

# The Second Tokyo Tech-MIT Symposium on Innovative Nuclear Energy Systems (TM-INES 2)

## Program

*Version on July10, 2007 by Y. Kato*

Date: July 23-25, 2007

Venue: July 23-24, KKR Kamakura Wakamiya Hotel <http://www.kamakurawakamiya.jp/>  
4-6-13 Yuigahama, Kamakura, Kanagawa 248-0014, Japan Phone +81-467-25-4321  
July 25, O-okayama Campus, Tokyo Institute of Technology <http://www.titech.ac.jp/access-and-campusmap/e/o-okayama-campus.html>

Organized by CRINES and COE-INES (Tokyo Tech), CANES (MIT)  
Supported by RLNR (Tokyo Tech)

Inquiry: COE-INES Secretariat, Tokyo Institute of Technology  
North Building 1, Room 312, 2-12-1 Ookayama, Meguro-ku, Tokyo, 152-8550, Japan  
Tel +81-3-5734-3992, Fax +81-3-5734-3833

### Program

Dress Code: No tie (Casual) style for July 23-24, Business style for July 25

July 19-20 Student Workshop for Nuclear Educational Game Production, Tokyo Tech (see page 4)

July 23, Mon, Day 1, SAGAMI, 3<sup>rd</sup> floor, KKR Kamakura Hotel

- 9:00-9:20 Welcome addresses;  
Hiroshi Sekimoto, Tokyo Tech, "Progress in COE-INES" (O-01)
- 9:20-12:20 Session 1 Innovative Fast Reactors
- 9:20-10:20 Part 1 Chair: Ninokata, Tokyo Tech
- (a) Hiroshi Sekimoto, Tokyo Tech, "CANDLE Burnup Regime after LWR Regime" (O-02)
  - (b) Minoru Takahashi, Tokyo Tech, "Conceptual Study of Lead-Bismuth-Cooled Fast Reactor and Its Applicability to Petrochemical Complex" (O-03)
  - (c) Pavel Hejzlar et. al., MIT, "Supercritical CO<sub>2</sub> Cycle GFR for Generation IV Service" (O-04)
- 10:40-12:20 Part 2 Chair: Hejzlar, MIT
- (d) Toru Obara, Tokyo Tech, "Polonium Research for LBE coolant technology" (O-05)
  - (e) Ronald G. Ballinger, MIT, "Corrosion of Materials in Supercritical CO<sub>2</sub> Environments" (O-06)
  - (f) Tomohiro Furukawa, Kazumi Aoto, Osamu Miyake, Masaki Inoue, Tai Asayama, JAEA, "Compatibility of core and structural materials of FBRs with the coolants -Lead Bismuth Eutectic and Supercritical CO<sub>2</sub>-" (O-07)
  - (g) Michael P. Short, MIT, "Functionally Graded Composites for Service in Lead-Bismuth Eutectic (LBE) Reactors" (O-08)
  - (h) Toyohiko Yano, Tokyo Tech, "Neutron Irradiation Damage of Ceramic Materials for Fission and Fusion Reactor Applications" (O-09)
- 12:20-12:30 Photography
- 14:00-15:20 Session 2 Advances in Heat Transfer  
Chair: Takahashi, Tokyo Tech

- (a) Masanori Aritomi, Tokyo Tech, “Development of Ultrasonic Flow Rate Measurements related to Power Up-rate for Light Water Reactors” (O-10)
- (b) Jacopo Buongiorno, MIT, “Nucleate Boiling and CHF Characteristics of Nanofluids” (O-11)
- (c) Pavel Hejzlar and Lee J.I., MIT, “Deteriorated Turbulent Heat Transfer of Gas Up-flow in a Circular Tube” (O-12)
- (d) Hisashi Ninokata, Tokyo Tech, “Computational Approach Relevant to Safety-by-Design” (O-13)

