

Japan the Horned Islands

JSPS Nordic & Baltic Newsletter (6)

2010 Spring/Summer



Rice harvest

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Market (Kyoto)

The newsletter can be accessed at the JSPS Stockholm homepage www.jsps-sto.com

I. Reports

Bright Laboratory Impressions from a JSPS Colloquium

by Kazuhiro Maeshima

When you go abroad, you will get the opportunity to experience many things due to the differences of language, region, and culture; such an experience can in many ways give a tangible effect on science as a "stimulus". This time, I came to Stockholm in order to participate in JSPS Colloquium – "Current approaches and future perspectives on the human genome, transcriptome and proteome". During this stay I experienced many things both at the colloquium and outside of it, which I here will try to share.

In the evening of January 17, 2010 I stepped onto the snowy ground of Stockholm Arlanda airport. According to the news in Japan, Europe was hit by a wave of harsh climate and experienced very cold weather. However, when I came out of the airport it was not as cold as I would have thought, but it was said that the previous week had been extreme. To arrive late in a foreign country can be unsettling, and I was relieved that the taxi driver arranged by JSPS was waiting for me at the exit. I boarded the taxi, and headed to the hotel. It was snowing outside and the temperature was well below zero. Even though the road seemed to be icy, the distance between the vehicles was surprisingly short, and as soon as the car entered the highway, the speed started to exceed 120km/h. My earlier feeling of security was blown away, and again I felt uncomfortable. Does everyone fly down the road in the snow? In horror, I looked out the window. Maybe because I was close to the Earth's pole, somehow I felt that the night sky was bright, it was whitish. Despite my worried state, the conversation with the driver moved along. The driver was a fan of Japan and had visited three times. He was deeply impressed by the Japanese ability to perform everything "correctly". 30 minutes passed quickly and I arrived at Hotel Oden safely. I was happy to be in a warm hotel room, and had no trouble falling asleep.

The next morning I left the hotel early and arrived at the colloquium venue, "Nobel Forum", at Karolinska Institute. Nobel Forum is a small building, but is it only me who feel "solemn" because of the name? I became nervous just by going inside the building.

The Colloquium was very interesting as different types of

topics were mixed. I was most impressed by the speech of Dr. Joakim Lundeberg. He did a genome sequence at exposed skin cells, and reported that frequent mutations of p53 occurred in skin cells. Mutations will occur in p53, the guardian of the genome, even when being exposed to just a small amount of sunshine. This is a worrying discovery. When I was a child, I remember getting sunburned in the summers while playing outside. At the time, it was said to be a "proof of health", but it changed with changing times. How many genomic mutations have I stored in my body so far? I think that Dr. Lundeberg's tests were carried out on Caucasians and I am wondering whether the same result would be observed in other skin types, such as the East-Asian, and how about organs under the skin? Many questions were brought up one after another in connection with this interesting speech.



Snow walk outside Nobel Forum

The Colloquium being successfully completed, the next day I visited my friend researchers in the Karolinska Institute. I first noticed the desk in the experimental lab, in Japan the experiment desk is often black, but in Karolinska they were white. As for the cabinet and other furniture, they were made of a light wood grain like the Swedish IKEA furniture. Because of this, the entire lab felt very bright and warm. In this way warmth and brightness was given to the room even though the winter-day of Northern Europe is short, and the outside was cloudy.

We live in a world where a person easily can access many different places by just catching an airplane. Even so there

exist many interesting differences, not only simple things like the design of the lab, but in a different environment, a different science buds.

Since several Japanese researchers recently won the Nobel Prize, I also went to the Nobel museum. I was surprised that a lot of kindergarden and elementary school children visited the museum and played happily. There was a corner for children in the museum, and it had a creative exhibition with play equipment, and the children seemed to be enjoying the science in any way they wanted. When I saw such a scene, my feeling was that the science of the next generation in Sweden will be bright, and I felt sure that

interesting science will continue to be presented from this small country in the future. Different ideas will be likely to bud if you visit different places. I have lived in Switzerland, a small country like Sweden. How can they do very unique science in such small countries? How is science in Japan? These questions left me with a lot to ponder. I think that there are many things which we could learn from these countries.

Finally, I wish to express my deep gratitude to Dr. Hayashizaki who was the organizer of this Colloquium, Dr. Kere in Karolinska Institute, and staffs of the JSPS Stockholm office (*Research Center Professor, National Institute for Genetics & Structural Genetics*).

JSPS Sweden Alumni Club General Assembly & Seminar

by Lisa-Mi Swartz



Jan Sedzik, speaker at SAC seminar

In March JSPS Sweden Alumni Club held annual General Assembly followed by a seminar at KTH, Stockholm.

The general assembly discussed FY 2010 activities. SAC will try to reach out to more members by hosting more

general and Japan-oriented seminars. Next meeting is planned for early 2011, please look out for further information in later.

BRIDGE, the fellowship program for SAC members, was also on the agenda. SAC received and extended quota this year, and is hoping for continued interest in re-visiting Japan.

The seminar following was titled “Life without crystals – is this possible in XXI century?”. The speakers were Jan Sedzik (SAC Chair, KTH), Min Qui (KTH), Hans Hebert (KI) and Mitsuo Ataka (AIST).

The day ended in the same feeling as the rest of the day, with a friendly dinner for SAC members and speakers at a quaint restaurant easily accessed from KTH (*Assistant, JSPS Stockholm*).

Observing NTA – Science Education in Sweden

by Tetsuya Murayama

Having been invited, we received a precious opportunity to see the situation of the primary science education of Sweden. This was through the Royal Swedish Academy of Science. We would like to express cordial gratitude to the Japan Society for the Promotion of Science, for organizing the academic exchange program.

We stayed about a week in the early October, 2009, visiting several primary schools, the National Agency for Education, the Ministry of Education and Research and so on. In these interactions, we found there are several similarities in science education between Japan and Sweden. One of the similarities is the fact that the curricula of the two countries are well-structured. It can also be said that the science education of Japan and Sweden both emphasize pupils' activities such as experiments and observations.

The Primary School Course of Study for Science, revised in March, 2008, describes the objectives of the primary science education of Japan, conveying its values. One important keyword of the new primary science education is 'realistic' and this is shown, like below, in the Overall Objectives in the Primary School Course of Study for Science.

