NATIONAL
INSTITUTE FOR
MATERIALS
SCIENCE

NIMS NOW International

No.3

2011 APRIL

The new NIMS strategy to come

new projects, new units, new NIMS

[special dialogue] **Konstantin Novoselov** and **Sukekatsu Ushioda**

NIMS 3rd Five-year Plan

We extend our sincere sympathy to all who were affected by the massive earthquake and tsunami in eastern Japan.

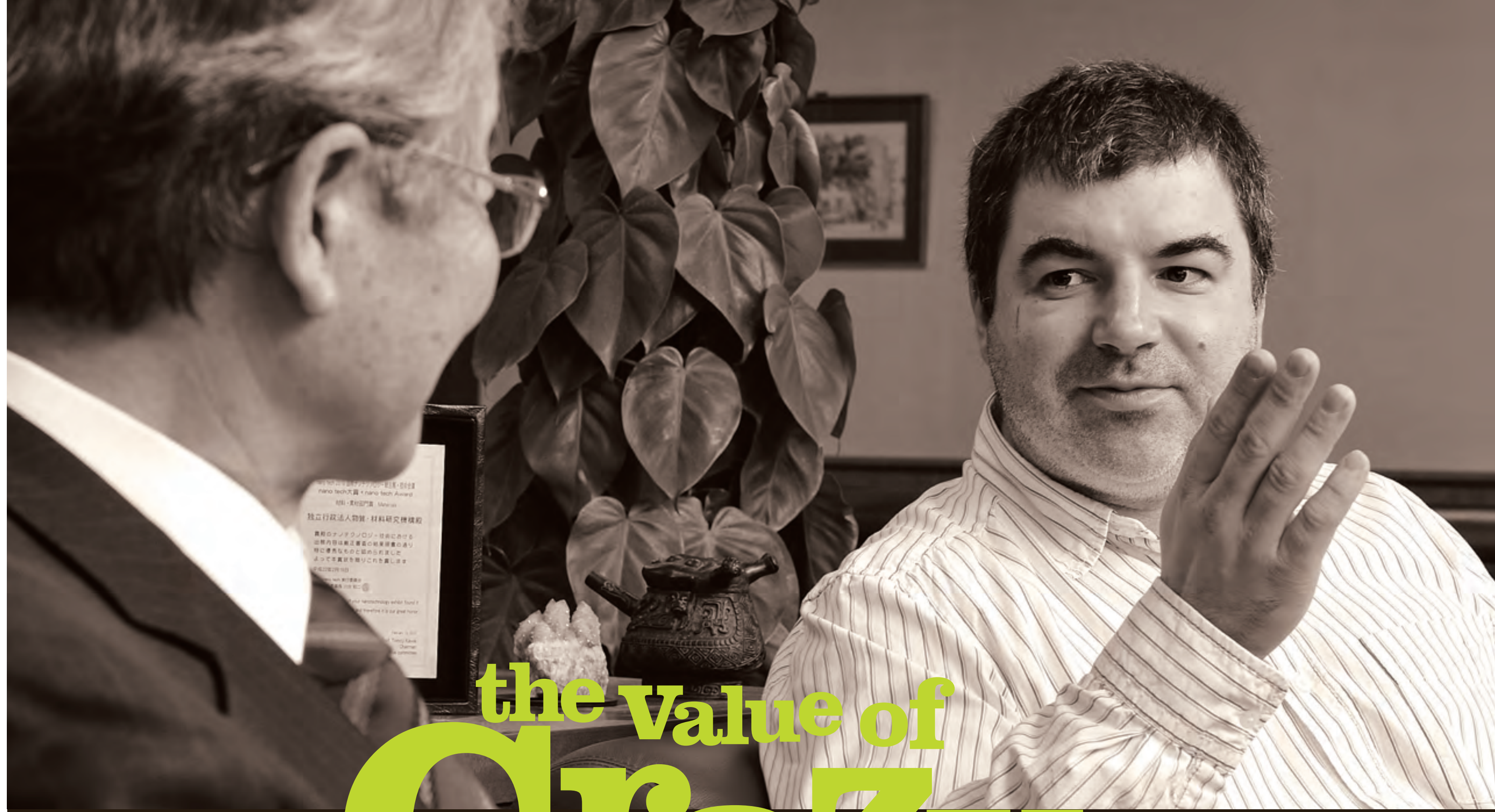
We at NIMS suffered various damages on our equipment and facilities. However, fortunately no staff member was hurt. At this moment we are concentrating our efforts toward evaluating the damages and making plans for recovery. I am pleased to report that there has been NO leakage of harmful materials from NIMS to the surrounding area.

