

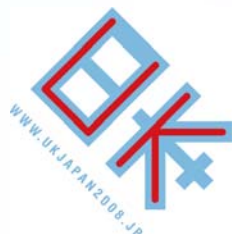


**October 2008**

**British Embassy Tokyo  
Science & Innovation  
Section Newsletter**

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## 1. Editorial

### Japan's prolific year of Nobel laureates

At a time when the world was hard hit by falling stocks, falling currencies and a series of bank bailouts in early October, Japan was cheered with one piece of bright news: four 'Japanese-born' scientists won the Nobel Prize out of the total of 12 awarded this year. In a country where people are highly obsessed with the prize, these four laureates were treated like TV celebrities. The media rushed to run special features, not only about their research but also about their personalities, childhood and even their married life.

Yoichiro Nambu, 87, professor emeritus of the University of Chicago, was awarded the Physics Prize for 'the discovery of the mechanism of spontaneous broken symmetry in subatomic physics'. His theory laid the foundation of modern elementary particle physics, explaining why an excess of matter versus antimatter was created at the birth of the universe and how gravity was produced.

The Physics Prize was also given to two others working on broken symmetry: Makoto Kobayashi, 64, Professor Emeritus of Japan's High Energy Accelerator Research Organisation (KEK) and Toshihide Maskawa, 68, Professor Emeritus of Kyoto Sangyo University. In 1972 they presented a theory to explain why the universe is made of matter, not antimatter, by identifying the existence of new elementary particles. Other researchers at Stanford and KEK independently proved in experiments that the pair's prediction was correct as late as 2001.

Lastly, Osamu Shimomura, 80, Professor Emeritus of the Marine Biological Laboratories in Massachusetts and the Boston University Medical School received the prize in chemistry jointly with two US colleagues for their discovery and development of glowing green fluorescent proteins (GFP) from jellyfish. In recent years a GFP has become an essential tool for the observation of cells and development of diseases such as cancer.

In fact, that number 'four' is a little tricky. The Royal Swedish Academy of Sciences counts Professor Nambu and Professor Shimomura as 'US' researchers. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) decided to count Professor Nambu as a US laureate, and Professor Shimomura, who is a US resident, as a Japanese researcher. The headcount is critical because MEXT set a goal to produce 30 Nobel laureates in natural sciences in the first half of this century. Since 2000, the official number of Japan's Nobel laureates in natural sciences has been seven (excluding Professor Nambu).

Although the series of Nobel prizes is prompting the Japanese government to increase its support for basic science, such a numerical target is insufficient to beef up Japan's research competitiveness.

One worrying figure is the future of young scientists. Backed by the government's initiatives, the number of post-doctoral researchers in sciences has increased. But positions in universities are limited, so it has created a serious shortage of job opportunities. Only 61% out of 1,606 post-docs found a job this year, and 20% of them were neither employed nor in other forms of education according to a MEXT survey earlier this year. So why not seek careers abroad like Professor Nambu and Professor Kobayashi? Unlike the early days of these two professors, young Japanese researchers nowadays seem more inclined to stay home, partly because the research environment and infrastructure have improved considerably since the 1960s. The number of researchers going abroad for more than 30 days has been on the decline since 2000, according to MEXT.

At a glance the reverse brain drain sounds a positive move, but Japan may actually be losing its relative appeal as a research base. For example, many global pharmaceutical giants have closed their Japanese research institutes. The latest was Merck & Co., which announced in October a closure of its basic science institute in Tsukuba, north of Tokyo by the end of 2009. Last month, the World Economic Forum also released the annual global competitiveness ranking, and Japan slipped to 9th place this year, from 8th in 2007 and 5th in 2006.

To address this problem, MEXT plans to establish regular meetings with Nobel laureates so that they can advise how to reform the research system and foster the development of young scientists. Some are outspoken in their views, with reports that Professors Maskawa and Kobayashi criticised Japan's educational system when they visited the MEXT Minister in October. Their influence may move the Japanese government to increase its support for science despite the current financial turmoil.

