engineers in 2002 and 2005

RSJ Award for the best papers from the Robotics Society of Japan in 2005

Original Paper Award, FANUC FA and Robot Foundation in 2004 and 2006

Best Paper Award of IROS'97

Satoshi MURATA, Professor, Graduate School of Engineering

"Molecular Robotics"

Abstract

The concept of nanometer scale mechanical systems first appeared in the famous lecture "There is plenty of room at the bottom" by Feynman (1959). Inspired by this idea, Drexler claimed that it is possible to build innovative artificial molecular machines such as gears and bearings by using a universal assembler that assembles atoms. Although his idea was met with much skepticism, it led to the establishment of a research field called *molecular nanotechnology.* In this lecture, DNA nanotechnology which is one of those emerging molecular nanotechnologies will be depicted. By the DNA nanotechnology, it becomes possible to make various mechanical and/or information processing devices out of DNA molecules. Accordingly, current efforts focus on creation of nanoscale molecular robots. Some topics on the frontline research will be reported.

Research Interests

(1) DNA Nanoengineering and its application to create Molecular Robots

(2) Distributed Autonomous Systems

(3) Sciences on Form

Honors and Awards

1992 IEEE Industrial Electronics Society, Outstanding Transaction Paper Award

1996 Outstanding Paper Award J.SICE 1996

1998, 2002, 2006 International Symposium on Distributed Autonomous Robotic Systems, Best Paper Award

2004 ROBOMEC Award, JSME

2007 Good Design Award, METI, Development of M-TRAN III (as a chief designer)

Takayuki OKATANI, Professor, Graduate School of Information Sciences

“Computer Vision”

Abstract

It is said that more than eighty percent of sensory information humans receive is through vision. Computer vision is a research area that studies how to make a computer perform the high-level visual information processing that humans do. Its application covers a wide range including robot vision, video/film production, medical applications, computational photography etc. This lecture describes two key problems in computer vision, 3D reconstruction from multi-view images and visual object recognition, from their theoretical bases to practical applications.

Research Interests

(1) Statistical methods and optimization in computer vision

(2) Multi-view geometry and its applications, e.g., large-scale city modeling

(3) Image-based recognition of objects, materials, and others that humans can visually recognize.

Dai OWAKI, Associate Professor, Graduate School of Engineering

“Neuro-Robotics II”

Abstract

Animals, even insects who have extremely limited numbers of neurons compared with vertebrates, exhibit adaptive locomotion under unpredictable environment and changes in their body properties, e.g., leg amputation. While control paradigm in coordinating leg movements, i.e., inter-leg coordination, for such adaptive locomotion have been discussed so far, the mechanism remains unknown. Understanding this mechanism is also useful for robotics fields, i.e., for establishing design principles of animal-like robots that can reproduce such ingenious locomotion under the real world and for developing application technologies for rehabilitation on patients with neurological and physical disorders. In this lecture, related research topics will be introduced.

Research Interests

(1) Legged locomotion robots

(2) Neuro-rehabilitation

(3) Measurement and control of insect locomotion

Honors and Awards

2016 Research Incentive Award, Aoba Foundation for the Promotion of Engineering

2012 JTCF Novel Technology Paper Award for Amusement Culture Finalist (IROS2012)

2009 Young Investigator Excellence Award, Robotics Society of Japan

2008 SICE Annual Conference Young Author’s Award

2008 IEEE Robotics and Automation Society Japan Chapter Young Award

Satoshi Tadokoro, Professor, Graduate School of Information Sciences

"Disaster Robotics"

Abstract

The Great Eastern Japan Earthquake was the first disaster where many robotic systems were used for disaster response and recovery. It is predicted that robotic systems become essential solutions in the near future. In this lecture, special topics related to rescue robots and systems will be introduced.