We are seriously concerned about the leakage of radioactive materials from the nuclear power plant in Fukushima. NIMS has been measuring the radiation level at our Sengen-site, and the local radiation data are available on our website*. Also we are providing this information to the local government in Tsukuba. This is our attempt to provide scientific information to the public, and to contribute to rational public understanding of the situation. Similar data are provided by other research organizations in Tsukuba.

Electricity and water supplies as well as internet connection have been restored, and the staff at NIMS is working very hard to recover from the damage. However, the shortage of electrical power remains a very serious problem in our recovery process. Thus we still expect to encounter various difficulties in the months and years to come. We would appreciate your cooperation and understanding in this time of national disaster.

Sukekatsu Ushioda
President
National Institute for Materials Science

*http://www.nims.go.jp/eng/siteinfo/info/sengen_radiation-ray.html



the Value of Crazy Projects

Scientific freedom and the value of 'Crazy Projects'

Konstantin Novoselov and Sukekatsu Ushioda

A conversation with Dr. Konstantin Novoselov, Nobel laureate in Physics, 2010

Dr. Konstantin Novoselov was awarded the 2010 Nobel Prize in Physics jointly with his research adviser Dr. Andre Geim for groundbreaking experiments into the two-dimensional material graphene. Their achievement in isolating and measuring the properties of these single-atom-thick sheets of graphite is now generating intense research interest worldwide because of the material's unique properties.

Dr. Novoselov spoke to NIMS President Sukekatsu Ushioda at NIMS Sengen site on Jan. 17, 2011, during the Graphene Workshop in Tsukuba 2011. During this time of transition for NIMS, as we switch over from the second to the third Intermediate-range Plan, we were delighted to have Dr. Novoselov speak with us.

Dr. Ushioda: It's been only a few months since you received the Nobel Prize; how does it feel?

Dr. Novoselov: It's getting better and better. I'm pretty much back to spending 90% of my time on normal work.

U: You've done some unique creative work in your career; what brought you to graphene?

N: Graphene was just one of those crazy projects we were doing. When we started we always jumped from one subject to another, just wanting to do some exciting and different work. My former supervisor Andre Geim is known for things like magnetic frog levitation (for which Dr. Geim won an Ig Nobel Prize in 2000), and we together developed "gecko tape," (a biomimetic adhesive) and worked with magnetic water. It's just the style of our lab – you try to investigate something that is unusual but requires the attention of a physicist. We were initially trying to create metallic transistors, and there are a few people there, including some we know personally, who were working in the metallic transistor area, and we thought we could do it better. It was a one-off – we thought if it works it works, if doesn't it doesn't.

U: You mean the peeling …

N: Yes. Initially we just took a chunk of graphite and tried to polish it on a polishing machine, which didn't work, so we almost forgot about the project. And then I saw how people in surface science were doing it, and saw how to prepare the surface of graphite.

U: Was the carbon coming out of the metal?

N: No, it was large piece of graphite. In surface science they clean graphite by sticking on Scotch tape and peeling it off.

U: And you used the leftovers …

N: Basically, yes. We picked up the scotch tape from the garbage and tried to work with it. It was never the main direction of our research. We were working on mesoscopic superconductivity and I was doing my PhD at the time on mesoscopic ferromagnetism, looking at how domain walls in ferromagnetic materials jump from one atomic plane to another, so this was something very different. But I switched to graphene.

U: Was it at someone's suggestion?

N: No, we don't have robust, concrete topics in the lab. You're allowed to switch topics as long as the new one is more interesting than the previous one. There's nothing wrong with that; it's the style of our lab.

U: I remember many years ago I was working with Raman scattering from surfaces, and I would peel layers of gallium selenide – they peel off too – but probably not monolayers.

N: Actually, that's probably the next topic for me, because there are so many lead materials. Many of them are very interesting as well, like molybdenum disulfide and gallium selenide, because some of them are superconductors as well, and it would be interesting to try to peel off monolayers.

Here at NIMS you grow very high-quality boron-nitride (by Dr. Kenji Watanabe and Dr. Takashi Taniguchi). Nobody else in the world grows boron-nitride as good as this. We've already got some samples and peeled off some layers. But what we can also do is take a monolayer of boron-nitride and put a monolayer of graphene on top, and then put monolayer of boron-nitride on top of that. So we can make a-b-a-b layers, thus creating an artificial three-dimensional material with completely novel properties. If you're careful you can orient them as well, so you can make a-b-c-a-b-c layers. There is still some tunneling in the third direction, so it's not just graphene layers isolated from each other by boron-nitride layers. It's really a three-dimensional material with some weak conductivity in one direction perpendicular to the others. This anisotropy could be an exciting property.