15:40-17:00 **Session 3 Nuclear Hydrogen and Synthetic Fuels**

Chair: Ballinger, MIT

- (a) Mujid S. Kazimi, MIT, “Potential Supply of Transportation Fuels Through Nuclear Energy” (O-14)
- (b) Ryutaro Hino, Masuro Ogawa, Shusaku Shiozawa, JAEA, “Development Status on Hydrogen Production Technology Using High-Temperature Gas-Cooled Reactor at JAEA, Japan” (O-15)
- (c) Kazuya Yamada, Toshiba Corporation, “High Temperature Electrolysis for Hydrogen Production using Tubular Electrolyte Cell Assembly Unit” (O-16)
- (d) Yukitaka Kato, Tokyo Tech, “Carbon Recycle Nuclear Energy Systems for Vehicles” (O-17)

18:30- Welcome Dinner (only pre-reiterated guests), WAKAMIYA, 2<sup>nd</sup> floor, KKR

Chair: Obara

Welcome address, Masanori Aritomi, Director of RLNR, Tokyo Tech

July 24, Tue, Day 2, SAGAMI, 3<sup>rd</sup> floor, KKR Kamakura Hotel

9:00-12:20 **Session 4 Technologies for Closing Fuel Cycle**

9:00-10:20 Part 1: Chair: Buongiorno, MIT

- (a) Masayuki Igashira, Tokyo Tech, “Present Status of Neutron Cross Section Data relevant to Nuclear Transmutation” (O-18)
- (b) Mujid S. Kazimi, MIT, “Role of PWRs in Actinide Management” (O-19)
- (c) Hiroyasu Hotokezaka and Yasuhisa Ikeda, Tokyo Tech, “Nuclide Separation Using Microchemical Chip: Liquid-Liquid Extraction and Electrochemical Properties of Metal Ions in Microchannels” (O-20)
- (d) Tatsuya Suzuki, Tokyo Tech, “Nuclide Separation by using tertiary pyridine resin” (O-21)

10:40-12:20 Part 2: Chair: Yano, Tokyo Tech

- (e) Michael Golay, MIT, “Evaluation and Guidance of the R&D Process” (O-22)
- (f) Naoyuki Takaki, Sidik Permana, Hiroshi Sekimoto, Tokyo Tech, “Water Cooled Thorium Breeder Reactor Based on LWR Technology” (O-23)
- (g) Yasuhiko Fujii, Tokyo Tech, “Nonproliferation Fuel Cycle Technology based on Ion Exchange Separation” (O-24)
- (h) Matt Richards, Francesco Venneri, Mike Campbell, General Atomics, “Deployment Scenarios for FBR/VHTR Systems” (O-25)
- (i) Masaki Saito, Tokyo Tech, “Protected Plutonium Utilization for Peace and Sustainable Prosperity” (O-26)

July 25, Wed, Day 3, O-okayama Campus, Tokyo Institute of Technology

9:30-11:00 RLNR Laboratory tour, 1<sup>st</sup> Meeting Room, 1<sup>st</sup> floor, North-1 Build. (Only MIT guests), Coordinator: Igashira

10:00-11:20 *Putting-up posters, Robby, West-9 Build.*

11:30-12:30 Contact forum for Poster Session, Digital MP Hall, West-9 Build.,  
Chair: Onoe, Suzuki  
(90 sec each x 30 persons)

13:30-15:00 Poster session, Robby, West-9 Build

15:30-17:30 Special Educational Session, Digital MP Hall, West-9 Build.  
Chair: Saito, Suzuki

Opening address, Masuo Aizawa, President of Tokyo Tech

Part 1 “Introduction of the Doctor course educational designs at Tokyo Tech and MIT”

Tyler S. Ellis, MIT (O-27)

Akito Nagata, Tokyo Tech (O-28)

Part 2 “Student Collaboration for Games for Public Nuclear Education”

