



RCMS NEWS

15
2014

NAGOYA UNIVERSITY
RESEARCH CENTER FOR MATERIALS SCIENCE

Reports and Communications of RCMS Activities
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March 2014
Issue #15



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MEXT Project of Integrated Research on Chemical Synthesis 2013

In 2013, MEXT Project of Integrated Research on Chemical Synthesis, a pioneering synthesis of a new scientific base and nurturing the next generation of researchers (Hokkaido University Catalysis Research Center, Nagoya University Research Center for Materials Science, Kyoto University International Research Center for Elements Science Institute for Chemical Research, Kyushu University Institute for Materials Chemistry and Engineering) held the symposium and forum below.

The 4th Young Researchers Forum

(Nagoya, June 28–29, 2013)



Group photo



Chair, Assoc. Prof. Shimizu



Guest speaker, Dr. Sato, Toyota Central R&D Labs

The 4th Symposium on MEXT Project of Integrated Research on Chemical Synthesis

(Hokkaido University, October 31 – November 1, 2013)



Opening remarks, Prof. Ueda



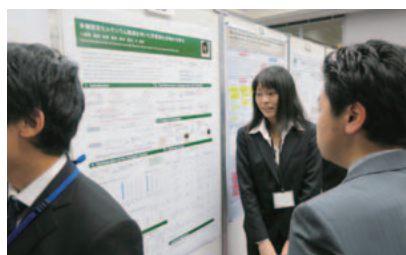
Prof. Kanai, Tokyo Univ.



Prof. Hosono, Tokyo Tec. Univ.



Prof. Hishikawa, Nagoya Univ.



Poster session

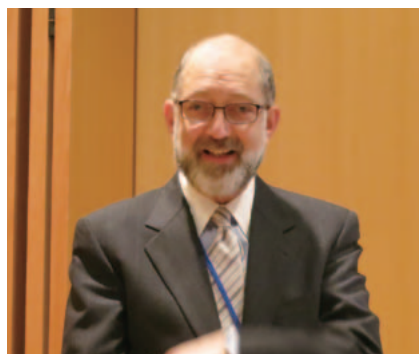
The 3rd International Conference on MEXT Project of Integrated Research on Chemical Synthesis
(Kyusyu University, January 10–11, 2014)



Prof. Takahara, Director of IMCE



Prof. Matyjaszewski, USA



Prof. Kertesz, USA



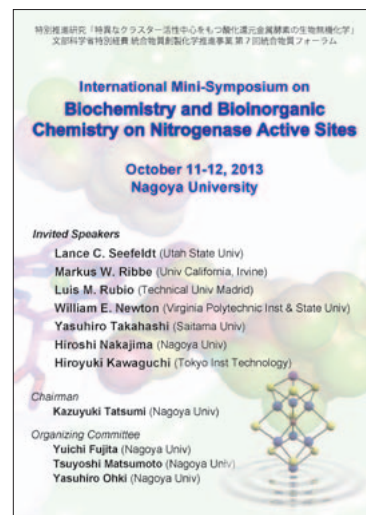
Poster session



Dr. Chan, Taiwan



Prof. Woerpel, USA



The 7th Forum

[Symposium and Forum in 2014]

- *The 4th International Conference on MEXT Project of Integrated Research on Chemical Synthesis in Kyoto (July 10–11, 2014)
- *The 5th Symposium on MEXT Project of Integrated Research on Chemical Synthesis in Nagoya (December 19–20, 2014)
- *The 5th Young Researchers Forum in Hokkaido

The 15th · 16th University of Münster · Nagoya University Joint Seminars

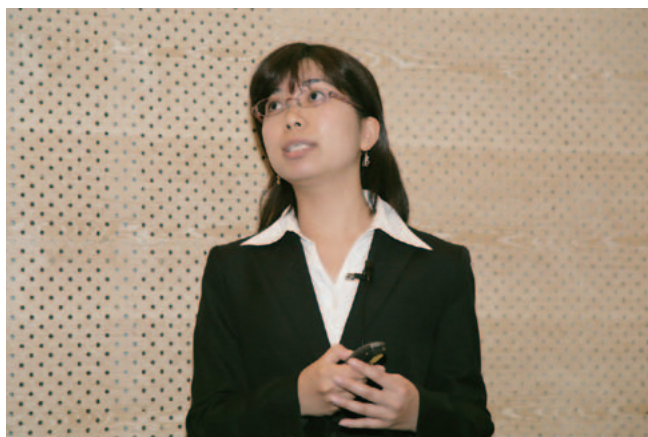
The 2013 University of Münster · Nagoya University Japan-Germany Joint Seminars were held on the dates listed below. As a successor of the Japan Society for the Promotion of Science's (JSPS) "Japanese-German Graduate Externship" program, these seminars function in the same vein as the "Strategic Young Researcher Overseas Visits Program for Accelerating Brain Circulation" as excellent opportunities for both Japanese and German postdoctoral students as well as students in the doctoral course to confirm and verify the state of progress of developing joint research while actively dispatched.

[15th Japan-Germany Joint Seminar]

May 20–21, 2013 (Monday – Tuesday) at Nagoya University

German Participants: 4 Faculty and 7 Students (Oral Presentations)

Japanese Participants: 5 Faculty and 4 Students (Oral Presentations), 30 Poster Presentations



Yamaguchi, student



Poster session



Group photo

[16th Japan-Germany Joint Seminar]

November 11–12, 2013 (Monday – Tuesday) at University of Münster

Japanese Participants: 8 Faculty, 1 Post doc and 4 Students (Oral Presentations)

German Participants: 3 Faculty, 2 Post doc and 6 Students (Oral Presentations), 19 Poster Presentations



Dr. Omachi



Discussion in Münster



In Münster

[Mini Piano Concert by Japanese Students]

At the 15th Joint Seminar, a mini piano concert by Japanese students was held. Using the grand piano in the Chemistry Lounge on the 2nd floor of the Noyori Materials Science Laboratory, at the site of the poster exhibition, the performers were able to show others their own characteristic piano playing.



Nanjo, student



Nishimoto, student

Integrative Graduate Education and Research Program in Green Natural Sciences (IGER)

In 2011, the Program for Leading Graduate Schools was adopted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), built on three pillars: ① practicing cutting-edge fundamental natural science research, ② completion of sufficient coursework to enable that research, and ③ graduate school literacy education (English training, studying abroad, skill seminars, etc.). Based on these, the program aims to nurture the “scientific ability and social skills to view situations from a broad perspective,” “developmental ability to extract practical results from fundamental research,” and “active international citizenship on a global scale,” along with fostering “corporate researchers cultivated as seeds in industry,” “academic researchers raised in the scholarly domain,” and “environmental coordinators and mentors active throughout global society” that will carry the environmental fields of the next generation.

