

FY 2007 WPI Project Progress Report

World Premier International Research Center (WPI) Initiative

Host Institution	Kyoto University	Host Institution Head	Kazuo Oike
Research Center	Institute for Integrated Cell-Material Sciences	Center Director	Norio Nakatsuji

Summary of center project progress

1. Foundation of iCeMS

Institute for Integrated Cell-Material Sciences (iCeMS) was established on October 1st as an independent research institute of Kyoto University. Management of the iCeMS is carried out by strong leadership of the Director (Prof. Nakatsuji) and close consultation with the Deputy Director (Prof. Kitagawa), the Chairman of the PI board (Prof. Kusumi) and the Administration Director (Mr. Soga). Also, PIs meet regularly (once or twice a month) to discuss scientific agenda aiming at development of collaborative research projects.

2. Recruitment and joining of PIs and other researchers

PIs from within Kyoto University joined the iCeMS quickly after its foundation. Several PIs are keeping double affiliation with the graduate schools or research institutes to avoid interruption of research activities. Also, two PIs from Kyoto University, namely Prof. Takano (as of November 16, 2007) and Prof. Tanaka (as of April 1, 2008) have/is to be joined the iCeMS completely to start new laboratories, meantime at rental laboratory spaces near Kyoto University. Laboratory of Prof. Kiso has become the satellite laboratory of the iCeMS by official agreement with Gifu University. Dr. Harada joined the iCeMS from other organization to start new laboratory. Dr. Kengaku, a newly recruited female PI, will join the iCeMS in 2008.

Professor Agladze joined the iCeMS from USA completely to take the fulltime PI position and set-up his new laboratory, meantime at rental laboratory spaces near Kyoto University. Prof. Chen has joined the iCeMS, with 40% of his efforts to keep his laboratory in Paris, by formal agreement with Ecole Normale Supérieure of Paris.

For recruiting other faculty members and postdoctoral fellows, we advertised open positions internationally by using Nature and Science Magazines as advertisement media. Also, we have set-up a website of the iCeMS to announce our scopes, aims and scientific activities of the iCeMS, as well as announcement of open positions. These advertisements attracted many applications and inquires from foreign researchers as well as domestic ones. We are now in the selection process of best candidates for associate professor, assistant professors and postdoctoral fellows.

3. Administration office and staff

Kyoto University provided 8 experienced administration staff members to start the iCeMS administration office. In order to strengthen English capability, we recruited 10 new staff members with qualification of English literacy in writing and conversation.

As the administration office of the iCeMS, Kyoto University provided a building (located at Konoe) with sufficient spaces for the administration office, meeting room, and director's office. They will move to the iCeMS headquarter building at Higashi-ichijo after it is renovated for the iCeMS by the end of the fiscal year of 2008.

4. Buildings and spaces for iCeMS

As presented in the application documents, Kyoto University provides two building

clusters (located at Higashi-ichijo and Hyakumanben) for the iCeMS. Renovation of one building at the Hyakumanben cluster has already started, and it will be completed in 2008. Renovation of the Higashi-ichijo buildings is now under planning, and it will be completed in the spring of 2009. Also, an additional building will be constructed in the Hyakumanben cluster in 2009. Total of these two clusters will be 10,000 square meters as planned.

5. Ground-breaking success in generation of iPS cells and foundation of the CIRA

Professor Yamanaka, one of our PIs, attracted world attention by his success in production of iPS cells from mouse and then human somatic cells. To facilitate progress of the iPS cell and related research under his leadership, the iCeMS established the iPS research center (Center for Induced Pluripotent Stem Cell Research and Application) very quickly, only two months after his famous research paper was published, on January 22nd under the directorship of Prof. Yamanaka. He has recruited several key researchers and other members for the CIRA. Kyoto University is planning to construct a new building for the CIRA.

6. Major events and activities of iCeMS in the fiscal year of 2007

The iCeMS gave the opening ceremony and accompanying lectures on February 19th at the Clock Tower Centennial Hall of Kyoto University with many guests and participants totaling ca. 400. English was used for all the events and programs.

The 1st iCeMS International Symposium was carried out on February 20nd – 22rd at Hotel Fujita near Kyoto University, focusing on biophysics and cell biology. Prominent scientists from 6 countries came to Kyoto to give excellent lectures. Participants of ca. 100 enjoyed exciting scientific discussion and interaction.

In these events, key scientists were invited from the collaboration partner institutes of the iCeMS, from USA, Europe and Asia, thus making good start of the international networking and collaboration.

Besides international research activities, the iCeMS is planning unique programs to nurture world-leader scientists of the next generation. One of them is scientific communication program aiming that all the scientists in the iCeMS will possess good communication skills beyond the scientific community toward other sectors of the society, such as young generations and general public. As the initiating event, Scientific Café was opened on March 1st (Saturday) in a traditional Japanese House (kyo-machiya) in Kyoto. Prof. Kitagawa and members of his laboratory gave excellent and enjoyable chat-talk and intellectual interaction with guests from various sectors of the general public. It should have been a stimulating and revealing occasion for the participating graduate students and postdoctoral fellows of his laboratory.

1. Summary of center project

<Initial plan>

This proposal is a response to the government initiative to found world-premier research institutes to explore interdisciplinary fields, which will be placed within the global career-development flow of young scientists. We will accumulate a critical mass of leading scientists for the symbiotic integration of material and cell sciences (focusing on mouse and monkey pluripotent stem cells), based on the notion that the fundamental understanding and control of molecular complexes in the meso-scale of 10-100 nm is critical for creating the science and technology of the next generation. We will achieve this goal by taking cross-disciplinary approaches, with the following inter-related targets. For basic science:

1) Chemistry in nano-meso space in aqueous media; 2) Cellular meso-biophysics; and 3) Stem-cell-differentiation meso-engineering. We will contribute to human wellness by developing A) environmentally-friendly chemical reaction systems, by developing new methods of material conversion (chemical reaction), separation, and storage B) drug-synthesis/controlled-release microvessels working in the body, and C) regenerative medicine based on regulated cell-material complexes.

