PNST 2024 round webinar
Kyushu Institute of Technology

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Kitakyushu, Japan

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Kyutech offers **full-scholarship program** named **PNST** which is operated under Space Engineering International Course (SEIC), by Kyutech Collaboration with UNOOSA and Japanese Government.
Kyushu Institute of Technology (Kyutech)

- A national university founded in 1909
  - 4,200 Undergraduate students
  - 1,300 Graduate students
  - 360 Faculty members
  - Engineering, Computer science, Life-science
- Located in the Kitakyushu region
  - Population of more than 1 million
Hands-on and Practical Education

Lab-Based Final Year of All Undergraduate Program

Final-year undergraduate students become laboratory members for research work and thesis
Research Centers & Units

Center of Excellence for Advanced Research

- Laboratory of Lean Satellite Enterprises and In-Orbit Experiments
- Integrated Research Center for Energy and Environment
- Next Generation Power Electronics Research Center
- Research Center for Neuromorphic AI Hardware
International trend of Nano/Small Sat

- **Space business and Tech demo**
  - Mainly LEO mission
  - Lower prices of components, etc.
  - Ideas for space applications are important
  - Interdisciplinary research on multiple disciplines

- **Advanced research on Nanosatellites**
  - Challenging programs of science missions (Moon, deep space missions)
  - Huge amount of technical challenges
  - Research topic of cutting-edge is crucial
  - Advanced Research Initiatives and Technology Demonstrations in LEO
Mission of LaSEINE

Bringing diversity to the space sector and contributing to space activities through CubeSats
Introduction

Overview comments by Associate Prof. T. Fuse
Space Engineering International Course (SEIC)

- Started in April 2013 at Graduate School of Engineering, Kyutech to support PNST
  1. Research toward a Master or Doctoral degree
  2. On-the-job training such as space environment testing workshop
  3. Project Based Learning (PBL) through space projects
  4. Space-related lectures in English
     - Not only engineering, but also space policy and others

There is a scholarship opportunity. “PNST”
Space Projects at Kyutech

Kyutech has numerous world-class space facilities and space projects, including:

1. Electrostatic discharge testing in space plasma environment
2. Space-use material degradation testing under UV and atomic oxygen flux
3. Nano-satellite environment testing (vibration, shock, thermal vacuum, thermal cycling, outgassing, EMC & antenna compatibility, etc.)
4. Hypervelocity impact testing using two-stage light gas guns (up to 6.2 km/s)
5. BIRDS nano-satellite series
6. HORYU nano-satellite series
7. SPATIUM nano-satellite series
8. Aoba-Velox nano-satellite series
9. KITSUNE 6U satellite
Center for Nanosatellite Testing

To be capable of doing all the tests for a satellite up to 50cm, 50kg

- Vibration
- EMC & Antenna pattern
- Pressure & Leak
- Thermal vacuum
- Assembly & Integration
- Thermal vacuum
- Thermal cycle
- Shock
- Outgas (ASTM E595)

Conducted more than 400 tests for external users since 2010

Space Development and Utilization Award (JAXA president award), 2022
Kyutech Satellite Heritage

HORYU-1 (1U)  
2006-2010  
Not launched

HORYU-II  
2010-2012  
Launch 2012/5/18

Shinen-2  
2013-2014  
Launch 2014/12/03

HORYU-IV  
2013-2016  
Launch 2016/02/17  
ISS Release 2017/01/19

AOBA VELOX-III  
2014-2016  

BIRDS-I constellation  
2015-2017  
ISS release 2017/07/07

BIRDS-II constellation  
2016-2018  
ISS release 2018/08/10

SPATIUM-I  
2016-2018  
ISS release 2018/10/06

Ten-Koh  
2016-2018  
Launched 2018/10/29

AOBA VELOX-IV  
2016-2018  
Launched 2019/01/18

BIRDS-III constellation  
2017-2019  
Launched 2019/04/18

BIRDS-IV constellation  
2018-2020  
Launched 2021/03/14

KITSUNE  
2019-2021  
Launched 2022/03/24

FUTABA  
2018-2021  
Launch, 2021

BIRDS-5J, -5Z, -5U  
2022年

MITSUBA  
2022年

Satellite name  
Satellite development period  
Launch/ISS release date
Operator and Mission Type Trends
Number of Academic Smallsats 2013 – 2022, by Institution

Academic Institutions with More than Five Smallsats Launched

200+ academic operators launched smallsats 2013 – 2022

Smallssats by the Numbers 2022, Bryce Space and Technology, 2023
### Where SEIC students come from (as of April 2022)