Some activities of our program are introduced as follows;

Annual Meeting: The Annual Meeting was held on January 8th. Five activities, “Research at foreign research institution”, “Female Top Leader Promotion Program”, “Internship”, “International Education Project” and “Short Leadership Program at North Carolina” were reported. In addition, many participants viewed and discussed around 180 posters exhibiting reports of the results of various efforts and research reports of selected twelve students.

Short Leadership Program at North Carolina: Twelve students participated in the Short Leadership Program at North Carolina, US, between March 3rd and 14th, 2014. All students not only attended lectures regarding Leadership, Entrepreneurship and Technology Transfer but also visited many laboratories in North Carolina State University, Duke University and University of North Carolina at Chapel Hill to build networks with PIs, postdocs and graduate students. In addition, all of them had opportunities to do presentations on their research to these researchers and have discussions. Furthermore, they visited seven companies to learn some ideas of working in industry as a researcher and business environment in the USA from entrepreneurs and researchers. Here are companies students visited during their stay: GlaxoSmithKline, Eisai, Inc., and Biogen Idec, world leading pharmaceutical companies; Syngenta Biotechnology, Inc. and BASF Corporation, global agribiotechnology companies; and Scynexis, Inc. and NIRvana Sciences, growing local companies.



Annual meeting



Work shop In North Carolina

In October, 2013, a meeting between Dr. Osamu Shimomura, Distinguished Invited Professor of Nagoya University and International Advisory Board Member for our program (IGER), and Dr. Kunio Awaga, Professor and Director of RCMS and Program Coordinator of IGER, was held. During this meeting, Dr. Shimomura kindly offered some advice for the IGER and for young researchers including graduated students.



Dr. Shimomura, Nobel Laureates and Prof. Awaga

10th Yoshimasa Hirata Memorial Lecture and ITbM-IGER-RCMS International Nagoya Symposium on Transformative Synthesis

The 10th Yoshimasa Hirata Memorial Lecture and the ITbM-IGER-RCMS International Nagoya Symposium on Transformative Synthesis were held at the Noyori Conference Hall on Tuesday, February 18th 2014.

The Yoshimasa Hirata Memorial Lecture was established in 2004, laying the foundation for natural product chemistry, where a great number of distinguished pupils gathered to honor the achievements of the late Nagoya University Professor Emeritus Yoshimasa Hirata. Since then, it has been held annually, where prominent researchers in the domain of synthetic organic chemistry have been presented with an award for their lecture. This year, for its 10th and final round, the lecture was held in conjunction with the International Nagoya Symposium on Transformative Synthesis, where up-and-coming young researchers from Japan and around the world were invited to speak and learn about the most recent developments in synthetic organic chemical research.

This year's Hirata Memorial Lectureship Award was received by Professor Martin D. Burke (University of Illinois at Urbana-Champaign, USA), who achieved innovative progress for the Suzuki-Miyaura coupling reaction and 'Molecule Prosthetics'. Prof. Burke was presented with a genuine gold medal embedded with the image of Professor Hirata, and the packed auditorium listened with great enthusiasm as he discussed the background, successes, and course of his research.

The invited lecturers for the International Nagoya Symposium on Transformational Synthesis were Yoshito Kishi (Professor, Harvard University, USA), Daisuke Uemura (Professor, Kanagawa University, Japan), and Justin Du Bois (Associate Professor, Stanford University, USA), all whom presented wonderful talks in an easy-to-understand manner regarding the development of research at the forefront of synthetic organic chemistry.

In the closing remarks, Prof. Yamaguchi (ITbM, vice-Director) deeply expressed his appreciation for all participants' efforts contributing to the success of the Yoshimasa Hirata Memorial Lectures and announced that the Yoshimasa Hirata Memorial Lecture will continue next year as the 'Hirata Award'.



Award ceremony of 10th Yoshimasa Hirata Memorial Lecture



In the front row, from the left: Shigehiro Yamaguchi, Daisuke Uemura, Kiyoyuki Yamada, Ryoji Noyori, Martin D. Burke, Yoshito Kishi, Justin Du Bois, Kenichiro Itami.
In the back row, from the left: Takashi Ooi, Masato Kitamura, Masaaki Suzuki, Tohru Fukuyama, Haruki Niwa, Tsuyoshi Matsumoto, Takashi Yoshimura, Toshio Nishikawa, Stephan Irle.

Visiting Professors 2013

Prof. E. Peter Kündig

Professor of Emeritus, University of Geneva



Period of Stay:

September 30 – December 21, 2013

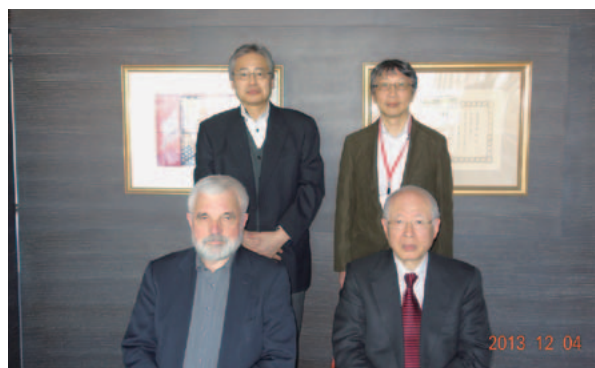
Research Theme:

“Study on High Performance and Environmentally Benign Molecular Catalysis”

University of Geneva (Swiss) and stayed for three months from September 30 to December 21 2013. He is a specialist of transition-metal chemistry and his research interests are broad from metal complexes syntheses to application for catalytic organic syntheses. Recently, he has contributed to catalytic asymmetric C-H activation methodology. During such researches,

he also contributed to chemical societies through the President of the Swiss Chemical Society, President of the evaluation committee of the Department of Chemistry and Applied Biosciences, ETH Zurich, and so on.

During this period, he has participated in our research group meeting and given us many valuable suggestions. He lectured to graduate school students at a curriculum, “Cross-sectional Graduate Lecture by foreign professors” for six times, and to all of members at RCMS seminar, titled as “New chiral NHC ligand for the catalytic asymmetric arylation of amides and the enantioselective C(sp³)-H activation.” He made many opportunities to discuss with researchers including young scientists and student. We have had precious time for these three months.



