

Post-graduate study on **Nano-Satellite Technologies** (PNST) **2023 Round** Webinar



Thursday 3 November



UNITED NATIONS Office for Outer Space Affairs





Access to Space for All Space Technology Capacity Building



The goal of the Access to Space 4 All initiative is to provide research and orbital opportunities for UN Member States **to access space and to ensure that the benefits of space, in particular for sustainable development, are truly accessible to all**



Provides the possibility of developing hands-on capabilities from A-Z in to promote the safe and sustainable use of outer space



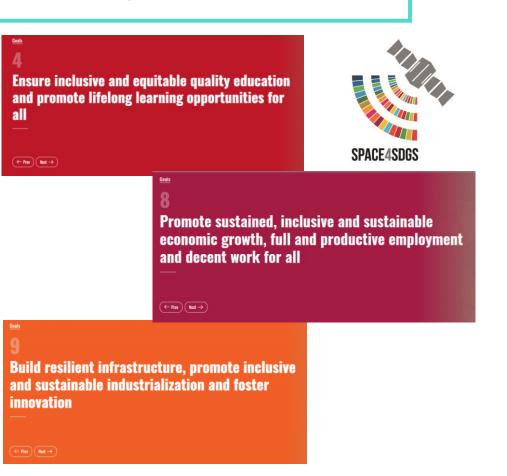
Provides cutting edge skills for jobs and other opportunities



Fosters international cooperation between the UN, space-faring partners, and applying developing nations



Has a strong social impact to the country, regions, and young generations





Access to Space for All Impact of the initiative



HyperGES "Watermeal, the Future Food Source for Space Exploration"



HyperGES and community impacts

- Expand space-related knowledge and awareness in Thailand
- Flagship program in astroculture, produce
- intensive research environment
- Team up with other organization. Stepping out of their comfort zone encouragement



3. How has participating in DropTES changed the environment around you?



RESEARCH CENTER



"Hay campo on el país"

StELIUM: A student experiment to investigate the

Free and Forced Oscillations of Magnetic Liquids Under Low-Gravity Conditions 🥝

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LATERAL SLOSHING OF MAGNETIC LIQUIDS IN MICROGRAVITY

Å. Romero-Cabro^{1,a} A. J. Garvia-Salcodo¹, I. Rivoaleu¹, F. Garrone¹, G. Cano Gimer², E. Castro-Hernänder³, M. Å. Herrada Guthirreg³, F. Maggi

sloshing of magnetic liquids in microgravity

RESEARCH PAPERS

(R) Check for updates Appl. Mech. Feb 2020, #7123: 021010 (

Free surface reconstruction of opaque liquids in microgravity. Part 1

Free surface reconstruction of opaque liquids in microgravity. Part 2:

AXISYMMETRIC AND LATERAL FREE SURFACE OSCILLATIONS OF FER-ROFLUIDS IN MICROGRAVITY

Milano, Milan, Jtaly, filippo moggi

Romero-Calvo^{4,6,4}, F. Garrone⁶, A. J. García-Salcedo⁸, I. Rivculen⁸, G. Cano-Gómez⁴, Custro-Hernández⁴ and F. Maggi⁸

Romero-Cabop^{16,e}, A. J. Garcia-Salcedo³, F. Garrone⁸, I. Rivoalen⁸, O. Cano-Gómero-Camop Haminakof and E. Manar²

design and on-ground testing

results of drop tower campaig

Interials Sciences in Space (G) top Tower Days (G0.2)

Final results!!

COSPAR 2021

3. How has participating in DropTES changed the environment around you? Cont'd (3)

FIRST MAURITIAN SATELLITE - OPENING NEW OPPORTUNITIES

In Feb. 2017 I was elected to be the President of the American University of Madaba (AUM) in Jordan. That month AUM started the Innovation project for its students and for high school students in Jordan at







Access to Space for All Structure of the initiative



HYPERGRAVITY AND MICROGRAVITY

Building capacity for conducting experiments in orbit



Hands-on opportunities in hypergravity and microgravity from ground to orbit



Open source tools bridging hands-on and education components



Educational material for building up experiments

SATELLITE DEVELOPMENT

Building capacity that enables the development, deployment, and operation of satellites



