

December 4, 2018

To whom it may concern

FY 2019 Joint Use/Research Program

We invite applications for the FY 2019 Joint Use/Research Program at the Institute for Planetary Materials (IPM), Okayama University, Misasa, Japan.

1. Application types

- 1) International joint research
- 2) General joint research
- 3) Joint Use of facility
- 4) Workshop

2. Period of research: April, 2019 – March, 2020

3. Application eligibility: International and domestic researchers belonging to a research institute or other equivalent organizations, including 4<sup>th</sup>-year undergraduate students and graduate students

4. Application procedure: Fill out the application form for Joint Use/Research (see attached form) and submit by mail or email.

5. Application deadline: Must be received no later than January 31 (Thursday), 2019

6. Notification: Written notification by the end of March 2019

7. Other: See the attached “Guideline for the Joint Use/Research Program at the Institute for Planetary Materials, Okayama University ”

Xianyu Xue

The director of Institute for Planetary Materials, Okayama University, Misasa, Japan

## **Guideline for the Joint Use/Research Program at the Institute for Planetary Materials, Okayama University**

### **1. Guideline**

The Institute for Planetary Materials (IPM), Okayama University was established on April 1, 2016 via reorganization of the Institute for Study of the Earth's Interior (ISEI). The mission of IPM is to study the origin, evolution and dynamics of the Earth and other planets and the origin of life. As a Joint Use/Research Center for Earth and planetary materials science designated by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), we offer Joint Use/Research opportunities to both domestic and overseas researchers in research fields related to Earth and planetary materials science. Innovative applications for joint use/research are welcome.

Starting from the 2019 fiscal year, we newly designated five research categories for Joint Use/Research at IPM (hereafter called the Joint Research) as described below in order to further promote Joint Research in research fields related to Earth and planetary materials science. These include joint research conducted at IPM by international/domestic researchers in collaboration with faculty of IPM, research conducted via joint use of facilities of IPM by international/domestic researchers, workshops sponsored by IPM, and intern-type joint research sponsored by IPM. We welcome not only proposals that further promote research conducted at IPM, but also research in areas that are complementary, as well as those that accelerate the research activity of IPM as a research center for earth and planetary materials science.

#### 1) International joint research

Joint research conducted by a researcher belonging to an international research organization in collaboration with faculty of IPM by using the facilities, equipment, samples and data of IPM. Researches conducted outside IPM may be considered. Domestic researchers outside IPM can join the research as a collaborator.

#### 2) General joint research

Joint research conducted by a researcher belonging to a domestic research organization other than IPM in collaboration with faculty of IPM by using the facilities, equipment, samples and data of IPM. Researches conducted outside IPM may be considered.

#### 3) Joint Use of facility

Research conducted by a researcher belonging to an international or domestic research organization other than IPM by using the facilities of IPM.

#### 4) Workshop

Domestic/international workshop on a specific research theme sponsored by IPM for promoting joint research. In principle, the workshop should be held at Okayama University.

## 5) Intern-type joint research

Long-term joint research conducted by a student belonging to a domestic/international research and educational organization, in collaboration with the faculty of IPM, on a research project proposed by the faculty of IPM, by using the facilities, equipment, samples and data of IPM.

The recruitment for all categories except 5) is conducted every 6 months, twice a year. Nevertheless, for urgent cases, application may be accepted any time.

\*The recruitment of the intern-type joint research (category 5) is conducted separately once a year. The eligibility and period of the program will be described separately.

\* We also accept applications for joint use/research from the industry in order to promote industry-university collaboration. Please consult with a faculty member whom you are interested in collaborating with.

## 2. Eligibilities

The application is open to international and domestic researchers belonging to a research organization or others equivalent, including 4<sup>th</sup>-year undergraduate students and graduate students. When an undergraduate/graduate student applies as a principal researcher, his/her supervisor must agree to and participate in the project as a collaborator. When the project includes undergraduate/graduate student as a collaborator, he/she must obtain permission from his/her supervisor. For joint research and workshop, a faculty member of IPM must be included as a collaborator. For workshops, the faculty of IPM is also eligible to apply. A principal investigator can apply for up to one joint research project and one workshop.

