

Application Guidelines (October 2020 Enrollment) for the Forefront Physics and Mathematics Program to Drive Transformation (FoPM), a World-leading Innovative Graduate Study (WINGS) Program [For Students who Enrolled in the Master's Course in April, 2020]

Educational and research goals of FoPM

FoPM is an international integrated Masters-Doctoral program that aims to maximize the potential and competitiveness of basic science specialists on the world stage. The program provides exceptional students with the skills needed to exert a wide influence on scientific and social innovation, and thus prepares them to play leading roles as Doctoral graduates in the future of academia and all other business sectors.

To promote the development of the above skills, FoPM accepts students from a variety of backgrounds, including international students and students with full-time work experience.

*For more details of the program, refer to the following FoPM website:

<https://www.s.u-tokyo.ac.jp/en/FoPM/>

1. Application requirements

To apply for this program, **you must be a student at the University of Tokyo and have enrolled in the Master's course of one of the following departments in April, 2020** (*1).

- **Department of Physics, Astronomy, Earth and Planetary Science, or Chemistry in the Graduate School of Science**
- **Department of Applied Physics, Graduate School of Engineering**
- **Department of Mathematical Sciences, Graduate School of Mathematical Sciences**

You must also fulfill all of the requirements below:

- You aim to acquire a PhD degree in the physical or mathematical sciences (in the broad sense of the term)
- You are interested in broadening your horizons and working with researchers outside of your specialist field
- You are interested in the influence of basic science on social innovation, and are eager to actively learn about this topic
- You fully understand the purpose of FoPM, as well as the course requirements and other rules, and will cooperate with activities related to FoPM
- You intend to enroll in the Doctoral program at one of the above-listed departments (*2)
- You agree to apply for the JSPS Research Fellowship for Young Scientists, and should you be accepted, you also agree to stay in FoPM (This requirement does not apply for students awarded Japanese Government (Monbukagakusho) Scholarships)
- You are eager to gain experience abroad and to apply for external funding ([JSPS Overseas Challenge Program for Young Researchers](#) or other relevant programs)
- You understand and agree to the fact that your PhD diploma will bear a note saying that you have completed FoPM

(*1) In principle, you may not simultaneously apply for FoPM and another WINGS program. However, students from the Graduate School of Science may apply for both FoPM and the International Graduate Program for Excellence in Earth-Space Science (IGPEES), and students from the Graduate School of Mathematical Sciences may apply for both FoPM and World-leading Innovative Graduate Study for

Frontiers of Mathematical Sciences and Physics (WINGS-FMSP).

(*2) You must not apply for FoPM if you are planning to find business employment when you finish your Master's degree.

2. Selection method

Selection will be based on the prospective students' application documents (Applicant Information, Research Proposal, Research Background, Essay, and Supervisor's Letter of Opinion), and their scores in the graduate school entrance examination.

3. Number of students to be admitted

Graduate School	Department	Number of students to be admitted
Graduate School of Science Graduate School of Science Graduate School of Science Graduate School of Science Graduate School of Engineering Graduate School of Mathematical Sciences	Dept. of Physics Dept. of Astronomy Dept. of Earth and Planetary Science Dept. of Chemistry Dept. of Applied Physics Dept. of Mathematical Sciences	40

4. Selection announcement and enrollment procedures

- (1) The Applicant ID numbers of successful applicants will be posted in the front hallway of the School of Science Bldg. 1 (Area W), on **Monday, August 31st, 2020** at around 1 pm. You will receive an Applicant ID when you submit your application. All applicants will also receive their results by email (sent to the email address on their application form).
- (2) Enrollment documents will be emailed to successful applicants with the selection results. Those who have been accepted must finish the necessary procedures (submitting the enrollment documents) by **Monday, September 14th, 2020**. Those who fail to submit the necessary documents by the deadline may not be able to receive the financial support from the beginning.

5. Application procedures

(1) Application documents

a. Application Form

Fill out the form directly on the website indicated in (2).

b. Research Proposal

Fill out the form provided by the Graduate School of Science on the website indicated in (3), convert the file to a PDF, and upload the PDF file to the website in (2) as designated.

c. Supervisor's Letter of Opinion

Enter your supervisor's name, affiliation, title, and email address on the website indicated in (2). As soon as you submit your application, an automated email asking them to fill out an online form will be sent to your supervisor at the email address that you entered. Your supervisor will then have to fill out the form directly on the designated website (*1 and *2).