Hands-on opportunities for satellite deployment



Open source tools bridging hands-on and education components



Educational material supporting the whole life-cycle of satellites

SPACE EXPLORATION

Broadening the engagement in space exploration



Hands-on opportunities to engage in space exploration



Open source tools bridging hands-on and education components



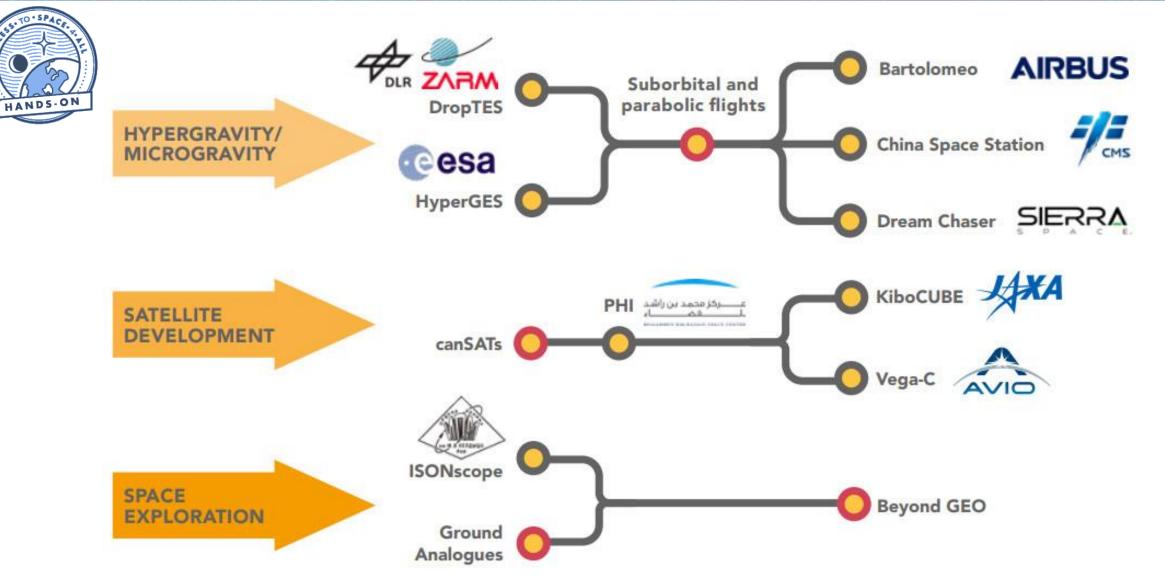
Educational material for space exploration

- CubeSats offer a large variety of applications
- CubeSat development can be the first step for a country in the acquisition of the skills and know-how needed to develop a space programme CubeSats are affordable to develop and represent an achievable entry point to space activities.



Access to Space for All Hands-on Component

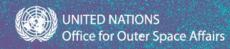


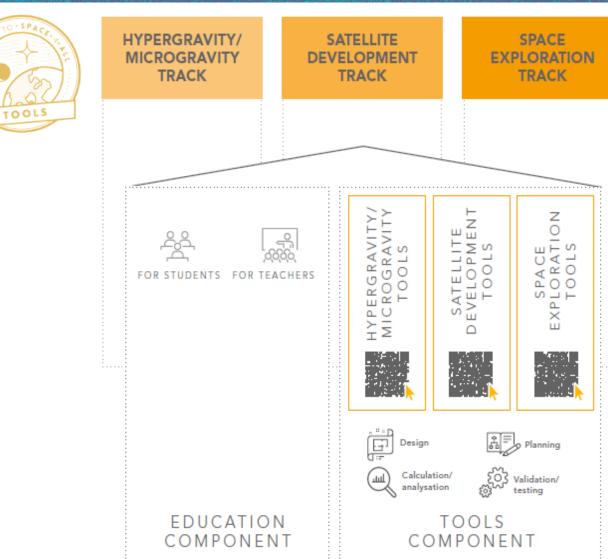




Access to Space for All

Tools Component





▼ Tools Component

This list is work in progress. The tools listed are not endorsed by UNOOSA and are provided only for information. The tools are maintained by third parties. Each user bears sole responsibility for their use and the use of their results.