Ichiko Fuyuno  
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Science and Innovation Section  
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## 2. Recent Reports from Tokyo S&I Section

Title	Category	Issued Date
Overview of Organic Electroluminescence R&D in Japan	ICT	15-Oct-08
Japan's large-scale clinical research into pre-pandemic vaccines	Policy	3-Sep-08
Ageing Society in Japan, Part II -Japan's medical research and nursing technologies	Policy	20-Aug-08
Innovative Technology Strategies in Japan	Policy	10-Jul-08
Green IT Initiative	ICT	30-Jun-08
The Japanese Government's "Cool Earth – Innovative Energy Technology Programme"	Energy & Environment	14-May-08

### 3a. News Headlines: science and innovation policy

#### **CSTP to create new funding scheme for emerging national projects**

The Council for Science and Technology Policy (CSTP) will establish a new funding scheme which allows the government to provide funds for emerging important projects swiftly. Usually, the allocation of research funding is decided only once a year. Under the new scheme, the CSTP will select themes that urgently need the government's support, open calls for proposals biannually and allocate funds immediately after they are chosen. The CSTP has requested 14 billion yen (GBP70 million) for FY2009 budget. (29 September 2008, Nikkei Shimbun)

#### **Government to enhance human resources for international standardisation**

The Ministry of Economy, Trade and Industry (METI) will facilitate human resource development programs to increase the number of experts in international standardisation. METI will publish new textbooks highlighting the impact of international standardisation on business activities using case studies such as fuel cells and biometrics to explain the mechanism of standardisation. METI will establish a new official examination system especially designed for business experts who are responsible for overall business strategies in order to gain special skills. (October 6, 2008, Nikkan Kogyo Shimbun)

#### **Postdocs with overseas experience write more papers: survey**

Postdoctoral researchers who have worked abroad write more than twice the number of peer-reviewed papers as those who haven't, according to a survey by the National Institute of Science and Technology Policy (NISTEP). The former researchers write an average 4.02 papers a year, compared to 1.5 papers for the latter researchers. There are few differences between those who have worked only at one institute and those who have experienced several places to work. (8 October 2008, Nikkei Sangyo Shimbun)

#### **Measure to secure disposal sites for HLW**

The Ministry of Economy, Trade and Industry (METI) is making an attempt to secure a disposal site for high-level radioactive waste. With grants and tax incentives ready for candidate regions, METI has been waiting for local governments to present themselves as candidates for the site but no local authority has applied to the scheme so far. In order for local governments to consider how to exploit financial incentives, the ministry has compiled a list of 160 concrete examples of regional development. (15 October 2008, Nikkan Kogyo Shimbun)

#### **Japan, China, South Korea discussed how to tackle pandemic flu**

Government officials from Japan, China and South Korea met on 16 and 17 October in Seoul to discuss what measures each country should take in the event of pandemic flu. On the assumption that the flu broke out in one of these three countries, government officials presented how to cope with the emergency and how to exchange information. A joint announcement was issued at the health ministers' meeting on 2 November: <http://www.mhlw.go.jp/houdou/2008/11/dl/h1102-1a.pdf> (17 October 2008, Nikkei Sangyo Shimbun)

### **Social welfare expenses set to double by 2025: government council**

The government's financial expenditure on social and medical welfare services could exceed 90 trillion yen (GBP530 billion) in fiscal 2025, more than double the levels of fiscal 2007, according to the government's council on social security issues. To cover the increased expenses, a 4% hike in the consumption tax (presently set at 5%) may be necessary. The government has so far tried to curb social welfare expenses, but the council concluded that additional expenditure is inevitable to maintain the current medical and nursing-care systems. Prime Minister Taro Aso plans to compile a mid-term tax and fiscal programme for pension, medical and nursing-care services by the end of this year. Whether to raise a consumption tax will be the centre of the discussion. (24 October 2008, Nikkei Shimbun)

### **Government to strengthen the development of advanced IT experts**

METI and the Ministry of Education, Science, and Sports (MEXT) will jointly establish a new working group aimed at developing advanced IT experts through academic-industry collaboration. The workshop will examine the promotion of matching systems between industrial experts and professors as well as the arrangement of adult retraining systems. Keidanren, Japan Federation of Economic Organisations, large ICT companies, the University of Tokyo, Keio University, and the University of Tsukuba, as well as a few industry associations, will become core members of the group. (October 24, 2008, Nikkan Kogyo Shimbun)