(*1) Note that it is not until you submit your application that the email asking your supervisor to fill out the form is sent to them.

(*2) Confirm that your supervisor has submitted the form during the application period. Your application will not be considered unless all of the necessary documents (including the supervisor's letter of opinion) are submitted by the deadline. An automated email will be sent to you once the supervisor submits the form online.

(2) Online application form:

<https://apps.adm.s.u-tokyo.ac.jp/WINGS/>

(3) Download application documents from:

<https://www.s.u-tokyo.ac.jp/ja/info/6868/>

(4) Application period

Application Form and Research Proposal: From Monday, June 1st, 2020 until 3pm on Wednesday, June 17th, 2020 (JST). *Late submissions will not be accepted (*1).

Supervisor's Letter of Opinion: From Monday, June 1st, 2020 until 3pm on Friday, June 19th, 2020 (JST). *Late submissions will not be accepted

(*1) Complete the application well in advance as the server may become busy just before the deadline.

6. Enrollment period

New FoPM students will be enrolled in the program **from October 2020 to March 2022.**

In January or February 2022, a Qualifying Examination (QE) will be held to select those permitted to stay in the program throughout their Doctoral studies. The QE will include the submission of a research proposal for your Doctoral research and the oral defense of the proposal. Students who pass the QE will be enrolled in FoPM up to **March 2025.**

Those who are selected to stay in the course will take their Final Examination (FE) in the summer of 2024, and those who pass the FE will qualify to complete the course. The FE will include the submission of a research report and the oral defense of the report. The course will be completed if and when the students receive their PhD degrees. For those who submit their dissertations early, FoPM will be completed at the time of the conferral of their degrees, provided that they have qualified to complete the course by that time.

7. Financial support

(1) Master's students

If desired, students may be appointed as *TAKUETSU* (Excellence) Research Assistants (TRAs) and be paid to engage in research in the physical and mathematical sciences. The appointment will begin from October 1, 2020, and 170,000 yen will be paid per month (*1, *2, and *3). **Those who wish to be appointed as TRAs must fill out the designated column on the online application form indicated in 5. (2) to describe your research assignment as a TRA during the first academic year of enrollment (AY2020).**

Students awarded Japanese Government (Monbukagakusho) Scholarships or any scholarships from the University of Tokyo cannot be appointed as TRAs, but may apply for FoPM. Students who do not wish to be appointed as TRAs, for example, because they are receiving other scholarships or having concerns about dependent exemption, may also apply for the program.

(2) Doctoral students

Students selected to stay in the course based on the results of the QE may also be appointed as TRAs. In this

case, they will receive 180,000 yen per month to carry out research related in the physical and mathematical sciences (*1, *2, and *3). Students who are accepted as JSPS Research Fellows or who receive Japanese Government (Monbukagakusho) Scholarships or any scholarships from the University of Tokyo cannot be appointed as TRAs.

- (*1) TRAs are not allowed to work as Research Assistants, but are encouraged to work as Teaching Assistants on campus.
- (*2) Income tax will be deducted from your TRA salary every month. You must therefore make a year-end adjustment or file a final tax return.
- (*3) If your total income in one calendar year (January-December) exceeds a certain amount, you will be excluded from the category of dependent and/or non-working dependent on your parents' or spouse's health insurance. Moreover, depending on your total yearly income, you may be required to pay resident's tax in the next fiscal year.

8. Course requirements

(1) Courses

All FoPM students are required to obtain eight credits from the course list which can be found at the following website. If a student has obtained credits for some of these courses prior to enrolling in FoPM and after entering the graduate school, the credits will be counted toward their required coursework credits.

<https://www.s.u-tokyo.ac.jp/en/FoPM/application/requirement.html>

(2) International Career Seminar and Diversity and Ethics Training

It is required to attend International Career Seminar by the end of the second year of their Doctoral studies where students can learn the diversity of career options outside of Japan and outside of academia. In addition, students must attend the Diversity and Ethics Training during the first year of their Master's studies where students can learn the importance of respectful interaction and collaboration with people of different genders and backgrounds. Details will be announced after the selection of FoPM students.