I visited Nagoya University first in 1985 on invitation by Ryoji Noyori and Hisashi Yamamoto. Over the years I came to Nagoya several times again and have witnessed the consolidation of this school as one of the foremost places of research in chemistry in Japan and the world. My 3-month (Oct–Dec. 2013) stay at the Nagoya Research Center for Materials Science was terrific. It was rich in interaction with RCMS colleagues, those in the Graduate Schools of Science and of Pharmaceutical Sciences, as well as with chemistry colleagues in the Graduate School of Engineering. Several of the discussions ended in agreements to collaborate. I enjoyed giving research lectures and teaching to graduate students. One of my favorite also was the Saturday morning group seminars of my host, Masato Kitamura. My schedule saw exponential growth as a result of lecture invitations from a large number of Universities in the Nagoya and Kansai region. In addition to a profound enrichment of my knowledge of frontier areas of catalysis and synthesis, I acquired a considerable expertise in Japanese cuisine and in Sake and intensified and extended friendships. Discussions on science, publishing and exchanges of reminiscences with Ryoji Noyori were another appreciated component of my stay.

A great apartment on top of the Noyori conference hall, superb hospitality, all contributed to a scientifically and personally very rich stay in Nagoya. It will be remembered fondly forever. Special thanks go to Masato Kitamura for being an outstanding host and friend, and to Yuriko Nakamura and Yuko Kihara, whose great help was very much appreciated.

E. Peter Kündig

Prof. Peter Skabara

Professor, University of Strathclyde



Period of Stay:

January 21 – March 1, 2014

Research Theme:

“Synthesis, properties, and application of novel conjugated molecules for organic electronics”

Professor Peter Skabara, from the United Kingdom’s Strathclyde University, stayed as a resident at Nagoya University for around one month, from January 21 – March 1, 2014 under his research subject “Synthesis, properties, and application of novel conjugated molecules for organic electronics.” Prof. Skabara is a prominent researcher in the field of synthesis and physical property development of novel conjugated system organic compounds that make up the materials for organic solar cells, organic electroluminescence elements and organic transistors, and works as the Deputy Editor in Chief of the Royal Society of Chemistry’s material systems journal “Journal of Materials Chemistry C.” During his residency, Prof. Skabara participated in discussions and offered a great amount of valuable advice to laboratories such as the Advanced Materials Laboratory and Functional Organic Materials Laboratory. In particular,

he showed interest in the application of polythiophene with the tetrathiafulvalene region that he himself synthesized as electrode material, and along with immediately bringing a sample, is commencing joint research with the Advanced Materials Laboratory. Furthermore, it was decided that he will participate as a cooperative member of the Japan Society for the Promotion of Science’s Core-to-Core Program (A. Advanced Research Networks) coordinated by RCMS Director Awaga.

Along with moving the joint research forward, Prof. Skabara gave a lecture on February 4th at the RCMS-IGER seminar entitled “The role of non-covalent interactions in band-gap tuning, conformation and self-assembly;” where his humorous style (such as using wooden chopsticks to explain the molecular arrangement inside of a crystal) received an overwhelmingly favorable reception.

In addition to Prof. Skabara’s warm and openhearted personality, he also had a profound interest in Japanese culture, food and tradition, and came away from his experience with an immensely positive impression of Japan. During the second half of his stay, his wife also visited Japan, and on the weekends they traveled to many nearby sightseeing spots together. Unfortunately, his short stay ended with his return to the UK on March 1st, but Prof. Skabara will again return to Nagoya in October to participate in the symposium for the Core-to-Core Program, and we are looking forward to the progress of our joint research, including the exchange of each other’s students.



In late summer 2013 an unexpected opportunity presented itself to me with the prospect of 1–3 months as a visiting professor at the University of Nagoya in Japan. This was an extremely exciting opportunity, but some concerns went through my mind: family commitments (I have 4 daughters); would my research group function well in my absence with correspondence limited to e-mails and conference calls; will the time spent abroad have at least equal value and output as the same time spent at my home institution in Glasgow. On the other hand, the position would present a unique opportunity to build links with an internationally leading Materials Chemistry group in one of the top Universities in Japan. At the same time, being based in Nagoya would provide an excellent base to reach further out into the country and make contact with other groups to disseminate my group’s research activities and develop collaborative projects. My final decision was a compromise: -a 6-week term of appointment to begin in January 2014.

Having visited Japan before, once for a conference in Osaka and a few years later a two-day meeting in Nagoya, I was no stranger to the culture and cuisine that is so strikingly different to the Western world. However, these previous trips were only for a few days (the return to ‘fish and chips’ was never far away in time), and I was conscious that a 6-week experience would be an entirely different prospect. I arrived in Nagoya International airport on Tuesday late afternoon, feeling tired and jetlagged after having spent several hours at Narita airport (Tokyo) waiting for the connecting flight. A familiar and welcoming face, that of Prof Shigehiro Yamaguchi (previous host in Nagoya), was there to greet me and I was subsequently escorted by train and taxi to the University campus where my apartment was located. Despite my tiredness, I could not fail to notice the stunning blue display of the University clock tower – a legacy from the successful patents that were developed by Isamu Akasaki on GaN LEDs in the late 1980s. Prior to my arrival, I had not thought so deeply about accommodation and what was in store for me for the next 6 weeks – all that mattered was that I had a roof over my head and a warm bed, close to the University. So, it was a somewhat unexpected but very pleasant surprise to be presented with a beautiful spacious and modern apartment, equipped with all mod cons. This included remote controlled air conditioning and full electronic control of the bath system. In the morning I would open the blinds of my apartment to have full view of my office in the Materials Science building. The Noyori international accommodation facilities and location were a perfect start to my stay in Nagoya.

My time in Nagoya and elsewhere in Japan was filled with many activities and discussions, so the 6-week period went by swiftly – too swiftly. I felt I had made some excellent new contacts and cemented ongoing collaborations. On my last night on campus, we held a farewell reception so that I could thank my hosts and all the people I had interacted with in Nagoya. This was a touching and special moment for me. I have now spent research sabbaticals in several locations around the world, but never have my shoes been filled with so much lead as they were the next morning when I finally left Japan on this particular trip. A core-to-core workshop is scheduled for October in Hokkaido and I cannot wait to return to this beautiful country and link once again with the highly talented research colleagues I have befriended.