Moderator: Sagara, Tokyo Tech

(1) Games for Public Nuclear Education Produced from the COE-INES Captainship Program

Introduction of Nuclear Games (1), Tokyo Tech

Introduction of Nuclear Games (2), Tokyo Tech

(2) Proposals on New Game Concepts for Public Nuclear Education  
Tokyo Tech, MIT Ph D Course students

Proposals of the game concepts (1) MIT

Proposals of the game concepts (2) Tokyo Tech

Proposals of the game concepts (3) MIT

Proposals of the game concepts (4) Tokyo Tech

Game demonstration, Tokyo Tech & MIT

Evaluation comments, Takanobu Kimura, F9, Game Production Company

Closing remarks for TM-INES 2, Kazimi, Sekimoto

17:30-17:50 *Removing posters*

18:00-20:00 Banquet, Restaurant TSUNOBUE, 4<sup>th</sup> floor, Centennial Hall, (only pre-reiterated guests), Chair: Akatsuka

18:30-18:50 Special Lecture : Akio Minato, CRINES Prof., CRIEPI, “4S Project in Alaska” (O-29)

19:50- Closing address

## Student Workshop for Nuclear Educational Game Production

Date: July 19-20, 2007

Venue: Meeting Room, North-2 build., 6<sup>th</sup> Floor, Research Laboratory for Nuclear Reactors,  
Tokyo Tech

Moderators: Kato, Sagara

19 July, Thu

Workshop (1)

9:30 -10:00 Orientation of the workshop

10:00-10:40 Development of Nuclear Educational Game

Masayuki Yamato (TEPCO)

Prof. MiyakoTakagi (Nihon Univ.)

10:40-12:30 Introductions of Games from students

Game demonstrations, Tokyo Tech students

Game proposals, MIT & Tokyo Tech students

Advice, Takanobu Kimura, F9, Game Production Company

12:30-13:30 Lunch

13:30-16:00 Discussion for proposed games

MIT & Tokyo Tech students

Advice, Takanobu Kimura, F9, Game Production Company

16:00-17:00 Game play and discussion of developed games

20 July, Fri

Workshop (2)