<Results/progress/alternations from initial plan>

As for the three interdisciplinary research areas, preliminary operations for collaborative researches are now in progress with intensive efforts by researchers of the iCeMS.

As for the target of "regenerative medicine based on regulated cell-material complexes", we set the first goal of "Regenerative Medicine by Controlling Stem Cells with Smart Materials."

In November, 2007, Professor Shinya Yamanaka, a Principal Investigator of the iCeMS, has succeeded in generating human induced pluripotent stem (iPS) cells, which could complement the use of embryonic stem (ES) cells, greatly advancing regenerative medicine (one of the most important targets is achieved).

The Center for iPS cell Research and Application (CIRA) was established as an affiliate body of the iCeMS in FY 2007. Here, the research for the clinical application is advanced as well as the basic research of the iPS cells, with thorough measures for the center infrastructure being launched.

As for the target of "Environmentally-friendly chemical reaction systems by developing new methods of material conversion (chemical reaction), separation, and storage" and "drug synthesis and controlled release microvessels working in the body", the center infrastructures indispensable for realizing these goals are highly reinforced, while the existing studies are in progress respectively.

In addition, more researchers will be affiliated as the renovation of the new building is completed.

2. Research fields

<Initial plan>

An interdisciplinary research field, spanning Biosciences, Chemistry, Material Sciences, and Physics (selected from the provided list of fields).

The scientific direction of this proposed Institute was conceived based on TWO KEY CONCEPTS. They are MESO-SPACE and STEM CELLS.

(1) Meso-space is the space of 10-100 nm. Between the two well-walked lands of bulk- and nano-spaces, there is the vast unexplored field of meso-space. However, we can find fledgling developments there in various branches of science. The cooperative structural changes of porous coordination polymers present good examples. Many key functions of the cell, such as transcription (mRNA synthesis using a DNA template) and signaling, are achieved by large molecular complexes of 10-100 nm, rather than simple bimolecular collisions. In this Institute, we will develop a fundamental understanding and control of the key molecular (weakly cooperative) interactions occurring in the meso-space, throughout cellular, chemical, physical, and materials sciences. By taking interdisciplinary approaches, we will establish a unified view of the molecular interactions in the meso-space in all of these fields, and will develop a variety of unprecedented technologies based on the meso-scale interactions.

(2) Mouse and monkey pluripotent STEM CELLS will be used as an important paradigm of the cell throughout the research in this Institute. A unified cellular paradigm is critical for fostering the collaborative research by investigators with various backgrounds. This would enable the application to regenerative medicine using human embryonic stem (ES) cells.

Kyoto University has been known worldwide for its excellence in both material and cell sciences. Physics and chemistry-related departments have produced four Nobel Laureates, and the times cited for Chemistry of Kyoto University was fourth in the world and first in Japan in 2006. Its Institute for Frontier Medical Sciences is a strong world leader in pluripotent stem cell research. Many faculty members of Kyoto University are active leaders in the forefront of such scientific integration, and thus will enable a critical mass of researchers to establish an ideal research environment.

<Results/progress/alternations from initial plan>

By the strong leadership of the center director, the Center for iPS cell Research and Application (CIRA) was established as an affiliate body of the iCeMS in FY 2007, making giant steps toward enabling the application to regenerative medicine using human stem cells.

3. Research objectives

<p><Initial plan> The same as those described in the "Project Summary" and "Research fields"</p>	<p><Results/progress/alternations from initial plan> The center infrastructure has been reinforced intensively, while the existing studies are in progress, aiming at realizing our goals of "Regenerative medicine by controlling stem cells with smart materials", "Detoxication and drug synthesis working in the body" and "Environmentally-friendly chemistry by meso-Control".</p>
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4. Management

<p><Initial plan> 1) Composition of administrative staff An Administrative Director and a Deputy-Director, together with an administrative staff (approximately 27 people) will be hired. One of the Directors should have impeccable experience in international scientific collaboration matters, whereas the other should know how administrative business is carried out in a Japanese national university, thus complementing each other. Six administrative sections will be created, to be in charge of General Affairs (including Personnel and Public Relations), Planning and Industry Liaison, Finance, Research Support and Intellectual Property, Facilities (Physical Plant), and Research Ethics and Safety. All sections will have at least two staff members who are fluent in English. For the qualifications of such administrative leaders, firstly, she/he needs to be familiar with university administrative matters, including those of Kyoto University, and to be able to plan and create new directions in the administration of this new Institute. On the other hand, she/he must have impeccable experience in international scientific collaboration matters. An especially close connection with the administrative headquarters of Kyoto University will be strongly required during the initial establishment of the center. Thus, the Director of Research Promotion of the Kyoto University Administration Bureau will be designated as the Administrative Director, and the Deputy Director will be recruited from a younger member of the career staff of JSPS (Japan Society for Promotion of Science) overseas center in Europe, for the above-mentioned necessity.</p> <p>2) Decision-making system The Center Director is responsible for all aspects of running the Institute,</p>	<p><Results/progress/alternations from initial plan> 1) Composition of administrative staff: - 1 Administrative Director - 1 Administrative Deputy Director - 1 Administrative Assistant Director</p> <p>General Affairs Section (Planning/Public Relations included): - 1 Section Leader - 1 Administrative staff member (Full-Time) - 3 Administrative staff members (Part-Time) - 1 Temporary staff member</p> <p>Finance Section (Intellectual Property affairs included): - 1 Section Leader - 2 Administrative staff members (Full-Time) - 1 Administrative staff member (Part-Time) - 3 Temporary staff members</p> <p>Other part-time staff: - 2 Staff members</p> <p>The number of staff will be increased as new researchers are hired.</p> <p>2) Decision-making system The steering committee was renamed the Advisory Committee, and its</p>
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with the aid of the Co-Center Director as well as the Administrative Director. A Steering Committee, which advises the Center Director, will consist of both scientists and non-scientists from within and outside Kyoto University, and will gather twice a year regularly, and accordingly upon the Center Director's request. The Core Committee Meeting of the Principal Investigators will provide scientific advice. See Figure 1.