U: Well, I'm happy to hear that one of our people is involved in this boron-nitride. In surface science as you probably know, when you try to clean the surface of nickel, you heat it and the carbon precipitates out. Then you sputter off carbon by argon ion bombardment. And when you cool the sample the sulfur comes out, so you sputter it off, and repeat this process to clean the Ni surface. But we always thought it was amorphous carbon.

> **if it works it works, if doesn't it doesn't.**

N: If you do it at high temperatures, at 1,400C, then it graphitizes. That's one of the most realistic and popular ways to grow graphene on a metal. It's nice to work with crystals in the lab – we can peel off 100 microns or so, but that's not enough for industry. For applications, you need large areas of this material and grow it on the surface of some metal, either nickel or copper. That's the way forward. People now are growing meters-large graphene on the surface of copper.

U: According to the citation for the Nobel Prize, you were awarded it on the basis of monolayer graphene and two-dimensional Dirac-type electronic systems. You also worked with other types of graphene. So here's a standard Japanese-type question: You must have worked very hard. Tell us about the effort you had to make.

N: Yes, we worked hard. But honestly, I don't look at it as a hard job – I'm lucky I can combine my hobby and my work. I have a big conflict with my family though, because I spend evenings and weekends at work, and I don't see them very much. My wife calls me the "ghost," because I only see the kids when they're asleep. I come home at 10:00 at night and see them sleeping, and in the morning I send them to school and then I go to work. That includes weekends as well, unfortunately.

But it's fun to work in physics. Especially in those few very productive years, when you can see new phenomena on a weekly basis, it's really encouraging.

U: I'm glad to hear that. It should encourage our workers.

N: I always tell our students, no matter how brilliant you are, you still have to be as productive as you can. Brilliant is not enough. You have to work hard.

U: What do you see as the future of graphene, in terms of applications, research, etc.?

N: This is a big issue for me, because last year there was a huge breakthrough in producing large quantities of high-quality graphene. So we're now starting to see the really exciting intrinsic properties of this material. People are starting to combine graphene with other materials as well – the range of experiments really increased dramatically in the last year, and I think we're only at the beginning. I also see people from industry coming more and more, and every day I get emails from companies who want to work with graphene. The cautious part of me suggests I should start work in some other area, because you can't get a second Nobel in graphene. But the field is so exciting I can't leave it.

U: What new challenging topics are you thinking about?

N: Well, for instance, I mentioned these heterostructures, when you combine graphene with other lead materials to create three-dimensional lattices. We have already created graphene-boron-nitride heterostructures, but we can do graphene with some other materials. Boron-nitride is an insulator, so we can combine it with a semiconductor, or even a superconductor and see how it works.

U: You could make a terahertz device with this …

N: Yes you can. The possibilities really are endless. I may go back to ferromagnetism as well. If it's possible to do it together with graphene that will be nice; if not, we'll go to some other material.

U: NIMS is the core national institute for materials research, and we have many researchers of your generation. What elements are essential for young people to make a significant contribution?

N: First of all, I must say that the necessary elements are here already. This morning (at the Graphene Workshop in Tsukuba 2011) there were two talks, one by Prof. (Yoshiko) Ohashi and one by Prof. (Chuhei) Oshima, and we will be citing both of them in our next paper on graphene.

And you know, I don't want to pretend I'm like those big guys from the past, but as Newton said, "If I have seen further it is by standing on the shoulders of giants." We weren't doing our research in a vacuum; we were relying on the work of other people. There were only a few references in our first paper, and several of them were Japanese. Actually, one was Prof. Ohashi, from an obscure journal, "Tanso" – this is the only word I know in Japanese, just *arigato* and *tanso* (it means graphite, right?). The reason I know it is, I was looking for a reference, and I found this journal "Tanso", then I was trying to figure out what *Tanso* is, and finally I realized it means graphite.

There is quite a good tradition of new and notable research in Japan. In Western culture it's not that common anymore that we can afford to work outside of social demands. But in Japan there is still this freedom of research, and you can still work on projects of your choosing. That's very important.

U: We are being pushed more and more by social pressures.

N: It is necessary of course, but I'm always trying to explain to the government and the funding board that it is important to maintain freedom of research and freedom to choose topics.

necessary elements for researchers are here already.

U: You said at the beginning of this conversation that you had a lot of freedom in choosing your topics.