(3) International Research Experience

To complete FoPM, students must take part in joint research or a corporate internship abroad during the second year of their Master's studies (from January) and the second year of their Doctoral studies. Note that all of these activities require prior application. Once your plan has been reviewed and approved, FoPM may cover the travel expenses required to participate.

9. Features of the course

(1) Portfolio Management

FoPM students set their own independent goals and regularly evaluate their progress towards them through a learning portfolio. Supervisors use the same system to assess their students' progress and provide appropriate supervision.

(2) Lab Rotation

FoPM students carry out research in more than one group or specialist field which allows them to acquire a broad perspective in your overall field before specializing in their chosen area.

(3) Secondary Supervisor

Each FoPM student is assigned a secondary supervisor in addition to their main supervisor. All FoPM students

are required to meet and report their academic progress to their secondary supervisor once every six months. See the Appendix for details of faculty members who can take on the role of secondary supervisor.

(4) Study Abroad in UTokyo

FoPM students may have a chance to collaborate with international researchers at Kavli IPMU and IRCN so that they can experience an international research environment without leaving Japan.

(5) 4PM Seminar

The 4PM seminar is a place to give short active TED-style presentations and students discuss and evaluate each other's research beyond their own specialist fields.

(6) Scientific meetings hosted or co-hosted by FoPM

Students are encouraged to attend meetings hosted or co-hosted by FoPM, including seminars and forums.

(7) Job opportunities

FoPM plans to offer jobs as Teaching Assistants and mentors supporting international students.

10. Notes

- (1) Only applications for which all of the necessary documents are submitted by the deadline will be considered.
- (2) Under no circumstances may an applicant change the contents of their application once it has been submitted.
- (3) For unforeseen reasons, changes may be made to these guidelines or the application procedures. In such cases, an announcement will be made to potential applicants.
- (4) Personal information made known to FoPM through the application process will be used for the following purposes: (i) selection of FoPM students (application processing and selection), (ii) announcement of selected applicants, and (iii) enrollment procedures. For selected applicants only, the information will be further used for administrative duties relating to: (i) academic affairs (e.g., registration, enrollment), and (ii) student support (e.g., employment assistance, tuition waiver applications).
- (5) Any student who is found to have made a false statement in their application, even after being selected to join the program, may have their status as an FoPM student removed retroactively.

11. Contact

WINGS Desk, Academic Affairs Office of the Graduate School of Science, The University of Tokyo
Room 275, School of Science Bldg. 1 (Area E), 7-3-1 Hongo, Bunkyo-ku, Tokyo
Phone: 03-5841-4626
Email: wings.s@gs.mail.u-tokyo.ac.jp

[Last updated: **May, 2020**]

List of Secondary Supervisors for the
Forefront Physics and Mathematics Program to Drive Transformation (FoPM)

Name	Title, Affiliation	Specialization
Abe, Tomoyuki	Associate Professor, Kavli IPMU	Mathematics
Ando, Masaki	Associate Professor, Dept. of Physics, Graduate School of Science	Gravitational Wave Physics
Asai, Shoji	Professor, Dept. of Physics, Graduate School of Science/ Director, ICEPP	Particle Experiment
Asano, Katsuaki	Associate Professor, ICRR	High Energy Astrophysics
Bamba, Aya	Associate Professor, Dept. of Physics, Graduate School of Science	High Energy Astrophysics (Experiment)
Campbell, Robert Earl	Professor, Dept. of Chemistry, Graduate School of Science	Biomolecular Chemistry
Cannon, Kipp	Professor, RESCEU, Graduate School of Science	Gravitational Wave Astrophysics
Chao, Zenas	Associate Professor, IRCN	Neuroscience/Computational Neuroscience
Doi, Mamoru	Director/Professor, Institute of Astronomy, Graduate School of Science	Observational Cosmology/Infrared Astronomy
Fujii, Michiko	Associate Professor, Dept. of Astronomy, Graduate School of Science	Theoretical Astrophysics
Furusawa, Akira	Professor, Dept. of Applied Physics, Graduate School of Engineering	Quantum Optics/Quantum Information Science
Furuta, Mikio	Professor, Graduate School of Mathematical Sciences	Topological/Gauge Theory
Hamaguchi, Koichi	Associate Professor, Dept. of Physics, Graduate School of Science	Theory of Elementary Particles
Hellerman, Simeon	Associate Professor, Kavli IPMU	Theoretical Physics (String Theory)
Hensch, Takao	Director/Project Professor, IRCN	Neuroscience
Higuchi, Takeo	Associate Professor, Kavli IPMU	Particle Physics Experiments
Hirachi, Kengo	Professor, Graduate School of Mathematical Sciences	Complex Geometry
Hori, Kentaro	Professor, Kavli IPMU	String Theory/Field Theory
Ide, Satoshi	Professor, Dept. of Earth and Planetary Science, Graduate School of Science	Seismology
Inaba, Hisashi	Professor, Graduate School of Mathematical Sciences	Mathematical Demography /Mathematical Biology