### **Government study group to examine future Intelligent Transport System (ITS)**

The study group, led by the Ministry of Internal Affairs and Communications (MIC), will examine a next-generation ITS system, focusing on a new function of the wireless system to avoid collision at a corner. The study group also discussed the issue of how to diffuse emerging new ITS to the market, and will complete a report around May 2009. The Chair will be Prof. Kawashima of Keio University. Toyota, Nissan, Honda, Mazda, Oki, NEC, Hitachi, Fujitsu, Sumitomo Electric Industries, and Denso are going to join the future meetings. (October 27, 2008, Nikkan Kogyo)

### **Safety guidelines for CCS to be set up**

The Ministry of Economy, Trade and Industry (METI) will set up a guideline regarding the safety of carbon capture and storage technology by March 2009. The guideline is for a large-scale demonstration planned in 2009 or after, specifying required geological characteristic of candidate sites, safety standards for injecting carbon dioxide underground or under the seabed and ways of monitoring stored carbon. (31 October 2008, Nikkei Shimbun)

## **3b. News Headlines: IT and communications**

### **The University of Tokyo achieved new technologies to raise efficiency in controlling photons**

Prof. Yasuhiko Arakawa's research group at the University of Tokyo successfully pursued technologies to control photons ten times more efficiently than before. This new technology is capable of saving energy and leading to the realization of advanced cryptoanalysis and quantum computing. Arakawa's group developed a new semiconductor microfabrication method and built a special structure capable of shutting lights and electrons simultaneously. The group also used special structured semiconductors (so-called photonic crystals) capable of manipulating a single photon and thus widely perceived as the most suitable semiconductors for fast optical communication. (October 9, 2008, Nikkei Sangyo Shimbun)

### **Fujitsu and Hitachi facilitate the development of energy-saving data centres**

Fujitsu is attempting to promote the development of energy-saving data centres through achieving optimum layout of air conditioning in facilities. Fujitsu has already developed thermic fluid simulation software capable of calculating the air movement as well as measuring the change in room temperature. Also, Hitachi seeks to enhance the development of application methods capable of connecting air-conditioned facilities and IT equipment. A new energy-saving data centre is now under construction in Yokohama, which is intended to develop a new optimum layout of IT equipment and improve air conditioning and electric power supply facilities. (October 11, 2008, Nikkei Sangyo Shimbun)

### **Toshiba achieved new development for quantum cryptography telecommunication**

Toshiba accelerated the speed of transferring cipher keys in quantum cryptography about 100 times faster than before. This achievement was made by applying receiving equipment for optical communications called Avalanche Photodiode (APD). Toshiba increased the drive frequency of APD and successfully detected a single photon even under high driving frequency. Toshiba has participated in a standardisation project of

quantum cryptography at the European Telecommunication Standards Institute (ETSI). Toshiba will attempt to complete standardisation within two years and thereafter examine the commercial viability. (October 15, 2008, Nikkei Sangyo Shimbun)

### **Chemical companies developed new energy-saving materials for Electro Luminescence Panels**

Shin Nittetsu Chemical will launch mass production of light emitting materials to cut power consumption by one-fourth. The company has carried out mass production of red light emitting materials in the development of phosphorescence lights in which light emitting efficiency is four times larger than fluorescence lights. Idemitsu Kosan will develop phosphorescent red light and Hodagaya Chemical will start mass production of auxiliary materials within this year. The materials will be installed in a mobile terminal. (October 16, 2008, Nikkei Shimbun)

### **Hitachi developed next generation fast wireless transistors**

Hitachi developed transistors capable of driving at low energy consumption for next-generation fast wireless telecommunications. For this success, Hitachi used original thin film formation technology called epitaxial growth with a silicon-germanium alloy of semiconductor materials suitable for fast processing. This formation technology could reduce impurities enabling the transfer of electrons and saving electronic power by about one-third. The newly developed transistors are expected to be applied to mobiles and wireless LAN. (October 17, 2008, Nikkei Sangyo Shimbun)

## **3c. News Headlines: life sciences**

### **Takeda files for approval of new diabetes drugs**

Takeda Pharmaceutical has filed for government approval to produce and sell a treatment for type-II diabetes. The drug, code-named SYR-322, inhibits activities of an enzyme named DPP-IV to maintain hormone blood concentration and reduce the blood sugar levels. Thanks to sufficient overseas clinical data, Takeda was able to file for the approval without conducting Phase III testing in Japan. (30 September 2008, Nikkei Sangyo Shimbun)