Pupils grasp properties and regularities of natural things and phenomena, by approaching them on their own initiatives. Images and naive conceptions about natural things and phenomena that pupils already had will gain new

meanings and get related to each other, through the process of problem-solving. After learning, pupils will replace previous images and naive conceptions about natural things and phenomena with new ones, which are more appropriate and valid. Although this depends on the pupils' development and experience at that stage, it can be regarded as one scientific understanding of natural things and phenomena. The Overall Objectives emphasize this "understanding" by adding "realistic."

【Overall Objectives】

To enable pupils to become familiar with nature and to carry out observations and experiments with their own prospectus, as well as to develop their problem-solving abilities and nurture hearts and minds that are filled with an affection for the natural world, and at the same time, to develop a realistic understanding of natural phenomena and to foster scientific perspectives and ideas.

(The underline has been added)

It is certainly expected that a continuous exchange of ideas and opinions in science education of the two countries will broaden their views, leading to the development of science education for both countries (*Senior Specialist for Curriculum, MEXT, translated by Kenji Matsubara, National Institute for Educational Policy Research*).

Kojiro Nishina Honorary Doctorate at Chalmers University of Technology

by Lisa-Mi Swartz



Kojiro Nishina, professor emeritus at Nagoya University, has been awarded an honorary doctorate at Chalmers University of Technology. Kojiro Nishina is Professor of Nuclear Engineering and is prominent in the research of reactor physics, reactor diagnostics and the

safety of nuclear installations through analysis of neutron fluctuations.

Kojiro Nishina has contributed to improve the operating

safety and efficiency of nuclear reactors, which at the same time helps promote public acceptance of nuclear energy and nuclear science in general.

Professor Nishina has an extensive Swedish network and contacts with the Nuclear Engineering Division at the Department of Applied Physics at Chalmers.

20 May, 2010 Professor Nishina held his doctoral lecture, "Criticality safety and the utilization of nuclear power", at Chalmers, where he also talked about his father, the notable Physicist Yoshio Nishina's contacts with Swedish prominent scientist at that time (*Assistant, JSPS Stockholm*).

JSPS European Alumni Club Meeting

by Jan Sedzik

This May the French had an opportunity to host European JSPS Alumni Club Chairs meeting. The gathering was in Strasbourg, the capital and principal city of the Alsace region in north-eastern France, close to the border with Germany. Strasbourg is the seat of several European Union institutions such as the Council of Europe, the European Parliament, as well as the European Ombudsman. Strasbourg's historic city centre is classified as a World Heritage site by UNESCO (in 1988). The University of Strasbourg is the largest in France. The meeting had two parts. In the first parts the discussion was without presence of JSPS representatives, and in second part representative of the JSPS Headquarter from Tokyo, was present. In the first part there were discussed internal matters of each club and performed activities of the previous year. There is steady development of activities within each club. French group has their own small library of Japanese books, provided by previous visitors or alumni. This library is open for everybody interested in Japan, particularly for students preparing their degree on Japan. The other aspect was focused on "Social Security" of the JSPS fellows, this include taxation, travelling, retirement, health insurance.etc. Swedish

and German group, presented for further discussion with JSPS a written evaluation of actual "social security" situation from perspective of Sweden and German.

The second part was with Mr. Kato Hisashi, Head of the Overseas Fellowship Division of the JSPS in Tokyo. It was very encouraging from the report, how widely the idea of the JSPS Alumni Association develops. There are at present 12 clubs worldwide: in the UK, USA, Sweden, Finland, Germany France, Egypt, Kenya, India, Korea, Bangladesh, and recently Thailand. After new Japanese government the JSPS budget was decreased by 14%, there is no much burden to the JSPS Alumni Association activities. BRIDGE fellowship program will be continued as other club activities. Monsieur Hiroshi Karube, Consul General of Japan in Strasbourg invited all participants for reception in the residence of Japanese Embassy. The delicious Japanese food with French cuisine was served. The next meeting of the JSPS Alumni Clubs is planned in Berlin, 2011 (*Chair, Sweden Alumni Club*).



Reception at Japanese Embassy, Consul General Hiroshi Karube (in the middle) with Swedish Alumni Chair Prof. Jan Sedzik (left), and German Alumni Chair (right) Prof. Heinrich Meinkhause



Participants of the JSPS European Alumni Club Chairs, Strasbourg, France.

Social Security of JSPS Fellows and Alumni

by Jan Sedzik

At the JSPS European Alumni Club meeting in Stockholm, March 2009, Jan Sedzik raised the issue that time spent in Japan whilst supported by the JSPS did not count towards one's final retirement and pension conditions. There were also possible taxation issues. There was discussion of the situation across Europe and this article is the result of comparison for reference of Swedish and Japanese conditions as a JSPS fellow.

Individuals supported by the JSPS have to be from the countries with which Japan has established diplomatic relations. The stay in Japan on the JSPS programs is not considered as an employment. The payment is as maintenance (or daily) allowance or fellowship. Fellows get medical insurance; including accident coverage, sickness coverage, rescue coverage, these coverage are valid only on territory of Japan. Money paid by the JSPS is excluded for payment of Japanese tax, and there is no provision towards retirement or pension.

In Sweden, the taxation is high 29-59% (but in Japan 5-40%), and it usually concerns income from Swedish employer. Swedish employers are obligated to pay some money to future retirement, this include also people which are supported by the government, as being unemployed. Nowadays in rapidly changing economy the unemployed level in Japan is 5.2% (4/2010), in Sweden 7.3% (2009) in European Union average unemployment is 9.3% (2009). The "unemployed" individual is a person registered in local unemployment office, which is available and willing to work but currently is not able to find any work. To qualify for unemployment benefit, the person must fulfill specific criteria, varied from country to country, for Sweden s/he must be a member of "Unemployment funds" or "Arbetslöshetskassa". Scientists have in Sweden an organization called AEA "Akademikernas Erkända Arbetslöshetskassa", for non- voluntarily unemployed post docs, researchers, professors and technicians and other. The daily allowance per working day is maximum 680 SEK. Unemployment benefit can be paid normally for 300 days, plus 150 days if you have children under 18. To get benefit from the Swedish (AEA) social security net, the unemployed

person must reside in Sweden, must be in a disposition of called "labour market" and must be active searching for a job reporting successes and failure to the local Employment Office.