Name	Title, Affiliation	Specialization
Ito, Yukari	Professor, Kavli IPMU	Mathematic (Algebraic Geometry)
Kajita, Takaaki	Director/Distinguished University Professor, ICRR	Cosmic-ray Physics
Kapranov, Mikhail	Professor, Kavli IPMU	Mathematics
Katori, Hidetoshi	Professor, Dept. of Applied Physics, Graduate School of Engineering	Quantum Electronics
Katsura, Hosho	Associate Professor, Dept. of Physics, Graduate School of Science	Condensed Matter Theory/Mathematical Physics
Kawahigashi, Yasuyuki	Professor, Graduate School of Mathematical Sciences	Theory of Operator Algebras and Mathematical Physics
Kida, Yoshitaka	Professor, Graduate School of Mathematical Sciences	Discrete Group/Ergodic Theory
Koashi, Masato	Professor, Photon Science Center/Dept. of Applied Physics, Graduate School of Engineering	Quantum Information Science/Quantum Optics
Kobayashi, Toshiyuki	Professor, Graduate School of Mathematical Sciences	Analytical Representation Theory/Discontinuous Group Theory/ Geometric
Kohno, Kotaro	Professor, Institute of Astronomy, Graduate School of Science	Radio Astronomy
Kono, Toshitake	Project Professor, Graduate School of Mathematical Sciences	Topological/Mathematical Physics
Kusaka, Akito	Associate Professor, Dept. of Physics, Graduate School of Science	Astrophysics
Martens, Kai	Associate Professor, Kavli IPMU	Experimental Physics
Matsui, Chihiro	Associate Professor, Graduate School of Mathematical Sciences	Mathematical Physics/Statistical Mechanics
Matsumoto, Shigeki	Professor, Kavli IPMU	Theory of Elementary Particles
Milanov, Todor Eliseev	Associate Professor, Kavli IPMU	Mathematics
Miyoki, Shinji	Associate Professor, ICRR	Gravitational Wave Experimental Physics/ Precision Measuring Length
Mori, Toshinori	Professor, ICEPP	Particle Physics
Moriyama, Shigetaka	Professor, ICRR	Cosmic Particle Physics
Moroi, Takeo	Professor, Dept. of Physics, Graduate School of Science	Theory of Elementary Particles/Cosmology
Murao, Mio	Professor, Dept. of Physics, Graduate School of Science	Quantum Information Theory
Murayama, Hitoshi	University Professor, Kavli IPMU	Particle Physics