9:30 -12:00 Presentations of Brush-upped Games

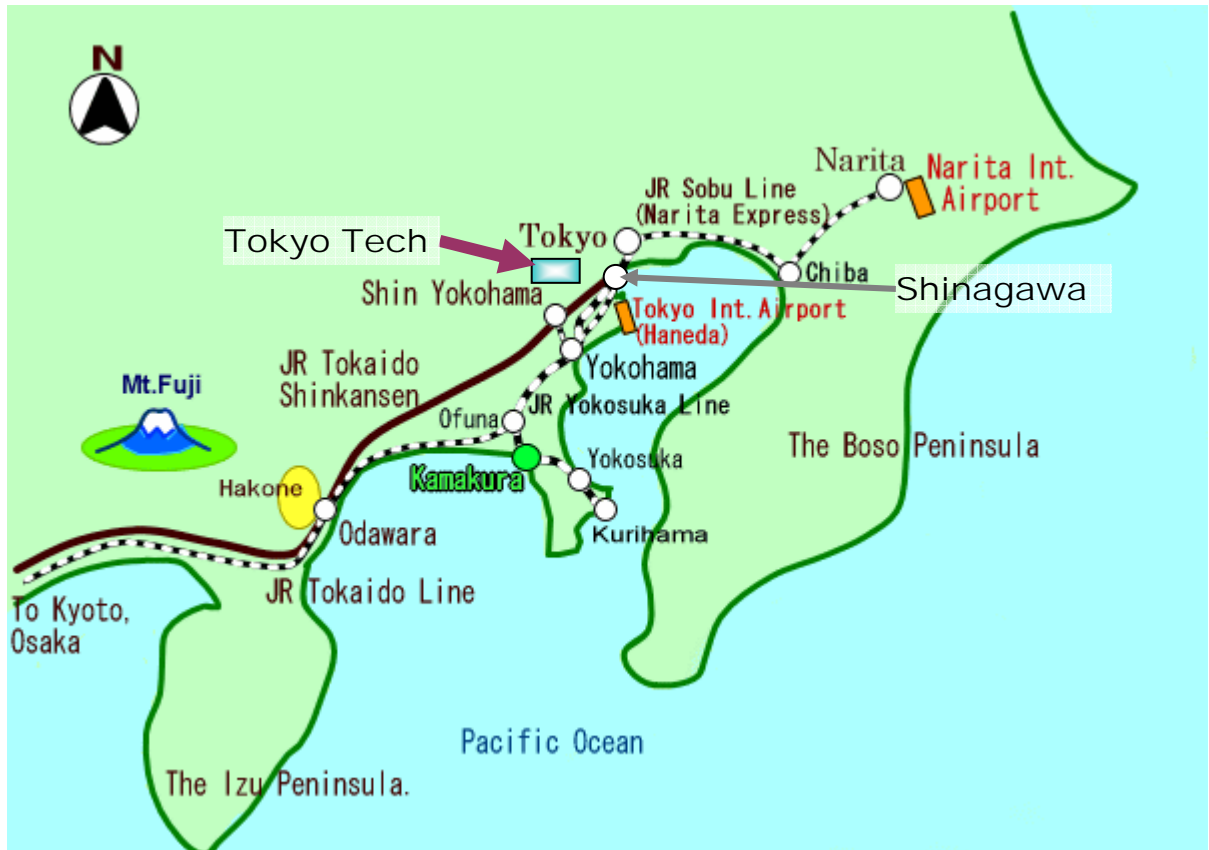
13:00- 15:00 Discussion

## TM-INES 2 Poster Presentation List

### Poster Presentations

P-01	Anna S.	Nikiforova	MIT	Flexible Conversion Ratio (FCR) Lead-Cooled Reactor
P-02	Lara M.	Pierpoint	MIT	Proliferation Resistance of Advanced Nuclear Fuel Cycles
P-03	Matthew J.	Memmott	MIT	HYDROGEN PRODUCTION USING A SUPERCRITICAL CO <sub>2</sub> -COOLED GFR AND STEAM ELECTROLYSIS
P-04	Gerardi D.	Craig	MIT	Experimental study of boiling and diffusion phenomena in nanofluids
P-05	David M.	Carpenter	MIT	Experimental Investigation of Internally- and Externally-Cooled High Performance PWR Fuel
P-06	Thomas M.	Conboy	MIT	Core Design Options for High Power Density BWRs
P-07	Sidik	Permana	Tokyo Tech	Core Design Optimization of Water Cooled Thorium Breeder Reactor
P-08	Akito	Nagata	Tokyo Tech	Effects of Recladding in CANDU Reactor
P-09	Toru	Sasaki	Tokyo Tech	Study on Warm Dense Matter Physics based on Pulsed-power devices and Heavy Ion Accelerator
P-10	Takashi	Sawabe	Tokyo Tech	TEM Observation of Neutron-Irradiated SiC after 1500°C Annealing
P-11	Sou	Ryuzaki	Tokyo Tech	Organic Thin-Film Photovoltaic Cells Consisting of Zinc-Octaethylporphyrin and Fullerene
P-12	Ken	Katagiri	Tokyo Tech	Development of a coaxial tapered electromagnetic shock tube for beam-plasma non-linear interaction experiments
P-13	Toshihide	Tobitsuka	Tokyo Tech	Effect of Space Exposure on Surface Characteristics of Silicon Carbide Ceramics
P-14		ISMAIL	Tokyo Tech	Feasibility Study of Small Long-Life Water Cooled Thorium Reactors (WTRs)
P-15	Jun	Nishiyama	Tokyo Tech	Measurements of keV-Neutron Capture Cross Sections and Capture Gamma-Ray Spectra for Sn isotopes
P-16	Kunihiko	Tomiyasu	Tokyo Tech	Design for Medical Radioisotope Production Using a Compact Fusion Proton Source
P-17	So	Kamada	Tokyo Tech	Experimental studies on keV-neutron Capture Cross Sections of Se Isotopes for the R&D of nuclear transmutation systems
P-18	Ho-Jin	Kim	Tokyo Tech	Preparation and Characterization of Gold (Au) Nanofluid for Standardization of Nanofluids as an Advanced Energy System Coolant
P-19	Nam Hoai	Tran	Tokyo Tech	Optimization of Burnable Poison Loading in HTGR cores with OTTO Refueling