There is no comparison with Japan, but the system for unemployment benefits in Sweden is divided in two parts; 1) the basic unemployment benefit and 2) the income related unemployment benefit. In order to receive income related benefits you need to be a member of Unemployment Fund (for example the AEA). The basic unemployment benefit does not require a membership in AEA. In Swedish legislation there is no residence-"requirement" concerning unemployment benefits. There are, however, with regard of European Council Regulation (EC, No 1408/71 of 14 June 1971) some regulations on the application of social security schemes to employed persons, to self-employed persons and to members of their families moving within the Community. In the new regulation No 883/2004 which will be applicable on May 1st, 2010, there is full coordination of social security systems under which you are entitled to unemployment benefits in Sweden, while residing in another country (within the EU, Japan is excluded).

Every member state of the EU has its own legislation. In some cases, there is an EC-regulation allowing, under certain conditions that unemployed person may receive unemployment benefits from one member state, while have been working in another member state. This regulation area consists of the entire EU, Norway, Iceland, Lichtenstein and Switzerland and does not cover Japan.

In reality, a Swedish student who got her/his Ph.D. degree in Japan, and was not lucky enough to find a job in Sweden after returning home, would be without any support. There is some exception, if the student has been studying and has not been employed, this period could be excluded from the period that the conditions for entitlement to unemployment benefits shall be fulfilled within. In reality, this means that a person who have been working in Sweden for sixth months, and then goes to Japan (or any other country) to study full time, is entitled (if every other conditions are fulfilled, for

example availability to work within the Swedish labour market, etc.) to unemployment benefits if returning back immediately after the studies have been finished.

If non tenured scientists/academician is losing a job at university, but is lucky of getting for example one year duration a JSPS fellowship or scholarship, it does not have any benefit to unemployment benefit after returning home. In modern labour market, the highly educated individuals have very hard time to find new employment. The benefit of being

JSPS scholars is very low, the period of stay in Japan does not count to the Swedish pension, and for other countries as well, since there are no other bilateral agreements regarding social security, tax, retirement, etc.

The Japanese nationals supported by the JSPS have a different experience, they do not pay any income tax to any country as long they are JSPS fellows. The JSPS is not providing funds towards retirement. They may voluntarily (this is not compulsory) pay the Japanese national pension fee during the stay in Sweden. If a JSPS fellow wants to get unemployment benefit, s/he would need to continuously pay

money to an insurance corporation but JSPS fellows normally do not pay it during the stay abroad. When people in Japan have a job, this fee is automatically subtracted from their salary. In Japan there are no AEA funds taking care about economy of JSPS fellows without job.

The biggest difference between Sweden and Japan is that in Japan the social policy is focused on concept of collaboration and “full employment”, but in Sweden on “conditional employment” based on darwinistic concept of competitions.

For Japanese JSPS fellows, the biggest burden is a currency exchange rate. If monthly salary was 120,000 JPY, then in 2009 (for Sweden) it is equivalent around 10,000 SEK, but in 2007, it was only 7,000 SEK.

The system of inviting foreign individuals to Japan, was established 50 years ago, and because of currency exchange it was not very attractive before. The JSPS support can be very attractive for foreigners now, if the problem of “social security” is solved (*Chair, Sweden Alumni Club*).

Visit to the Research Council of Norway

by Yuko Kamoshita

On February 18 a meeting with the Research Council of Norway, RCN and JSPS Stockholm Office was held. The purpose of this meeting was to enhance our relationship and discuss about the future corporation between NRC and JSPS. The agenda contained discussions about the bilateral research collaboration funds, the JSPS Alumni Association activities, colloquia, and the exchange program among researchers from both countries based on the ongoing JSPS system.

RCN described their international collaborations as focusing on Europe and North America so far. However, RCN is interested in deepening the collaborations between Japan to widen their scope of target countries.

RCN is in the process of setting up alumni network for the alumni who studied in Japan. The Norwegian government provides large financial supports for Norwegian students who go abroad to study. Annually around 15,000 Norwegian students are awarded university degrees abroad. Around half of the master students study abroad at least one semester.

As a conclusion of our discussions, we agreed that we will start discussing to set up a colloquium in the near future between Norway and Japan. We hope the colloquium will be the trigger to enhance the research collaboration between the two countries (*Deputy Director, JSPS Stockholm Office*).

II. Science & Culture

East Meets West on a Plate (5)

Temple Cuisine

by Elisabeth Sano

The vegetarian food eaten by monks and nuns in Japan's Buddhist temples is known as "*Shojin ryori*" or *shojin* cuisine. From it have originated almost all the basic principles which characterize the best in Japanese cuisine. It was first imported to Japan from Tibet and China, and became popular in the 13th century. Although Japanese temple cooking is strictly plant-based, dairy products are used in these countries.

The word *Shojin* is composed of the characters for spirit (精) and to progress (進). The cuisine is meant to improve the practice of the Buddhist faith by consuming only the simplest foods. The religion forbid the killing of living things, not only human beings but also all animals, birds and insects. Thus the believers do not accept meat, fish or eggs in their meals but the diet contains sufficient nutritive elements and for centuries most monks, whose time is spent in rigorous self discipline, have lived long and healthy lives.

In temples, the monks in training are usually served three meals a day; a bowl of rice gruel, pickled radishes and a salted plum in the morning; a bowl of rice, one soup, one side dish made of a simple cooked vegetables and pickled radishes for lunch; and a light meal in the evening composed of gruel made of leftovers from the morning and a midday meals. More elaborate meals are served when there are guests and for special celebrations.

The Buddhist religion reached Japan in the 6th century. Among Buddhist sects only the *Zen* sect has maintained the strict *shojin* techniques to these days, although the monks of the other sects (*Rinzai*, *Nichiren*, *Shingon*) eat in the *shojin* style. The *Zen* sect began in Japan in 1168 with the establishment of *Rinzai Zen*, the *Soto* sect followed, founded by the monk *Dogen* in 1225, *Obaku Zen*, another branch appeared in 1654.

Zen is based on seated silent meditation and aims at reaching the state of *Void (mu)*. But it is conscious of people's need to go on living and this spirit can be observed in the practices surrounding *shojin* cooking. The founder of the *Soto* sect of *Zen*, *Dogen*, wrote a book, *Tenzo Kyokun*, in which he

reveals the way the *Tenzo*, the cook in a *Zen* community, should prepare food for monks engaged in practices of religious discipline. The duty of the *tenzo* is very important and involves the whole person. Only those who show deep faith in the Buddhist teachings and possess a righteous and kind heart are selected. The concept of true *shojin* cooking is that love and gratitude should be offered to Buddha by the *shojin* cooks in the performance of their duties. The preparation and consumption of meals have deep religious significance and are conceived of as a discipline rather than as an end in itself.