Peter Skabara

New Faculty Member

Design and Regulation of Solid Catalyst Surfaces and Catalysis

Various chemical processes have been achieved by heterogeneous solid catalysts, however it is still difficult to understand the active structures of solid catalysts and their reaction mechanism of heterogeneous catalysis. Molecular level design of heterogeneous catalyst surfaces toward selective catalysis is one of the challenging subjects in modern chemistry. We have studied supported metal complexes and metal nanoclusters on oxide surfaces prepared by chemical attaching techniques of metal-complex precursors and chemical functionalization of solid catalyst surfaces. We have also developed in situ time-resolved/space-resolved XAFS techniques to understand dynamic catalysis at solid surfaces. Scanning nano-XAFS and X-ray computed laminography XAFS provide 2 or 3-dimensional images of structures and chemical states of solid catalysts, and relationship between active structures in solid catalysts and their catalysis are discussed.



Collaborator: Dr. Satoshi Muratsugu, Dr. Nozomu Ishiguro, Dr. Tomoya Uruga, Dr. Toshihiko Yokoyama

(Mizuki TADA)

Mechanisms of phospholipid trafficking for maintaining organelle homeostasis

Cellular power plants, mitochondria are dynamic organelle and constantly fuse and divide to maintain their proper shape. More importantly, mitochondria can dramatically change (increase/decrease) their volume in response to extracellular environment, indicating that mitochondria are flexible organelle (Figure 1). Since it has been revealed that defects in mitochondrial fusion and fission lead to neurodegenerative disease and cardiomyopathy, the mechanisms of mitochondrial fusion/fission have been extensively studied. However, it is hard to explain how mitochondria proliferate from the aspect of mitochondrial fusion/fission. In order to understand how mitochondria maintain their flexibility, we focus on phospholipids, major components of organelle membranes, especially their traffic among organelles. Despite the importance, it is largely unknown how phospholipids travel between organelle membranes. We are now tackling this unexplored field through identifying novel players involved in phospholipid biogenesis and developing assay system to analyze phospholipid transport between mitochondria and the endoplasmic reticulum (ER) *in vitro*.

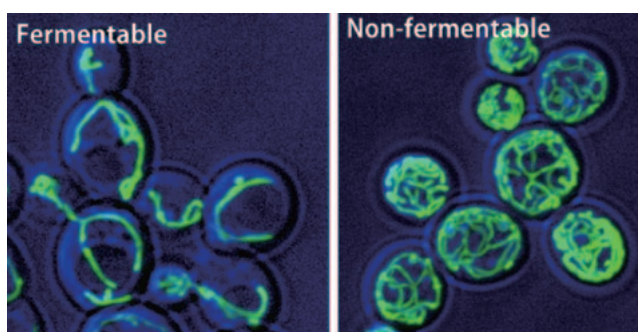


Figure 1 Morphological change in mitochondria in response to extracellular nutrient

References

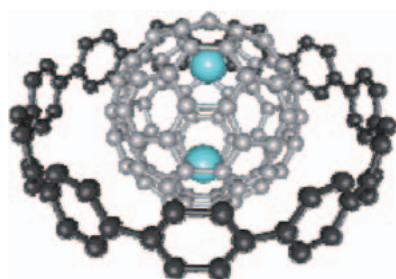
- [1] Tamura, Y. *et al.* (2012) *J. Biol. Chem.* **287**, 15205–15218.
- [2] Tamura, Y. *et al.* (2012) *J. Biol. Chem.* **287**, 43961–43971.
- [3] Tamura, Y. *et al.* (2013) *Cell Metab.* **17**, 709–718.

(Yasushi TAMURA)

Size-Selective Extraction of Endohedral Metallofullerenes

Endohedral metallofullerenes, fullerenes with metallic species encapsulated, show unique electronic and magnetic properties.^[1] Despite their great potential, applications of metallofullerenes have been limited by the known difficulties of efficient separation and purification.

Herein, we report a new strategy for the non-chromatographic extraction of metallofullerenes is based on the size-selective complexation with cycloparaphenylene (CPP), an all-benzene carbon nanoring.^[2]



CPP, which has an inner cavity and π -conjugated structure, represents one of the best candidate host molecules for metallofullerenes.^[3] We found that [11]CPP has a high affinity for $\text{Gd}@C_{82}$, $\text{Tm}@C_{82}$, $\text{Lu}_2@C_{82}$. In addition, an enrichment of $\text{Gd}@C_{82}$ was demonstrated from mixture solutions of arc-processed raw soot by the addition of [11]CPP. This approach should open new opportunities in metallofullerene chemistry, including for missing metallofullerenes.

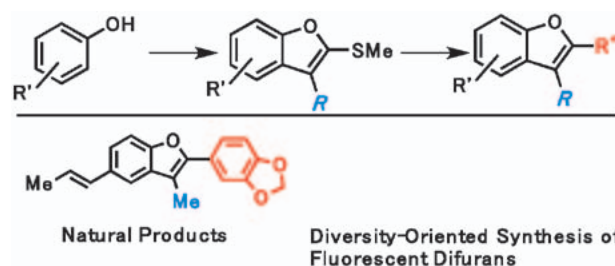
References

- [1] H. Shinohara, *Rep. Prog. Phys.* **2000**, *63*, 843.
- [2] Y. Nakanishi, H. Omachi, S. Matsuura, Y. Miyata, R. Kitaura, Y. Segawa, K. Itami, H. Shinohara, *Angew. Chem., Int. Ed.* **2014**, *53*, 3102.
- [3] H. Omachi, Y. Segawa, K. Itami, *Acc. Chem. Res.* **2012**, *45*, 1378.

(Haruka OMACHI)

Development of New Transformation of Unreactive Bonds

Organic chemistry has been regarded as the most important field in materials science because it provides understanding on organic molecules, which have been widely found in various bioactive molecules and organic functional materials. Since structures of molecules significantly affect their properties, development of direct, precise, and selective synthesis of target molecules is highly important. Here, I wish to introduce our recent achievements that have been conducted under the guidance of Profs. Atsuhiro Osuka and Hideki Yorimitsu until Feb. 2014 at the Hakubi Center for Advanced Research.