Design Development and Risk Assessment Tools

CARA Analysis Tool Suit

- Conjunction Consequence Assessment is an algorithm for determining the expected amount of debris production in case of collision
- Monte Carlo from TCA is a method of determining the probability of collision
- Single Covariance Max Pc is a method by which the maximum possible probability of collision could be determined for a close approach event for which only one object has position uncertainty information
- Two-Dimension Pc is a method used to characterize and analyze close approach events and determine resultant probabilities of collision as a result of mitigation actions
- · DAS The Debris Assessment Software
- DRAMA Debris Risk Assessment and Mitigation Analysis
- MASTER Meteoroid and Space Debris Terrestrial Environment Reference
- ORDEM Orbital Debris Engineering Model
- · RABBIT Risk Avoidance assist tool based on debris collision proBaBIliTy
- Savi Satellite constellation visualizer and maker
- · GMAT Trajectory optimization and design system
- · Trajectory Browser A tool to find spacecraft trajectories to planets and small-bodies
- GNU Octave Scientific programming language featuring powerful mathematics-oriented syntax with built-in 2D and 3D plotting and visualization tool
- FreeCAD Computer-aided design software
- LibreCAD 2D-focused Computer-aided design software
- OpenSCAD Solid 3D Modelling-focused Computer-aided design softwar

Operations Tools

- · GNU Radio Signal processing tool to implement software-defined radios and signal-processing systems
- · gr-soapy A wrapper for GNU Radio
- gr-satnogs Telecommunications solution, operating in UHF and S-band. Closely integrated with SatNOGS Network
- gr-satellites A GNU Radio out-of-tree module encompassing a collection of telemetry decoders that supports many different Amateur satellites.
- · Qubik Pocketqube mission for LEOP satellite identification and tracking
- · LibreCube Software suite for space and earth exploration
- Polaris Machine learning for exploring and analyzing telemetry data
- PW-Sat2 Example of an On Board Computer (OBC)
- LAR-18740-1 Low Fidelity Space Systems Analysis Tools-Solar Cell/Fuel Cell/Battery Sizing Tool
- Open MCT A next-generation mission control framework for visualization of data on desktop and mobile devices
- Gpredict Real-time satellite tracking and orbit prediction application
- Operational Simulator for Small Satellites A suite of tools to aid in areas such as software development, integration and test, mission
 operations and training, verification and validation, and software systems check-out
- COSMOS Software that provides all the functionality needed to send commands to and receive data from one or more embedded systems
- Core Flight System A generic flight software architecture framework used on flagship spacecraft, human spacecraft, cubesats, and
 Raspberry Pi