### **Hokkaido startup licenses out antibodies technologies to Boehringer Ingelheim**

Evec, a spin-out of Hokkaido University, has signed an exclusive agreement with Boehringer Ingelheim for the rights to develop and sell one of its full human therapeutic antibody technologies. The start-up company will receive a maximum 8 billion yen (55 euro) as milestones from the German pharmaceutical firm, highlighting Japan's first licensing-out by a biotech venture to a global pharma company. Founded in 2003, Evec develops human antibodies using B-lymphocyte to treat infectious diseases, cancer and inflammatory diseases. (3 October 2008, Nikkei Sangyo Shimbun)

### **MHLW issues clinical testing guidelines for pharmacogenomics**

The Ministry of Health, Labour and Welfare (MHLW) released guidelines to conduct clinical trials for pharmacogenomics, which means to investigate the link among patient's genotypes with the effect of drugs, dosage and side effects. It is a delayed move compared with the US Food and Drug Administration, which issued guidelines for pharmacogenomics data submissions in 2005. The FDA approved to include genotype information in the package insert of irinotecan, a cancer treatment in 2005, but the equivalent approval was made as late as July 2008 in Japan. (10 October 2008, Nikkei Sangyo Shimbun)

### **Creation of iPS cells without virus**

A team of Shinya Yamanaka, Japan's inventor of human induced pluripotent stem (iPS) cells, has made an important step in the research by creating the cell without viral vectors. Virus is used to carry a few genes into a somatic cell to make it behave like an embryonic stem (ES) cell, but it is also one of the cancer-triggering factors. The researchers succeeded in using circular DNA as a vector instead of virus to create iPS cells from mouse cells. The hit rate is still low, but Yamanaka believes the technology can be applied to human cells. (10 October 2008, Nikkei Shimbun)

### **Pfizer started to market Japan's first nucleic acid medicine**

Pfizer launched a drug to treat age-related macular degeneration, the first nucleic acid medicine put on sale in Japan. The drug, made by modifying base pairs of DNA and RNA, is designed to slow both the growth of pathologic blood vessels and the progress of damaging eyesight. The number of patients is estimated at 52,000 in Japan. (15 October 2008, Nikkei Sangyo Shimbun)

### **Female researchers face hard times to continue work: survey**

The working environment for female researchers is still very severe, and many are struggling to keep the work-life balance, shows a survey by the Japan Inter-Society Liaison Association Committee for Promoting Equal Participation of Men and Women in Science and Engineering (EPMEWSE). The association is comprised of various academic societies. In the online survey that had 103,000 male respondents and 3,800 female respondents, 66% of female researchers didn't have children, and only half of mothers of newborn babies took child-care leave. The pace of promotion is several years behind their male colleagues and their salaries are 80% the levels of men. The number of female researchers stood at 13% of the total, much lower than most other developed countries. (15 October 2008, Nikkei Shimbun)

### **House of Lords refuses appeal by NICE against Eisai**

The House of Lords rejected the application by the National Institute for Clinical Excellence (NICE) to appeal against the Court of Appeal verdict on the guidance of Eisai's Alzheimer's treatment Aricept. NICE has created procedures to limit the use of Aricept for patients with mild symptoms, but Eisai has claimed it was unfair. Following the first instance in summer last year, Eisai went to the Court of Appeal, which then ruled in favour of Eisai in May this year. (31 October 2008, Nikkei Sangyo Shimbun)

## **3d. News Headlines: energy and environment**

### **Nippon Oil and Sanyo to mass-produce PV jointly**

Nippon Oil and Sanyo officially announced that they would establish a joint company to start mass-producing next-generation photovoltaic cells in 2010. The silicon-base thin film PV will cost half as much as conventional ones. The volume of production will be initially 50,000 to 100,000kW. The two companies have already co-operated with each other in the production of residential fuel cells. (1 October 2008, Nikkei Shimbun)