## 3. Method of application

Before application, obtain formal consent from the organization you belong, and consult with a faculty member of IPM about the title of your research project, expected visiting period, and required expenses. Refer to “Research Divisions and Faculty Members of the Institute for Planetary Materials, Okayama University” shown separately for the research area and faculty members of IPM. The application for joint research and workshop must be done by filling out a designated format and send it to “16. Address for Submission” by post or e-mail.

## 4. Research period

- International joint research, General joint research, and Joint Use of facility

Period between April 1, 2019 and March 31, 2020. The application must be made each fiscal year even if the project is continued from previous year.

- Workshop

Period during April 1, 2019 to March 31, 2020

- Joint research of urgency

Period between the date of admission to March 31, 2020

## **5. Necessary expenses**

- The use of equipment is in principal free of charge for all adopted research projects. Nevertheless, the users may be requested to partly cover the cost of expendables. Please consult with the manager of the facility in advance.
- Part of the travel and living expenses may be provided within the limits of budget as necessary for international joint research (category 1), general joint research (category 2) and workshop (category 4) that are conducted at IPM. The number of visits may be limited depending on the budget.
- Travel expenses will not be provided in principal for joint research (categories 1 and 2) conducted outside IPM, such as sample analysis request, use of IPM research facility, samples, data, etc. outside IPM, and joint use of facility (category 3).
- Only expenses related to joint use/research may be provided. In order to meet the needs for joint research from the broad research community within the limited budget, we welcome joint research sponsored by external funding.

## **6. Application deadline**

First-round application: Must arrive no later than January 31, 2019

Second-round application: Must arrive no later than July 31, 2019

(Application for joint research in urgency may be accepted any time)

## **7. Selection and notification**

For the first-round of recruitment, the decision will be made by the director after evaluation by the Steering Committee of Joint Use/Research Center of IPM conducted in early March, 2019. The proposals will be evaluated comprehensively on the basis of conformity of project with the aim of the program, academic importance, feasibility of research proposal, and expenses required. Applications that are considered to have particular academic importance and expected to produce outstanding results will be considered in priority. Special considerations will be given to the applications from researchers of university or research organization of small scale and young researchers. Research projects requiring financial supports and those that do not will be evaluated separately for each research category. The principal applicant will be informed in written of the decision by the end of March in 2019.

## **8. Report of joint use/research and workshop**

A report must be submitted with the designated form of “Research report of joint use/research” to the e-mail address shown below after the research period.

## **9. Copyright**

The copyright of the submitted report belongs to IPM. Therefore, please be sure to conform with the following:

1. The report must be original. A copy of an article already published on journals or proceedings cannot be accepted.
2. The author must take the responsibility when any problems related to the copyright law incur.

## **10. Disclosure of results**

The report submitted to IPM will be made open at IPM’s website. Also, IPM will publish the research report of joint use/research in each fiscal year. If you do not wish to disclose it to the public due to a patent application, please let us know at the time of the submission.

## **11. Publication of research results and others**

When the research result is published, please acknowledge in the acknowledgement section, etc., that it is a joint use or joint research with IPM. Some examples are shown below.

1) This paper presents results of a joint research program carried out at the Institute for Planetary Materials, Okayama University, supported by "Joint Use / Research Center" program by MEXT, Japan.

2) This study was performed using joint-use facilities of the Institute for Planetary Materials, Okayama University.

3) \_\_\_\_ was supported from IPM for long-term Joint-Use Research.

Also, please send a reprint of the published paper to the administration office of IPM (PDF file or two hard copies)

## **12. Intellectual properties**

In the event that inventions are obtained as a result of joint research, its attribution etc. shall be decided after negotiation with consideration given to the contribution to the invention by each researcher and the institution concerned.

## **13. Security trade control**

When providing research instruments, samples, technology etc. to overseas (nonresidents) or conducting joint research with overseas researchers, it may be necessary to take measures according to the Okayama University Regulations on University Security Export Management.