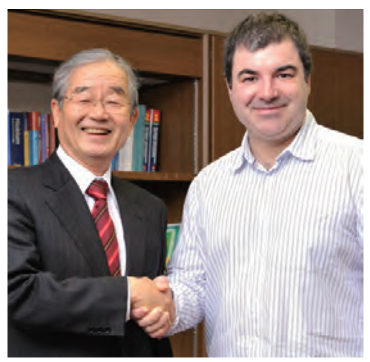
N: We were extremely lucky at that time. Now it's not as good; the government has identified a few priority areas like health, energy, etc.

U: In the U.S., I used to do research for the Air Force. They have their own mission, but I was working with gallium arsenide, doing Raman spectroscopy, surface physics and things.

N: Yes, it may sound quite strange, but the military allows much more freedom. Even if it costs them a fortune, they can afford it. So even some dreamy research can be affordable for the military. We get funding from both the Air Force and the Naval Research Lab. Not large amounts of money – outside the U.S. they only give small grants. Our government can't afford this type of blue-sky research, but the military are the richest guys in the world.

U: When I came back to Japan 25 years ago, there was a lot of freedom at universities, but not a lot of money. Japanese taxpayers were not really aware they were paying for all this. But Americans are always aware; they have a strong taxpayer consciousness. The Japanese public is becoming more and more tax-conscious, and they're starting to want to direct us.

N: Yes, but you've managed to create a great facility here, and you are keeping the spirit of freedom of research alive.



Konstantin Sergeevich Novoselov

Konstantin Sergeevich Novoselov was born Aug. 23, 1974, in Russia. He obtained a diploma from the Moscow Institute of Physics and Technology and earned his PhD at the University of Nijmegen in the Netherlands, then moved to the University of Manchester in the U.K. with Dr. Andre Geim, his doctoral advisor. He is currently a member of the mesoscopic physics research group at the University of Manchester as a Royal Society University Research Fellow. Dr. Novoselov was awarded the Europhysics Prize in 2008 "for discovering and isolating a single free-standing atomic layer of carbon and elucidating its remarkable electronic properties", and the Nobel Prize in Physics in 2010 jointly with Dr. Geim "for groundbreaking experiments regarding the two-dimensional material graphene".

Chapter 3

The new NIMS strategy to come

The New Chapter Begins

NIMS begins changes from April 2011.

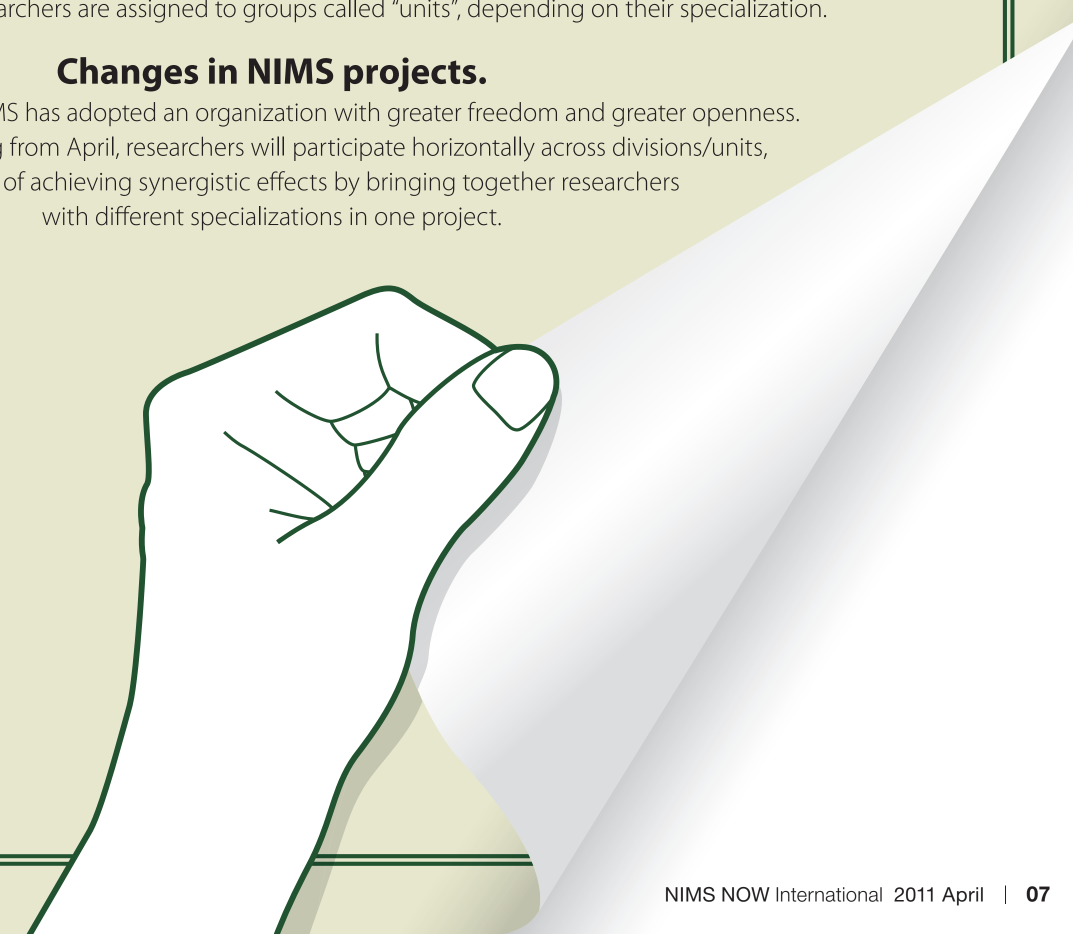
It's been 55 years from the establishment of the National Research Institute for Metals and 45 years from the establishment of the National Institute for Research in Inorganic Materials (both are the predecessor of NIMS), and NIMS itself is now 10 years old. In passing this milestone, we have adopted an even more innovative approach to research. As we begin our 3rd Five-Year Plan, we will carry out research activities with a completely new organization and a fresh spirit of challenge.