A meal served to visitors at the Tenryu-ji restaurant (Kyoto)

The *tenzo* carefully chooses the produce of the four seasons. He decides how to prepare the ingredients in order to draw out the natural flavors rather than smothering with spices and heavy sauces. He takes care not to waste a cutting from a vegetable and a single grain of rice.

Eating food in season provides the body with the nourishment it needs at a given time of the year. For example, summer vegetables, such as tomatoes, eggplants and cucumbers have a cooling effect on the body. In winter, root vegetables such as turnips, *daikon* (long white radish) provide warmth and sustainance. The concept that food is medicine is an important aspect of Buddhist cooking. The curative powers of nature can work. One should eat only enough to

ensure health and not to eat until fully satisfied. If one falls sick, one should first examine one's diet, then choose the food well, chew carefully and give thanks.

In addition to seasonable vegetables, dried foods such as grains, *shiitake* mushrooms, soybean products and seaweeds, are often used. They have a high nutritional value and are known to ensure a long, healthy life. For example, seaweeds are rich in fiber, calcium, minerals and iodine. They are known to control blood pressure and cholesterol levels. *Tofu* products are high in protein yet low in calories and fat. In many temple restaurants, they are used in more than half of all dishes made throughout the four seasons.

Artificial flavorings are never used. The basic seasonings are salt, sugar, *miso*, *sake* (rice wine) and *shoyu* (Japanese soy sauce). Subtlety is the rule in the use of everything. It helps us to develop a discerning palate and it allows the natural flavors of vegetables to come through.

When there is an abundance of one vegetable at a particular time of the year, a variety of cooking methods (frying, boiling, grilling) and seasoning (salt, *miso*, soy sauce) allow the same vegetable to be enjoyed in many different ways. An important part of temple cuisine is to study the ingredients and the various methods of cooking them. It also allows the originality of the cook to develop.

Although *shojin* cooking is vegetarian, some dishes bear a strong visual resemblance to meat, fish or egg. The *tenzo*, when preparing dishes, concerns himself with the six tastes (*rokumi*), the three virtues (*santoku*) and the five colors (*goshiki*); green, yellow, red, white and black (or purple). The

six basic flavors are bitter, sour, sweet, salty, hot and delicate. The *tenzo* works to balance these effectively while including the three qualities; light and flexible, clean and fresh, conscious and thorough. Ingredients with strong odors such as leeks, garlic and onions are forbidden as they are believed to promote sexual energy that would disturb the monk's training.

Temples of Japan's large cities open restaurants for laymen, they are popular among Japanese people. They are known for their relaxing atmosphere, their simplicity, their attractive garden and their uncluttered *tatami* room decorated only with a single scroll and flower.

People agree that temple food is satisfying and light on the stomach. It can easily be prepared at home. It requires no special equipment, only a sharp knife. We must have in mind that both cooking and presentation are the heart of this cuisine. Nowadays many vegetables are grown year around, and it is difficult to know their true season. In temple cuisine, it is believed that following the flow of nature by using only seasonable ingredients is best for the body. A vast range of seasoning is not required for the enjoyment of the natural flavor of ingredients. In today's society, processed and additive laden foods are standard. They lead to diet-related disorders such as diabetes and high blood pressure.

When the room is clean and neat and the food is arranged attractively on the plates, the meal tastes twice as good. To fully appreciate the spirit of *shojin* cooking, it is fundamental to feel gratitude for the people who provided the ingredients and those who carefully prepared them.

Carrots with sesame

Ingredients (photograph 1)

- 2 medium carrots
- 1 teaspoon sesame oil
- 1 tablespoon ground sesame seeds
- a pinch of salt
- water

Methods

Wash the carrots. Cut into 1/2 cm slices. Place them in a saucepan, add enough water to cover the bottom of the pan. Add a pinch of salt and 1 teaspoon sesame oil. Bring to a boil then reduce heat to medium and simmer until the carrots are just cooked and the water evaporates. Adjust the seasoning. Sprinkle with ground sesame seeds (photograph 2).



Photograph 1



Photograph 2

Research Report from Stay as a JSPS BRIDGE Fellow at HIMAC, NIRS, in Chiba

by Lembit Sihver

I am once again back at the National Institute of Radiological Sciences (NIRS) in Chiba, near Tokyo. I was very happy to arrive in the end of March, just when the cherry blossom had started. However since it was quite cold and windy, the blossom did not keep so long as I had hoped. It feels like coming home when arriving to Japan, since I use to stay here for some months nearly every year. My first visit to NIRS was already in 1991-92, as a Science and Technology Agency (STA) Fellow. During that time, the Heavy Ion Medical Accelerator in Chiba (HIMAC), which has successfully treated more than 5,000 cancer patients with accelerated high energetic carbon ions since 1994, was under construction.

Before I came to NIRS for the first time I had worked at many accelerator facilities around the world and when I was performing experiments at Lawrence Berkeley Laboratory, in California, I saw how they performed cancer treatments with charged particles accelerated to nearly the speed of light. At the same time I read about the construction of HIMAC and I became very interested in working with this project. I therefore applied for a Fellowship at NIRS, but before I will tell more about my stay in Japan, let me first try to explain why accelerated carbon ions are used for cancer treatment.

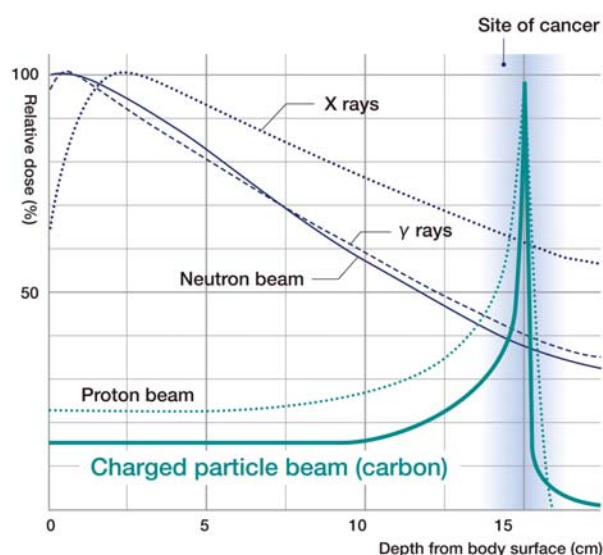


Fig. 1 Distribution of dose versus depth for various types of radiation in the living body.