#### **14. Accident insurance**

Joint use researchers to IPM should join accident insurance etc. For students, please join the "International Student Education Research Disaster Accident Insurance" of the Japan International Education Support Association or equivalent insurance before starting joint use/research.

#### **15. Accommodation**

The "Misasa guest house" located in IPM may be used. Please discuss with the faculty of IPM and notify us the visit period at least two weeks before the visit.

The accommodation fee for joint-use researchers is:

Western-style room: 1,600 yen (per night)

Japanese-style room: 1,200 yen (per night)

#### **16. Address for submission and contact information**

The department of general affairs

Institute for Planetary Materials, Okayama University

827 Yamada, Misasa, Tottori, 682-0193, Japan

Phone: +81-858-43-1215

E-mail: [eee0502@adm.okayama-u.ac.jp](mailto:eee0502@adm.okayama-u.ac.jp)

**Research Divisions and Faculty Members of the Institute for Planetary Materials,  
Okayama University**

(As of December 1, 2018)

**Division for Basic Planetary Materials Science**

Masami Kanzaki (Professor)	mkanzaki@okayama-u.ac.jp
Akio Makishima (Professor)	max@misasa.okayama-u.ac.jp
Takuo Okuchi (Associate Professor)	okuchi@misasa.okayama-u.ac.jp
Takuya Moriguti (Associate Professor)	moriguti@misasa.okayama-u.ac.jp
Shigeru Yamashita (Associate Professor)	shigeru@misasa.okayama-u.ac.jp
Daisuke Yamazaki (Associate Professor)	dy@misasa.okayama-u.ac.jp
Akira Yoneda (Associate Professor/Retiring on March 31, 2019)	yoneda@misasa.okayama-u.ac.jp
Takashi Yoshino (Associate Professor)	tyoshino@misasa.okayama-u.ac.jp

To understand the internal structure and evolution of the Earth and planets via determination of the structure and physical properties of Earth and planetary materials using experimental and computational approaches. Toward that goal, researchers are being conducted in the development of ultra-high pressure generation technique, large-volume high pressure generation technique, high-temperature high-pressure in-situ physical properties measurement, understanding the basic physical processes via structural analysis of materials at the atomic level and first-principles calculation, and unravelling the inner structure of the planets and the evolutionary process of the solar system by understanding meteorites and ice physicochemically.

**Division for Planetary System**

Eizo Nakamura (Professor)	eizonak@okayama-u.ac.jp
Katsura Kobayashi (Professor)	katsura@pheasant.misasa.okayama-u.ac.jp
Takuya Kunihiro (Associate Professor)	tkk@misasa.okayama-u.ac.jp
Hiroshi Kitagawa (Assistant Professor)	kitagawa@pheasant.misasa.okayama-u.ac.jp

To understand the origin, evolution and dynamics of the Earth and planets by highly accurate/precise quantitative analysis, mass spectroscopic analysis and spectroscopic analysis of Earth and extraterrestrial materials. Toward that goal, development of state-of-the-art analytical methods and the construction of a “Comprehensive Analytical System for Terrestrial and Extraterrestrial Materials (CASTEM)” that link various apparatuses in a coordinated fashion have been made.

**Division for Astrobiology**

Xianyu Xue (Professor)

xianyu@okayama-u.ac.jp

Ryoji Tanaka (Professor)

ryoji@misasa.okayama-u.ac.jp

Matthew Izawa (Assistant Professor)

[matthew\\_izawa@okayama-u.ac.jp](mailto:matthew_izawa@okayama-u.ac.jp)

Cross-appointed Professors:

Gray Bebout (Lehigh University, USA)

Javier Martin-Torres (Lulea University of Technology, Sweden)

Martin Van Kranendonk (University of New South Wales, Australia)

To investigate mineral–organic–fluid interactions, origin of life, and traces of primitive life in the solar system via both experimental and analytical approaches.