A new organization at NIMS.

NIMS has created a more dynamic organization. To heighten specialization, the organization to which researchers belong has been changed to a 3 division/1 center system. As part of this system, researchers are assigned to groups called "units", depending on their specialization.

Changes in NIMS projects.

For project research, NIMS has adopted an organization with greater freedom and greater openness. In projects beginning from April, researchers will participate horizontally across divisions/units, with the aim of achieving synergistic effects by bringing together researchers with different specializations in one project.



Chapter 3

The new NIMS strategy to come

Creating your future with materials science.

The themes of the 3rd Five-Year Plan.

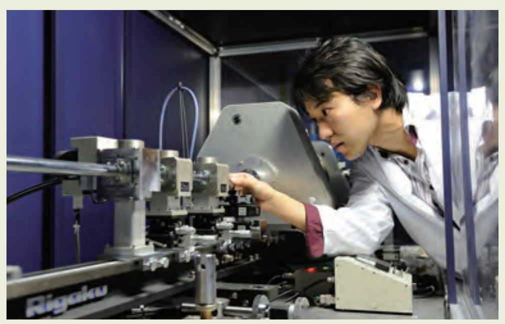
Up to now, NIMS has carried out its research and development under two Five-Year Plans, the 1st Five-Year Plan established for FY2001 to 2005, and the 2nd Five-Year Plan for FY2006 to 2010. At the conclusion of the 2nd Five-Year Plan (March 2011), NIMS had achieved a citation ranking (Citation Index) of No. 3 in the world and No. 1 in Japan for research papers in the field of materials science. NIMS also ranked No. 1 in Japan in both the number of published papers per researcher and patent applications per researcher, providing impressive evidence of how NIMS has grown during the last decade.
In the 3rd Five-Year Plan, we asked ourselves once again what is required of us. The answer to that question is the theme of the 3rd Five-Year Plan, "Basic research responding to social needs".

For "Materials science linked to society".

Society places wide-ranging expectations on science, and these expectations change with the times. The needs of society are truly diverse, including more advanced science and technology, changing lifestyles, and the problems of the natural sciences and sustainability, among others. It also goes without saying that there is no one-to-one correspondence between these social needs and designated fields of research. For this reason, it is always necessary to organize projects in a way that cuts horizontally across multiple research fields.
With this in mind, rather than focusing only on specialization in our own research, NIMS is launching an experiment that links research to society by organizing project teams across specialties in order to address individual social needs.
Moreover, as a research project progresses, the ramifications of the project become increasingly complex. If this is reflected directly in subdivisions in the project organization, it may lead to compartmentalization by specialty, or "vertical compartmentalization".

To avoid vertical compartmentalization, and to realize more active cooperation and information exchanges across fields, we have reconsidered the relationship between "research organization" and "research project".

