Meiji **I**nstitute for Advanced Study of **M**athematical **S**ciences

---

MIMS Ph.D. Program

A selected project for
Global COE (Centers of Excellence) Program :
Formation and Development of Mathematical Sciences
Based on Modeling and Analysis

Application Guidelines

(Type B : Pre-arrival Admission for International Students)

Enrollment for April 2010

Summary Version

This is only a "Summary Version."
It is your responsibility to obtain the "Complete Version" to confirm the details and officially apply to this program.

MEIJI UNIVERSITY

●Global COE (Centers of Excellence) Program:

Formation and Development of Mathematical Sciences Based on Modeling and Analysis

'Formation and Development of Mathematical Sciences Based on Modeling and Analysis' has been selected by the Ministry of Education, Culture, Sports, Science and Technology for its 2008 Global COE (Centers of Excellence) Program. The program was submitted for selection by the Meiji Institute for Advanced Study of Mathematics (MIMS), an affiliated research institute of the Organization for the Strategic Coordination of Research and Intellectual Property of Meiji University and will be headed by Dr. Masayasu MIMURA, MIMS Director and Professor in the School of Science and Technology. The program will focus on complex phenomena found in society, in nature and in the biological world, using mathematical modeling and analysis to extract the essence of these phenomena. It will run from 2008 until 2012, and will be developed in conjunction with the Department of Mathematical and Life Sciences at the Graduate School of Science, Hiroshima University.

The MIMS Ph.D. Program is an educational system placed for supervising Doctoral students that is provided by the Global COE Program. The Ph.D. program consists of, participation in the "Inter-Departmental Curriculum" at Meiji University's Graduate School, "MIMS Research Guidance Program" supervised by three selected MIMS members and research fellows, and enrollment of courses offered by other graduate schools based on the credit transfer system, "project research for graduate students with the Doctoral program" at the Department of Mathematical and Life Sciences at the Graduate School of Science, Hiroshima University.

●What is Mathematical Sciences Based on Modeling and Analysis?

The 21st century is the age of the mathematical sciences. The society that envelopes us is full of dynamically evolving systems, such as our brains, our immune systems, the internet, economic changes and social development. The evolution of life is just one example of how complex systems develop, overcoming uncertain fluctuations, through self-organization and dynamic change. These systems can be observed everywhere, in our developing societies and in our changing natural environment, as well as in the biological domain. The complexities within these systems rest in the fact that they contain an extremely large number of elements, which are then contained within multiple layers that combine to make the whole system. The non-linearity hidden within these domains is gradually being revealed, and now that the collection of large amounts of data has become possible, one of the most urgent challenges facing the mathematical sciences is to obtain a clearer understanding of these systems. The key solution for this challenge can be found in the innovation of mathematical modeling and analysis, the mission of which is to attain a clear-cut understanding of these phenomena through the application of modeling and analytical techniques. In order to understand complex systems, we also need to elucidate the multiple

links that exist between all of the elements that make up a system, and it is the task of mathematical modeling and analysis to be the vanguard of innovative development by building models able to function at the core of investigations into these phenomena.

●A Vision for Human Resources Development within the MIMS Ph.D. Program

The key educational component of the Global COE Program for the 'Formation and Development of Mathematical Sciences Based on Modeling and Analysis' is the Ph.D. program provided by MIMS, an affiliated research institute of the Organization for the Strategic Coordination of Research and Intellectual Property, Meiji University.

This program will allow students to develop their ability to adopt multiple and diverse perspectives, to identify problems, and to develop appropriate solutions. It is our aim to foster young, talented researchers, well versed in the principles of mathematical modeling and analysis and well equipped with strong technical skills, who will then continue to seek greater synergy between mathematics and the sciences through the modeling of system phenomena.

We expect our graduates to emerge as unique specialists, forming a bridge between phenomena modeling and mathematics, able to make their mark in diverse fields in both the academic and the industrial arenas.

●Overview of MIMS Ph. D. Program

This program consists of (1) **"Cross Educational Programs"** and (2) **"Practical Programs"**.