3) Allocation of authority between center director and host institution
In the organizational structure of Kyoto University, this Institute will occupy a special position, freed from many binding rules of the classical Japanese university archetype, to present a future-model of a highly authorized research institute not only to Kyoto University but also throughout Japan and to the world. For this purpose, flexible rules of a new paradigm, as for the relationships with the university headquarters, the salary levels and deserved special bonuses, and the reduced duties in various committees and undergraduate education, will be created. These rules will be applied as a basis and model for the foundation of other research institutes within Kyoto University in the future. The Center Director will report directly to the President of Kyoto University and the Member of Executive Board in charge of research, but the Institute will basically be run autonomously.

infrastructure is now being arranged aiming at launching in the immediate future.

As an autonomous and independent management system to ensure the center's autonomy and the center director's leadership in making decisions regarding the center's overall operation, the Board Committee consists of the center director, the deputy center director, the chairperson of the PI board and the administrative director was established. The Board Committee plays a role equivalent to the faculty in making decisions on important matters (personnel, budget, etc.) as an autonomous organization.

In addition, the Core Committee Meeting of the Principal Investigators was organized as an advisory body for the director on research education matters.

3) Allocation of authority between center director and host institution
As for the personnel affairs, a new category of job titles for program specific professors and other academic staff was created (e.g. Program Specific Research Center Professor, etc.) so as to the director ensures the authority to decide salaries as well as the "iCeMS Incentive" of the staff. The "Rules of Employment for Fixed-Term Program-Specific Staff of Kyoto University" was partially amended accordingly by the host institution.

In consideration of the mission of iCeMS as the WPI center, Kyoto University decided that duties on researchers of the iCeMS, such as membership of various committees of Kyoto University shall be as reduced as possible.

5. Researchers and center staffs

i) "Core" to be established within host institution

Principal investigators

	At beginning	Planned for end of FY 2007	Final goal (Date: month, year)	Results at end of FY 2007	April, 2008
Researchers from within host institution	12	12	13	9	11
Foreign researchers invited from abroad	0	4	5	2	3
Researchers invited from other Japanese institutions	2	3	3	2	2
Total principal investigators	14	19	21	13	16

All members

	At beginning	Planned for end of FY 2007	Final goal (Date: month, year)	Results at end of FY 2007	April, 2008
Researchers <Number of foreign researchers among them and their percentage> [Number of female researchers among them and their percentage]	70 <10,15%>	111 <29,27%>	171 <52,31%>	24 <2,9%>[3,13%]	53 <6,12%>[9,17%]
Principal investigators <Number of foreign researchers among them and their percentage> [Number of female researchers among them and their percentage]	14 <0,0%>	19 <4,22%>	21 <5,24%>	13 <2,16%>[1,8%]	16 <2,13%>[1,7%]
Other researchers <Number of foreign researchers among them and their percentage> [Number of female researchers among them and their percentage]	56 <10,18%>	92 <25,28%>	150 <48,32%>	11 <0,0%>[2,19%]	36 <4,11%>[9,25%]
Research support staffs	45	53	59	7	41
Administrative staffs	27	29	29	18	22
Total	142	193	259	49	116

<p>ii) Satellites <Initial plan> <u>Faculty of Applied Biological Sciences</u> -Role Collaboration and instruction between nanotechnology and stem cell biology</p> <p>-Personnel composition and structure A PI</p> <p>-Collaborative framework In relation to the chemical reaction between: - cells and cells - cells and air quality</p>	<p><Results/progress/alternations from initial plan> <u>Faculty of Applied Biological Sciences, Gifu University</u> -Role No change</p> <p>-Personnel composition and structure A PI An associate professor, a researcher and a technical to be hired on April 1, 2008</p> <p>-Collaborative framework No Change</p>
<p>iii) Partner institutions <Initial plan> <u>Bionanotechnology Interdisciplinary Research Centre, the University of Oxford</u></p> <p>- Role Collaborative research on DNA-based nano-meso technology</p> <p>-Personnel composition and structure Prof. John Ryan</p> <p>-Collaborative framework Academic exchanges of ideas, samples, PIs, postdocs, and graduate students</p>	<p><Results/progress/alternations from initial plan> <u>Bionanotechnology Interdisciplinary Research Centre, the University of Oxford</u></p> <p>-Role: Collaborative research on the structure-function of G-protein-coupled receptors. The initial target of the research is shifted due to the changes of the research directions of the main collaborators at Oxford University.</p> <p>-Personnel composition and structure: Profs. John Ryan and Anthony Watts</p> <p>-Collaborative framework: Academic exchanges of ideas, samples, PIs, postdocs, and graduate students.</p> <p>The initial meeting with Prof. John Ryan, together with another influential professor, Dr. Anthony Watts, of the same department was held on February 18, 2008. In this meeting, we agreed that, as the first target of the collaborative research, we will start working on the structure-function studies of a G-protein-coupled receptor (GPCR) in neural cells, neurotensin, using NMR, AFM, single-molecule tracking as well as technologies handling stem cells.</p>

Wellcome Trust Centre for Stem Cell Research, The University of Cambridge

- Role
Research collaboration in interdisciplinary stem cell biology studies

-Personnel composition and structure

-Collaborative framework
Joint research and academic interaction including the professors, postdocs and graduate students visiting one another

National Centre for Biological Sciences (NCBS), Bangalore, India

- Role
Collaborative research on membrane meso-domains

-Personnel composition and structure
Profs. Satyajit Mayor and K. VijayRaghavan

-Collaborative framework
Academic exchanges of ideas, samples, PIs, postdocs, and graduate students. Co-sponsoring meetings and symposia.