Benzofurans are ubiquitous frameworks that are found in various natural products, bioactive molecules, and functional molecules. Development of selective and tailor-made syntheses of benzofurans is therefore highly important for pharmaceutical chemists, as well as material chemists who need libraries for novel medicines and functional molecules. We submitted our work on the extended Pummerer annulation/cross-coupling sequence to construct multisubstituted benzofurans at will.¹ Our sequence is powerful enough to synthesize biologically active natural products as well as highly fluorescent benzofuran derivatives.

Recently, I joined the Itami Group² as an assistant professor, where the people are pursuing ideal synthesis to discover new functional materials. I wish to contribute my work in our common goal through novel reactions.

References

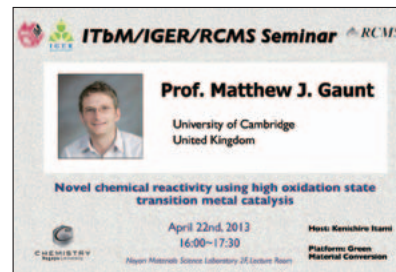
1. K. Murakami, H. Yorimitsu, A. Osuka, *Submitted*.
2. Recent reviews from our group: (a) J. Yamaguchi, K. Muto, K. Itami, *Eur. J. Org. Chem.* **2013**, *1*, 19; (b) J. Yamaguchi, A. D. Yamaguchi, K. Itami, *Angew. Chem., Int. Ed.* **2012**, *51*, 8960; (c) H. Omachi, Y. Segawa, K. Itami, *Acc. Chem. Res.* **2012**, *45*, 1378.

(Kei MURAKAMI)

RCMS Seminars

April 9, 2013 Prof. Dr. Marcus Elstner
 (Institute of Physical Chemistry, Karlsruhe Institute of Technology (KIT), Germany)
 “Multi-Scale Methods for the Investigation of Biological Structures and Processes”

April 22, 2013 Prof. Matthew J. Gaunt
 (University of Cambridge, United Kingdom)
 “Novel chemical reactivity using high oxidation state transition metal catalysis”



April 24, 2013 Prof. Dr. Marek Wojcik
 (Professor of Chemical Sciences, Laboratory of Molecular Spectroscopy, Faculty of Chemistry, Jagiellonian University, Krakow, Poland)
 “Spectroscopy of hydrogen bond – theoretical modeling of spectra and proton tunneling”



May 13, 2013 Prof. Olivier Baudoin
 (University of Lyon 1 and CPE Lyon)
 “Palladium(0)-catalyzed intramolecular C(sp³)-H bond functionalization”

May 28, 2013 Prof. Wolfgang Weigand
 (Friedrich-Schiller-Universität Jena)
 “From Prebiotic to Bio-Inspired Hydrogen Production”



June 5, 2013 Prof. Guosheng Liu
 (Shanghai Institute of Organic Chemistry, China)
 “Transition Metal-Catalyzed Direct Fluorination of Organic Compounds”

June 6, 2013 Dr. Jiahao Chen
 (Department of Chemistry, MIT, Cambridge, MA, U.S.A.)
 “Disorder and excitonic structure in organic semiconductors”

June 14, 2013 Dr. Toshio Miyamachi
 (Institute for Solid State Physics, the University of Tokyo)
 “A spin crossover-based multifunctional molecular memory”

June 19, 2013 Prof. Dr. Robert K. Szilagy

(Department of Chemistry & Biochemistry, Montana State University, Bozeman, MT U.S.A.)

“Spectroscopic Calibration of Electronic Structure Theory: Basis Sets, Exchange and Correlation Functionals, Ground and Excited States”

July 3, 2013 Prof. Alexander S. Fedorov

(L. Kirensky Institute of Physics, Russian Academy of Science & Siberian Federal University, Krasnoyarsk, Russia)

“Kinetic stability vs thermodynamics of nanostructures - investigation of relative stability of fullerenes and SWCNTs”

July 4, 2013 Prof. Stephen F. Lincoln

(University of Adelaide, Australia)

“Cyclodextrin Supramolecular Chemistry”

July 19, 2013 Prof. Dr. Yasutaka Kitagawa

(Department of Chemistry, Graduate School of Science, Osaka University)

“Application of a spin-projected broken-symmetry (BS) DFT to polynuclear metal complexes ~ Electronic structure, molecular structure and physical properties~”

July 24, 2013 Dr. Alister J. Page

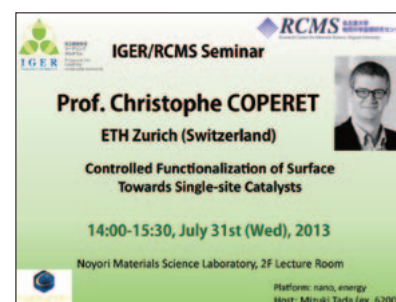
(Discipline of Chemistry, The University of Newcastle, Callaghan)

“Simulating Ionic Liquid Nanostructure with Quantum Chemistry”

July 31, 2013 Prof. Christophe COPERET

(ETH Zurich, Switzerland)

“Controlled Functionalization of Surface Towards Single-site Catalysts”



July 31, 2013 Dr. Pierre H. Dixneuf

(Professor, University of Rennes 1)

“Cross-coupling reactions from C-H bonds with Ruthenium(II)-carboxylate catalysts”

August 2, 2013 Dr. Gong Chen

(Assistant Professor, Pennsylvania State University)

“New Palladium-Catalyzed C-H Functionalization Strategies for Organic Synthesis”



August 29, 2013 Prof. Josep M. Poblet

(Departament de Química Física i Inorgànica Universitat Rovira i Virgili, Tarragona, Spain)

“Electronic Structure of Polyoxometalates : From the Nucleation of Small Polyoxotungstates to the Properties of Large Anions”

September 3, 2013 Dr. Jan M. Knaup
 (Bremen Center of Computational Materials Science (BCCMS), Universität Bremen, Germany)
 "Advanced Modeling of Functional Nanoionics in Oxides"

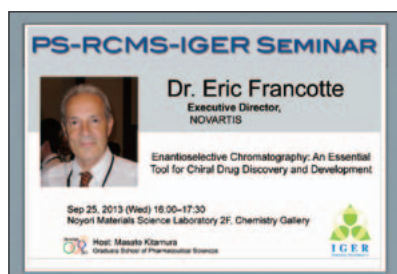
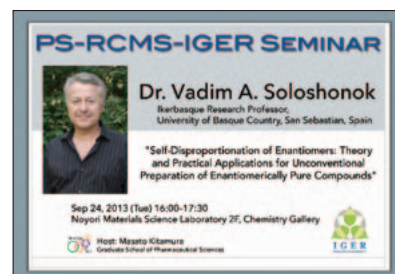
September 4, 2013 Dr. Andrew E. H. Wheatley
 (University Senior Lecturer, Department of Chemistry, The University of Cambridge)
 "New ideas in directed metallation –Teaching old dogs new tricks"