P-20	Suguru	Nishinomiya	Tokyo Tech	A differential pumping system for the measurement of the energy loss of low-energy heavy ions in a shock-compressed gas target
P-21	Jun-ichi	Yamane	Tokyo Tech	Compatibility of Silicon Nitride Inert Matrix with Reprocessing Method
P-22	Kei	Takano	Tokyo Tech	Development of compact electron generator using ultrashort pulse laser
P-23	Hideaki	Futagami	Tokyo Tech	Analysis for rarefied gas flow in a rotating cylinder
P-24	Kotaro	Kondo	Tokyo Tech	Electro-magnetically Driven Strong Shock Experiment
P-25	Yuya	Takahashi	Tokyo Tech	Partitioning System for High Level Radioactive Liquid Wastes Utilizing Microchemical Chips
P-26	Yu	Tachibana	Tokyo Tech	Kinetic and mechanistic studies on decomposition reactions of organic anticorrosives using ozone
P-27	Elia	Merzari	Tokyo Tech	Investigation of laminar- turbulent transition phenomena in a tight lattice fuel pin subassembly of sodium-cooled fast breeder reactors
P-28	Abu Khalid	Rivai	Tokyo Tech	Corrosion Resistance of Alloy-Sputtering-Coated Steels, High Chromium Steels, Refractory Metals and Ceramics in High Temperature Lead-Bismuth Eutectic
P-29		NOVITARIAN	Tokyo Tech	Experimental Study on Lead-bismuth Natural Circulation and Lead-bismuth-water Direct Contact Boiling Two-phase Flows

## Access to Kamakura



Access to Kamakura:

[http://www.city.kamakura.kanagawa.jp/foreign01\\_english/1\\_2\\_access.html](http://www.city.kamakura.kanagawa.jp/foreign01_english/1_2_access.html)

**From Narita Airport to Kamakura by JR train** (JR: Japan Railway Company)  
 [Narita Airport station] => JR Narita Express => [Tokyo station] (1<sup>st</sup> station) => JR Yokosuka/ Sobu Line (the same platform) => [Kamakura station] (10<sup>th</sup> station), around 2 hr 20 min.

You can change also at Yokohama Sta. and Ofuna Sta., from Narita Express to JR Yokosuka/Sobu Line.

Narita Express Timetable

[http://www.jreast.co.jp/nex/timetable/from\\_narita/yokohama/index.html](http://www.jreast.co.jp/nex/timetable/from_narita/yokohama/index.html)

Access Guide to Narita Airport

<http://www.jreast.co.jp/e/nex/index.html>

**From Kamakura to Shinagawa**

[Kamakura station] => JR Yokosuka/Sobu line => [Shinagawa station] (8<sup>th</sup> station), 52 min.