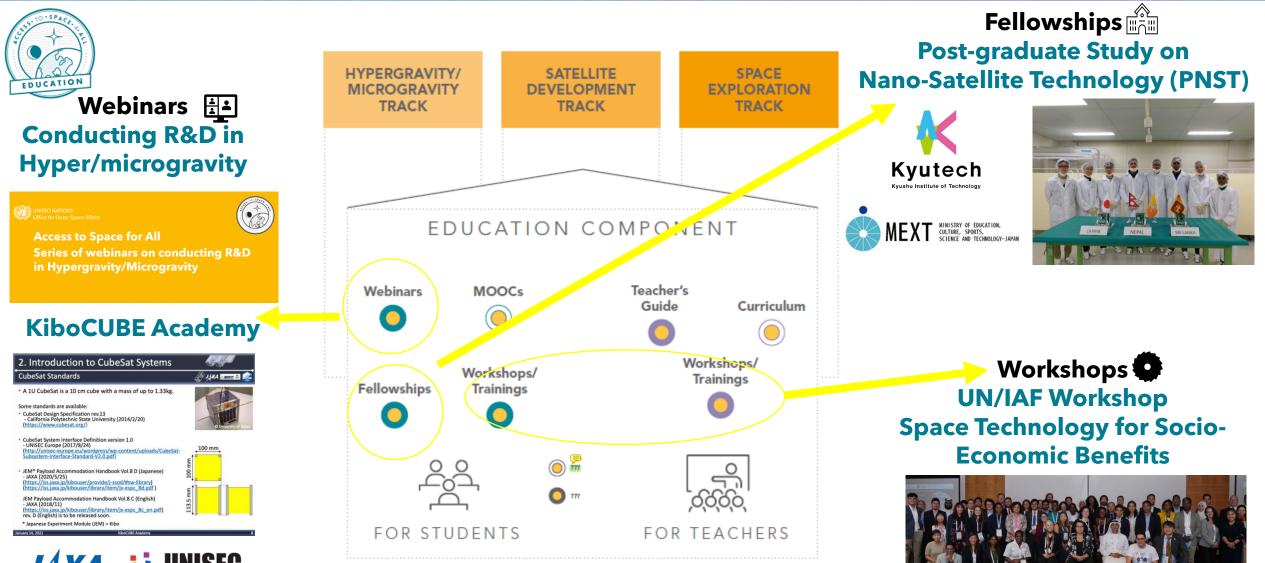
End of Life and Deorbiting Tools

ORIUNDO On-ground RIsk estimation for UNcontrolleD re-entries tOol



Access to Space for All Education Component









Post-graduate Study on Nano-Satellite Technology (PNST)

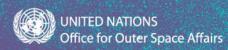




- Partner: Kyutech (Kyushu Institute of Technology) with the support of the Gov. of Japan (MEXT)
- Established: 2013
- Provides 3 students in the Master's Programme (2 years duration) and 3 students in the
 Doctoral Programme (3 years duration) to enroll in Kyutech's Space Engineering International
 Course (SEIC) for a hands-on, extensive research opportunity in nano-satellite systems through
 the use of the nano-satellite development and testing facilities available at Kyutech.
- The selected fellows are expected to return to their home counties upon completion of their studies and contribute to their countries using the experience and knowledge gained from the programme.







Post-graduate Study on Nano-Satellite Technology (PNST)

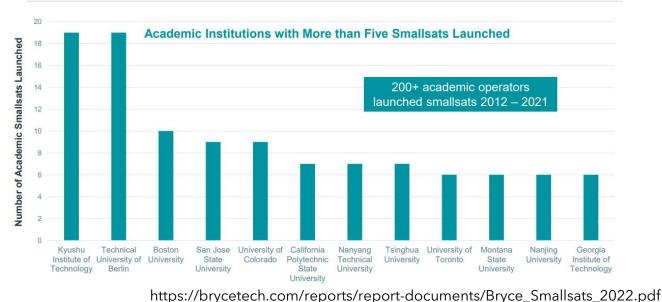
WHY PNST?

1. Opportunity to study in an international <u>environment at a leading university in the field of small</u> <u>satellites</u>

- Hands-on, extensive research opportunity in nanosatellite systems through the use of the nanosatellite development and testing facilities available at Kyutech.
- From 2018, Kyutech was reported by Bryce Space and Technology to have launched the highest number of small satellites among all academic operators.

Number of Academic Smallsats 2012 – 2021, by Institution Smallsats in Context and Operator/Mission Type Trends





2. Generous support from Japan

- The selected candidates will each receive a grant under the MEXT scholarship of approximately 144,000 JPY per month for the duration of their fellowship study (2 or 3 years) to cover housing, food, local transportation, and other expenses. Also, according to the route as designated by MEXT, an economy class air ticket between an international airport in the country of his/her nationality and Narita International Airport or Fukuoka International Airport.
- Fees for matriculation, tuition and entrance examinations will be paid by Kyutech.