## Facilities of the Institute for Planetary Materials, Okayama University

### High-temperature, high-pressure apparatus

- 6-axis high-pressure apparatus, 6UHP-70 (Yamazaki)
- KAWAI-type multi-anvil high-pressure apparatus, USSA-5000 (Yoshino)
- KAWAI-type multi-anvil high-pressure apparatus, USSA-1000 (Yamazaki)
- Piston-cylinder apparatuses (Yamashita, Yoshino, Kanzaki)
- Internally heated pressure vessel(Yamashita)
- Cold-seal hydrothermal apparatuses (Kanzaki)
- The high pressure apparatus with DIA-type guide blocks (UHP-2000/20, AMAGAEL)
- DIA-type multi-anvil press with deformation facility (Yamazaki)
- Externally heated diamond anvil cells (Yamashita, Kanzaki)
- Diamond anvil cells (Kanzaki)
- Megabar diamond anvil cells (Okuchi)
- Large-volume opposed anvil cells (Okuchi)
- Pre-compression cells for laser-shock experiments (Okuchi)
- Vacuum/inert gas furnace (Okuchi)

### X-ray analytical equipment and Electron Microscope

- Powder X-ray diffractometer Rigaku SmartLab (Kanzaki)
- Micro-focused X-ray diffractometer Rigaku RintRapid II (Kanzaki)
- X-ray fluorescence spectrometer PW2400(Kitagawa)
- Electron probe micro analyzer JXA-8800(Yamashita, Yoshino)
- Field-emission Electron probe micro analyzer JXA-8530F(Kunihiro)
- Low Vacuum Field-emission SEM JSM-7001F with EDS(Kunihiro)
- SEM JSM-7001F with EBSD and EDS (Yamazaki)
- Transmission Electron Microscope JEM-7001F(Kobayashi)

### Mass spectrometers

- Multi-collector ICP-MS: Thermo Fisher Scientific Neptune plus(Kobayashi)
- ICP-MS: Thermo Fisher Scientific iCAP TQ(Kitagawa)
- TIMS: Thermo Fisher Scientific Triton plus(Tanaka)
- HR-SIMS: Cameca IMS-1280HR(Kunihiro)
- Gas-MS: MAT 253 IRMS(Tanaka)
- Gas-MS: VG 5400(Kitagawa)
- Gas-MS: Thermo Fisher Scientific Helix(Kitagawa)

- Orbitrap Mass Spectrometer (Thermo Fisher Scientific Orbitrap Fusion) (Tanaka)
- GC-MS (Thermo Fisher Scientific TRACE 1310 & ISQ 7000) (Tanaka)

### **Spectrometers**

- NMR spectrometer Bruker Avance NEO 400MHz (solid & liquid) (Xue)
- Micro-Raman spectrometers (Kanzaki, Yamashita, Okuchi, Izawa)
- Low-frequency micro-Raman spectrometer (Kanzaki)
- Micro-FTIR spectrometer (Yamashita)
- Vacuum FTIR spectrometer (Yoshino)

### **Thermal analysis instruments**

- Thermogravimetric/differential thermal analyzer Rigaku Thermo plus EV02(Okuchi)

### **Other instruments**

- Focused Ion Beam Instrument JIB-4500 (CASTEM)(Kobayashi)
- Ion chromatographs(Kitagawa)
- Ultrasonic reflectivity spectroscopy system (Yoshino)
- Resonant ultrasound spectroscopy system (Yoshino)
- Single crystal cutting and lapping system (Yoshino)
- Infrared laser micro-machining system (Yamazaki)
- Ultraviolet laser micro-machining system (Okuchi)
- Impedance/gain-phase analyzer (Yoshino)
- Sputtering system (Yamazaki)
- Wire-cut electrical discharge machining (Yamazaki)
- Arc welder (Okuchi)
- Diamond wire saw for dry/low-loss cutting (Izawa)
- Ultraviolet curing optical adhesive system (Okuchi)
- HPLC (Thermo Fisher Scientific Vanquish) (Tanaka)
- High temperature conversion elemental analyzer (Tanaka)
- Combustion elemental analyzer (Tanaka)
- GC-IsoLink system (Tanaka)
- Laser fluorination system (Tanaka)