

2009-2010

Osaka University

FrontierLab@OsakaU

*Scientific Empowerment Program for
International Students*



Why FrontierLab@OsakaU?

Close Supervision by Top Scientists in the World

Osaka University has long been recognized for its world-class research output and quality training for up-and-coming researchers. We are ranked 34th in the world with regard to citation data of academic papers published from January 1998 to December 2008, announced by Thomson Reuters (2009). Each participant in the FrontierLab Program will be assigned to an internationally renowned research group, and thematic studies will be conducted under the close supervision of the faculty who are top in the field.

Interactive and Experiential Learning
FrontierLab@OsakaU characterizes itself with a small-sized class and one-to-one supervision by faculty, which enable participants to experience interactive and experiential learning. Participants select a topic from basic to applied to the most challenging and cutting-edge and conduct experiments through peer consultation, group work and interactive discussions.

Learning in the Community of Practice

The Japanese tradition of the spirit of creation is very much alive in the frontier research laboratory. Participants will have a first-hand experience of the Japanese spirit of invention and breakthrough through laboratory experiments at Osaka University.

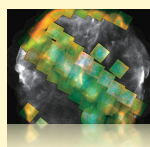
**Hands-on
Experience of
Internationally
Renowned
Science and
Technology
Fields**



INTRODUCTION

Scientific Empowerment Program for International Students

Osaka University is at the forefront of technological innovation in Japan and is recognized as one of the leading science universities in the world. FrontierLab@OsakaU of Osaka University is a program designed to nurture **creative competency** in students by offering a wide range of potential research directions and emphasizing hands-on laboratory experience. It is specifically created for international students seeking a challenging, short-term upgrading of vital research and analytical skills. Applications from both undergraduate and graduate science and engineering majors/minors are welcome.



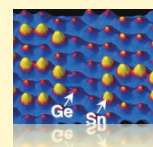
Science

The Graduate School of Science continues its research policies that focus on a liberal, lively spirit and creativity unencumbered by old conventions. The School includes a variety of disciplines, as can be seen in diverse departments such as Mathematics, Physics, Chemistry, Biological Science, Macromolecular Science, and Earth and Space Science. To meet the needs of society and industry, the School of Science is not only concerned with fundamental research studies but also with practical applied research studies.



Engineering Science

The main objective of the Graduate School of Engineering Science is to develop scientists with a keen interest in practical technology, and engineers who have a firm grasp of the basic sciences and may use this expertise to create new technology. The School consists of departments such as Materials Engineering Science, Mechanical Science and Bioengineering, and Systems Innovation.



Engineering

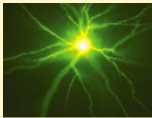
The Graduate School of Engineering boasts a history of more than 100 years, and has sent many students into society who are now playing a leading role in various fields of academy and commerce both within and outside the country. The Graduate School consists of 10 divisions and the School of Engineering has 5 divisions, covering fields such as Advanced Science and Biotechnology, Adaptive Machine Systems, Sustainable Energy and Environmental Engineering, Applied Chemistry, Adaptive Machine Systems, and Mechanical Engineering. To harmonize nature and human beings, and to contribute to the creation of a safe society as well as add to human wealth, the Graduate School of Engineering aims to "produce, raise, and transmit wisdom" and "contribute to society" based on the excellent wisdom.



Information Science & Technology

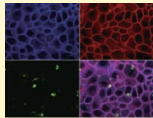
The advanced information society rapidly takes shape in the 21st century, paving the way for people to engage in a much wider range of social activities. To meet social demands, the Graduate School of Information Science and Technology was established in April 2002, consisting of 7 departments: Pure and Applied Mathematics, Information and Physical Science, Computer Science, Information Systems Engineering, Information Networking, Multimedia Engineering, and Bioinformatic Engineering. The School has been performing various activities and working actively to forge closer cooperation between the industry and academia and has been utilizing our research and development results for the betterment of society.

Coordinating Schools



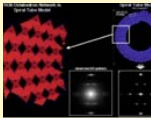
Frontier Bioscience

The Graduate School of Frontier Biosciences is dedicated to advancing the forefront of life sciences with the aim of nurturing students and scientists in its active research environment so that they become fully equipped to take biosciences to the next level. The School consists of 7 groups of laboratories and affiliated laboratories, combining a wide range of disciplines such as medicine, biology, physics, and engineering.



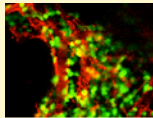
Medicine

The Graduate School of Medicine is known for its cutting-edge research in the fields of study such as immunology, molecular cell biology, molecular genetics, infectious diseases science and gene therapy science. The School aims to develop the research capabilities of its researchers and offers them comprehensive medical knowledge so that they can engage in research activities independently.