Max Planck Institute for Molecular Cell Biology and Genetics

-Role:
Collaborative research on vesicular-transport meso-complexes

Wellcome Trust Centre for Stem Cell Research, The University of Cambridge

Gave an inauguration lecture at the iCeMS Opening Ceremony.

National Centre for Biological Sciences (NCBS), Bangalore, India

-Role:
Collaborative research on membrane meso-domains

-Personnel composition and structure:
Profs. Satyajit Mayor and K. VijayRaghavan

-Collaborative framework:
Academic exchanges of ideas, samples, PIs, postdocs, and graduate students. Co-sponsoring meetings and symposia.

The joint retreat of the Kusumi group in our institute with the laboratory of Prof. Satyajit Mayor of NCBS was held between November 19 and 25 in Bangalore. The research direction was intensively and extensively discussed during this retreat. We also agreed on having joint postdoctoral fellows. We will jointly advance the studies on meso-domains in the plasma membrane. Prof. K. VijayRaghavan, the director of NCBS, visited us twice in October, 2007 and February, 2008, to discuss collaborative efforts in the field of regenerative medicine.

Max Planck Institute for Molecular Cell Biology and Genetics

-Role:
Collaborative research on vesicular-transport meso-complexes

-Personnel composition and structure:

Prof. Kai Simons

-Collaborative framework:

Academic exchanges of ideas, samples, PIs, postdocs, and graduate students

California NanoSystems Institute, UCLA

-Role

While PCPs are mainly constructed by coordination bonds, zeolites are dominated by ionic bonds and activated carbon by covalent bonds. The advantage of the latter chemical bond types is stability against thermal and mechanical stimuli, which is important for industrial applications. Therefore, Kitagawa PI's and Yaghi's groups develop synthetic methods of new materials, which are characterized by covalent organic frameworks with porous crystalline forms constructed solely from light elements (H, B, C, N, and O), and discover new type of functions including sensing, trapping, and conversion of molecules as catalysts, which perform even in biological environment.

-Personnel composition and structure

Yaghi and coworkers will continue to create these materials while Kitagawa and coworkers plan to explore the functions of such novel porous compounds. Both leaders will allocate at least one postdoctoral fellow to this project.

-Personnel composition and structure:

We agreed to include many more PIs from, both institutions. In addition to Prof. Kai Simons, Prof. Wieland Huttner, current director of the Institute, joined in a meeting held in Kyoto on February 19, 2008. Profs. Mario Zerial and Johnathan Jones will join in this collaborative effort.

-Collaborative framework:

Academic exchanges of ideas, samples, PIs, postdocs, and graduate students

The initial meeting with Prof. Kai Simons, together with Prof. Wieland Huttner, current director of the institute, was held on February 19, 2008. In this meeting, we agreed that, as the first target of the collaborative research, we will start working on the chemical analyses of a vesicular-transport meso-complexes, which have been isolated by Kai Simons group. However, this institute has researchers in the area of nanotechnology and single-molecule tracking, much broader collaborations between two institutes are now being discussed.

California NanoSystems Institute, UCLA

-Role

By utilizing not only coordination / covalent bonds but also other bonds such as metal-carbon bonds, we designed robust frameworks having open-metal and functional organic sites on the surface of the pores towards efficient catalysts.

-Personnel composition and structure

Kitagawa and Yaghi have agreed to do research on target materials in the next fiscal year, and are ready to hire a post doctoral fellow, who is suitable for this project.

-Collaborative framework

Kitagawa PI will send a post doctoral fellow to CNSI for about three weeks as the total work days. In addition, Kitagawa group (3 -4 members) will visit CNSI and hold a meeting with Yaghi's group.

-Collaborative framework

New PCPs will be prepared in Yaghi's group, CNSI while the function is designed and the materials are prepared by Kitagawa's group. Kitagawa PI hires at least one post doctoral fellow for the purpose. They keep the further close and enduring relationship by an internet communication and organize a on-site meetig in either Kyoto or Los Angels in every year.

Membrane Center, Purdue University

- Role

Collaborative research of on-chip membrane technology

-Personnel composition and structure

Prof. Ken Ritchie

-Collaborative framework

Academic exchanges of ideas, samples, PIs, postdocs, and graduate students

The Center for Developmental Biology, RIKEN

- Role

Research collaboration between developmental biology and stem cell biology

-Personnel composition and structure

-Collaborative framework

Joint research and academic interaction among the professors, postdocs and

Membrane Center, Purdue University

-Role:

Collaborative research of on-chip membrane technology

-Personnel composition and structure

Prof. Ken Ritchie

-Collaborative framework:

Academic exchanges of ideas, samples, PIs, postdocs, and graduate students

During February 20 and 24, Prof. Ken Ritchie and we had intensive discussions on how we advance this project. Prof. Ritchie is a physicist, and would like to pursue nano-meso technological aspect as well as the theoretical frame work of the research in the meso-scale phenomena. We will contribute by using single-molecule detection technique we have been developing, and by applying the technologies for regulating the embryonic as well as induced pluripotent stem cells. Together, we will develop methods for artificially creating and manipulating membranes and membrane molecules.