### **Direct current supply system for houses**

TDK will embark on the business of power supply system for houses. The company plans to develop a system that enables people at home to use direct electric current generated by renewable sources for home appliances without converting it into alternating one. The company has already developed dye-sensitised photovoltaic cells (DSC) with a photoelectric efficiency of 7.9% and lithium rechargeable batteries and has invested in a company that develops micro wind power generators. They also work with electric manufacturers to develop home appliances to be operated on direct current. (2 October 2008, Nikkan Kogyo Shimbun)

### **Evaluation of performance of dye-sensitised photovoltaics**

EKO Instruments started to sell a system to evaluate the performance of dye-sensitised photovoltaic cells (DSC). The system measures changes in electric current and voltage with laser beam, changing the intensity of the beam. This method is capable of evaluating performance of each component such as electrodes, electrolyte and dye, whereas widely-used methods estimate these values from the entire performance of DSC. (8 October 2008, Nikkei Sangyo Shimbun)

### **Oil company to develop plastics from non-food crops**

Oil company Idemitsu has decided to accelerate research on production of raw materials for plastics from non-food crops. Their research will range from breed improvement of plants, planting methods of plants, to chemical conversion technologies of alcohol. The company conducts research on bio-fuels, expanding the research to chemical products. They pursue to put the research into a practical level around 2015. (9 October 2008, Nikkei Sangyo Shimbun)

### **Use of earth thermal energy for air-conditioning and hot water supply**

Wellthy, a company based in Tokyo, will market a system to use earth thermal energy for air-conditioning and hot water supply at houses. The system is combined with a heat pump and use of earth thermal energy, which is stable at 18 to 20 degrees centigrade through the year, reducing the power necessary for the

operation of the heat pump. The company will also sell a facility to pump up water from 80 to 100m underground, filter it and use it as drinking water. (10 October 2008, Nikkei Sangyo Shimbun)

### **High fire-resistance bio-plastic**

Canon and Toray have developed a bio-plastic with the world-highest fire-resistance. The material is made from nano-size plastic molecules and contains halogen-based fire retardant. The production emits 20% less carbon dioxide than that for conventional plastics. Canon will start to replace a few percentages of plastics of multi-function copying machines with the developed material as early as 2009. (11 October 2008, Nikkei Sangyo Shimbun)

### **Mass-production of petrochemical raw material from weeds**

A research institute plans to commercialise a technology jointly with US Dow Chemical to mass-produce basic material for petrochemicals from weeds and agricultural waste. The Research Institute of Innovative Technology for the Earth (RITE) owns the technology to produce propanol, the basic material, using genetically-modified bacteria and the consortium will build a demonstration plant in 2010 and start mass-production as early as 2012. (17 October 2008, Nikkei Shimbun)

### **Mass-production of micro fuel cells**

Aquafairy, based in Tokyo, completed a mass-production line for micro fuel cells for mobile appliances. The plant is capable of producing 250,000 units of polymer electrode fuel cells (PEFC) per month. The 20-cubic-centimetre device has an output of 3.0W and a generation of 5Wh. The battery has a function to generate hydrogen as fuel from water using a substance the firm developed. Aquafairy will ship a sample to equipment manufacturers in April 2009 and accelerate its commercialisation in co-operation with some of them. (20 October 2008, Nikkan Kogyo Shimbun)

### **Smallest fuel cells for laptop computers**

Panasonic has developed the world smallest fuel cells for laptop computers. The 270cc battery keeps generating power for five hours with 50cc of methanol. The company wants to cut costs by improving efficiently and reducing amounts of platinum. They plan to market the device in a fiscal year of 2012. (20 October 2008, Nikkei Shimbun)

### **150 fuel cells to be installed in an area**

Nippon Oil will start a demonstration project of 150 units of residential fuel cells installed in a district. The area is supplied with LPG through pipes from an LPG station inside and the fuel cells that will be installed by March 2009 are run with LPG. The company will investigate status of the operation and promote the large number of instalment in other areas. (20 October 2008, Nikkei Sangyo Shimbun)

### **Estimation of carbon emission from soil**

The Japan Atomic Energy Agency (JAEA) has developed a technique to estimate carbon emission from different soils. The method is to estimate residence time of carbon in a specific kind of soil by analysing the amount of radioactive carbon contained in organic matter. The estimation contributes to raising accuracy in a long-term projection of global warming. The institute plans to apply the method to various kinds of soil across the world. (22 October 2008, Nikkei Sangyo Shimbun)