In cancer treatment, radiation therapy is the preferred choice over classic surgery, independent chemotherapy, biological or hormone therapy for certain types of tumors. The first radiation therapies used x-rays and γ -rays, and later also fast neutrons were used. In order to optimize the radiation therapy, it is essential to use a type of radiation with a high therapeutic effect. Therefore, it is important that the radiation intensity (dose) will be high in the tumor region, but

as low as possible in the normal tissue to reduce possible acute and late side-effects. However x-rays, γ -rays and fast neutron beams deliver most of the dose near the surface of the human body and are attenuated in deeper areas of the tissues, as shown in Fig 1. This suggests that when a deep seated cancer is treated with these types of radiation, normal tissues between the surface and the tumor are susceptible to damage and a deep area beyond the target will be also affected. In contrast, the use of protons or charged particle beams can reduce damage to the normal tissues by focusing the peak of the beam on the location of the tumor, as the beam becomes dramatically intense at a certain depth according to the energy applied but is weak before and after that depth.

There are two other main indicators for therapeutic effects of radiation: relative biological effectiveness (RBE) and oxygen enhancement ratio (OER). The RBE of heavy ions is superior to that of conventional radiotherapy beams, using x-ray and γ -ray, even in conditions of hypoxia (lack of oxygen). Therefore radio resistant tumors that have a high repair capacity against photon irradiation become sensitive for treatment with protons and heavy ions. When using charged particles, there is also smaller differences between cell cycle phases compared to when using conventional radiation therapy, which makes it possible to kill growing and dormant (inactive) tumor cells.

The first suggestion that high energetic protons could be an effective treatment method was made in USA, 1946, and the first treatments with protons were performed at particle accelerators built for physics research at Berkeley, outside San Francisco, in 1954 and in Uppsala, Sweden in 1957. At the end of 2008, there were a total of 26 proton therapy centers in the world and over 60,000 patients had been treated.

Investigations on the use of ion beams for radiation therapy were initiated in 1975, also at Berkeley. The first patients were treated with argon and silicon ions, but due to large side-effects in the normal tissue, these irradiations were stopped after a few patients. However, lighter neon beams did show tolerable side-effects and 433 patients were treated with neon beams until 1993 when the accelerator was closed and the therapy ended.

In the 90ths there was an increased interest worldwide for ion therapy that resulted in the construction of the HIMAC, which was the first facility in the world mainly dedicated to medical treatments with heavy ions. My main duties as a STA

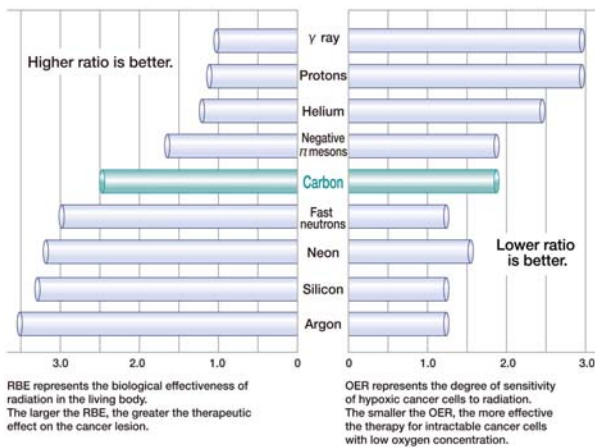


Fig. 2 Relative Biological Effectiveness (RBE) and Oxygen Enhancement Ratio (OER) of various radiation types.

Fellow was to support the biologists and medical doctors with the physics needed to understand what ions would be best for the treatments and to develop the physical models to calculate the dose and energy distributions of the ion beams, when penetrating the human body, which is needed for the treatment planning system. Finally, it was decided that carbon ions should be used for the treatments since accelerated carbon ions feature a high ionization density and a high RBE which culminates in a sharp maximum at a discrete penetration depth that coincides with the maximum physical dose, and a low OER as can be seen in Fig. 2. For lighter ions, the increase in RBE is smaller while for heavier ions, and it occurs further upstream of the maximum physical dose deposition, thus enhancing the damage to surrounding healthy tissue and risks for late side-effects as was already seen during the early treatments at Berkeley. Carbon ion beams also show less lateral scattering than protons and lighter ions which makes it possible to deliver the maximum dose to the tumor more precisely than for these particles.

Fig. 3 shows the HIMAC building from outside and Fig. 4 shows a schematic layout of HIMAC with its three cancer treatment rooms.

Figs. 5 and 6 show the annual number of patients treated at NIRS, and the number of patients treated during June 1994-July 2009 by tumor type, respectively.

After my stay as a STA Fellow at NIRS, I moved to the GSI heavy ion physics research facility in Darmstadt, Germany, where I continued my research and incorporated my models into the treatment planning system there. At GSI they performed 440 clinical treatments with carbon ions during 1997 – 2008.

In April 2001, Hyogo Ion Beam Medical Center (HIBMC) in Harima Science Garden City, Hyogo, Japan, started as the world's first institution where both proton and carbon-ion therapy can be performed and on November 15, 2009, the Heidelberg Ion-beam Therapy Center (HIT) in Germany started to treat the first patients with carbon ions. Two other projects are now under construction in Germany

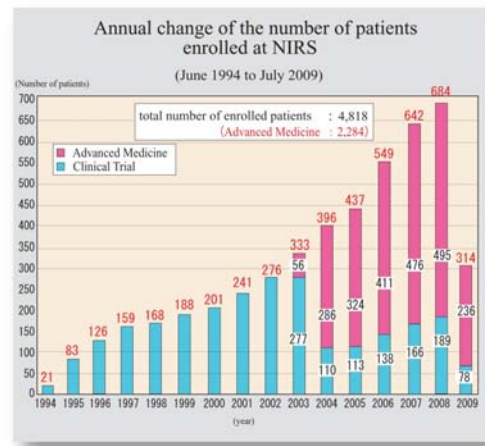


Fig. 5 Annual number of patients treated at NIRS.

and also in other European countries, as well as in China, several new heavy ion therapy projects have started. Since all current treatment facilities are using my physical beam models in different ways in their treatment planning systems, I am very pleased that I could make a small contribution to the success of carbon ion therapy worldwide.