Research Interests

Rescue robotics, Actuators, Virtual Reality

Honors and Awards

President, IEEE Robotics and Automation Society 2016-2017

President, International Rescue System Institute

Program Manager, Japan Cabinet Office ImPACT Tough Robotics Challenge Program

IEEE Fellow, JSME Fellow, RSJ Fellow, SICE Fellow

RSJ Best Achievement Award

JSME RMD Best Achievement Award

SICE SI Best Achievement Award

RSJ Social Contribution Award

METI Robot of This Year

FDMA Commissioner Award

Yueh-Hsuan Weng, Assistant Professor, FRIS

"Law & Robotics"

Abstract

This course aims to provide a core understanding of AI/Robotics and its new impacts to current legal system. AI has been widely considered as the next revolutionary technology after the Internet. Although it has great potential to provide better life quality for human beings, it can be a double edge sword to cause unwanted outcomes to human society as well. Hence, we have to think about an AI Policy for human's sustainable development. Another concern is an emerging society for human-robot co-existence. In light of the above, there has been a global initiative advocating legal regulations and ethical considerations into the design, usage and interaction to intelligent robots. Therefore, engineers might need to have basic knowledge about this topic in order to properly deal with ethical and legal cases in human-robot interaction.

Research Interests

(1) The governance of emerging technology

(2) Ethical, legal, and social issues in AI & Robotics

(3) Legal informatics and intuitive legal visualization

Kazuya Yoshida, Professor, Graduate School of Engineering

"Space Robotics"

Abstract

Space robots have two distinct application fields: One is orbits around the earth. Manipulator arms mounted on Space Shuttle or International Space Station are in this category and dynamics and control in free-floating environment are of interest. The other is the surface of the moon or planets. Locomotion and remote/autonomous navigation are of interest. After a general introduction of current achievements in space robotics, specific focuses are placed on *Hayabusa*, a Japanese asteroid probe and the sensing and navigation of a wheeled mobile robot (rover) for lunar/planetary exploration.

In the lecture of "Micro-satellites and Micro-rovers," our current activities on micro-satellites and micro-rovers are introduced. As for the micro-satellites, a university-made "RISING-2" satellite was launched on May 24, 2014 and it is now making top-of-the-world level achievements. As for the micro-rovers, lunar rovers for the GLXP challenge are elaborated.

[reference article]

"Achievements in Space Robotics" Kazuya Yoshida, IEEE Robotics & Automation Magazine, Volume: 16, Issue: 4, pp.20-28, 2009.

Research Interests

(1) Dynamics and control of space robotic systems ranging from orbital free-flying robots to planetary exploration rovers

(2) Development of university-based micro-satellites

(3) Terrestrial applications of space technology, such as robotics remote exploration for search and rescue missions.

Honors and Awards

2015 Terrestrial Milestone Prize in Google Lunar XPRIZE (for team HAKUTO)

2014 Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, Japan

2008 Award for Excellence in Physical Science & Mathematics for Springer Handbook of Robotics, Association of American Publishers, Inc.

2008 Best Paper Award in IEEE 2008 International Conference on Mechatronics and Automation

2001 Best Conference Paper Award in IEEE 2001 International Conference on Robotics and Automation

1998-Now Visiting Faculty of International Space University

JSME Fellow, JSASS Fellow, RSJ Fellow

JAPANESE CULTURE

July 30th or 31st
Aoba Memorial Hall 7th floor (Sado & Kimono)
IEED Lecture Room (Japanese Hour)

Participants will be separated into small groups. Please confirm your group and time on the back side of your nameplate and come to the place on time. You can join the Japanese Hour at any time on these two days.

“SADO” - Tea Ceremony

茶道

You will have an opportunity to experience a Japanese tea ceremony in an authentic tearoom. The procedures for tea making will be demonstrated by professionals as well as a chance to prepare it by yourself. Through Tea ceremony, you can learn the manner and also learn the Japanese culture of “Wa”(和) spirit, which emphasizes harmony and peace. Please enjoy the tea and wagashi (Japanese cake) with friends.

“KIMONO” Dressing

着物

You will also have an opportunity to wear a “Kimono” or “Yukata”.
The Yukata is a Japanese summer Kimono worn by both men and women. It is popular to wear Yukata at outdoor summer events such as “Hanabi” (fireworks) festivals.