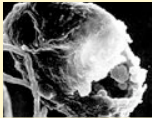
Institute of Scientific and Industrial Research

ISIR is a multidisciplinary research institute that contributes to the development of industry through basic science and technology. It is composed of 3 major research divisions: information and quantum science, material and beam science, and biology and molecular science. The Institute is renowned for its state-of-the-art Nanoscience and Nanotechnology Center.



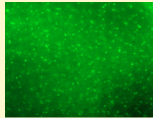
Research Institute for Microbial Diseases

The Research Institute for Microbial Diseases boasts 75 years of experience. It includes nineteen departments spanning diversified subjects such as infectious diseases, immunology, cancer and molecular biology. The Institute offers a dynamic study environment to researchers focusing on microbiology and oncology, and its research has contributed to the diagnosis, prevention, and treatment of infectious diseases and cancer.



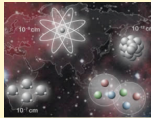
International Center for Biotechnology (ICBiotech)

ICBiotech is dedicated to promoting international cooperation among Asian countries in research and educational advancement in the field of Biotechnology by furthering academic interrelationships in Asian countries. The Center is committed to industrial biotechnology studies and its research projects revolve mainly around development and utilization of biological functions, optimization of bioconversion processes, and conservation of genetic resources.



Research Institute for Protein Research

The Institute for Protein Research plays a pivotal role in the study of protein science in Japan. The Institute emphasizes research on the structure and function of proteins and their biological significance at the molecular level, as well as investigations at the cellular level. The Institute's recent projects include protein engineering, structural biology, neurobiology, proteomics, and protein informatics.



Research Center for Nuclear Physics

The Research Center for Nuclear Physics is a national research center and provides a unique opportunity for research and education in nuclear physics. Its high-tech facilities are open to researchers involved in various fields ranging from particle physics to solid state physics and even medical science, and are used for worldwide collaborations performing physics of the subatomic world.

Participating Schools & Institutes

"A Lab Life of Top Research and Social Interaction"



Priyanka SONI *Niitinkumar*

*Nationality: Indian
Home University: California University of San Diego (US)
Assigned Laboratory: Department of Frontier Biosciences, Graduate School of Frontier Biosciences,
Project Name: Analysis of proBDNF-p75NTR signaling pathway involvement in long-lasting reduction in synaptic strength and spine density elicited by repeated induction of mGluR-dependent LTD (LOSS) using Sholl Analysis and Spine Counting*

Interested in Prof. Akihito OGURA's work for a long time, Priyanka was looking for a way to study at his laboratory. When she found out about FrontierLab@OsakaU, she took the initiative to contact a coordinator of the international office and together they worked out her participation in the program. She became the first student from her university to join this program. Her goals were to be trained in basic lab techniques and specific procedures related to her field to be able to work on independent projects. She plans to attend medical school after graduation from UC San Diego.

Priyanka is a multifaceted person with a healthy appetite for scientific research.

"I have been quite interested in research, and reached out to the professors and tried to start working in the lab as early as possible. Despite many rejections, I eventually was given the opportunity to work in a lab during my second year. However, I could rarely meet my head professor and hardly interact with graduate students personally. Japanese lab life is, in contrast, totally different. With lab people here, I could enjoy not only academic activities but also social interaction outside the lab. I had never imagined that I, as an undergraduate student, could have a drink with doctoral students. Sometimes, you can speak more openly and freely outside the lab, which is eventually conducive to research activities. Coached by graduate students and having a top researcher as supervisor, my Japanese lab life is an invaluable experience!"

Apart from close supervision by the faculty, what I loved about this program is learning how to read scientific papers in order to apply up-to-date information to my research. Here, rather than being told what to do, I was instructed to look things up myself. I read as many papers as possible, which greatly contributed to my personal research. If I had another chance to continue my research here in Osaka University, I would not even think twice to do so."

"Cutting-edge Research in Robotics and Japanese Anime"



Fabio DALLA LIBERA

*Nationality: Italian
Home University: University of Padova (DI)
Assigned Laboratory: Department of Systems Innovation, Graduate School of Engineering Science
Project Name: Motion development as direct CPG adjustment by touching*

Fabio came to Japan through an inter-lab exchange program between his currently assigned lab in Osaka University and the lab in University of Padova, his home university. He loves to watch Japanese animation. "Gundam" -- a world-famous Japanese anime classic -- is one of his favorites. That is in part the reason why he fell in love with robotics. He is a first-year doctoral student and after graduation, he wants to pursue an academic career at the university. Fabio is an eloquent multilingual scholar with a keen interest in the robotic future.

"The best thing about this program is that it offers hands-on experience in both academic and cultural settings. I have been very interested in Japanese culture, especially Japanese animation, ever since high school and I started to learn Japanese language. I think that you will never be able to know the true essence and real spirit of things, unless you actually do them or experience them. Osaka University provided me that opportunity by offering me a lively, vibrant Japanese culture and state-of-the-art science as well.