The NIMS 3rd Five-Year Plan will lead to a solution to this problem from the viewpoint of organizational structure.
Under the 2nd Five-Year Plan, the members of individual research organizations such as Centers simply became members of projects. However, under the 3rd Five-Year Plan, "research organization" and "research project" intersect, enabling flexible rearrangement.
In other words, a "research organization" is organized by the field of specialization of the researchers, whereas a "research project" brings together researchers in multiple "research organizations" horizontally to create the optimum team for each research topic. It is also possible for individual researchers to participate in multiple projects.
We believe that this new system will avoid rigidity in research due to vertical compartmentalization, while preserving the specialization of researchers, and thus will enable a more flexible, more effective response to the needs of society.



Chapter 3

The new NIMS strategy to come

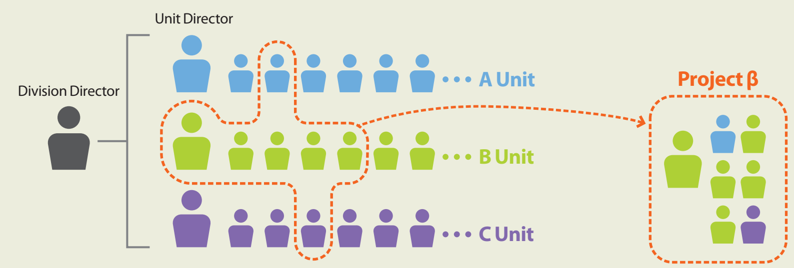
Research projects integrated into 19 projects in 3 fields.

Project research under the 2nd Five-Year Plan comprised 30 projects in 6 fields. This research was carried out mainly by Centers. Under the 3rd Five-Year Plan, this approach was reviewed, and all of these projects were integrated into 19 projects in 3 fields.
The largest number of projects is in the field of energy, environment and resource materials, where 10 projects are underway. The high priority assigned to this area responds to the fact that the government's New Growth Strategy (adopted by Cabinet resolution on June 18, 2010) positions "Green Innovation", focusing on the environment and energy, as a growth field that takes advantage of Japan's strengths. In promoting materials science in Green Innovation, it is important that our efforts not be limited only to the Japanese government's Growth Strategy. This is because the problems of the environment, energy, and natural resources are not limited to the one country of Japan, but are problems of global scope. Newly-developed materials that can contribute to solving environmental and energy-related problems can also make an important contribution at the global level, beyond national boundaries.

The field of advanced key technologies and that of nano-scale materials are the basis for the research potential of NIMS. These are technologies which support breakthroughs in materials science, such as characterization techniques (measurement and analysis), simulation techniques, material design techniques, creation of new production processes, the search for new phenomena and functions unique to nano-scale materials. It can also be said that these are the foundations of NIMS. For example, the field of energy, environment and resource materials includes a project called "Advanced Materials Research for Strategic Natural Resources". This project was established on an urgent basis in the autumn of 2010 by reorganizing strategic element research in NIMS, responding to concerns that Japan has become overly dependent on foreign sources of rare earth metals in recent years. This type of dynamic response was possible because these two basic fields firmly support research at NIMS.

Forming units with high specialization in a research organization comprising 3 research divisions and 1 center.

The areas and centers under the 2nd Five-Year Plan were newly reorganized into a system of 3 research divisions and 1 center. In each of these research divisions, "units" are formed, bringing together researchers with a high degree of specialization in more closely-defined areas.
The 3 divisions are the "Environment and Energy Materials Division", "Nano-scale Materials Division/MANA", and "Advanced Key Technologies Division". The center is the "Research Center for Strategic Materials".
Here, researchers in each specialization belong to divisions or a center, where they carry out their own research work and grapple with the development of human resources. Based on their affiliation with a field of specialization, researchers also participate in various projects.



Units are organized by research area, and Projects are set up across Units. For example, researchers from Units A, B, and C can participate in Project β. The fusion of research areas in these Units proceeds in parallel with the successful results of the Project. Through this fusion, we will accelerate the process of diversification of research and continuously expand its effects.

Chapter **3**

The new NIMS strategy to come

Strengthening of collaboration with the private sector.

For NIMS to carry out basic research and return the results of that research to society, collaboration with companies in the private sector is of the utmost importance. However, it is not easy to transfer the results to the private companies.

For this reason, the 3rd Five-Year Plan prioritizes 3 elements in collaboration with private companies.

First, NIMS has extremely high latent potential for basic research in materials science. That potential is attracting increasing attention, beginning with the large number of scientific papers published by NIMS researchers.

Second, NIMS possesses advanced generic/infrastructural facilities and equipment which are difficult for individual companies to own and maintain. Sharing of those facilities has also encouraged greater activity in joint research by user organizations and NIMS.

The third key element is use of intellectual property produced by this kind of joint research with companies. In this connection, NIMS also makes it easier for the private-sector to participate in collaborative projects by flexibly responding to company needs, for example, by giving counterpart companies priority in use.