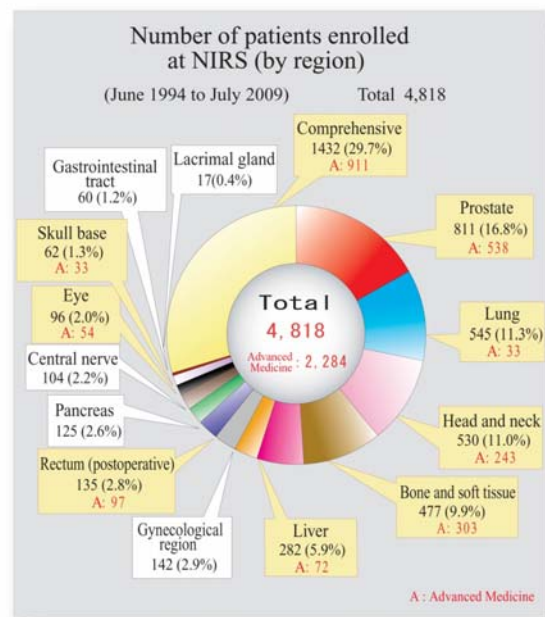


Fig. 6 Number of patients treated during at NIRS, June 1994-July 2009 by tumor

For the moment I am involved in different projects aiming at estimating the long term risk for radiation induced cancer in patients after they have gone through radiation therapy with x-rays, γ-rays, protons or heavy ions, and for astronauts after being exposed to space radiation during long term space missions. My main work in this field is developing models and particle and heavy ion transport computer codes, which is performed in close collaboration with Japan Atomic Energy Agency (JAEA), Research organization for Information Science and Technology (RIST) and the High Energy Accelerator Research Organization (KEK). My research group is also responsible for simulations



Fig. 3 The HIMAC building from outside

of many experiments which are estimating dose and radiation risks to astronauts inside and outside the International Space Station (ISS).

Related to this work, I have the great pleasure to be a JSPS BRIDGE Fellow at the NIRS Space Radiation Research Unit of the International Open Laboratory from the end of March to the end of April, 2010. The International Open Laboratory consists of three units 1) Space Radiation Research Unit, 2) Particle Radiation Molecular Biology Unit, and 3) Particle Therapy Model Research Unit, and is a collaboration between several research centers at NIRS. The International Open Laboratory offers a unique opportunity for foreign researcher to perform physics and biology experiments at HIMAC, and to develop new detector systems and analysis methods related to heavy ion therapy and space radiation research.

In collaboration with my host Dr. Yukio Uchihori and his research group at the Fundamental Technology Center, University of Tokyo and JAEA, I am starting up a new research project to study how the radicals, which are created when high energetic particles and heavy ions are penetrating human tissue and organs, are damaging the DNA. This research is very important for development of drugs and countermeasures to minimize the damage to the healthy tissue in patients when going through radiation therapy, as well as for astronauts on long term space missions. We are planning to perform all the experiments at HIMAC, which is also a fantastic facility to perform experiments at night time when no patients are treated.

In addition to my collaboration with researchers at NIRS, JAEA, RIST and KEK, I have managed to build up a large



Fig. 4 Schematic overview of HIMAC with its three cancer treatment rooms and a new compact therapy machine

and successful network of collaborations with scientists at JAXA, RIKEN, University of Tokyo, Tokyo institute of Technology, Waseda University, and Saitama University over the years. I have also the pleasure of hosting PhD students at Waseda University on a regular bases, since in order to advance the scientific knowledge of the doctoral students at Waseda university, a practical doctoral training program has been set up in collaboration with me and my research group. This program is promoted and financed by the Japanese Ministry of Education, Culture, Sports, Science and Technology, with the purpose of “fostering practical abilities of students or researchers at doctoral level conducive to industrial innovation”.

Japan of course offers so many other interesting and pleasant things to be explored except work, research and high technology, e.g. the beautiful nature, the long term culture and history, as exemplified in Fig. 7, as well all the delicious Japanese food, which can be seen in Fig. 8.

The pulsating life of Tokyo, as can be seen in Fig. 9, offers a never ending opportunity to explore and find new and fascinating ways to spend the spare time, if there is any..., but I can tell more about that in a future report.

I would like to thank JSPS for giving me the opportunity to visit NIRS again. I also would like to express my sincere gratitude to my host Dr. Yukio Uchihori for all his kind help and support during my stay in Japan. Finally, I would like to thank all the personnel at the Fundamental Technology Center for all their help, kindness and hospitality. Our interesting discussions and my pleasant time will always be remembered.



Fig. 7 Japanese nature and culture.



Fig. 8 Japanese food



Fig. 9 Tokyo by night.

Promenade (6)

Satoyama Walking

by Hiroshi Sano

Perhaps the most cosmopolitan Japanese word today is *Sushi*. The prototype of *sushi* appeared as early as the 10th century, and the present form of *nigiri-zushi* (hand-rolled *sushi*) was established during the early 19th century. Today, *sushi* has become one of the world popular foods, being remade according to the specific taste of each nation.

Being not as much famous as *sushi*, several Japanese words are widely used in the world: *Tsunami* (seismic wave), *Shin-kansen* (bullet train), *Kaizen* (improvement), *Shinto* (shintoism) and *Satoyama* (village forest). Among them, *tsunami* and *satoyama* are very specific terms, for which no corresponding words are available in other languages.

The word *Satoyama* has a broad meaning. *Sato* indicates villages and arable lands, and *yama* means mountains, hills and forests. Consequently *Satoyama* stands for the forests or woods located at nearby villages. Historically the term *Satoyama* indicated not only geographical features but also the field of human activities. Until the early 20th century, villagers have long utilized materials produced in *Satoyama*, such as firewood, edible plants, small animals, undergrowth and others. All were precious for maintaining domestic life and for trading to obtain cash.

The *Satoyama* products had to be sustainable or recyclable over the years. To this end, the field was very strictly controlled and managed by villagers. They took care of the vegetation, issued permission to “enter” the field and determined the amount of materials to allocate to the individual farmer. Eventually, the ecological system, or flora and fauna of the *Satoyama* has maintained diversity, showing a typical “cohabitation” between nature and humans.



Today, the life style has greatly changed and people do not utilize the *Satoyama* as the base of everyday life anymore. Since many fields are abandoned, the original landscape has gradually been lost, for example pine woods disappeared and oak trees and bamboos invaded the land. Nevertheless, the *Satoyama* is still one of the representative landscapes of Japan, and walking and observing nature there give us comfort and relaxation.