(1)**"Cross Educational Programs"** are based mainly on the **"Project Based Analysis and Research Cluster"** and the **"Inter-Departmental Course"** at the Graduate School of Meiji University. In the **"Project Based Analysis and Research Cluster"**, four subjects – Advanced Study of Mathematical Sciences I & II, and Advanced Mathematical Sciences I & II - are provided, which are coordinated by MIMS members and research fellows. These subjects are taught in both English and Japanese, and are designed to instruct students in "Mathematical modeling and analysis" for nonlinear non-equilibrium systems and non-linear time-series, which are central themes at MIMS. The aim is that students become able to consider complex phenomena in societies from various perspectives. The **Inter-Departmental Course** offer a number of "Multilingual Graduate Research", such as "Fundamentals of English Communication Skills in Academic Setting" and "Fundamentals of Writing Academic Papers in English". These subjects, which are taught by English native speaking professors specializing in academic English teaching, are aimed to cultivate highly skilled researchers able to be active internationally.

Moreover, as an optional curriculum, students are recommended to study at graduate schools of partner universities based on the credit transfer system. At the Department of Mathematical and Life Sciences at the Graduate School of Science, Hiroshima University, a collaborating institute of our Global COE Program, some courses are available to be enrolled. In addition, the Graduate School of Science and Technology of Ryukoku University, an education and research

hub for western Japan on Mathematical Sciences, provides students with the opportunity to take classes as well.

On the other hand, (2) **“Practical Programs”** are based mainly on the **“MIMS Research Guidance Program”** at the Graduate School of Meiji University, and the **“Project research for graduate students”** at the Department of Mathematical and Life Sciences at the Graduate School of Science, Hiroshima University. In the **“MIMS Research Guidance Program”**, a MIMS member or research fellow will be selected from each MIMS research group (Modeling, Mathematical Analysis, and Simulation) to form a research guidance team which will then provide comprehensive supervision to each individual student. The program mainly consists of two courses: the “Non-linear non-equilibrium systems course” which focuses mainly on vital and biological phenomena and the “Non-linear time-series course” which focuses mainly on economics, finance and the phenomena of natural science. The **“Project research for graduate students”** allows students to actually study at the Graduate School of Hiroshima University and participate in research programs for several months. Students must plan their own research subject, and complete a report of their accomplishments. The aim is to enhance students’ ability to study on their own initiative in different environmental conditions and heighten their research expertise and understanding of their respective fields.

Students who complete all of the courses mentioned above receive necessary guidance, and once the student has reached a certain level, the student will receive permission to submit a dissertation (Doctoral Thesis). Students who have successfully passed the examination of the thesis, will be awarded a Doctoral Degree.

●Multiple Guidance Structure by a Research Guidance Team

The focal point of the MIMS Ph.D. Program is the structure of research guidance provided to doctoral students. Providing students with consolidated instruction, appropriate to each individual research theme and consisting of a fusion of modeling (the mathematical description of phenomena), simulation (the analysis of phenomena) and mathematical analysis, is crucial for the effective study of mathematical modeling and analysis. The multiple guidance structure introduced for the MIMS Ph.D. Program is based on this very principle. Unlike the more traditional model, in which one supervisor oversees the research of a number of students, MIMS members and research fellows will be selected according to the specific needs of each research project, and form a strong guidance teams consisting of three supervisors, with each member specializing in modeling, simulation and mathematical analysis respectively. This will allow students to learn the kind of mathematical modeling and analysis that will allow them to synergize mathematics and the sciences. Particularly outstanding is the fact that amongst MIMS members and research fellows there are many leading academics in the field of mathematical modeling and analysis, gathered not only from Meiji University but from other various institutions. Therefore students will come into contact with a wide scope of academic staff.