Post-graduate Study on Nano-Satellite Technology (PNST)

Year	Selected Student's Countries of Origin		
2022	Egypt, Mexico, Mongolia, South Africa, Turkey, Thailand	-	
2021	Bhutan, Cambodia, Ethiopia, Laos, Trinidad and Tobago, Zimbabwe	Fr	
2020	Brazil, El Salvador, Indonesia, Nepal, Paraguay, Vietnam	1	
2019	Bhutan, Ethiopia, Laos, Malaysia, Sri Lanka, Trinidad and Tobago		
2018	Algeria, Egypt, Nepal, Sudan, Turkey		

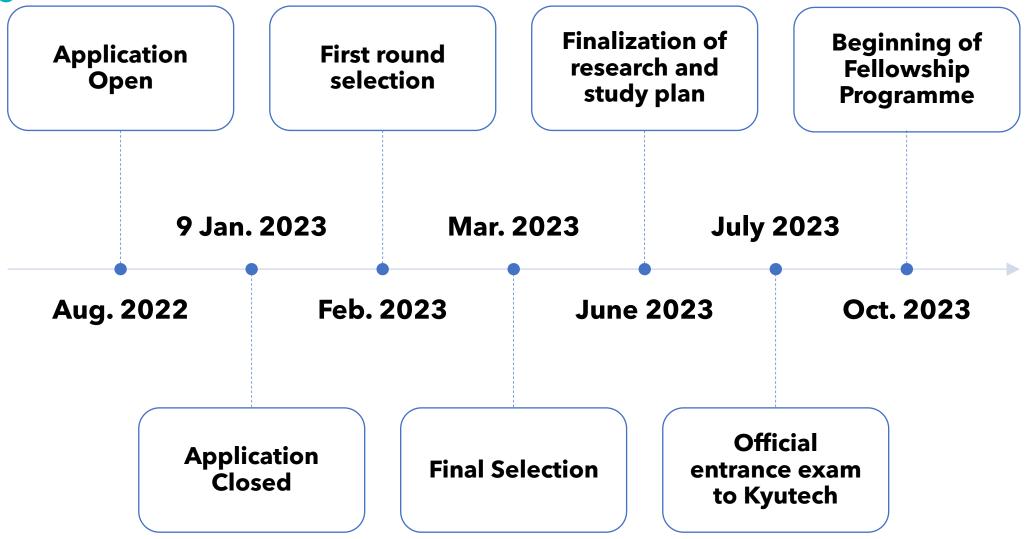




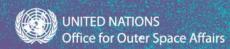




Schedule







Post-graduate Study on Nano-Satellite Technology (PNST)



UNITED NATIONS If ice for Outer Space Affairs	Search Q
About Us + Our Work + Space4SDGs + Information for + Events + Space Object Register + Documen	ts - COPUOS 2022 -
Dur Work > Access to Space for All > Opportunities > Satellite Development Track	
Post-graduate study on Nano-Satellite Technologies (PNST)	Our Work
Rounds	Secretariat of COPUOS
OPEN FOR APPLICATION (2023 Round)	Programme on Space Applications
	UN-SPIDER
ıpdated on 5 October 2022 <mark>√EW</mark> ! PNST 2023 round webinar will be held on Thursday 3 November 1pm CET. Register from here.	International Committee on GNSS
The United Nations Office for Outer Space Affairs and the Government of Japan in cooperation with the Kyushu Institute of Technology	UN-Space
Kyutech) have established a United Nations/Japan Long-term Fellowship Programme on Nano-Satellite Technologies for nationals of leveloping countries or non-space-faring nations. The Programme will provide extensive research opportunities in nano-satellite systems	UNISPACE+50
brough the use of the nano-satellite development and testing facilities available at Kyutech.	Space Law
Every year this "Post-graduate study on Nano-Satellite Technologies (PNST)" Fellowship Programme will accept up to three students in the	Benefits of Space
Aster's Programme (2 years duration) and up to three students in the Doctoral Programme (3 years duration). Successful participants will e awarded a master or doctoral degree after successful thesis defence. The successful candidates will enroll in the Space Engineering	Space4Health
nternational Course (SEIC) after passing an official entrance examination by the Graduate School of Engineering, Kyushu Institute of Technology.	Access to Space for All
	For Member States Partnerships
he selected candidates will each receive a grant under Japanese government (Ministry of Education, Culture, Sports, Science and echnology: MEXT) scholarship (Research Students) of approximately 144,000 JPY per month for the duration of their fellowship study (2 or	Opportunities
years) to cover housing, food, local transportation, and other expenses. Each candidate will be provided, according to his/her itinerary and	Hypergravity/Microgravity Track
oute as designated by MEXT, an economy class air ticket between an international airport in the country of his/her nationality and an nternational airport in Japan used on the normal route to the accepting university. Fees for matriculation, tuition and entrance examinations	Satellite Development Track Space Exploration Track
/ill be paid by Kyutech.	Awardees
he purpose of this fellowship is to help non-space-faring nations join the community of space faring nations. Consequently, if	Acknowledgement
rou are selected as a PNST Fellow through the aforementioned process and you earn your advanced degree at Kyutech, you have an immense moral obligation to return to your home country and contribute to it. This is the central expectation of both UNOOSA	Space for Persons with Disabilities
nd Kyutech.	Space4Youth
Applications for the Fellowship Programme will be accepted until 9 January 2023 (Monday, 23:00 JST). If not fully completed at the time of	Space4Water
he deadline, the application will be deemed to be not qualifying.	Space4Women