The Center for Developmental Biology, RIKEN

Started research collaborations, such as a joint research and an academic interaction, making its first step by inviting a renowned researcher from RIKEN to the iCeMS Inauguration Lectures as one of the guest speakers.

graduate students	
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6. Summary of center's research environment

<p><Initial plan> 1) Environment in which researchers can devote themselves to their research Efficient administration is to be formed.</p> <p>2) Startup research funding The program's expense and budget provided by the university</p> <p>3) Postdoctoral positions through open international solicitations To be internationally advertized.</p> <p>4) Administrative personnel who can facilitate the use of English in the work process English is to be used as the official language to form English-language administration.</p> <p>5) Rigorous system for evaluating research and system of merit-based compensation Interim evaluations are to be conducted by the external committee chosen</p>	<p><Results/progress/alternations from initial plan> 1) Environment in which researchers can devote themselves to their research The support personnel at the beginning consisted of: - 8 administrative officers/staff members - 5 research assistants (3 teaching and 2 temporary assistants) The support personnel now consists of: - 18 administrative officers/staff members - 7 research assistants (3 teaching, 2 clerical, and 2 temporary assistants)</p> <p>2) Startup research funding 63 million yen has been allocated from the program's expense and budget provided by the university to cover the expenses for research groups led by PIs relocated from external organizations, as well as 53 million yen for start-up expenses to be used for renovation of laboratories.</p> <p>3) Postdoctoral positions through open international solicitations Job advertisements were placed: - on iCeMS' website in December, 2007 - in Nature (International) issued on December 20, 2007 - in Science (AAAS) issued on December 21, 2007</p> <p>4) Administrative personnel who can facilitate the use of English in the work process Nine fluent English-speakers have been allotted in the administration department so English can be used to facilitate the work processes.</p> <p>5) Rigorous system for evaluating research and system of merit-based compensation The "Center Incentive", which can be offered depending on academic</p>
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<p>from home and abroad in 3, 5, 8 and 10 years, and a merit-based pay system is to be employed.</p> <p>6) Equipment and facilities, including laboratory space, appropriate to a top world-level research center</p> <p>Laboratories, lounges and equipment decent enough as a World Premiere International Research Center are to be organized.</p> <p>7) International research conferences or symposiums held regularly to bring world's leading researchers together</p> <p>To be held twice a year.</p> <p>8) Other measures, if any</p>	<p>achievements, has been introduced and implemented. (¥ 50,000 up to ¥ 300,000 per month)</p> <p>6) Equipment and facilities, including laboratory space, appropriate to a top world-level research center</p> <p>In FY2007, the renovation plan of the university main campus and its surrounding area started in order to remodel the area of 1701m² at the General Research Bldg.No.1 (formally the Faculty of Engineering Bldg.No.9) and the area of 4802 m² at the West General Research Bldg. (formally the Institute for Research in Humanities (Main Bldg./ West Wing.) into research facilities of the center.</p> <p>The university has agreed to provide the financial support to cover the construction cost of a new building (3000 m²) in FY2008 and after. Extra attention is being paid to the reforming plan for the West General Research Bldg., which is located at the intersection of Higashi Ohji Street, so the activities as a top world-level research center will be both internally and externally demonstrated.</p> <p>7) International research conferences or symposiums held regularly to bring world's leading researchers together</p> <p>The 1st iCeMS International Symposium took place February 20 through 22, 2008.</p> <p>8) Other measures, if any</p> <p>The iCeMS held the 1st iCeMS Cafe on March 1, 2008 to implement the scientific communication program.</p>
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7. Criteria and methods used to evaluate center's global standing

<p><Initial plan></p> <p>The iCeMS will form the international evaluation committee to assess whether:</p> <p>1. researchers are individually achieve world-class research</p> <p>2. joint-research between the PIs are making progress</p>	<p><Current assessment></p> <p>1. The researchers have individually achieved world-class studies, such as PI Hiroshi Imahori, who was selected as a "NISTEP Researcher in 2007", and PI Shinya Yamanaka.</p> <p>2. Pairs of PI Norio Nakatsuji and PI Hiroshi Sugiyama, and PI Akihiro Kusumi</p>
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<p>3. the administration and support system for researchers are sufficiently functioning as an international center</p> <p>4. the center is in the global career flow</p> <p>5. collaboration with researchers from the East and Asia are promoted.</p>	<p>and PI Kohichiro Tanaka have started a joint-research. PI Motonari Uesugi and PI Shinya Yamanaka also have one in discussion.</p> <p>3. Nine fluent English-speakers have been allotted in the administration department so English can be used to facilitate the work processes. Official occasions, such as the PI meeting, are conducted all in English, and the administration communicates to the researchers basically in English or by providing an English-written summary.</p> <p>Moreover, Executive Vice-President for Research and Finance, Headquarters administration, iCeMS professors and iCeMS administration visited National Institutes of Health and Cold Spring Harbor Laboratory in the United States as world premiere international institutes in FY2007.</p> <p>4. Career opportunities for researchers are internationally advertized. We have received 27 applications and many more inquiries.</p> <p>5. International collaboration and interaction are and will be strongly encouraged: A PI of the iCeMS has visited the National Centre for Biological Sciences (NCBS), National University of Singapore, Seoul National University and National Taiwan University. Three Asian researchers have visited the iCeMS to date.</p>
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8. Securing competitive research funding

<p><Initial plan> A billion yen from the external source and a billion yen from the university</p>	<p><Results/progress/alternations from initial plan> The iCeMS obtained a competitive grant of 618 million yen in FY2007, and the university provided financial assistance of 232 million yen.</p>
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9. Other important measures taken to create a world premier international research center

<p><Initial plan></p> <ul style="list-style-type: none"> - Mentor development program - Scientific integrity and communication program - Counseling to encourage young researchers and female researchers to be independent. - Program to recruit and nurture female researchers 	<p><Results/progress/alternations from initial plan></p> <p>The "iCeMS Cafe", a series of events to implement scientific communication, started in FY 2007. Organizing a group that facilitates scientific communication and human resources cultivation is now under discussion.</p> <p>The iCeMS is planning to establish rooms exclusively prepared for counseling and supporting young researchers, female researchers and researchers from abroad.</p>
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10. Host institution's commitment

<Initial plan>

-Provision in host institution's mid-to-long-term plan

Kyoto University distinctively places the "World Premier International Research Center Initiative" as its top priority program in the current (2004 to 2009) and the next (2010 to 2015) mid-term plans. As clearly defined in its mission statement, the university has strived for sustainable human societies, which are featured by harmonious coexistence within human and ecological communities on this planet, by bringing forth its outstanding research and education programs generating world-class knowledge. Kyoto University believes that establishing a world top-level academic research center within the university is an indispensable step to further promote this mission and to achieve the ultimate goal for the sustainable human societies. Under the strong leadership of the president, Kyoto University is vigorously committed to promote this program, and to actively take concrete and responsible measures, such as preparation of research systems and provision of resources, for establishing the world premier international research center to lead the world's research activities.