## Access to KKR Kamakura Wakamiya Hotel

For July 22, 23



[http://guide.city.kamakura.kanagawa.jp/kanko\\_shiryo/PDF/English2006\\_B.pdf](http://guide.city.kamakura.kanagawa.jp/kanko_shiryo/PDF/English2006_B.pdf)

### To KKR Kamakura Wakamiya Hotel from Kamakura Station

<http://www.kamakurawakamiya.jp/>

By taxi, around 800 JPY, 5 min

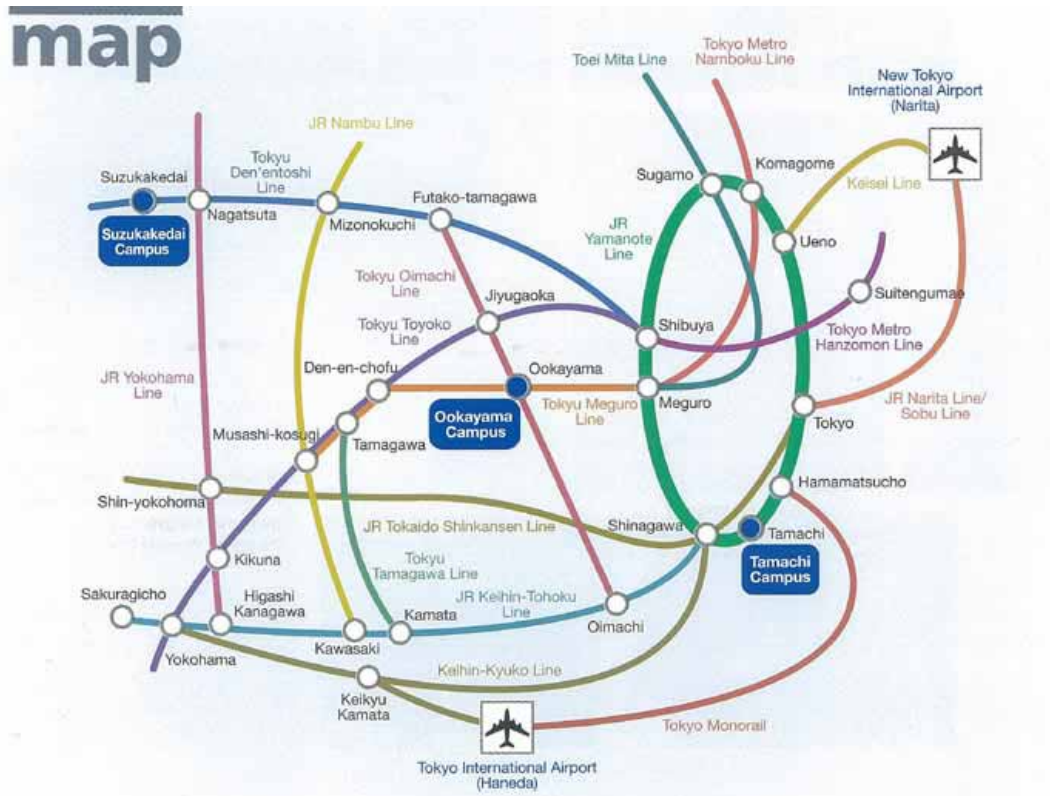
By walk, 15 min, 1.5 km

By Enoden Line, Local classic train, getting-off WADA-ZUKA station, 1st station, and 6 min walk.

Kamakura City Official Guide

[http://www.city.kamakura.kanagawa.jp/foreign01\\_english/index.html](http://www.city.kamakura.kanagawa.jp/foreign01_english/index.html)