All the information can be found on: https://www.unoosa.org/oosa/en/ou rwork/access2space4all/PNST/PNST_ Rounds.html

Please read this page carefully







Post-graduate Study on Nano-Satellite Technology (PNST)



Application Requirements

Applicants should:

- Be nationals of developing countries or non-space-faring nations (countries without an established substantial capability to develop space technology/launch space objects);
- · Be duly nominated by their institutions;
- · Born on or after 2 April 1988;
- Should have the academic and professional background required by the specific fellowship programme. Candidates seeking a Master
 degree are expected to have completed studies ending with a Bachelor Degree or equivalent in engineering-related subjects.
 Candidates seeking a Doctorate degree are expected to have completed studies ending with a Master Degree or equivalent in
 engineering-related subjects. Degrees in different technological fields can be considered by the Selection Committee; and
 Doctorate degree are expected to the endine with the fell we because the selection.
- Be able to make professional use of the experience gained in the fellowship programme.

The Office for Outer Space Affairs is committed to achieving 50/50 gender balance in its programme and ensuring a balanced representation from different perspectives. This programme intends to select 3 male and 3 female students for the fellowship.

▼ Information Note and Application Documents

Before submitting the completed application documents through the online upload-form, please first complete the electronic registration form, using the link below:

• Registration for the Post-graduate study on Nano-Satellite Technologies (PNST)

After registering for PNST you will receive a confirmation email with the web address where you will download the .doc-versions of the application forms.

- · Application Documents:
 - Information Note (.pdf)
 - Terms of Participation (.pdf)
 - Nomination Form (.pdf)
 - Application Form (.pdf)
 - Referee Report Form (.pdf)
 - Academic Background (.pdf)
 - Academic Background Sample (.pdf)
 - Application for Japanese Government (Ministry of Education, Culture, Sports, Science and Technology: MEXT) Scholarship (.pdf)
 - Field of Study and Research Plan (.pdf)
 - Checklist (.pdf)

▼ Application Submission Procedure

- The fully completed application form and other required documents except the referee report forms shall be submitted in electronic format (.doc or .pdf or.xls) at the Web address that is in the confirmation e-mail you will receive after registering above, by no later than 9 January 2023 (Monday, 23:00 JST). If not fully completed at the time of the deadline, the application will be deemed to be not qualifying.
- Note: For file a name, do not use any non-English characters. Moreover, each character must be a one-byte type of character. As well, do not use spaces in your file names as the file server will not handle such data correctly. Use "_" (under bar) or "-" (hyphen) instead, e.g. "01_Tom_Smith_2022.12.24".
- The Referee report forms should be sent by email to the Post-graduate study on Nano-Satellite Technologies (PNST) (pnst [at] spacekyutech.net) email address by the referees themselves by no later than 9 January 2023 (Monday, 23:00 JST).