As far as I know, in many cases, if you participate in an exchange program, you end up sacrificing your study in favor of experiencing a new culture and interacting with new people. But here, you would lose nothing. I could achieve my academic goals and gain cultural experience at the same time. I go to the lab every day, although there is no fixed time schedule, and in the lab, I can interact with my supervisor, lab assistant professors and lab mates all the time. If you have any questions to ask, they are always there! We openly discuss research and find solutions together. I am truly enjoying the Japanese lab life. I would like to recommend this to students who would like to continue their research in this field."

"Upgrading Research Skills"



Priscille DREUX

*Nationality: French
Home University: National School of Chemistry and Engineering Science of Paris (MS)
Assigned Laboratory: Applied Chemistry, Graduate School of Engineering
Project Name: Fabrication of polymeric nanoporous materials via thermally induced phase separation*

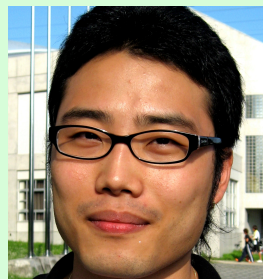
Priscille is the first prize winner of the final presentation of FrontierLab@OsakaU, held on July 30, 2009. She had no intensive experiment experiences dedicated to her field of specialization, back in her home university. But during the FrontierLab@OsakaU program, she could concentrate on experiments specialized in her own field. It was a valuable, rewarding experience to make her more specialized in her research field, she says. With her improved research skills and cross-cultural experiences, she landed a job with a major Japanese company in Belgium, which she will start in September 2009.

"One great thing about this program is that through the research process, I was able to increase my knowledge about my research field and improve my research skills. Dedicated to one laboratory for the entire research project, I could concentrate on my own research project. I could select the topic myself and freely choose the research procedure. I worked with a small group of 3 to 4 people, and we often had open discussion sessions as a way to solve problems.

In France, at the undergraduate level, you are not assigned to a specific laboratory and therefore not that many opportunities to conduct experiments are provided to students. By coming to Osaka University, I finally seized the opportunity to devote myself solely to experiments, which allowed me to enhance my research skills. I found one main difference between France and Japan regarding the way to approach research. In France, the research centers on one point, which means that you focus more on finding one specific way to solve a research question, while in Japan, many different ways to analyze research are attempted for the first step, which helped me to learn various approaches and their results.

Preparing for the final presentation was also a great learning experience to develop my research on a larger scale. It was a challenge for me to condense my research into ten minutes and simplify it in order to explain it to someone with a completely different research background. In particular, when I was asked a question, I could view my research from a very different perspective. It made me think more of the big picture, and how to make my research accessible to a different range of people."

"Wholesome Experience"



Mun-seok PARK

*Nationality: Korean
Home University: Seoul National University (U.I)
Assigned Laboratory: Department of Systems Innovation, Graduate School of Engineering Science
Project Name: The pairwise binomial approach of pricing barrier options*

Mun-seok has studied a wide range of fields. As an undergraduate, he first studied Electrical Engineering for four years and then Management for another one year. He found himself interested in Financial Mathematics, which Japanese universities are more specialized in than his home university. Osaka University gave him the opportunity to fuse his engineering background and management knowledge using the tool of mathematics. He loves dancing. He traveled to Osaka with dance club members several years ago, and since then, he has been looking for an exchange program to allow him to study in Osaka.

"What I loved about this program most was small-sized classes. Most of the courses I undertook are structured with seminar-style classes, which mostly consist of 3 to 4 students and a professor. The classes are very interactive and engaging. Students present their work on mathematical proofs and get the professor's hands-on guidance for many different ways to solve a problem. My personal impression is that the level of Japanese undergraduate students is no lower than that of the graduate students. I believe specialized, intensive course work and personal guidance by the professor make the level of students in Japan high.

One of the challenges was to use textbooks written in Japanese, but it turned out to be a great opportunity to improve my Japanese language skills. I started to learn the Japanese language after I came to Japan, and one month before going back to my country, I reached a level that would allow me to take the first level of the Japanese Language Proficiency Test. This is a wholesome experience! Studying here offers many possibilities, that is, from learning a language and developing my own research area to experiencing Japanese firms through an internship.

One great change brought about by this program is that I started to see myself as a researcher. I always wanted to work for well-known enterprises, not giving a thought to continue my studies in a graduate school. However, I found myself quite interested in conducting research, and I am seriously considering pursuing a master's degree. This is truly a paradigm shift!"

Program



The Frontier Lab Program reflects the tradition of Osaka University, which has long been recognized for its world-class research output and quality training for up-and-coming researchers. This is achieved in myriad ways but most recognizably in a sustained commitment to the integration of basic science with applied fields of study and the early introduction of laboratory experience so as to nurture the spirit of invention and breakthrough. The Japanese tradition of 'mono zukuri' or the 'spirit of creation' is still very much alive in the frontier research laboratories.