## O-okayama campus, Tokyo Institute of Technology



<http://www.titech.ac.jp/access-and-campusmap/e/o-okayama-campus.html>

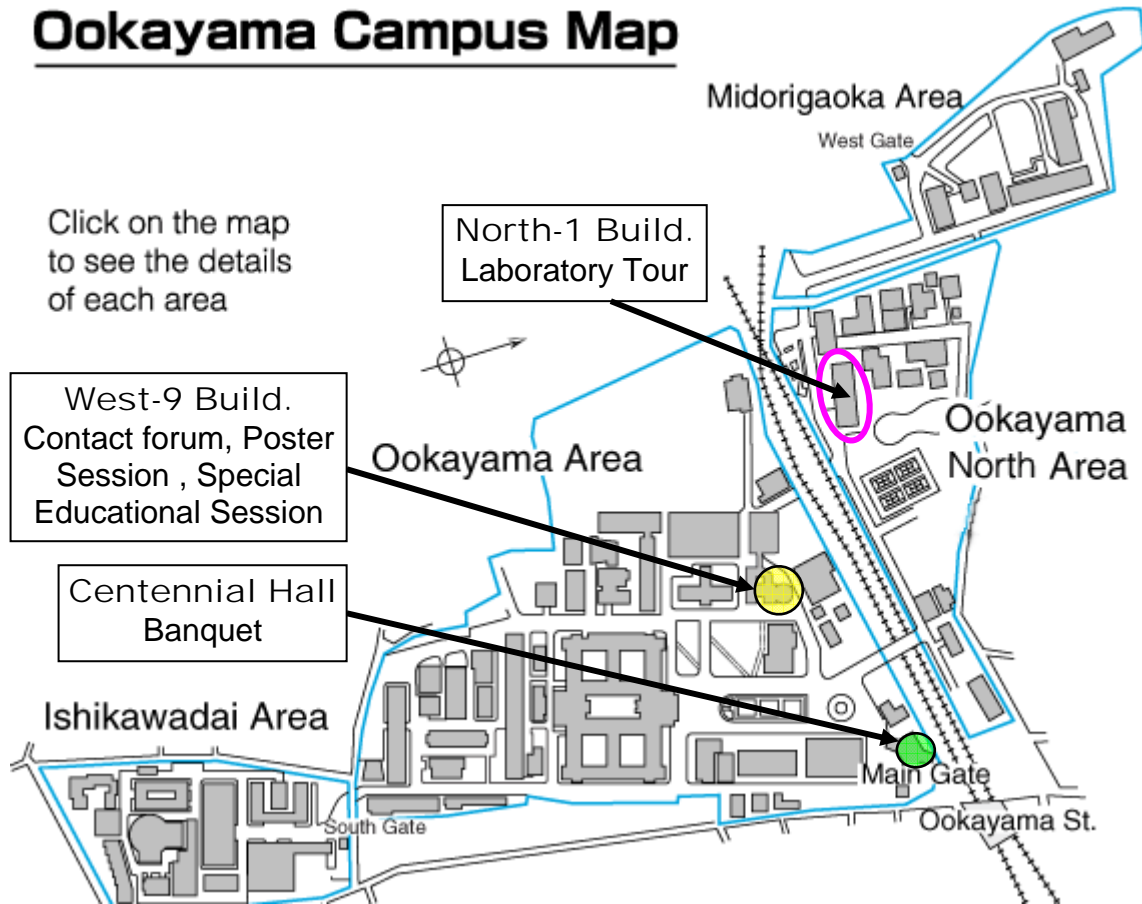
The O-okayama campus is a one-minute walk from O-okayama Station.

From Downtown Tokyo

1. Take [Keihin-Tohoku Line](#) (Japan Railways) to Ooimachi Station. Transfer to Ooimachi Line (Tokyu Transportation Systems) there and get off at Ookayama Station. The train ride from Ooimachi Station to Ookayama Station is about 10 minutes.
2. Take [Yamanote Line](#) (Japan Railways) to Meguro Station. Transfer to Meguro Line (Tokyu Transportation Systems) there and get off at Ookayama Station. The ride from Meguro Station to Ookayama Station takes about 10 minutes.
3. Take [Mita Line](#) (Toei Subway) to Meguro Station and continue the ride to Ookayama Station.
4. Take [Namboku Line](#) (Tokyo Metropolitan Subway) to Meguro and continue the ride to Ookayama.



## Ookayama Campus Map



<http://www.titech.ac.jp/access-and-campusmap/e/o-okayama-campusmap.html>