▼ Timeline of the Selection Process

The timeline anticipated for the selection process of the Fellowship Programme is as follows:

- From August 2022: Dissemination of information on the Fellowship Programme to potential candidates worldwide and application period.
- 9 January 2023(Monday, 23:00 JST): Submission deadline all application documents must be received by PNST
- Late January 2023: After the first round of selection based on the application documents, the remaining candidates will be notified
 regarding interviews about two weeks after the submission deadline.
- February 2023: The first interview will be held in February 2023. The second interview (if necessary) will be held after the first
 interview. The interviews will be conducted remotely. All the applicants shall make themselves available for these days. The outcome
 of the remote interviews is the selection of six persons who will be offered PNST scholarships.
- March 2023: After the interviews, all PNST applicants will be informed about the outcome of their applications to PNST. We will
 contact you. Please do not contact us.
- February-June 2023: Discussion and finalization of research and study plan between the successful candidates and their supervisors.
- Late February- early March 2023: Selected candidates must send all the required documents including original certificates of
 graduation, original transcripts, and original English test score with explanation of transcripts to Kyutech using a reliable express
 mailing service. If any documents are written in any language other than English, official certified translations are also required. For
 the details of the required documents, please refer to the Checklist.
- · July 2023: Official entrance exam to Kyutech. Formal admission and administration to obtain student visa.
- · August 2023: Travel arrangements for the candidates to Japan
- · September 2023: Arrival in Japan and finding accommodation. Official enrollment procedures at Kyutech.
- October 2023: Beginning of the Fellowship Programme at Kyutech.

For any further questions regarding the PNST, please contact us.





Post-graduate Study on Nano-Satellite Technology (PNST)



▼ Frequently Asked Questions (FAQ)

Q: I am expected to graduate sometime in 2023. Am I still eligible to apply for the PNST?

A: We accept applications as long as the applicant is expected to have the degree by September 2023. However, the applicant will need to submit a proof of the expected degree conferral date by the submission deadline; 9 January 2023 (23:00 JST), and if selected, will also have to submit the diploma received before the Fellowship Programme starts on 1 October 2023.

Q: As the topic of my Doctoral or Master thesis, am I restricted to choose something related to nano-satellite?

A: Space technology is made of many disciplines. You do not have to restrict yourself to choosing a topic too narrowly such as "nanosatellite guidance", "nano-satellite communications", etc. As long as the topic is space related, it has a possibility of being applied to nano-satellite. The important thing is that the thesis topic has suitable academic meaning as a Doctoral or Master thesis. Your research topic will be determined via matching between your research interest and the academic disciplines that Kyutech faculty members can offer. We will try to find a supervisor who is able to guide you in the area of your research interest.

Q: Where can I find more information about the research work I could conduct at Kyutech?

A: Please visit http://kyutech-cent.net/seic/seic_web.html which provides information about the research programmes at Kyutech, on the subjects of the Space Engineering International Course and on the faculty members and their recent publications.

You can also find the list of professors who belong to the Department of Space Systems Engineering at https://www.space.tobata.kyutech.ac.jp/lab/list/ . Although the page is in Japanese, you can go to the webpage of each laboratory from the links listed in the page.

Q: After a survey of the different researchers at Kyutech I am interested in working with Dr. XXX. My question is if I can apply to the United Nations/Japan Long-term Fellowship Programme on Nano-Satellite Technologies even though I do not have any agreement with any researcher yet?

A: Yes, of course you can apply! You do not need any pre-agreement with a Kyutech faculty before you apply. After the first round of down-selection, we will work on matching the remaining applicants to a professor at Kyutech. We will consider your interest in working with a particular professor if you pass this first round. Please first register for the PNST programme 2023 and then submit your application package.

Q: Who should sign the "Nomination Form"?

A: The nomination form shall be signed by the head of the nominating organization. If you are a student right now, the person who signs the form has to be the Dean or higher ranking officer. If you are employed by a company, the person who signs the form has to be the president of your company. If you are neither a student nor employed, please ask the Dean or higher ranking office of the school you attended most recently.

Q: Is it sufficient for the "Referees Report Form" to be signed by the referee or is the seal of the referee's organization also required? A: The referee's signature is sufficient, however, for the "Nomination Form" the official seal of the nominating organization is required. Q: Is it necessary to send the hardcopies of the application forms to PNST?

A: At the first stage in the application process this is not necessary. You should just upload and submit the softcopies of required documents through the specified website. However, please retain all the original certificates; such as Certificate of graduation (Diplomas) or expectation of graduation, grade certificates (transcripts) and those official translations into English, and official score report of English test (such as TOIEC, TOEFL, etc.), and Nomination Form signed by the head of the nominating agency/institution. The short-listed candidates will be contacted and asked to send those original documents by express mails (such as DHL, FedEx) directly to Kyutech in the beginning of March.