FrontierLab@OsakaU offers students an opportunity to study with scientists who are top in their field and with them push the frontier of scientific advancement in the following research areas within the Schools of Science, Engineering Science, Engineering and Graduate School of Information Science and Technology.

1. Research Areas

Participants select two research areas from the following:

- Nanotechnology & Molecular Science
- Life Science & Biotechnology
- Systems & Robotics
- Computing & Information Science
- Advanced Material Science
- Photon Science
- Other Emerging Fields

Final selection and the laboratory affiliation will be decided by Osaka University. It will be communicated to the home institution with the information of the laboratory.

2. Study Plans

We offer two plans of enrollment as below:

- Plan 1:
 - Applicable for either undergraduate student or graduate student
 - Fixed period (semester based)
 - 1 semester (15 weeks): From April to August 2009, or from October to February 2010
 - 2 semesters (30 weeks): From April 2009 to February 2010
 - Applicant will participate in credited supervised research, and have an option to take other credited courses
- Plan 2:
 - Applicable only for graduate student
 - Flexible period
 - Study period commences between April and September 2009, for November 2008 applicant
 - The duration should be more than 3 months and less than 12 months
 - Applicant will participate in supervised research but not in coursework that will grant credits
 - Research work will be evaluated by supervisor and reported to your home institution

3. Languages of Instruction

English or Japanese

4. Academic Calendar

See below for details specific to each academic year, refer to the program website: <http://www.osaka-u.ac.jp/jp/international/iabc/c/FrontierLab.html>

Events	Date	2009-2010	
		Oct 2009 Enrollment	Apr 2009 Enrollment
Course Orientation/Fall	Late September	Sep 28, 2009	
Fall Semester Starts	Early October	Oct 1, 2009	
Yea End/New Year Break	Late December-Early January	Dec 23, 2009-Jan 5, 2010	
Fall Semester Ends	Mid February	Feb 16, 2010	
Spring Break	Mid February-Early April	Feb 17-Apr. 2010	
Course Orientation/Spring			Apr 6, 2009
Spring Semester Starts	Early April		Apr 6, 2009
Mid-term Break	Late April- Early May		Apr 29-May 6, 2009
Spring Semester Ends	Early August		Aug 3, 2009
Summer Break	Early August-Late September		Aug 4-Sep 30, 2009
Fall Semester Starts	Early October		Oct 1, 2009
Yea End/New Year Break	Late December-Early January		Dec 23, 2009-Jan 5, 2010
Fall Semester Ends	Mid February		Feb 16, 2010

Research Achievements

The Final Oral Presentation and Final Report

FrontierLab@OsakaU program held the Final Presentation on February 6, 2009 at Convention Center in Suita Campus of Osaka University. All 18 FrontierLab@OsakaU students who have completed the program in March 2009, in addition to submitting their theses in a written form, gave an oral presentation of their own research project for 10 minutes. All FrontierLab@OsakaU students joined this final presentation and actively participated in the Q&A session. The final presentation was graded by FrontierLab@OsakaU program coordinators and supervisors based on 5 criteria: contents, logical and analytical strength, presentation skills, and response to questions. At the end of the session, the top 3 presenter received best presentation awards from Dr. Kichino Tsuji, Vice President of Osaka University.