Name	Title, Affiliation	Specialization
Nagai, Yukie	Project Professor, IRCN	Cognitive Development /Robotics
Nakajima, Hiraku	Professor, Kavli IPMU	Geometry/Representation Theory
Ogata, Yoshiko	Professor, Graduate School of Mathematical Sciences	Mathematical Physics of Quantum
Ogiso, Keiji	Professor, Graduate School of Mathematical Sciences	Algebraic Geometry
Ohkoshi, Shin-ichi	Professor, Dept. of Chemistry, Graduate School of Science	Physical Chemistry
Okada, Yasushi	Professor, Dept. of Physics, Graduate School of Science/IRCN	Biophysics
Okumura, Yasuyuki	Associate Professor, ICEPP	Particle Experiment
Ooguri, Hiroshi	Director/Project Professor, Kavli IPMU	Theory of Elementary Particles
Ouchi, Masami	Professor, ICRR	Astrophysics/Astronomy
Ozawa, Takeaki	Professor, Dept. of Chemistry, Graduate School of Science	Analytical Chemistry
Saito, Norikazu	Professor, Graduate School of Mathematical Sciences	Numerical Analysis
Saito, Takeshi	Professor, Graduate School of Mathematical Sciences	Diophantine Geometry
Sako, Takashi	Associate Professor, ICRR	Cosmic-ray Physics
Sakurai, Hiroyoshi	Professor, Dept. of Physics, Graduate School of Science	Nuclear Physics(Experiment)
Sasada, Makiko	Associate Professor, Graduate School of Mathematical Sciences	Probability Theory
Sato, Kaoru	Professor, Dept. of Earth and Planetary Science, Graduate School of Science	Meteorology
Sawada, Ryu	Associate Professor, ICEPP	Particle Physics Experiments
Seki, Kanako	Professor, Dept. of Earth and Planetary Science, Graduate School of Science	Space Physics/Space Plasma Physics
Sekiguchi, Hideko	Associate Professor, Graduate School of Mathematical Sciences	Non-commutative Harmonic Analysis/Representation of a Lie Group
Shiho, Atsushi	Professor, Graduate School of Mathematical Sciences	Diophantine Geometry
Shiozawa, Masato	Professor, ICRR	Elementary Particle/Cosmic-ray Physics Experiment
Silverman, John David	Associate Professor, Kavli IPMU	Astrophysics

Name	Title, Affiliation	Specialization
Tagoshi, Hideyuki	Professor, ICRR	Astrophysics
Takada, Masahiro	Professor, Kavli IPMU	Cosmology
Takeuchi, Kazumasa	Associate Professor, Dept. of Physics, Graduate School of Science	Physics of Out-of-Equilibrium
Toda, Yukinobu	Professor, Kavli IPMU	Algebraic Geometry
Totani, Tomonori	Professor, Dept. of Astronomy, Graduate School of Science	Astronomy/Astrophysics
Tsuji, Takeshi	Professor, Graduate School of Mathematical Sciences	Number Theory/Diophantine Geometry
Ueda, Kazushi	Associate Professor, Graduate School of Mathematical Sciences	Symplectic Geometry/Complex Geometry
Ueda, Masahito	Professor, Dept. of Physics, Graduate School of Science	Ultracold Atom/Informational Thermodynamic/Quantum Information Science
Vagins, Mark Robert	Professor, Kavli IPMU	Particle Astrophysics
Watari, Taizan	Associate Professor, Kavli IPMU	Theory of Particles Physics
Wilcox, Ralph	Professor, Graduate School of Mathematical Sciences	Mathematical Physics/Applied Mathematics
Yamamoto, Masahiro	Professor, Graduate School of Mathematical Sciences	Application Analysis
Yamamoto, Satoshi	Professor, Dept. of Physics, Graduate School of Science	Astrophysics
Yamanouchi, Kaoru	Professor, Dept. of Chemistry, Graduate School of Science	Physical Chemistry/Strong Photo Field of Science
Yamazaki, Masahito	Associate Professor, Kavli IPMU	High Energy Theory
Yazaki-Sugiyama, Yoko	Project Associate Professor, IRCN	Neurobiology
Yokoyama, Charles Takeshi	Executive Director/Professor, IRCN	Natural Sciences
Yokoyama, Hiromi	Professor, Kavli IPMU	Modern Science
Yokoyama, Junichi	Professor, RESCEU, Graduate School of Science	Astrophysics
Yokoyama, Masashi	Professor, Dept. of Physics, Graduate School of Science	Particle Physics Experiments
Yoshida, Nakahiro	Professor, Graduate School of Mathematical Sciences	Stochastic Statistics
Yoshida, Naoki	Professor, Dept. of Physics, Graduate School of Science	Astrophysics