Beginning in 2009, use of a wider range of infrastructure became possible under an initiative called the Tsukuba Innovation Arena (TIA), further expanding the possibilities of collaborative research. TIA was established under the leadership of NIMS, the National Institute of Advanced Industrial Science and Technology (AIST), and the University of Tsukuba, in cooperation with industry.

High potential in basic research, advanced research facilities and equipment, and flexible use of intellectual property – By organically integrating these three elements, NIMS intends to realize a collaborative environment where cooperation with private companies is easy, providing a "model of success" in collaboration between industry and independent administrative agencies like NIMS.

Acceleration of internationalization.

To date, the International Center for Materials Nanoarchitectonics (MANA), which is now one of the new research divisions, has promoted internationalization by constructing an international, interdisciplinary research environment, training young scientists and young research leaders, introducing bilingual administrative procedures, etc. In the future, similar efforts will be expanded to research and administrative divisions other than MANA.

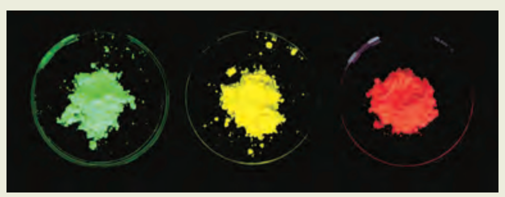
In particular, realizing an environment in which international researchers can devote their full efforts to research work through introduction of bilingual procedures responds to the circulation of intellectual talent at the global level, making it possible to secure outstanding non-Japanese researchers at NIMS.

NIMS has also constructed an international network with research centers in other countries under international cooperation agreements, such as the World Materials Research Institute Forum (WMRIF), which includes many of the world's leading research institutes for materials science. Under the 3rd Five-Year Plan, NIMS intends to translate these international activities into concrete research results, for example, by publication of papers under international joint authorship.

A new structure for effective governance.

In the 3rd Five-Year Plan a new management structure was established, combining centralization and decentralization, to enable efficient decision making on issues identified by the President.

The President directly manages the progress of collaboration with private companies, as this is a critical activity that returns the results of research at NIMS to society. On the other hand, the President delegates the authority for routine management of progress in research work to the Directors of the respective divisions, resulting in an efficiency division of labor in the management of various projects.



Research Organization : 3 Research Divisions and 1 Center

President

Advanced Key Technologies Division (7 Units)

- Nano Characterization Unit
- Surface Physics and Structure Unit
- Quantum Beam Unit
- Computational Materials Science Unit
- Photonic Materials Unit
- Materials Processing Unit
- Polymer Materials Unit

Nano-Scale Materials Division · MANA (17 Units + 1 Foundry)

- Soft Chemistry Unit
- Inorganic Nanostructures Unit
- Nanotubes Unit
- Supermolecules Unit
- Nano-Electronics Materials Unit
- Nano-System Organization Unit
- Nano Functionality Integration Unit
- Atomic Electronics Unit
- Nano-System Theoretical Physics Unit
- π-Electron Electronics Unit
- Nano Interface Unit
- Sustainability Materials Unit
- Soft Ionics Unit
- Nano Photocatalyst Unit
- Reticular Materials Unit
- Biomaterials Unit
- Tissue Regeneration Materials Unit
- MANA Foundry

Environment and Energy Materials Division (12 Units)

- Environmental Remediation Materials Unit
- Superconducting Properties Unit
- Superconducting Wires Unit
- Battery Materials Unit
- Hydrogen Materials Unit
- Photovoltaic Materials Unit
- Materials Reliability Unit
- High Temperature Materials Unit
- Hybrid Materials Unit
- Optical and Electronic
- Materials Unit
- Sialon Unit
- Magnetic Materials Unit

Research Center for Strategic Materials (1 Unit)

- Structural Materials Unit

Research Project : 3 Fields and 19 Projects

Advanced key technologies	Advanced Materials Characterization Materials Design Simulation Innovative Photonic Materials Novel Materials through Improved Particle Processing Organic Molecular Networks
Nano-Scale materials	System Nanotechnology Chemical Nanotechnology New Materials Research for Future Nano Electronics Design of Novel Bio-functional Materials by Nano-bio Technologies
Energy, environment and resource materials	Innovative Materials for Environmental Remediation Superconducting Materials Electric Generation and Storage Photovoltaics Advanced Materials Research for Strategic Natural Resources R&D of Assessment Technology on Reliability of Structural Materials for Energy Industry Heat Resistant and Durable Materials for a Low Carbon Society Light Weight-High Performance Hybrid Materials Wide Bandgap Materials for Optics and Electronics Magnetic Materials

*The above information is as of April 1, 2011.