Final Presentation of FrontierLab@Osaka U		Fall Semester 2008			
Project name	Home University	Country	Assigned Laboratory at Osaka University	FrontierLab Supervisor	School/Faculty
Gene Expression Profile of MAGE Family during Brain Development	National Cheng Kung University, Taiwan	Taiwan	Laboratory of Regulation of Neuronal Development	Prof. Katsuki Yoshikawa	Sci.
Multiple Signal Transduction Roles of Vanadium Induced Root Hair Formation of Arabidopsis thaliana seedlings	National Cheng Kung University, Taiwan	Taiwan	Laboratory of Plant Growth and Development	Prof. Kakumoto, Tetsuo	Sci.
Purification of New Compound from Streptomyces sp. SBI108	Mahidul University, Thailand	Thailand	Molecular Microbiology Laboratory	Prof. Takuya Nihira	Eng.
The SE36 DNA Vaccine Development for Malaria Prevention	Wuhan University, China	China	Department of Molecular Protozoology, Research Institute of Microbial Diseases	Prof. Toshihiro Horii	Med.
Examination of Protein-protein Interaction by Fluorescence Resonance Energy Transfer: An Application to PDZ Interaction between Urate Transporter URAT1 and Scaffold Protein PDCD1	Wuhan University, China	China	Laboratory of Bio-system Pharmacology	Prof. Yoshitatsu Kanai	Med.
Consistent transfer of plasmid DNA from Escherichia coli to Streptomyces sp. SJE177	Mahidul University, Thailand	Thailand	International Center for Biotechnology	Prof. Takuya Nihira	Eng.
Methanol Adsorption on Platinum – A Cluster Model Study	Indonesian Technology Bandung, Indonesia	Indonesia	Laboratory of Theoretical Material Science	Prof. Hideo Kawai	Eng.
Adsorption of O2 on Cobalt (n)Pyromet Cluster - A Density Functional Theory Study	Indonesian Technology Bandung, Indonesia	Indonesia	Laboratory of Theoretical Material Science	Prof. Hideo Kawai	Eng.
Adsorption and decomposition of H2S on V(III), Pd(II), and Pt overlayers on V(III): a first principle study	Institute of Technology Bandung, Indonesia	Indonesia	Laboratory of Solid Co-Mechanics	Prof. Yoji Shibutani	Eng. Sci.
Human Teaching and Supervision in Dynamic Systems for Cell Recognition	Wuhan University, P.R.China	China	Department of Intelligent Media, ISIRI	Prof. Yasuaki Yagi	Eng. Sci.
Application of whole-cell patch clamp technique in carp cone photoreceptors measurement of light responses under voltage-clamped conditions	Mahidul University, Thailand	Thailand	Neurobiology Laboratory, Sensory Transduction Group, Graduate School of Frontier Biosciences	Prof. Satoshi Kawamura	Frontier Biosciences
Thermoelectric properties of rare-earth filled ultrathin compounds and performance of thermoelectric module constructed from these compounds	Seoul National University, Korea	Korea	Laboratory of Interface Science and Technology	Prof. Toshihiro Tanaka	Eng.
Diagnosing density profiles in super-high dense plasma by ultra-high intensity laser generated high-speed proton beam	University of Shanghai, Jiangong, China	China	Laboratory of plasma photonic device	Prof. Ryoisuke Kodama	Eng.
The Blowable Mouse: A Hands Free Input Device for the Disabled	Tsing Hua University, Taiwan	Taiwan	Department of Mechanical Science and Bioengineering	Prof. Fumio Miyazaki	Eng. Sci.
Learning muscle pairs of a human-like robotic arm	University of Groningen, The Netherlands	Netherlands	Intelligent Robotics Laboratory	Prof. Hiroshi Ishiguro	Eng. Sci.
Improving aerospace automated control systems by integration of grip pressure and steering acceleration sensors	Technical University of Delft, The Netherlands	Netherlands	Sato Laboratory of Human-Machine Interfaces, Graduate School of Engineering Science	Prof. Kosuke Sato	Eng. Sci.
Device for Simulation of Gravity Sensation of Visual Objects	Xian Jiaotong University, China	China	Oshiro Laboratory, Graduate School of Engineering Science	Prof. Osamu Oshiro	Eng. Sci.
Evaluation of retinoid acid receptor antagonistic activity in aquatic environment using a yeast two-hybrid assay	Chungnam Natl. University, Korea	Korea	Bio-Environmental Engineering Laboratory	Prof. Michiko Ise	Eng.
Metabolic Fingerprinting by GC/MS for quality assessment of Thai olong tea	Mahidul University, Thailand	Thailand	Laboratory of Bioscience Engineering	Prof. Eiichiro Fukusaki	Eng.

Prerequisites

Undergraduate students are required to have completed at least two years of study before participating in the FrontierLab@OsakaU program. Both undergraduate and graduate students in science, engineering and other relevant fields are required to have completed science and/or engineering foundation courses.

Crediting

6 to 14 credits/semester, an equivalent of 14-30 credits in ECTS unit will be awarded upon successful completion of the requirements.

Grading

- Oral Presentation 40%
- Introductory 10%, Mid-term 10%, Final 20%
- Seminar Presentation/Participation 20%
- Written Laboratory Report 40%

Assessment of the Contact hours in the laboratory will comprise the general basis for grading.

Score Assessment

S	90 points and above
A	80 points to 89 points
B	70 points to 79 points
C	60 points to 69 points
F	59 points or below

Textbooks

No specific textbook is required for the program but is instead left to the discretion of the individual laboratory supervisor.

Course Options and Estimated Workload

(Applicable to Plan 1 students only)

FrontierLab@OsakaU program offers four credited courses for students who participate in semester-based study programs (Plan 1). While "FrontierLab I" requires a full workload (750 hours per semester and 50 hours per week), students who register for courses A, B, or C may take other courses offered either in English or Japanese. Each FrontierLab course awards 6 to 14 Osaka University credits, while lecture courses such as "International Exchange Subjects" offer 2 credits per semester. Information on courses taught in English will be made available during the orientation session at the beginning of the semester.

Many FrontierLab supervisors may require "Course I" registration for students to achieve satisfactory outcomes from laboratory experiences. Students are thus advised to consult with their supervisors prior to course registration to discuss individual lab requirements and study needs in other areas.

Description of Study Hours

1. Contact Hours

Contact hours or laboratory time is time students spend in the assigned laboratory. During contact hours, students conduct activities related to experiments with their supervisors and other members of the laboratory. To achieve FrontierLab@OsakaU program goals and objectives, which emphasizes hands-on laboratory experience, the contact hours are set at between 180 and 420 hours/semester depending on which of the four courses options is being pursued. This accounts for more than 50% of the total workload. Through these contact hours, students are expected to acquire basic laboratory knowledge and techniques to conduct actual research.