FIELD TRIP

August 3rd
Shiogama - Matsushima, Miyagi prefecture

Itinerary *subject to change	
7:30 am	Hotel Lobby *Please be punctual
8:00 am	Departure by bus
8:40 am	Shiogama Seafood Wholesale Market
9:40 am	Sightseeing boat departure
11:00 am	Arrive at Matsushima
12:10 pm	Lunch at Restaurant “Romantei“
13:30 pm	The Historical Museum of Jomon Village Oku Matsushima
	“Magatama” handmade experience
15:30 pm	Go back to Sendai City
16:30 pm	Arrive at the hotel

Matsushima

Matsushima (松島,"Pine Islands") is a bay in Miyagi prefecture, 25 km north-east of the prefectural capital, Sendai.

For hundreds of years, **Matsushima Bay has been celebrated as one of Japan's three most scenic views** alongside Miyajima and Amanohashidate. The bay is dotted by over 260 small islands covered by pine trees. The beauty of the bay changes with the seasons making for a rewarding visit at any time of year.

Matsushima Bay Cruises

The best way to enjoy the bay is by sightseeing cruise. Multiple companies offer various courses, including circular cruises starting and ending at Matsushima and cruises that connect Matsushima with nearby Shiogama. You can see over 260 pine tree covered islands that dot this coastal inlet.

“MAGATAMA” Handmade Experience

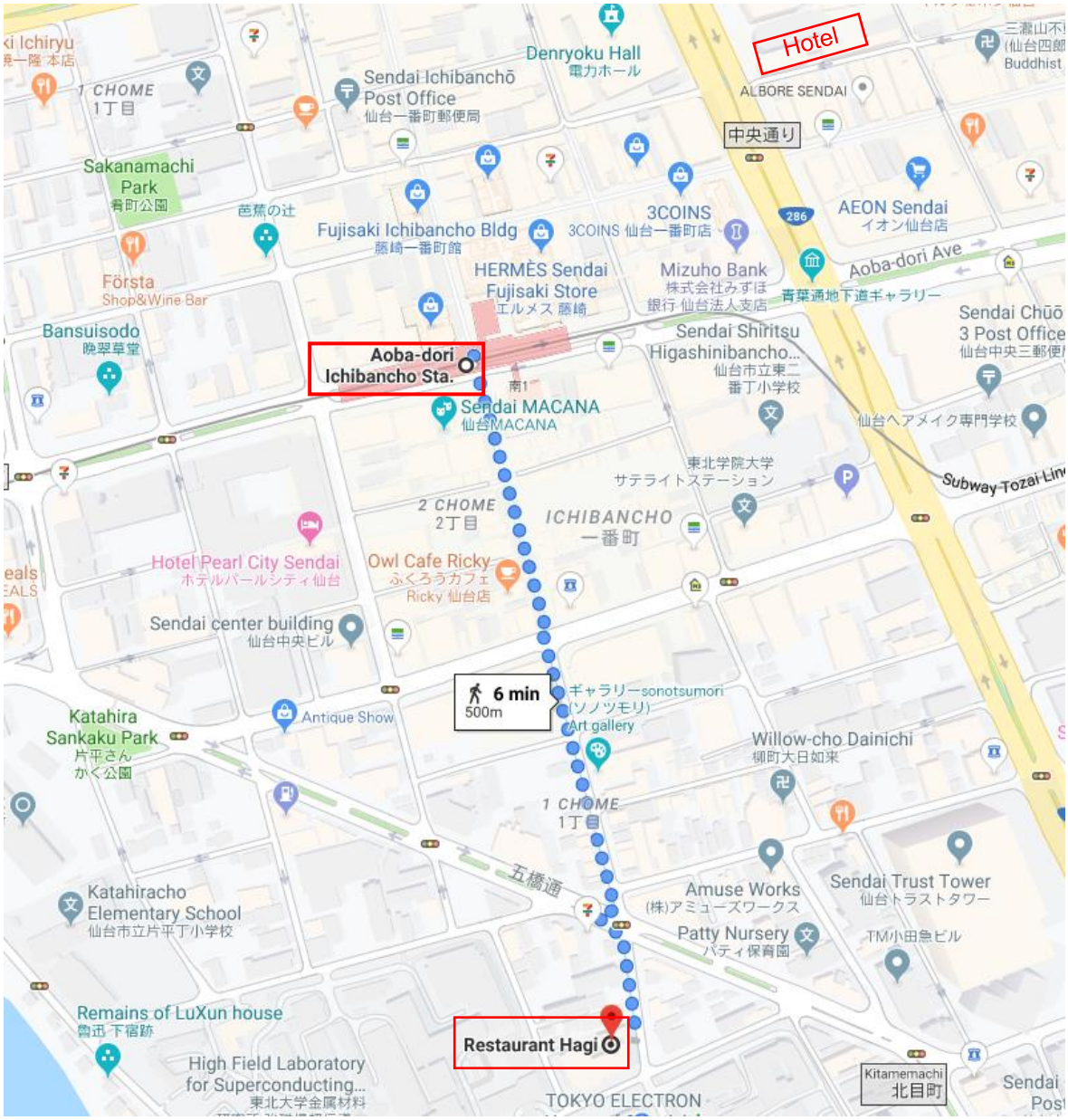
Beads have been an important part of human decoration for centuries. Tama (balls) have had a special meaning for people in the far east for just as long. There are four aspects to the ancient meaning of the ball. The four are: harmony, bravery, graciousness, and working wonders. Everyone will agree these characteristics are very important to human beings. However, the most important ball in Japan is the Magatama, which is known as the Curved Jewel.