NIMS NEWS

Condition of NIMS after the Great East Japan Earthquake

Some equipment and facilities at NIMS were damaged by the Great East Japan Earthquake on March 11. NIMS conducted a survey immediately after the quake and found that the damage to NIMS facilities did not affect the surrounding area. Sequential restoration of equipment began from March 14.

In order to provide emergency information, the NIMS Public Relations Office set up and began using a new Twitter account (**@NIMS_PR**). To determine the effects of the accident at the Fukushima Daiichi Nuclear Power Plant, NIMS also began measuring the radiation level on the grounds of Sengen Site. The results can be found at the following page:

>> **http://www.nims.go.jp/siteinfo/info/sengen_radiation-ray.html**

Measurement location: 1-2-1, Sengen, Tsukuba, Ibaraki Prefecture (measured in exposed condition outdoors)

Measurement conditions

Measuring instrument: NaI scintillation counter (ALOKA TSC-161)

Dose rate: Value including background level (0.1μSv/h)

◆ Postponement of Observation Tours, Seminars, and Open House

The 2nd eSciDoc.JP Workshop, which had been scheduled for March 22 (Tuesday), was postponed until June.

The 2011 Science and Technology Week event, "NIMS Open House", which was scheduled for April 8 (Friday), 20 (Wednesday), and 24 (Sunday), has also been postponed. The new dates for the Open House event will be posted on the NIMS website, etc. when this information is available.

1 MANA Hosts "Prof. Rohrer's Science Class 2011"

On March 5, MANA hosted "Prof. Rohrer's Science Class 2011" at the Namiki Site.

As part of a series of outreach activities at MANA, this science class was held to encourage an understanding of the interest and pleasures of sciences under Prof. Heinrich Rohrer, who was the 1986 winner of the Nobel Prize in Physics and is now a NIMS Adviser. A total of 80 middle school students from the nearby Tsukuba area participated.

Prof. Rohrer gave a lecture entitled "Science, Fascination and Passion", and all the participants listened with keen interest to his talk which was filled with humor and wisdom.

During the question-and-answer session, many students asked Prof. Rohrer about his own student days and his everyday life. The session was quite active, with specialized questions about research, and some students also posed questions to Prof. Rohrer directly in English. At a reception after the lecture, students took photos with Prof. Rohrer and chatted with him in English. Students were greatly stimulated by Prof. Rohrer's lecture and personality.

Prof. Heinrich Rohrer (center, back row) with middle school students who participated in his "Science Class".

Hello *from* NIMS

Dear NIMS NOW readers,

My name is Rudder Wu. I was born in Taiwan, grew up in Vancouver, British Columbia and received my PhD degree from Imperial College London in the United Kingdom. After PhD, I moved to Japan and have been working as a postdoctoral researcher at the International Center for Young Scientists (ICYS) of NIMS for more than 2 years. Unlike typical postdoctoral experience, here at ICYS, my colleagues and I were given the freedom to pursue independent research, the encouragement to apply for external competitive funding, the opportunity to manage research budgets and most importantly, the environment to freely interact with other young scientists of different cultural and research backgrounds.

On days off work, I enjoy reading books, exercising in the gym and taking photos of nature scenery. Rather than paying attention to the development of latest electronics and techno gadgets, I am more interested in discovering fine details from Japanese traditional culture and seeking alternative inspiration from every encounter with the elder generation and their preserved work ethic and discipline of the past. If you share similar interests, feel free to get in touch with me. Finally, as NIMS NOW International newsletters get delivered to just about every corner of the world, I hope my story above will serve as a catalyst to encourage young researchers to consider potential research opportunities at NIMS or other institutions in Japan.

Attending the Millennium Science Forum at the British Embassy in Tokyo

Random photos taken in Japan

Rudder Wu (Canada)
ICYS researcher
More than 2 years at NIMS.

NIMS NOW International 2011. Vol.9 No.3
National Institute for Materials Science
http://www.nims.go.jp/eng/publicity/nimsnow/

To subscribe, contact:
Mr. Tomoaki Hyodo, Publisher
Public Relations Office, NIMS
1-2-1 Sengen, Tsukuba, Ibaraki, 305-0047 JAPAN
Phone: +81-29-859-2026, Fax: +81-29-859-2017
Email: inquiry@nims.go.jp

R70 Percentage of Waste Paper pulp 70%
PRINTED WITH SOY INK