There are many *Satoyama* hiking courses in almost every prefecture such as the “*Forest of Totoro*” in *Saitama* Prefecture (near *Tokyo*), which was founded based on the animation film “*My Neighbor Totoro*” by *Hayao Miyazaki*. A number of *Satoyama* areas is well maintained and managed by local towns and/or the NPO. You may contact such an organization and ask for an appropriate suggestion and guidance. However, it would be convenient to understand some Japanese for communication. Otherwise you can ask your Japanese colleagues for help.

*

Here I give an example of a typical *Satoyama* course in the *Nara* area. Get off at the *Kintetsu-Koriyama* Station of the *Kintetsu Kyoto Line* (45 min from *Kyoto*). Take a bus heading to *Koizumi* station, get off at *Matsuodera-guchi* stop (about 23 min), and walk to the *Matsuo-dera* temple (30 min). The temple was founded in the 8th century, and possesses several important cultural monuments, including statues and buildings, which are worthy to see.

Take the hiking course starting from a small parking lot in front of the temple gate or behind the pagoda, then you will reach the ridge of *Yata-kyuro* (*Yata* hills), from where a well maintained path runs through typical *Satoyama* woods, composed of various deciduous trees and shrubs. In spring, you can enjoy the wild azalea in bloom. There are several branching paths and you select an appropriate one depending on your time schedule. You may take a course heading to *Yata-dera* temple, from where a bus going to the *Kintetsu-Koriyama* Station is available (20 min).

The temple also known as the “temple of hydrangea” (*ajisai*) was founded in the 7th century, and contains many cultural monuments. The flowers can be enjoyed in early summer in the ground of the temple. The whole course may take 1 to 2 hours (*Director, JSPS Stockholm Office*).

Festival (6)

Tanabata

by Lisa-Mi Swartz

Tanabata, 七夕, meaning “Evening of the seventh” is a Japanese festival with mixed origin. The traditional date of celebration was the seventh day of the seventh lunar month. Since the transition to the Gregorian calendar, many Japanese traditional holidays which were dated according to the lunisolar calendar, exist with parallel dates. Therefore some Tanabata festivals are held on July 7 and others around one month later, this year Tanabata would coincide with August 16.

The Tanabata festival is believed to be derived from a mix of a Chinese legends and local beliefs. The Japanese elements are said to be features from the *Obon* festival (see Japan the Horned Islands no 1) and a Shinto ceremony, in which a *miko* (shrine maiden) wove a cloth on a loom called the Tanabata to offer it to the gods while praying for a good harvest.

These elements were merged with the Chinese festival *Qi Xi* – The Festival to Plead for Skills, and was spread via the Kyoto imperial court to the general public by the early Edo period (1603-1868). During the Edo period girls would wish for better sewing and craftsmanship and boys wished for better handwriting, by writing wishes on strips of paper. This tradition lives on by people writing wishes, sometimes in the form of poetry, on pieces of coloured paper (*tanzaku*) and hanging them on bamboo. Other tanabata decorations are



Girls wearing yukata during Sendai Tanabata festival

colorful streamers, symbolizing the weaving of threads, or *toami* (casting net), which means good luck for fishing and farming and *kinchaku* (hand bag), for wealth. There are two versions of the Chinese

legend of the princess and the cowherd which is part of the origin of Tanabata, each existing in different varieties of their own. They can be told as follows: A young farmer named Mikeran discovered on his farm a robe which belonged to a goddess named Tanabata. Soon after, Tanabata visited Mikeran and asked if he had found a robe. He lied and told the goddess that he hadn't but would help with her search. Eventually the pair fell in love, was wed and had many children. However, one day Tanabata noticed a piece of cloth coming from her missing robe. His lie discovered, Mikeran begged Tanabata's forgiveness. She agreed to forgive him on the condition that he weave a thousand pairs of straw shoes, and until he has completed his mission they would not meet. Mikeran was unable to weave the shoes in his lifetime and thus never met Tanabata again. However, it is said that the pair meet once a year when the stars Altair and Vega intersect.

The other version is the reason why Tanabata is also known as the star festival. It stars a weaver princess named Orihime (Vega) and a cowherd prince named Hikoboshi (Altair) who lived in heaven. After they fell in love they spent all time together forgetting about their jobs. The heavenly king (*Tentei*) became angry at them and separated them on opposite sides of the *Amanogawa* River (Milky Way). The king allowed them to meet only once a year on the seventh day of the seventh month. The first time they tried to meet, however, they found that they could not cross the river because there was no bridge. Orihime cried so much that a flock of magpies came and promised to make a bridge with their wings so that she could cross the river. It is said that if it rains on Tanabata, the magpies cannot come and the two lovers must wait yet another year to meet. Therefore people are praying for good weather during Tanabata. Writing *tanzaku* is also connected with this legend as a good day to make a wish, since it is a day for wishes to be realised.

At night, when the stars come out, the decorated bamboo are often set afloat on a river or burned, which resembles a common *Obon* custom. Actually one can find, in many areas in Japan, local Tanabata customs which are much related to local *Obon* traditions. There is also a traditional Tanabata song:

Sasa no ha sara-sara (笹の葉 さらさら)
Nokiba ni yureru (軒端にゆれる)
Ohoshi-sama kira-kira (お星様 キラキラ)
Kingin sunago (金銀砂子)

The bamboo leaves rustle, rustle,
shaking away in the eaves.
The stars go twinkle, twinkle;
Gold and silver grains of sand.



Schoolgirls hanging their tanzaku

Lately Tanabata has been much commercialized and large-scale festivals are held in many places in Japan, mainly along shopping malls and streets, which are decorated with large, colorful streamers. The most famous Tanabata festivals are held in Sendai, Kansai, in August, and in Hiratsuka, Kanto in July. (*Assistant, JSPS Stockholm*).

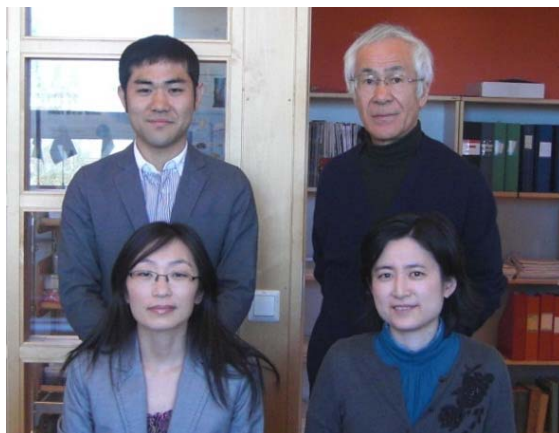
Introduction of JSPS Stockholm Office Staff

Hiroshi Sano (Director)

After obtaining a PhD in biology at the Tohoku University, Sendai, Japan, I worked as a postdoctoral research fellow at Freiburg University, Germany and Harvard Medical School, USA. In 1985, I moved to Akita Prefectural University, and then to Nara Institute of Science and Technology (NAIST) as a professor of plant science. Since April 2007, when I retired from NAIST, I am serving as director of the Stockholm Office of JSPS, and also as visiting professor at the Department of Botany, Stockholm University. I am interested in moving things including birds, butterflies and beetles, and trains. I play the cello.