●Model Research Themes

Examples of research topics that would be overseen by Team Fellows are shown below:

・Example 1: Theoretical Analysis of Cellular Information Processing Systems
Modeling supervisor: mathematical biology specialist with proven ability in biological phenomena modeling
Simulation supervisor: specialist in large-scale numerical modeling
Mathematical analysis supervisor: specialist in network geometric analysis

・Example 2: An analysis of the dynamics of share prices and the possibility of accurate predictions
Modeling supervisor: specialist in financial engineering with strong history of collaborative research with finance professionals
Simulation supervisor: specialist in computer assistance/ image enhancement analysis,
Mathematical analysis supervisor: specialist in probabilistic logic/ time series analysis

・Example 3: Spontaneous structural formations in nature
Modeling supervisor: specialist in the mathematic theories of self-organization
Simulation supervisor: specialist in model simulation analysis
Mathematical analysis supervisor: specialist in the mathematical analysis of spontaneously occurring patterns in nature

・Example 4: The science of hierarchical structures
Modeling supervisor: specialist in large degrees on freedom, non-linear and non-equilibrium modeling.
Simulation supervisor: specialist in simulation sciences
Mathematical analysis supervisor: specialist in non-linear/ non-equilibrium theory

Research themes related to mathematical modeling and analysis in addition to those mentioned above would be supported, in the same way, by a team comprising of institute members and/or research fellows, all engaged at MIMS, which acts as the pillar organization for the Ph.D. program education.

For further details on Meiji Institute for Advanced Study of Mathematics (MIMS) and the Meiji University Global COE Program, please refer to the following websites:
http://www.mims.meiji.ac.jp/index-e.html (MIMS)
http://gcoe.mims.meiji.ac.jp/index-e.html (Meiji University Global COE Program)

I. Enrollment Quota, School, and Course

A part of the enrollment quota for Graduate School of Science and Technology is allocated to the MIMS Ph.D. Program. Students admitted will receive education and research guidance under the MIMS Ph.D. Program.

Enrollment Quota for the MIMS Ph.D. Program	***School***	***Course***	***Enrollment Quota for the School***
5 students	Graduate School of Science and Technology	Doctoral Course	38 Students

II. Examination type and Screening method

Examination type	***Applicants***	***Screening method***
Type B Pre-arrival Admission	International Students residing abroad (Please refer to III for Qualification)	Document Screening

*** For the information on Examination Type A (for Japanese nationals and international students residing in Japan), please refer to the Application Guidelines in Japanese or contact the Office of the Global Centers of Excellence (COE) Program directly.**

III. Qualification for Application (Type B)

Inquiries of the following Qualification for Application must be received by the Office of the Global COE Program **THREE WEEKS (21 days) before the deadline of the application period.**

Applicants should be of non-Japanese nationality and reside outside Japan and fall into at least one of the following categories:

(1) Persons who have completed their primary and secondary education abroad, have graduated from a foreign university with a Bachelor's Degree, and who have either already been awarded a Master's Degree or will have been awarded a Master's Degree by 31st March 2010.

(2) Persons who have completed their primary and secondary education abroad, have graduated from a foreign university with a Bachelor's Degree, and who have either already been awarded a Master's Degree or will have been awarded a Master's Degree by 31st March 2010 as an international student of a Graduate School in Japan.

(3) Persons who have completed a correspondence course given by an institution abroad while residing in Japan and have already been awarded a Master's Degree or will have been awarded a Master's Degree by 31st March 2010.

(4) Persons who have been designated by the Ministry of Education, Culture, Sports, Science and Technology of Japan.

(5) Persons who have been approved by Meiji University, through an individual entrance screening process, as having scholastic abilities equivalent to or greater than those required to be awarded a Master's Degree and who will be at least 24 years of age by 31st March 2010.