September 9, 2013 Prof. Eckart Rühl
 (Physikalische Chemie, Freie Universität Berlin, Germany)
 "Photoexcitation, Photoionization, and Relaxation of Clusters and Nanoparticles"

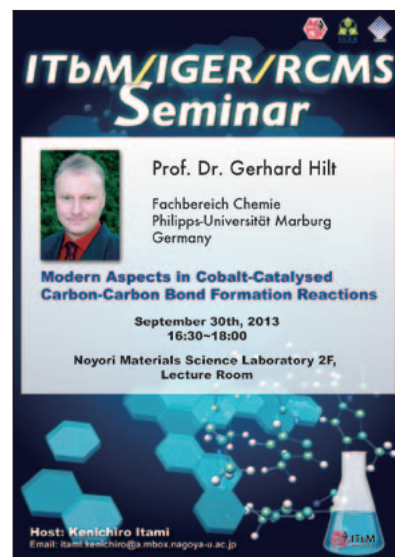
September 11, 2013 Dr. Jamal Musaeef
 (Cherry L. Emerson Center for Scientific Computation, Emory University, Atlanta, Georgia, U.S.A.)
 "Knowledge-based Catalyst Design: Transition Metal Catalyzed Water Oxidation and Stereoselective C-H Bond Functionalization"

September 24, 2013 Dr. Vadim A. Soloshonok
 (Ikerbasque Research Professor, University of Basque Country, San Sebastian, Spain)
 "Self-Disproportionation of Enantiomers: Theory and Practical Applications for Unconventional Preparation of Enantiomerically Pure Compounds"



September 25, 2013 Dr. Eric Francotte
 (Executive Director, NOVARTIS)
 "Enantioselective Chromatography: An Essential Tool for Chiral Drug Discovery and Development"

September 30, 2013 Prof. Dr. Gerhard Hilt
 (Fachbereich Chemie Philipps-Universität Marburg, Germany)
 "Modern Aspects in Cobalt-Catalysed Carbon-Carbon Bond Formation Reactions"



October 2, 2013 Dr. Matthew A. Addicoat
(School of Engineering and Science, Jacobs University, Bremen, Germany)
"A computational toolkit for mass-screening metal-organic frameworks"

October 2, 2013 Prof. Dr. Bernhard Wunsch
(Westfälische Wilhelms-Universität Münster)
"Synthesis and Pharmacological Evaluation of Novel Sigma Receptor Ligands"



October 8, 2013 Prof. E. Peter Kündig
(Professor, University of Geneva)
"New chiral NHC ligands for the catalytic asymmetric arylation of amides and the enantioselective C(sp³)-H activation"

October 15, 2013 Dr. Alex Domingo
(University of Strasbourg)
"Approaching multifunctionality through computational simulations of magnetic and photo-sensibilemolecular materials"

October 16, 2013 Prof. Martin Albrecht
(School of Chemistry & Chemical Biology, University College Dublin, Ireland)
"Variation on a theme: less classical N-heterocyclic carbenes and their (catalytic) impact"



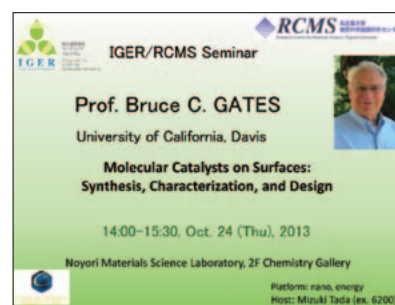
October 21, 2013 Prof. Mark J. MacLachlan
(University of British Columbia, Canada)
"Supramolecular Origami: Transforming Paper into Twisted Structures"

October 22, 2013 Prof. Jiun-Tai Chen
(National Chiao Tung University, Taiwan)
"Wetting and Instability Studies of Polymer Nanomaterials in Porous Anodic Aluminum Oxide Templates"

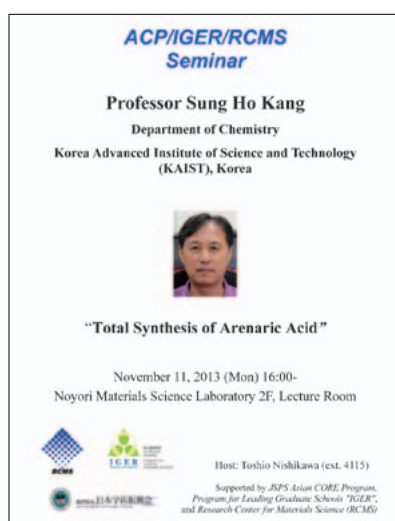


October 22, 2013 Prof. Yen-Ju Cheng
(National Chiao Tung University, Taiwan)
"Molecular engineering of new organic materials for solar cell applications"

October 24, 2013 Prof. Bruce C. GATES
(University of California, Davis)
"Molecular Catalysts on Surfaces: Synthesis, Characterization, and Design"



October 28, 2013 Asst. Prof. Dr. Pornpan Pungpo
(Department of Chemistry, Faculty of Science, Ubonratchathani University, Ubonratchathani, THAILAND)
"Computer aided drug design of anti-tubercular agents and anti-cancer agents"



November 11, 2013 Professor Sung Ho Kang
(Department of Chemistry, Korea Advanced Institute of Science and Technology (KAIST), Korea)
"Total Synthesis of Arenaric Acid"

November 27, 2013 Prof. Toshihiko YOKOYAMA
(Institute for Molecular Science)
"Novel Spectroscopic Methodology for Materials Science"

December 9, 2013 Prof. Itaru Hamachi
(Graduate School of Engineering, Kyoto University)



IGER-ITbM-RCMS Seminar

浜地 格 先生
京都大学大学院工学研究科
合成/生物化学専攻・教授

「天然タンパク質を標的とした生細胞有機化学の展開」

平成25年12月9日(月) 16:00-17:30
野依記念研究館2F 講演室
連絡先: 山口茂弘 (789-2291)
プラットホーム1グリーン物産館2Fコース



ITbM/IGER/RCMS Seminar

Prof. Suzanne A. Blum
Department of Chemistry
University of California, Irvine
USA