Q: Can I send additional certificates to support my application? A: Yes, you can if you think that it will strengthen your application.

Q: I will apply for the Master's Program. Do I have to fill the STATEMENT OF PURPOSE in the PNST 2023_Application Form? A: Yes, please complete this field if you apply for Master's Program as well as if you apply for Doctoral Program.

Q: As an applicant do I need any help from my nominating agency during the application process? How is the nominating agency going to know about the progress in the selection process?

A: It is up to the applicant and the nominating agency how they wish to relate to each other during the application process. For example, some successful applicants have retained employment with their respective nominating agency, retained the possibility to return to their previous employer, or had coordinated the topic of their theses work with their nominating agency. This is handled differently in each case and so it is up to the applicant and the nominating agency how you would like to handle this. It is also up to the applicant to keep the nominating agency informed about the progress in the application and selection process.

Q: Do I need preparation for an examination to Kyutech?

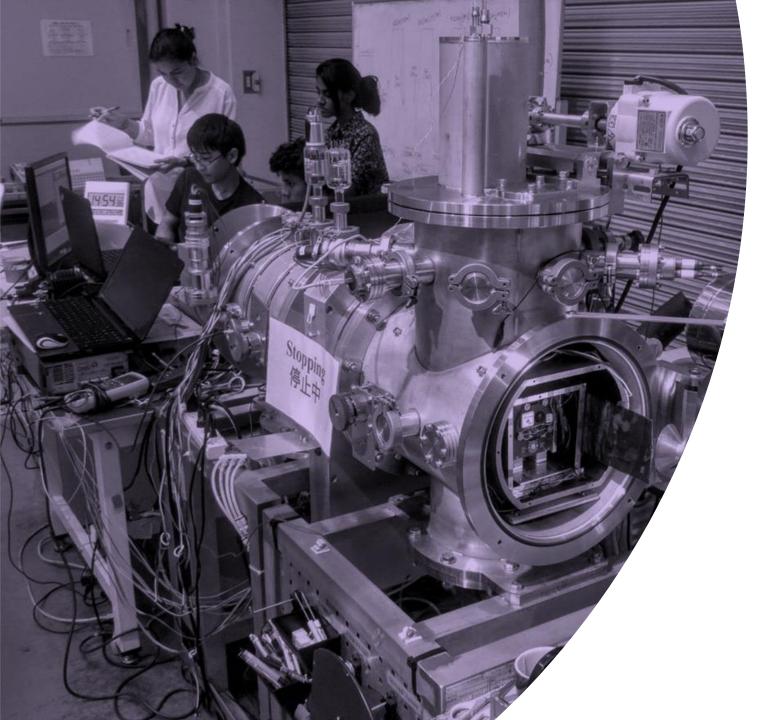
A: You need to register online for admission application in May, and then take an interview as an official entrance examination for Graduate School of Engineering, Kyutech in July. The details for registration will be provided by April from Kyutech. Doctoral Program candidates may be exempted from an interview, whereas Master's Program candidates must undergo an interview. However, as long as the candidates are selected as final PNST candidates, it is unlikely to fail the interview.

Q: Is TOEFL or another English proficiency certification required? If so, what score is required and where should the exam results be sent?

A: Basically, it is advised all the candidates should submit an official English test score taken within two years, such as TOEIC, TOEFL, etc., and the score level should be CEFR (Common European Framework of Reference for Languages) B2 or higher. Please check what tests are approved by CEFR at Wikipedia: https://en.wikipedia.org/wiki/Common_European_Framework_of_Reference_for_Languages

The submission of the test score is not mandatory if your university (Bachelor for Master candidates, Master for Doctoral candidates) education was conducted entirely in English, and you can submit the evidence of that as a certificate signed by Dean or an official of higher rank.

Please refer to the checklist No.08 for the details about certification of English proficiency.





Make sure to apply! Deadline: 9 January 2023

Please send questions to **unoosa-access-to-space@un.org**