2. Preparation Hours for Presentations

During the preparation hours for presentations, students are expected to prepare for three oral presentations, which the program sets as compulsory activities. In the introductory, mid-term and the final oral presentations, students are expected to display their understanding of basic theories in their discipline, demonstrate the ability to come up with solid research proposals, and analyze experimental results. They are also expected to show an ability to

integrate ideas and laboratory research results into creative and academically coherent works. Preparation time includes producing PowerPoint, handouts and other visual aids for use in the presentations.

3. Supervised Study (Meeting with a faculty advisor)

Supervised study enables students to discuss the progress of their research with supervisors. This close supervision by members of the faculty provides an opportunity for students to ask questions and receive constructive feedback about their research projects. Students may also be given assignments by their supervisors. The close contact with "Frontier" scientists is one of the most important aspects of the program.

4. Tutorial (Supplementary advice from senior students)

Tutorial is a time for peer consultation and group work with the laboratory members, during which time senior students often instruct and mentor their junior counterparts. Students are encouraged to discuss results obtained in their own experiments with peers to receive feedback, while providing a similar type of feedback at the work of others. Tutorial provide students opportunities to learn in a community of research practice, to motivate and learn from each other, and to be a competent and responsible member of a cooperative research team.

5. Participation in Seminar

Students are expected to participate in a seminar usually conducted once a week for 90-120 minutes. Well-prepared presentations and active participation are required to acquire a broad knowledge base and develop analytical and critical thinking skills.

6. Independent Study Hours

Students are expected to study without supervision or direction from others during independent study hours. Activities include reading assignments and relevant papers, analyzing research data and preparing for the laboratory research report to be submitted to the supervisor at the end of the program.

7. Other Laboratory Activities

The other laboratory activities are those offered by the assigned laboratory which are not categorized in the above mentioned student workload. These will vary in nature depending on the laboratory. These may include activities in the communities of research practice that enable students to communicate and interact more effectively with other students and acquire intercultural communication skills.

Syllabus and Student Workload

For your creative competency and more chances for hands-on experience

Objective

FrontierLab@OsakaU is a program designed to nurture creative competency in international students by offering them opportunities for learning in communities of research practice. The emphasis is on hands-on laboratory experience in a wide range of potential research directions. It is specifically created for international students seeking a challenging short-term upgrading of vital research and analytical skills in the fields of Nanotechnology & Molecular Science, Life Science & Biotechnology, Systems & Robotics, Computing & Information Science, Advanced Material Science, Photon Science and other emerging fields.

As study outcomes, students should be able to:

- Understand research backgrounds and relevant theories;
- Acquire basic laboratory techniques relevant to their field of study;

Formulate a research plan, implement it by conducting experiment-based research, and convey the results in scholarly presentations.

As the basis for continuous development of research skills, FrontierLab@OsakaU also aims at cultivating in students the ability to:

- Give constructive criticism by sharing ideas, data and findings with laboratory supervisors and peers through group work and peers cooperatively;
- Enhance independent research capabilities;
- Prepare research reports by assessing progress and describing accomplishments and failures of the research project.

Program Description & Grading Policy

Each participant in the FrontierLab@OsakaU Program will be assigned to a particular research group in one of Osaka University's science and technology fields. Thematic studies will be conducted under the close supervision of the faculty through experiments, peer consultation, group work and interactive discussions. Students will select one of the FrontierLab A, B, C and D courses with the total student workload ranging from 350 to 750 hours/semester. The four courses all emphasize laboratory/research experience for students and set the contact hours in the laboratory at between 180 to 420 hours/semester depending on the course. This accounts for more

than 50% of the total workload. The program also sets independent study hours for revision/review at 90-210 hours/semester, 6-14 hours/week to read assigned texts and research papers, analyze research data, and prepare for the laboratory research report to be presented to the supervisor at the end of the program. The amount of assignments and preparation time depends on the assigned laboratory and the field of study. Further details concerning the student workload are described in "FrontierLab@OsakaU Course Options and Estimated Workload."

Students will receive a combined grade for contact hours (laboratory time), seminar, oral presentations and written report. Each element is considered essential to their success in the program.

Contact Hours: As the assessment of the level of understanding of laboratory procedures and proficiencies will form a basis for the overall grade, students are expected to consider the stated contact hours as a minimum requirement. Through group discussions and exchange of opinions, students are expected to develop their own ideas and formulate specific research plans.

Seminar Presentation and Participation: There will typically be a single seminar per week and seminar presentation/participation is essential for student grade. Good presentations as well as active participation in seminars are critical in acquiring a broad base of knowledge and further developing analytical skills. Failure to present/participate in seminars on a regular basis will lower the grade. Individual tutorial, either on a regular basis or otherwise, may be available or required.