Yuko Kamoshita (Deputy Director)

It has already passed eight months since I arrived to take up the position in Stockholm. It is a good opportunity for me not to only to know about Nordic and Baltic countries but also Japan. I have been enjoying the long daytime and blooming beautiful season in Stockholm. Since I have been here in the harsh winter, I can appreciate the daytime and sunshine even more than before.



Lisa-Mi Swartz (Assistant)

I started working for JSPS Stockholm Office in October 2007. I am the Swedish speaking staff and I mainly handle external contacts concerning our activities, such as fellowships and colloquia. I studied at Stockholm University prior to my employment and I have lived in Tokyo, Japan for six years. I take my pleasure from the company of my family and friends. I enjoy yoga and gardening.

Taijiro Tsuruoka (Accounting Officer)

I came to Stockholm April (2010) as the successor of Ms. Hitomi Yasui. I come from Nagoya University via JSPS a training program for staff that is, or will be in charge of international affairs. It is the first time for me to come to Europe, and I will stay here for one year. I believe that I will have a very precious experience both officially and privately. My hobby is Karate. I am enjoying Karate here as well.

III. News & Announcements

Research Grant & Fellowship Information

If you are planning to visit and perform research in Japan, the JSPS Stockholm Office is ready to provide you with useful information on the JSPS fellowship programs. The JSPS fellows are usually recruited in each fiscal year (beginning in April and terminating in March of the following year).

Two ways of applications are available. The main route is (A) to prepare application forms through your host researcher at the host-university or institution in Japan. The host will send all documents to the JSPS Head Office, Tokyo. You may be able to ask your host researcher in Japan to apply for it in advance. This route is open for researchers in almost all countries outside of Japan. As for the deadline of each application, please find the table as below.

The other route is (B) to apply through the nomination system in relevant countries, where the applicant lives. In this case, the country must be assigned as a partner country by JSPS (note that not all countries are assigned as JSPS partner). This route is in principal, open only for researcher who is a national of such country.

For example, if you are a Swedish researcher, you can apply through the nomination system of the following programs, depending on your career and research field: Post-doctoral fellowship (Long-term and Short-term.) or Invitation fellowship (Short-term. Application deadline is announced by VINNOVA).

You can find necessary information through the website of JSPS Head Office (as below) or JSPS Stockholm Office (<http://www.jps-sto.com/> →Menu :Fellowship). *(Taijiro Tsuruoka, JSPS Stockholm)*

Program	Duration	Application Dead line(※1)	Commencement of fellowships (※2)
JSPS Postdoctoral Fellowship Programs For Young post-doctor etc. http://www.jps.go.jp/english/e-fellow/postdoctoral.html	(Standard) 12 to 24 months	<1nd Call> 30 Aug 2010 - 3 Sep 2010	Apr 1, 2011 – Sep 30, 2011
		<2nd Call> 6-12 May 2011	Sep 1, 2011 – Nov 30, 2011
	(Short-term) 1 to 12 months	<1 th Call> 4-8 Oct 2010	Apr 2011 – Mar 2012
		<2 th Call> 22-26 Nov 2010	Apr 2011 – Mar 2012
		<3 th Call> 31 Jan-4 Feb 2011	Jun 2011 – Mar 2012
		<4 th Call> 4-8 Apr 2011	Aug 2011 – Mar 2012
		<5 th Call> 6-12 May 2011	Sep 2011 – Mar 2012
<6 th Call> 1-5 Aug 2011	Dec 2011 – Mar 2012		
Invitation Fellowship Programs for research in Japan For Professor or mid-career Researchers etc. http://www.jps.go.jp/english/e-inv/main.htm	(Long-term) 61 days to 10 months	Sep 3, 2010	Apr 1, 2011 – Mar 31, 2012
	(Short-term) 14 to 60 days	<1 nd Call> Sep 3, 2010	Apr 1, 2011 – Mar 31, 2012
		<2 nd Call> May 12, 2011	Oct 1, 2011 – Mar 31, 2012

※1 These deadlines are for the head of the host institution to submit the application to JSPS Head Office; the time frames for applicants (host researchers) to submit their applications are normally earlier.

※2 Successful candidates must start the Fellowship in Japan during these periods.

Sweden- Japan Bilateral Research Grant

VINNOVA and JSPS have agreed to promote and support scientific co-operation between highly qualified Swedish and Japanese scientists affiliated with universities or research institutions in their respective countries and engaged in the fields of natural sciences, engineering and medical sciences promoted by both Agencies.

The purpose is to further strengthen and advance existing cooperation by supporting team to team collaboration, especially in the early stage of such collaboration.

The program will be open for proposals once a year until 2011, please contact [VINNOVA](#) for more information on upcoming call for proposals (Lisa-Mi Swartz, JSPS Stockholm office.)

Forthcoming JSPS Colloquium – Epigenetics

Monday 6 – Tuesday 7, September 2010

Venue: Nobel Forum, Karolinska Institute

Epigenetics – New Horizons in Japan and Scandinavia

Tentative Programme

The Dynamics of Chromatin Biology

Speakers: Karl Ekwall, Hiroshi Kimura, Anja Groth, Toru Nakano

Chromatin Marks and Stem Cells

Speakers: Ola Hermanson, Anita Göndör, Kristian Helin

Chromatin Marks and non-Coding RNA

Speakers: Chandrasekhar Kanduri, Yota Murakami

Emerging New Technologies in Epigenetics

Speaker: Noriyuki Sumida

Epigenetics and Human Diseases

Speakers: Tomas J. Ekström, Yutaka Kondo

To register, e-mail (info@jspm-sto.com) or fax (+46-(0)8-31 38 86) to JSPS Stockholm Office by 30 August, 2010

*Registration is free of charge *The seminar is open to all.



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