## **3e. News Headlines: engineering**

### **JAXA decided to develop next generation extravehicular space suit**

JAXA will develop an extravehicular suit which can be put on for up to 120 hours. Currently, equipment built into extravehicular suits can maintain battery and oxygen for up to eight hours. This will be the first attempt in developing a suit made in Japan. JAXA will propose this product for lunar exploration, including the moon base construction led by NASA. The outcome of this development will contribute to the progress of manned space activity. JAXA seeks to propose the project for an extravehicular suit for next year's budgetary request in MEXT. (October 2, 2008, Nikkan Kogyo Shimbun)

### **Robot venture business, Cyberdyne will conduct international development in 2009**

Cyberdyne, financed by Daiwahouse, will establish a local subsidiary in Denmark and set up a consortium intended to rent robot suits for care support with self-governments funded by central governments, IT companies, welfare facilities and hospitals. Cyberdyne's robot suits are developed by Prof. Yoshiyuki Sankai

at Tsukuba University (who is also the CEO) working across the fields of neuroscience and mechanical engineering. Cyberdyne will start mass production of robot suits with the aim to produce more than 5 million suits a year. Daiwahouse group will lease suits in hospitals and care support facilities at the cost of 200 thousand yen per month. (October 4, 2008, Nikkei Shimbun)

#### **Nissan accelerates the development of safety technologies in digital area**

Nissan will conduct collaborative R&D with Sony and electrical and electronic companies in order to save manufacturing costs and accelerate production for practical use. By 2015 Nissan will try to reduce the number of fatal and severe accidents by half the number of 1995. Nissan has been lagging behind other automakers in the area of safety technologies, and thus seeks to catch up with collaborators from electronic sectors. At this stage, Nissan has already developed a controlling brake system called lane departure prevention and technology capable of maintaining the distance between vehicles called distance control assist. Recently developed collision prevention technologies using a mechanism of bees' behaviour will be converted for electric vehicles. (October 6, 2008, Nikkei Sangyo Shimbun)

#### **Nissan develops small semiconductors for environmentally friendly vehicles**

Nissan's new development is intended to decrease the size of semiconductors by half through integrating two elements used for basic parts inverters in electric vehicles and to reduce peripheral parts. Nissan seeks to downsize and save weight by more than 40% within a few years in order to increase the efficiency of environmentally friendly vehicles. In the process of integration, Nissan uses heterojunction which reduces electric loss. Nissan seeks to improve the quality of silicon carbide through collaborating with material and semiconductor makers and achieve downsizing through reducing production costs. (October 9, 2008, Nikkei Sangyo Shimbun)

## **4. Forthcoming Events**

<b>Event</b>	<b>Project</b>	<b>Date</b>	<b>Venue</b>
<b>October 2008</b>			
UK-Japan Frontiers of Science Symposium	Reception	6 Oct	British Embassy
TWI Seminar	Seminar	7 Oct	British Embassy
IOP Reception	Reception	17 Oct	British Embassy
IUSS Committee Visit	Visit	22-25 Oct	Tokyo
Actinomycetes Reception	Reception	30 Oct	British Embassy
<b>November 2008</b>			
Millennium Science Forum	Seminar	12 Nov	British Embassy
UK-Japan Symposium on Privacy and Security in the Information Society	Symposium	11-12 Nov	British Embassy
Human-Computer interaction workshop	Workshop	18-19 Nov	Tokyo
UK Biotech Seminar: the Innovative Cycle	Seminar	19 Nov, 21 Nov	Osaka, Tokyo
Monoclonal Antibodies Seminar	Seminar	28-Nov	British Embassy
<b>December 2008</b>			
Takeda Young Forum	Symposium	6-Dec	Tokyo Forum
<b>January 2009</b>			
Quantum Information Workshop	Workshop	22-23 Jan	Tokyo
Climate Modelling and Business Risk Workshop	Workshop	26-27 Jan	British Embassy
Climate Modelling and Business Risk Seminar	Seminar	28 Jan	Tokyo
<b>February 2009</b>			
Brain machine interface workshop	Workshop	12 Feb	Tokyo
Diabetes Workshop	Workshop	16-17 Feb	Tokyo
Robot Mission	Mission	16-20 Feb	Tokyo