-Concrete Measures

(1) Competitive grants obtained by researchers participating in the project and in-kind contributions, etc.

To facilitate the center's researchers obtaining external funds, the university provides the various supports including startup funds. The funds will be used to support young researchers and foreign researchers to pursue research until they obtain their own external funds. The university will also provide researchers with various supports in every aspect of preparing the applications.

The university provides five positions and expenses for principal investigator-class personnel in order to enable Kyoto University's world-leading researchers to conduct academic research at the center while cooperating with their original departments, as well as to minimize the impact of the absences of top-level researchers on their departments' educational and research activities.

<Results/progress/alternations from initial plan>

-Provision in host institution's mid-to-long-term plan

Kyoto University's current mid-term strategies, namely "measures to be taken to achieve objectives in respect of enhancing the quality of the university's education and researches", "measures to achieve objectives related to researches", "remarks in relation to the system to carry out researches" and "organizing the system to carry out researches", now incorporate "make a special effort to structure an organization to promote researches in respect of creating a new generation of technologies through developing meso-control science and stem cell research at iCeMS, a WPI research center".

-Concrete Measures

(1) Competitive grants obtained by researchers participating in the project and in-kind contributions, etc.

Kyoto University has adopted the policy to provide the iCeMS with financial support to cover all indirect costs related to the program grant as well as indirect costs related to competitive grants obtained by the center's researchers.

According to the policy, the center received the financial aid from the university to cover all indirect costs related to the program grant in FY 2007.

The center also received as a financial support from the university:

- labor costs of five PIs
- five positions and labor costs for full-time administrative personnel
- one temporary staff member and his/her labor costs.

Two of the six full-time administrative staff members allocated are fluent in

For administration, the university provides full-time administrative staff and necessary personnel expenses in order to establish an independent administrative organization. Five current university staff members will be allocated for major functions such as general affairs, planning, finance, research support and facilities. University staffers with a good command of English will be preferentially selected. As for the position of vice center director in charge of administration, a director-class personnel from the university will be allocated initially at the time of the center's establishment. This person will soon be replaced by a full-time vice center director, recruited from outside the university, as soon as he/she is appointed.

(2) System under which the center's director is able to make substantive personnel and budget allocation decisions

To ensure autonomy of the center's operation, the university takes the following measures:

a) Flexible management of organization and operation system

An autonomous and independent management system that plays a role equivalent to the faculty will be implemented, to ensure the center's autonomy and the center director's leadership in making decisions regarding the center's overall operation. Decisions on important matters (personnel, budget, etc.) of the center will be made by the center director through discussions with vice center directors, who assist and support the center director, in order to ensure appropriate operation.

At the same time, to enable the university to provide various support and advice promptly, the university president and executive vice-presidents meet the director of the center on a regular basis.

b) Introduction of flexible salary system to allow researchers' easy transfers

The world's leading foreign researchers, Japanese researchers who are highly recognized worldwide, and postdoctoral and other promising young researchers will be assembled at this center. For these researchers, whether from inside or outside the university, Kyoto University will allow applying a new personnel system that can appropriately reflect their achievements. To attract various researchers both from Japan and around the world, the

English.

(2) System under which the center's director is able to make substantive personnel and budget allocation decisions

As an autonomous and independent management system to ensure the center's autonomy and the center director's leadership in making decisions regarding the center's overall operation, the Board Committee consists of the center director, the deputy center director, the chairperson of the PI board and the administrative director was established. The Board Committee plays a role equivalent to the faculty in making decisions on important matters (personnel, budget, etc.) as an autonomous organization.

Under the leadership of the Executive Vice-President for Research and Finance, meetings are held to exchange ideas among the staff of the university administrative office, in charge of personnel, finance, facilities, and research promotion, and the Board members and the staff of the iCeMS. In addition, the administration of the center attends weekly university meetings with the Executive Vice-President for Research and Finance to closely exchange information.

As for promoting and boosting iPS cell studies the MEXT has been cooperating in drawing up the overall strategy and determining the direction to take in the near future at Council for Science and Technology Policy (CSTP) as well as the university immediately requested support from the Minister of MEXT and the Minister of State for Science, Technology and Innovation Policy. Development of many other assistance schemes, such as planning and obtaining budget related to organizing the research environment and systemizing management of intellectual property by the Society-Academia Collaboration for Innovation (SACI), is also underway with the university in its core.

university will accept the center director's request to implement a variety of salary payment systems. The university also introduces a flexible personnel system in which the center director can select a salary system appropriate for each researcher that will assure the maximum flexibility for researchers in transferring to the center.

- The annual salary system that the university has already introduced (a fixed-term employment contract and an annual salary system based on achievements) will be applied.

- The current salary system will be applied to the researchers while they will be allowed to concurrently remain in the original departments if approved. These systems will promote; (1) intra-university cooperation among researchers, (2) integration of different academic fields, (3) human resource development through their participation in the university's educational activities, (4) effective usage of university facilities, and (5) flexible transfer of researchers within the university.

- Salaries for foreign researchers will be paid in foreign currency of their home countries, in principle.

- For qualified technical and administrative staffers, a special employment contract will be arranged to extend a regular retirement contract.