Microscopy for Synthetic Chemists and Dual-Metal Catalysis with Gold

December 16th, 2013
16:30-18:00
Noyori Materials Science Laboratory 2F,
Lecture Room

Host: Kenichiro Itami
Email: itami.kenichiro@u.nagoya-u.ac.jp

December 16, 2013 Prof. Suzanne A. Blum
(Department of Chemistry, University of California, Irvine, U.S.A.)
"Microscopy for Synthetic Chemists and Dual-Metal Catalysis with Gold"

January 21, 2014 Prof. Huailiang Xu
(State Key Laboratory on Integrated Optoelectronics,
Jilin University, China)
"Remote air lasing in femtosecond laser filaments"



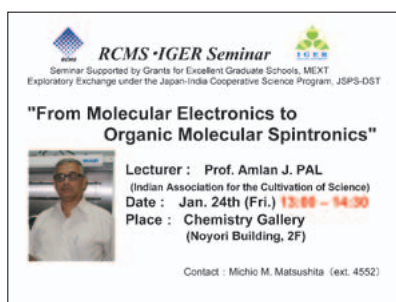
IGER and RCMS Seminar

"Remote air lasing in femtosecond laser filaments"

Prof. Huailiang Xu
State Key Laboratory on Integrated Optoelectronics,
Jilin University, China

January 21 (Tue), 2014,
15:30 - 16:30
Noyori Materials Science Laboratory
Room 308

host: Akiyoshi Hishikawa (2494)
hish@chem.nagoya-u.ac.jp
プラットホーム1グリーン物産館2F



RCMS-IGER Seminar

Seminar Supported by Grants for Excellent Graduate Schools, MEXT
Exploratory Exchange under the Japan-India Cooperative Science Program, JSPS-DST

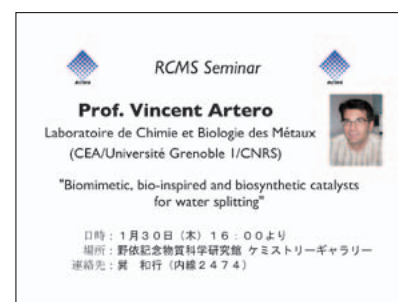
"From Molecular Electronics to Organic Molecular Spintronics"

Lecturer: Prof. Amlan J. PAL
(Indian Association for the Cultivation of Science)
Date: Jan. 24th (Fri.) 13:00 - 14:30
Place: Chemistry Gallery
(Noyori Building, 2F)

Contact: Michio M. Matsushita (ext. 4552)

January 24, 2014 Prof. Amlan J. PAL
(Indian Association for the Cultivation of Science)
"From Molecular Electronics to Organic Molecular Spintronics"

January 30, 2014 Prof. Vincent Artero
(Laboratoire de Chimie et Biologie des Métaux (CEA/Université
Grenoble 1/CNRS))
"Biomimetic, bio-inspired and biosynthetic catalysts for water splitting"



RCMS Seminar

Prof. Vincent Artero
Laboratoire de Chimie et Biologie des Métaux
(CEA/Université Grenoble 1/CNRS)

"Biomimetic, bio-inspired and biosynthetic catalysts for water splitting"

日時: 1月30日(木) 16:00より
場所: 野依記念物質科学研究館 ケミストリーギャラリー
連絡先: 巽 和行 (内線2474)

February 4, 2014 Prof. Klavs Hansen
(University of Gothenburg, Department of Physics, SE-412 96 Göteborg, SWEDEN)
"Radiative cooling of carbon clusters"

February 4, 2014 Prof. Peter J Skabara
(University of Strathclyde)
"The role of non-covalent interactions in band-gap tuning, conformation and self-assembly"



February 5, 2014 Prof. Hiroshi Nagase
(International Institute for Integrative Sleep Medicine (IIIS), University of Tsukuba, Japan)



February 26, 2014 Prof. Georg Süß-Fink
(Universität de Neuchâtel, Institut de chimie (ICH), Switzerland)
"Water-Soluble Arene Ruthenium Complexes: Anticancer Properties and Beyond"

March 6, 2014 Dr. Nawee Kungwan
(Department of Chemistry, Chiang Mai University, Chiang Mai, Thailand)
"Quantum Chemical Studies of organic sensitizers with modified donor units for efficient dye-sensitized solar cells"



March 6, 2014 Prof. Zhi-Heng Loh
(School of Physical and Mathematical Sciences, Nanyang Technological University, Singapore)
"Ultrafast Electron and Nuclear Dynamics Induced by Strong-Field Ionization: From Atomic Gases to Liquid Water"

March 14, 2014 Dr. Matthew A. Addicoat
(School of Engineering and Science, Jacobs University, Bremen, Germany)
"Development of the systematic molecular fragmentation method based on DFTB"

Students from University of Münster



Nils Schröder

Period of Stay:
April – September, 2013
Research Theme:
Synthesis of New Plant-growth
Molecules by C-H Activation

Raúl Adler

Period of Stay:
December, 2013 – June 2014
Research Theme:
Exploration of Photo-promoted
Bora-Nazarov reactions



David Königs

Period of Stay:
July – December, 2013
Research Theme:
Synthesis of new cationic ruthenium complexes with a bare Ru-P bond for heterolytic Si-H bond activation

Marina Szermerski

Period of Stay:
January – July, 2014
Research Theme:
P450 Catalysed Oxidation as a Key Step in the Synthesis of PET Tracers for Imaging



Matthias Dahlkamp

Period of Stay:
October, 2013 – March, 2014
Research Theme:
Hydroalumination of Unsaturated Nitrogen Containing Compounds

Steffen Eusterwiemann

Period of Stay:
January – July, 2014
Research Theme:
Selective synthesis of ring polymers mediated with nitroxide diradicals



Dominik Bergmann

Period of Stay:
October, 2013 – March, 2014
Research Theme:
Synthesis of aminoglycoside derivatives that induce inaccurate translation

Benjamin Vonhören

Period of Stay:
January – July, 2014
Research Theme:
Optoelectronic Devices build by the Layer-by-Layer-Approach



Eva Koch

Period of Stay:
November, 2013 – May 2014
Research Theme:
Direct coupling of carbonyl compounds and phenol derivatives



Report from the Chemical Instrumentation Facility

The Chemical Instrumentation Facility (CIF) is a shared facility for all of Nagoya University to analyze molecular structure using nuclear magnetic resonance apparatuses and mass spectrometers. The CIF provides services to faculty, researchers, students and others through the operation and maintenance of measuring equipment, teaching of measurement methods, consultation for specific measurements, and the taking of requested measurements. Furthermore, the CIF has taken on the role of the Nagoya University window for SciFinder, an online Chemistry information search service. In 2013, to display the "CIF Utilization Status," 85 research groups within Nagoya University registered, with the number of registered faculty, students, and researchers reaching 787. With the addition of the newly established Institute of Transformative Bio-Molecules, the number of users of the CIF continues to grow year after year.