Oral Presentations: Students are expected to carry out three oral presentations (or two in the case of students studying for a short period such as three months) during the study period. By giving three presentations, students will be able to integrate ideas and analyses on laboratory results into creative and academically coherent work. The final oral presentation will be attended and evaluated by FrontierLab@OsakaU coordinators and supervisors as part of a university-wide program.

Written Report: Submission of laboratory reports at the end of student participation in the program is required for successfully passing the course.

Course Name	FrontierLab A	FrontierLab B	FrontierLab C	FrontierLab D
Credits at Osaka University	6	8	10	14
1. Contact Hours (Laboratory time)	180	240	300	420
2. Preparation Hours for Presentations	30	30	30	40
3. Supervised Study (Meeting with a faculty supervisor)	20	15	15	20
4. Tutorial (Supplementary advice from senior students)	10	20	30	30
5. Participation in Seminar	15	15	15	20
6. Independent Study Hours	90	120	150	210
7. Other Laboratory Activities	10	10	10	10
Total Student Workload	350	450	550	750
Student Workload ECTS Equivalent (25 hrs = 1 ECTS)	14	18	22	30

PLEASE NOTE: Numbers indicate hours per semester, 15 weeks. Contact hours in FrontierLab A to D per day will be on the average 2.4, 3.2, 4.0 and 5.6 hours, respectively. The ECTS-compliant workload table is provided to facilitate credit transfer between Osaka University and partner institutions. Osaka University credits are awarded based on "contact hours (laboratory time)" stipulated under item "1" of the above. The other study hours written under items "2" to "7" are estimates that may vary according to the particular academic discipline, school/faculty/department, and/or individual laboratory.

How to apply to FrontierLab@OsakaU

Eligibility, deadlines, scholarship

1. Application Deadline

November 1, 2009 for enrollment commencing between April 2010 and September 2010
March 20, 2010 for enrollment commencing between October 2010 and March 2011

2. Download Application Forms

Application Form [Word / 500KB]
Application Form [PDF / 1MB] (Right click to save this file if you can't open it)

3. Eligibility

Both undergraduate and graduate students in science, engineering or other relevant fields who are registered at universities that share a student exchange agreement with Osaka University.

Undergraduate students are required to have completed at least two years of study before participating in the FrontierLab@OsakaU program.

FrontierLab@OsakaU requires adequate language proficiency in either English or Japanese. Proficiency equivalent to TOEFL 550 or Level 2 of JLPT is recommended, respectively.

4. Tuition Fees

Students from institutions that have concluded a mutual tuition waiver contract with Osaka University will not be required to pay tuition fees.

All Others must pay the following tuition fees.
Plan 1: 14,400 JPY per credit
Plan 2: 28,900 JPY per month
PLEASE NOTE: Tuition fees for Plan 2 are accrued not based on the total number of days, but according to each month of enrollment. In addition, the tuition fees are liable to change without notice.

5. Scholarship

Students of FrontierLab@OsakaU from institutions that share a student exchange agreement with Osaka University are eligible to apply for the following scholarships.

JASSO (Japan Student Services Organization) Scholarship
Provides 80,000 yen for travel expense as well as a monthly stipend of 80,000 yen

Those who receive financial aid exceeding 80,000 yen per month from ANY other funding body are NOT eligible
Application forms for the JASSO scholarship scheme is included with the application form of FrontierLab@OsakaU
For more information, please consult the JASSO website (http://www.jasso.go.jp/scholarship/short_term_c.html)

Osaka University (OU) Scholarship
Provides a monthly stipend of 80,000 yen
Those who receive financial aid exceeding 50,000 JPY per month from other JAPANESE funding bodies are NOT eligible
Application is made by filling out the relevant information directly on the FrontierLab@OsakaU application form
PLEASE NOTE: It is not possible for students to be funded by the JASSO Scholarship and OU Scholarship concurrently.

6. Life in Osaka

Accommodation

JICA: A limited number of rooms will be made available at JICA (Japan International Cooperation Agency) Osaka International Center (see right). The monthly fee is around 40,000



yen with a daily breakfast. The daily rate is 1,330 yen for stays in excess of 14 nights but 2,681 yen for stays up to 14 nights. Both of these rates include a daily breakfast.

Students who are unsuccessful in finding accommodation at the JICA International Center must find housing/accommodation with the assistance of Osaka University's Support Office for International Students and Scholars.

Living Expenses

Those who wish to stay in a private apartment house in the Osaka area should expect their average monthly living expenses (food, accommodation, and transportation, etc.) to be no less than 100,000 JPY.

Health and Liability Insurance

Students of FrontierLab@OsakaU are required to join "the Personal Accident Insurance for Students Pursuing Education and Research" scheme arranged by the University.