(3) Support for the center director in coordinating with other departments at host institution when recruiting researchers, while giving reasonable regard to the educational and research activities of those departments

The university takes the following measures with regard to educational and research activities within the university:

a) Support for researcher transfers to the center

To support researchers on their smooth and flexible intra-university transfer to the center, five (at least) principal investigator-class personnel positions will be provided so that the impacts on current educational and research activities, and administrative works will be minimized.

b) Support in relation to education and research activities

If approved by their original departments, researchers will be allowed to keep their research in part and education concurrently in their original departments. This will facilitate their participation in educational activities and their shared use of research facilities, equipment, and materials. This will, in turn, contribute toward more active research activities.

On personnel affairs,

- The iCeMS has employed researchers under an annual salary system, already adopted by the university, and introduced a discretionary labor system, and also legitimized it to hire staff without abiding by the mandatory retirement system as an exceptional rule for this initiative.

- The university has covered the personnel costs of five PIs.

- A program specified employment contract has been arranged to extend a regular retirement contract starting FY2008.

(3) Support for the center director in coordinating with other departments at host institution when recruiting researchers, while giving reasonable regard to the educational and research activities of those departments

Under "the double affiliation system" adopted for seven PIs at the center, they have been allowed to keep their posts in their original departments in order to facilitate their participation in research and graduate-school educational activities and their shared use of research facilities, equipment, and materials within the university. This has been, in turn, contributing toward more active research activities.

In helping researchers from abroad with handling the processes of immigration and accommodation, related regulations were introduced as well as seeking advice for each case.

To support the center's women researchers, the university provides effective assistance for and consultations on their research, child/nursing care, and daily lives.

c) Support for foreign researchers

To support foreign researchers and their families, the university prepares a handbook that explains immigration procedures, housing, the health-care system and other daily life information at the time of call for positions. Direct assistance by a foreign mentor will also be provided for a period of time immediately after their arrival in Japan.

To support education for their children, a system will be established in cooperation with neighboring Doshisha University to provide them with education services at its international junior/senior high school.

(4) Revamping host institution's internal systems to allow introducing of new management methods (e.g., English-language environment, merit-based pay, top-down decision making) unfettered by conventional modes of operation

The university will accept necessary system revisions for implementation of new management methods unfettered from conventional modes of operation. The university establishes an autonomous and independent management organization that serves a role equivalent to that performed by the existing faculty. Important issues (personnel, budget, etc.) will be discussed and decided by the center director and vice directors, in order to ensure prompt and appropriate administrative actions. However, the center director makes decisions on the following substantive matters necessary to promote this program.

- Matters related to recruitment of foreign and Japanese researchers, and postdoctoral and other young researchers
- Matters related to progress of research programs and evaluation of researchers' achievements
- Matters related to adoption/modification of the center's research programs
- Matters related to allocation and implementation of a budget for supporting research and operational activities of the center
- Matters related to management of research space in the center

For matters that require revision of the university regulations, the executive vice-president of the university in charge will provide specific consultation,

(4) Revamping host institution's internal systems to allow introducing of new management methods (e.g., English-language environment, merit-based pay, top-down decision making) unfettered by conventional modes of operation

More than 40% of the administration is fluent in English. Communication to researchers is basically carried out in English through written documents including summary messages made in English. All the official events and ceremonies of the center are conducted in English.

The center has established the Board Committee, an autonomous and independent management organization that plays a role equivalent to that of the existing faculty meeting and ensures the independence of the center and the leadership of the center director.

The Committee consists of the center director, the deputy center director, the chairman of the Core Committee Meeting of the Principal Investigators, and the administrative director. Important issues (personnel, budget, etc.) are discussed at the Board Committee. With this appropriate organization in place, prompt decisions have been made on the following matters.

- Matters related to recruitment of foreign and Japanese researchers, postdoctoral and other young researchers
- Matters related to adoption/modification of the center's research programs
- Matters related to allocation and implementation of a budget for supporting research and operational activities of the center

and necessary administrative procedures will be handled by the head office administration in coordination with the center administration.

For administration, the university will provide several administrative personnel and necessary personnel costs while ensuring autonomy in administration. External personnel with a good command of English will also be recruited.

(5) Accommodation of center's requirements for infrastructural support (facilities, e.g., laboratory space; equipment; land, etc.)

a) Provision of research space necessary to conduct the world top level research

It is important to establish a "globally acknowledged" center attracting top-class researchers to conduct world leading research. To this end, Kyoto University provides a high-quality research environment with the total area of about 12,000m² by ensuring exclusive facilities with fully equipped infrastructure.

As well, the center's head office will be located on the university's main campus to make available the university's diverse facilities, including conference halls for international symposiums and other academic meetings, the university hall, library, and cafeteria.

• Center's main office space

In addition to the head office functions, core facilities for the center's representative functions including research meetings, literature/academic database and information dissemination will be provided. To demonstrate autonomy of the center, a main office will be established and provided as an exclusive facility on the university main campus.

• Research project space

As the main space for the center's research activities, the university provides exclusive research facilities for researchers to concentrate on their own research activities. The university also takes special efforts to provide and maintain a state-of-the-art research environment for the individual research, flexibly responding to requirements from each project over its duration.

• Space for shared research equipment

To enable integrated management and operation of shared research equipment, exclusive space with technical staffers will be set up next to the research project space.

- Matters related to management of research space in the center

In FY2007, the decision to establish the Center for iPS Cell Research and Application (CIRA) was made promptly by the center director.

(5) Accommodation of center's requirements for infrastructural support (facilities, e.g., laboratory space; equipment; land, etc.)

In FY2007, the renovation plan of the university main campus and its surrounding area started in order to remodel the area of 1701m² at the General Research Bldg.No.1 (formally the Faculty of Engineering Bldg.No.9) and the area of 4802 m² at the West General Research Bldg. (formally the Institute for Research in Humanities (Main Bldg./ West Wing.) into research facilities of the center.