In streams in the early Jomon era, people found pebbles with tiny holes in them. The holes had been naturally formed by the action of the water. Though these Jomon Era pebbles were smooth, they were almost all uneven in shape. The people found them beautiful and made from them the really ancient necklaces we sometimes find in burial sites of that period. Later on, people learned to make the pebbles into a standard Magatama (curved jewel) shape, and assigned them religious significance. Early jewels were handmade by rubbing the material on other stones to establish the shape and then polishing the rough bead on wooden blocks until both ends were exactly alike.

More about MATSUSHIMA!

FAREWELL PARTY

Aug. 9th, 7 pm
“Restaurant Hagi”



Address:
1-14-25, Ichibancho, Aobaku-ku, Sendai

Go out Exit South 1 of the “Aoba-dori Ichibancho” Sta. and 6 mins on foot.

ACCESS

Subway Line

Take the subway（**Sendai Subway Tozai Line**）from Sendai Station to Aobayama Station (9 mins). Exit at South 1 for the School of Engineering.

Buying Tickets and Taking the Subway


(Ticket Machine)

Please buy tickets at the ticket machines. Please insert your ticket into the Automated Ticket Gates. Platform 3 is for “Arai” bound cars and Platform 4 is for “Yagiyama Zoological Park” bound cars. Please be sure to check the platform number and wait behind the white lines. The cars come every 7 or 8 munutes.

iCSCA CARD

iCSCA card is rechargeable IC card that can be used to conveniently pay fares on buses, subways and railways. You can purchase an iCSCA card at subway stations. The initial cost consists of a refundable deposit of 500 yen. Then you choose how much additional money you want to put on the card, from 500 up to 9,500 JPY. The current credit balance is shown on a small display whenever you pass a ticket gate or it can be checked at ticket machines.

SAFETY & HEALTH

Emergency Numbers

Police	110
Ambulance	119
Fire	119

Contacting Program Coordinators

In the event of an accident, hospitalization, or injury etc., please promptly contact us.

Program Coordinator: Ms. Fang Han
Division of International Education & Exchange (IEED)

Phone: 022-795-7996

What to Do During and Immediately After an Earthquake

You should know what to do in the event of an earthquake, especially if you have never experienced one before.

Refuge areas sign
In University In Sendai City

The first thing to do is to secure your own safety.
If possible, you should take cover under a sturdy table or desk, or else move to a safe space where you are not likely to be hit by falling objects; after finding a safe place, stay there until the tremor subsides.

Then, follow the instructions of faculty members or staff.
On the campus, there are refuge areas at each department. Confirm your nearest refuge area and escape route.

Sudden illness and injury

Medical treatment is available from any hospital outside the campus. We introduce some clinics and hospitals on your request. Please bring along your passport, cash and a copy of insurance to the medical facilities. Please carry your insurance policy throughout the program.

TESP 2019

ROBOTICS

DIVISION OF INTERNATIONAL EDUCATION & EXCHANGE
(IEED)
SCHOOL OF ENGINEERING
TOHOKU UNIVERSITY