Student's Manual

is downloadable at FrontierLab@OsakaU website; www.osaka-u.ac.jp/jp/international/lab/c/FrontierLab.html

7. Visa Information

Before coming to Japan, accepted students need to obtain a "college student (Ryugaku) visa, issued by the Japanese Embassy or Consulate in their country of residence. The Support Office for International Students and Scholars of Osaka University will assist with the visa application process.

8. How to Calculate GPA

Pattern	Grade				
	Excellent	Good	Sufficient	Fail	
Pattern 1	A	B	C	F	
Pattern 2					
Pattern 3	100-80	79-70	69-60	59 and below	
Pattern 4	100-90	89-80	79-70	69-60	59 and below
Pattern 5	S	A	B	C	F
Pattern 6	A	B	C	D	F
Grade	3	3	2	1	0
Point (GP)					

Use the formula below to calculate GPA (Round to two decimal places). To apply JASSO scholarship, students need GPA at 2.30 or above.

$$\frac{(Total\ Credits\ of\ GP3) \times 3 + (Total\ Credits\ of\ GP2) \times 2 + (Total\ Credits\ of\ GP1) \times 1 + (Total\ Credits\ of\ GP0) \times 0}{Total\ Credits}$$

9. Program Schedule

* The application deadline for enrollment commencing between Oct. 2009 and Mar. 2010 is Mar. 20, 2009

10. Transfer of Credits

Students will be graded on the basis of laboratory work, participation in seminars, oral presentations and reports. Participants in courses FrontierLab@OsakaU A, B, C and D will be awarded credits by the School/Faculty at which the student is enrolled upon successful completion of each course. Osaka University will issue a Notification of Results to each student and an Academic Transcript to the student's home university. For students enrolled in non-credited FrontierLab@OsakaU program, a Certificate of Completion, signed by the Supervisor and Chief Coordinator will be issued. The Certificate will include information on contact time and other study hours as well as evaluation of overall performance.

Cultural backgrounds of the program
A blend of tradition and innovation

Spirit of Creation

The FrontierLab@OsakaU Program reflects the tradition of Osaka University, which has long been recognized for its world-class research output and quality training for up-and-coming researchers. This is achieved in myriad ways but most recognizably in a sustained commitment to the integration of basic science with applied fields of study and the early introduction of laboratory experience so as to nurture the spirit of innovation and breakthrough. Many Japanese university laboratories, at least in the fields of science and engineering, still possess a traditional style of teaching and collaborative learning, and often offer opportunities for training in leadership and collaboration with others. This approach can be called "learning in the communities of research practice."

This emphasis on practical skills, even in the modern university laboratories, originates in the history of Japan. Respect of "craftsmanship" - the Japanese tradition of "monozukuri" or the "spirit of creation" in other words, is still very much alive in the cutting-edge research laboratories today.



Osaka University

Osaka University is recognized as one of the leading research universities in the world and at the forefront of technological innovation in Japan. Its strong orientation toward innovation, partnership with the local community and industry, and pioneering efforts in interdisciplinary research and education, all reflect the university's unique history and characteristics.

Osaka University traces its beginnings to the Edo Period, to the foundation of Tekijuku in Osaka in 1838. Reaching further back, scientific and educational development in Osaka was enhanced by the establishment of Kaikokudo in 1724 by five local merchants. Osaka University takes pride and inspiration from these two educational institutions, not founded by Japanese feudal lords but by local citizens. Both Tekijuku and Kaikokudo pursued scientific truth and knowledge while cultivating virtue and socio-cultural awareness in students.

In 1931, the University was established as Osaka Imperial University, relatively late among seven other Imperial Universities. It has grown rapidly in these 78 years, not only in size but also in terms of its contributions to the scholarly community. It is now a comprehensive research university with 16 graduate schools, 11 undergraduate schools/faculties, 5 research institutes, 24 joint-use facilities, 2 hospitals, and 4 libraries on 3 campuses of Suita, Toyonaka, and Minoh. As of May 1, 2009, 1455 international students studied at Osaka University out of a total of about 25,000 students. Osaka University takes pride in being a first-class university in both domestic and international settings and is committed to make contributions to society, based on the University's motto "Live Locally, Grow Globally."

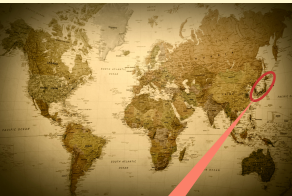


Contact Information

FrontierLab@OsakaU Program:
www.osaka-u.ac.jp/jp/international/iab/e/FrontierLab.html
Email: frontierlab@ipc.cmc.osaka-u.ac.jp

Osaka University
School of Science
School of Engineering Science
School of Engineering
Graduate School of Information Science and Technology

www.osaka-u.ac.jp/eng/index.html
www.sci.osaka-u.ac.jp/index.html
www.es.osaka-u.ac.jp/eng/index.html
www.eng.osaka-u.ac.jp/en/index.html
www.ist.osaka-u.ac.jp/english/index.html



Osaka on the
World Map

We are
here



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