[Introduction to the Setup and Equipment in the CIF]

The demand for structural analysis of insoluble organic and inorganic chemical compounds such as high polymer materials, battery materials, and soil organic matter by using a solid state NMR is increasing year by year. For this reason, the CIF is constantly adding reservations for its ECA700 solid state NMR to its queue. In order to improve this situation, the ECA600 NMR, which has been until now used as a liquid state NMR, has been opened to the public with a solid state measurement unit added. With this new unit, through



Liquid/Solid NMR (JNM-ECA600, JEOL)

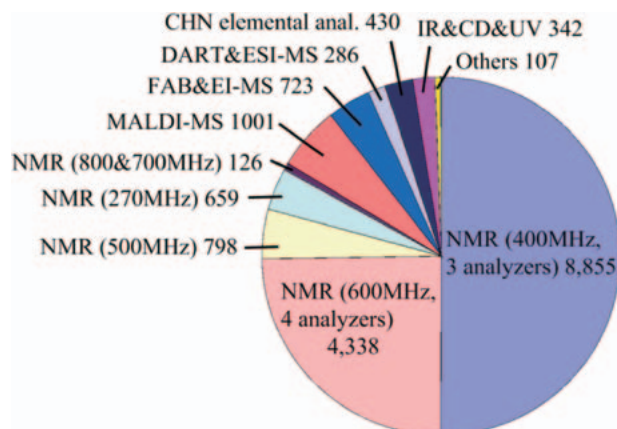
simply exchanging the probe, both liquid and solid state measurements can be taken using the same device, and by making it publicly available, use of the solid state NMRs is expected to proceed smoothly.



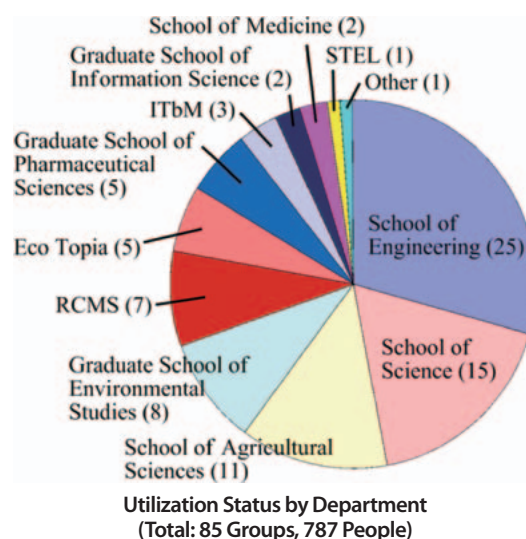
Solid state NMR probe

[CIF Utilization Status]

Utilization Status for the Academic Year 2013
(April 2013 – February 2014)



Number of Uses/Measurements by Instrument



Utilization Status by Department
(Total: 85 Groups, 787 People)

Prizes Awarded

Designated Prof. Kazuyuki Tatsumi

Japan Academy Prize 2013

The award ceremony was attended by Their Majesties the Emperor and Empress of Japan held on June 17, 2013, at the Japan Academy Assembly Hall in Ueno, Tokyo.



The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology 2013



Assistant Prof. Shohei Saito

The 2nd Ishida Prize of Nagoya University
The 2nd NF Foundation R&D Encouragement Award



JSPS Core-to-Core Program (Advanced Research Networks)

Professor Shigehiro Yamaguchi of the Research Center for Materials Science has been selected as the Coordinator of the Advanced Research Networks section of the Japan Society for the Promotion of Science's (JSPS) Core-to-Core Program. Starting in 2014, for the next five years, the goal of the program is to construct a base of world-class core research exchange, and along with it nurture the young researchers that will become central to the next generation. This will be achieved by connecting Japanese and overseas center of excellence (COE) organizations which is Germany and Canada, and building dynamic cooperative alliances through research projects that are leading-edge in Japan and considered important globally.

(Project Title: Elements Function for Transformative Catalysis and Materials)

Annual Meeting of The Chemical Society of Japan 2014 was held in Nagoya University

<Date> March 27 – March 30, 2014

<Venue> Nagoya University, Higashiyama campus

<President of the Annual Meeting>

Vice president of Nagoya University, Professor Yoshihito Watanabe, Research Center for Materials Science, Nagoya University

Staff List

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	Assistant Professor	Haruka Omachi	(3660)	omachi.haruka@a.mbx.nagoya-u.ac.jp
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	Assistant Professor	Shinji Tanaka	(2960)	tanaka@os.rcms.nagoya-u.ac.jp
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	Guest Professor	Kündig Ernst Peter (Professor Emeritus, University of Geneva)		
	Guest Professor	Skabara Peter John (Professor, University of Strathclyde)		
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	Assistant Professor	Chunguang Han	(3072)	hanc@cic.nagoya-u.ac.jp
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	Technical Personnel	Kin-ichi Oyama	(3069)	oyama@cic.nagoya-u.ac.jp
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		Roald Hoffman (Professor Emeritus, Cornell University – Laureate, Nobel Prize in Chemistry)		
		Henri Boris Kagan (Professor Emeritus, Paris-Sud 11 University)		
		Atsuko Tsuji (Editorial Writer, Asahi Shimbun)		
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	Professor	Akiyoshi Hishikawa (Graduate School of Science)	(2494)	hishi@chem.nagoya-u.ac.jp
	Professor	Kenichiro Itami (Institute of Transformative Bio-Molecules)	(6098)	itami.kenichiro@a.mbx.nagoya-u.ac.jp
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	Distinguished Invited University Professor	Sumio Iijima	(6460)	ijimas@nagoya-u.jp
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	Administrative Staff	Sakiko Komura	(5902)	komura@os.rcms.nagoya-u.ac.jp
	Administrative Staff	Sonoe Tankiku	(5908)	tankiku@os.rcms.nagoya-u.ac.jp