IV. Application Procedure (Type B)

	Application Period	***Screening Fee Payment Period***	***Notice of results***	***Enrollment period***
Period I	2nd July 2009 – 8th July 2009	25th June 2009 – 1st July 2009	3rd August 2009	11th December 2009
Period II	27th January 2010 – 2nd February 2010	20th January 2010 – 26th January 2010	27th February 2010	10th March 2010

1. Application Documents

All of the following documentation must be submitted:

1) Application Forms (Forms A, B and C)
2) 3 passport size color photos of the applicant (4.5cm X 3.5cm)
3) Official transcripts of all colleges and universities attended
4) Certificate of (expected) graduation/degree from all universities attended
5) Certificate of degree
6) Application Form for Admission of International Students (prescribed form)
7) Research plan (prescribed form)
8) Research achievements (within THREE selected papers)
9) TWO* recommendations letters, written in Japanese or English, from university supervisors or individuals who are familiar with the applicant's academic or scientific work.
10) Photocopy of the page showing the applicant's name, date of birth, passport number and photograph
11) TOEFL® Examinee Score Record or IELTS Test Report Form (For applicants from non-English speaking countries)
12) Photocopy of "Application for Remittance" to be issued by a financial institution.
13) Letter of Confirmation to apply for Meiji University Global COE Program Research Fellowships for Doctoral course students.

2. Screening Fee

15,000 Japanese yen

3. Application Periods

Applications can only be made during the application periods specified below.

*Application Period I: From 2nd July 2009 to 8th July 2009

*Application Period II: From 27th January 2010 to 2nd February 2010

Note: Applications must arrive no later than the final dates shown above.

4. Application Mailing Address

All of the documents mentioned above should be enclosed in the official envelope and sent by registered mail to the following address:

Office of the Global Centers of Excellence Program
Meiji University
1-1-1 Higashimita, Tama-ku, Kawasaki,
Kanagawa 214-8571 JAPAN

V. Notice of Results & Enrollment Registration

1 .Notice of Results (Type B)

Results will be posted on the university website. Successful applicants will also receive a letter of acceptance, to be sent out directly.

＊Date of results for Application Period I: 3rd August 2009

＊Date of results for Application Period II: 27th February 2010

2. Enrollment Periods

Documents required for the enrollment period will be sent with the letter of acceptance.

＊The deadlines for the enrollment periods are as follows :

Application Period I: 11th December 2009

Application Period II: 10th March 2010

Note: For detailed information on the enrollment periods, please refer to the “Guidelines for Admission Procedure”.

VI. Financial Support

1. Global COE Program Research Fellowships for Doctoral course students:

The following fellowship will be provided to those applicants who pass the Ph.D. Program entrance examination, enroll in Meiji University and show the intent to receive a research fellowship. This fellowship will not be provided to the student who is offered the JSPS Research Fellowships or other fellowships.

Tenure	1 year (from April 2010 to March 2011) *This contract is annually renewable for up to 3 years.
Monthly stipend	200,000 yen/month (*2,400,000 yen/year) The amount of the stipend will be basically equivalent to that of the JSPS Research Fellowship.
Note: The fellowship will be cancelled at the point when the student is conferred a Doctoral Degree or if the student should withdraw from Meiji University before completing the 3 year tenure. Further details are subject to each employment contract.	

2. Scholarship System (Waiver of Tuition Fees):

All tuition fees, including entrance fee, annual tuition and lab experiments fees, will be waived as scholarship for three academic years, for all students who pass this MIMS Ph.D. Program entrance examination and enroll in Meiji University

Tuition Fees for Doctoral students in Graduate School of Science and Technology, Meiji University

FY 2010	Entrance fee	280,000yen
	Annual tuition	780,000yen
	Lab experiment fee	70,000yen
FY 2011 & FY 2012	Annual tuition	780,000yen/year
	Lab experiment fee	70,000yen/year

Note: Students of this Ph. D. Program must pay the Meiji University Health Insurance Fee (2,500yen/year), as it will not be included in the financial support mentioned above.

VII. How to obtain MIMS Ph. D. Program application forms

Applicants **must send an e-mail** to the Office of the Global COE Program including the following information:

-E-mail Subject: “Request for MIMS Ph.D. Program application forms”

-Applicant’s full name

-Present residing address

-E-mail address (except free e-mail address)

-Telephone number

Application forms will be sent to the present address by post as indicated on the e-mail.

VIII. Contact Information

Meiji University

Office of the Global Centers of Excellence Program

1-1-1 Higashimita, Tama-ku, Kawasaki,

Kanagawa 214-8571

JAPAN

E-mail: gcoe@mics.meiji.ac.jp