Based on its Priority Action Plan, the university has decided to provide the financial support to cover the construction cost of a new building (3000 m²) in FY2008 and after.

In addition, the Japanese government plans to provide the Center for iPS Cell Research and Application (CIRA) with financial support to ensure high-quality research environment comparable to its counterparts in the world.

- Researchers' communication space that facilitates the exchanges among researchers from different fields

In order to develop new interdisciplinary research fields through a fusion of various studies, the university provides researchers in different academic fields and from various countries with space and opportunities to enhance communications.

- Accommodation (housing) facilities for researchers
Accommodation facilities will be taken care of for researchers coming from domestic and foreign areas.

b) Establishment of basic facilities and equipment

As a part of the process establishing the necessary research environment, the university sets up basic facilities and equipment that accompany the buildings and that need intensive initial investment along with the center's head office and basic infrastructure.

(6) Support for other types of assistance

As one of the leaders of the world's academic community, Kyoto University firmly determines to take a responsibility in establishing a genuine "world top-level research center" that will serve as one of "the world's leading knowledge centers". The center is expected to function as a top-level research organization since Kyoto University already has outstanding capabilities; 1) to create research environment that attracts world top level researchers, 2) to facilitate intra-university cooperation among world's leading researchers from different fields, 3) to integrate diverse academic fields to promote an interdisciplinary approach, and 4) to contribute to the present and future societies by generating unprecedented knowledge and research findings. Kyoto University is confident that with these essential capabilities, successful performances of the center will be promised.

Kyoto University has been characterized, since its foundation in 1897, by an "academic atmosphere of freedom"; one that values originality and independence rather than the mere accumulation of knowledge. Located in the historic city of Kyoto, the university has developed research on diverse fields with profound originality in this unique "academic atmosphere of freedom".

Based on this historical background, it is defined in its mission statement (declared in 2001) that the ultimate goal of the university is to contribute to future sustainable human societies, featured by harmonious coexistence within human and ecological communities on this planet. This goal can be

(6) Support for other types of assistance

The iCeMS has been receiving various range of support for its operation from the university, as well as personnel and material supports as stated in the "Host Institution's Commitment" in its WPI application.

While working in closer cooperation with the university, the iCeMS is determined to continue to strive to become a "World Premier International Research Center".

In an attempt to widely publicize the activities, the iCeMS has been proactive in public relations, namely presenting the activities at the university's management council, the board of department directors and symposiums hosted by the university.

achieved by bringing forth the outstanding research and education programs in conformance with high ethical standards, and by generating world-class knowledge. We strongly believe that the best research in the world is created in the environment where the academic freedom and autonomy in research are highly valued, in this regards, Kyoto University is one of the best places to establish the world premier international research center to lead the world's research.

11. FY 2007 funding

(Exchange Rate: JPY/USD=120)			Ten thousand dollars (Exchange Rate: JPY/USD=120)	
Cost Items	Details	Costs (ten thousand dollars)		
			WPI grant for FY 2007	566
Personnel	Center director and Administrative director	11		
	Principal investigators (11 of persons):	47	Costs of establishing and maintaining facilities in FY 2007:	54
	Other researchers (10 of persons):	10	Renovating Funai Tetsuro Auditorium & Funai Center etc.	16
	Research support staffs (5 of persons):	3	Renovating research space in the Center for iPS cell Research and Application	7
	Administrative staffs (13 of persons):	22	Renovating lab space on the 2nd floor of the Institute for Frontier Medical Sciences (38m ²)	3
	Total	93	Others	28
Project activities	Gratuities and honoraria paid to invited principal investigators (0 of persons):	0		
	Cost of dispatching scientists (6 of persons):	9	Cost of equipment procured in FY 2007:	219
	Research startup cost (3 of persons):	5	6 confocal laser microscopies	52
	Cost of satellite organizations (1 of satellite organization):	4	2 sets of mass spectrometer	21
	Cost of international symposiums (1 of symposium):	7	A set of nanoliter dispensing system	13
	Rental fees for facilities	1		

	Cost of consumables	57	A Sequential plasma spectrometer	9
	Cost of utilities	1	A set of assessment system of solar battery	8
	Other costs	117	3 fume hoods	8
	Total	201	Others	108
Travel	Domestic travel costs	3		
	Overseas travel costs	8		
	Travel and accommodations cost for invited scientists (47 of domestic scientists): (27 of overseas scientists):	8		
	Travel cost for scientists on secondment (1 of domestic scientists): (1 of overseas scientists):	1		
	Total	20		
Equipment	Depreciation of buildings	78		
	Depreciation of equipment	120		
	Total	198		
Other research projects	Projects supported by other government subsidies, etc.	37		
	Comissioned research projects, etc.	351		
	Grants-in-Aid for Scientific Research, etc.	127		
	Total	515		
Total		1,027		

12. Efforts to improve points indicated as requiring improvement in application review and results of such efforts	
<p>-Points specified as needing improvement</p> <ol style="list-style-type: none"> 1. More female researchers need to be hired. 2. The iCeMS Fellowship needs to be strengthened. 3. More focus needs to be put on Asian researchers as well. 	<p>-Efforts to improve them and results</p> <ol style="list-style-type: none"> 1. The iCeMS hired a female PI and two female researchers in FY 2007, and plans to hire a female PI and five female researchers. 2. The iCeMS plans to implement the iCeMS Fellowship in FY 2008, when the research environment is supposed to be ready by the reform. 3. At the 1st iCeMS International Symposium the iCeMS invited researchers from the National Centre for Biological Sciences (NCBS), a partner institute of the iCeMS, to promote collaboration with Asian research institutes. Joint

4. A lot of Japanese young researchers need to be dispatched to abroad to develop their knowledge and perspective.

researches will be further encouraged starting FY 2008.
4. The iCeMS dispatched 8 young researchers to abroad in FY 2007, and plans to further encourage researchers' interaction in FY 2008.