<table>
<thead>
<tr>
<th>Number of Students (67 in total)</th>
<th>Nationality</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>Japan</td>
</tr>
<tr>
<td>4</td>
<td>France, Philippines, Zimbabwe</td>
</tr>
<tr>
<td>3</td>
<td>Paraguay, Thailand, Uganda</td>
</tr>
<tr>
<td>2</td>
<td>Bhutan, Spain</td>
</tr>
<tr>
<td>1</td>
<td>Brazil, Cambodia, China, El Salvador, Ethiopia, Honduras, India, Indonesia, Laos, Malaysia, Mexico, Myanmar, Nepal, Rwanda, Sri Lanka, Trinidad and Tobago, Vietnam</td>
</tr>
</tbody>
</table>
More than 159 foreign students from 46 countries enrolled in 11 years

PNST/SEIC won Space Development Utilization Award (Minister of Foreign Affairs) in 2017
International Awards and Recognition

Bringing diversity to engineering education

GEDC Airbus Diversity Award (2017)

The BIRDS Project
BIRDS Program
Satellite program for non-space faring countries

Mission Statement
By successfully building and operating the first national satellite, make the foremost step toward indigenous space program at each nation.

JAPAN, GHANA, MONGOLIA, NIGERIA, BANGLADESH, THAILAND, TAIWAN

BIRDS-II (2016-2018)
JAPAN, BHUTAN, MALAYSIA, PHILIPPINE

BIRDS-III (2017-2019)
JAPAN, SRI LANKA, NEPAL

BIRDS-IV (2018-2020)
JAPAN, PARAGUAY, PHILIPPINE

BIRDS-V (2020-2022)
JAPAN, ZIMBABWE, UGANDA
Program features

• 1U CubeSat constellation of
  • BIRDS-I: 5 satellites by Bangladesh*, Ghana*, Japan, Mongolia*, and Nigeria
  • BIRDS-II: 3 satellites by Bhutan*, Malaysia and Philippine
  • BIRDS-III: 3 satellites by Japan, Sri Lanka* and Nepal*
  • BIRDS-IV: 3 satellites by Japan, Paraguay* and Philippine
  • BRIDS-V: 3 satellites by Japan, Zimbabwe* and Uganda*
• Made by students at Kyutech
• 2 years from concept design to disposal
• Released from ISS
• Network operation by multiple ground stations

* First satellite for the country
To promote international cooperation and proliferation of CubeSat technology, all the technical information will be put in the public domain very soon.
What you can acquire in SEIC

- Hands-on training
- Diversity environment
- Space engineering professionalism and research
- Project management and system engineering skills through space projects
- Be professional of space engineering
The Access to Space for All x SDGs Interview Series #2 on PNST is released in the UNOOSA website.

Access to Space for All initiative for Sustainability: Interview Series Article #2 July 2022

How Education Through PNST Contributes to the SDGs

Interviewee: Prof. Mengu Cho, Director of the Space Engineering International Course, Kyushu Institute of Technology (Kyutech)

Abhas Maskey, 2020 graduate of the PNST fellowship, Founder of Antarikshya Pratisthan Nepal

Date: Interview conducted with Kyutech on 28 June 2022 and with Abhas Maskey on 13 July 2022

Background:
The United Nations/Japan Long-term Fellowship Programme: Post-graduate study on Nano-Satellite Technologies (PNST) is offered by the United Nations Office for Outer Space Affairs (UNOOSA) and the Government of Japan, through the support of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), in cooperation with the Kyushu Institute of Technology (Kyutech). The Fellowship programme provides sponsorship, board and lodging.

https://www.unoosa.org/documents/pdf/Access2Space4All/AccSpace4AllxSDGsInterview/AccSpace4All_x_SDGs_Interview_PNST.pdf
FAQ

Q: What kind of academic background is needed to be selected for PNST candidates?

A: Any engineering background are possible. But especially, mechanical, electrical, computer science and related science background is preferable.

Q: What feature does Kyutech look for in an applicant other than an academic background?

A: Motivation and energy to change your home country and world using space technology

Note: GPA score is required to be qualified.
Must have earned Grade Point Average (GPA) of 2.3/3.0

APPLICATION GUIDELINES
JAPANESE GOVERNMENT (MEXT) SCHOLARSHIP FOR 2024
RESEARCH STUDENTS / UNDERGRADUATE STUDENTS (UNIVERSITY RECOMMENDATION) [SPECIAL SELECTION]

*4 Regarding the above k), if a GPA cannot be calculated from the transcript, only in case that the above k) clearly states that his/her grade ranking at the university/faculty or graduate school is within the top 30%, MEXT deems that the applicant’s academic achievement is equivalent to a GPA of 2.30 or above. If the university recommends such student, a copy of the above k) must be submitted to MEXT (See also 4. (4)③ of the appendix “Notes of Recommendation”).
Come to Japan for a great learning and cultural experience …

… it will change your life

SEIC students celebrating spring under cherry blossoms
The End

This pdf is available to you at UNOOSA website