



Reports and Communications of RCMS Activities  
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March 2013

Issue #14



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# MEXT Project of Integrated Research on Chemical Synthesis 2012

In 2012, 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 3<sup>rd</sup> Symposium on MEXT Project of Integrated Research on Chemical Synthesis (Kyushu University, June 1–2, 2012)



Group Photo



Special Lecturer: Prof. Toshiaki Enoki



Special Lecturer: Prof. Kazunari Domen

## The 3<sup>rd</sup> Young Researchers Forum (Biwako Resort, Shiga prefecture, July 23–24, 2012)



Group Photo



Discussion



Presentation

\*\*\*\*\*

### [Symposium and Forum in 2013]

- \*The 4<sup>th</sup> Symposium on MEXT Project of Integrated Research on Chemical Synthesis in Hokkaido
- \*The 3<sup>rd</sup> International Conference on MEXT Project of Integrated Research on Chemical Synthesis in Kyushu
- \*The 4<sup>th</sup> Young Researchers Forum

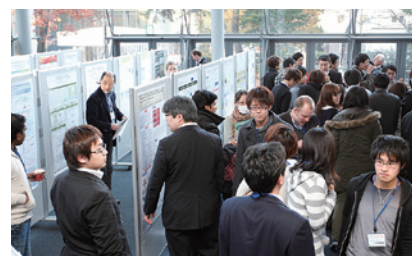
The 2<sup>nd</sup> International Conference on MEXT Project of Integrated Research on Chemical Synthesis  
(Nagoya University, Dec. 10–11, 2012)



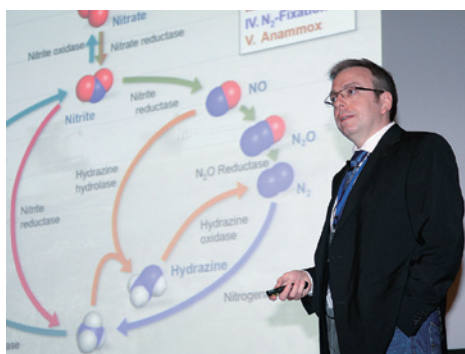
Group Photo



Prof. Ben Zhong Tang



Poster session



Prof. Oliver Einsle



Prof. Tamotsu Takahashi

The 5<sup>th</sup> Forum

**第5回統合物質フォーラム**  
The 5<sup>th</sup> MEXT Project of Integrated Research on Chemical Synthesis Forum  
Unique peptide assemblies with biological functions

主催 京都大学化学研究所 本館国際会議室 (N231C)  
日時 平成24年9月15日 (土) 13:30-17:00  
主報 統合物質創製化学推進事業

講演者:  
**Ines Neundorff**  
Department of Chemistry, University of Köln  
Calcitonin-based cell penetrating peptides and siRNA delivery

**Jiang Xia**  
Department of Chemistry, Chinese University of Hong Kong  
New designs of peptides and proteins for nanoparticle surface functionalization

**Hikaru Takaya**  
Institute for Chemical Research, Kyoto University  
Self-assembly of Pt-complex-bound amino acids

**Eiji Nakata**  
Institute of Advanced Energy, Kyoto University  
Using DNA binding proteins for site-specific protein positioning on DNA origami

**Yuichiro Hori**  
Graduate School of Engineering, Osaka University  
Development of fluorogenic probes with chemical triggers for imaging protein function and localization

**Silvia Pujals**  
Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University  
Epsin derived amphipathic peptide as positive membrane curvature promoter

参加料: 会場のご案内により事前登録をお願いします。  
申し込み先: info@icd.kyoto-u.ac.jp  
問い合わせ: 京都大学化学研究所 二本木研 (電話: 0774-38-5210 電子メール: maki@icd.kyoto-u.ac.jp)

The 6<sup>th</sup> Forum

第40回オルガノメタリックセミナー・第6回統合物質フォーラム  
「機能錯体化学のフロンティア」

主催 錯体学会有機金属研究会  
主催 文部科学省統合物質創製化学推進事業  
協賛 日本化学会  
日時 11月30日(金) 14:00~17:30  
会場 京都大学化学研究所 共同研究棟・大セミナー室  
(JRあるいは京阪美閑駅下車、徒歩10分)

プログラム  
14:00~14:10 開会の辞  
14:10~15:10 伊東 忍氏 (大阪大学・大学院工学研究科・教授)  
「金属オキソ錯体の新展開」  
15:10~16:10 織田宗隆氏 (東京工業大学・資源化学研究所・教授)  
「炭素集合体の有機金属化学クラスターから分子デバイスまで」  
16:25~17:25 関口 章氏 (筑波大学・数理物質系化学城・教授)  
「新しいπ結合をもつ分子: 三重結合ケイ素化合物  
ジシリンの創製研究と特異な反応場の形成」

参加費 主催・共催・協賛団体会員および学生は無料; 会場外 2,000円  
申し込み 氏名・所属・身分を明記し、電子メールでお申し込みください。  
申込締切 11月16日(金) 必着  
申込先 京都大学化学研究所 小澤文彦 (事務担当: 津田京華子: genso@sci.kyoto-u.ac.jp)

# The 13<sup>th</sup> · 14<sup>th</sup> University of Münster · Nagoya University Joint Seminars

The 2012 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.

## [13<sup>th</sup> Japan-Germany Joint Seminar]

**May 7–8, 2012 (Monday – Tuesday) at University of Münster**

Japanese Participants: 7 Faculty and 5 Students (Oral Presentations)

German Participants: 3 Faculty and 5 Students (Oral Presentations), 16 Poster Presentations



Opening – Prof. Erker



Mr. Iijima



Group Photo from excursion

## [14<sup>th</sup> Japan-Germany Joint Seminar]

**October 1–2, 2012 (Monday – Tuesday) at Nagoya University**

German Participants: 8 Faculty and 9 Students (Oral Presentations)

Japanese Participants: 3 Faculty and 3 Students (Oral Presentations), 30 Poster Presentations



Opening – Prof. Yamaguchi



Mrs. Takuma – JSPS



Prof. Humpf

## [Mini Piano Concert by Japanese and German Students]

At the 14<sup>th</sup> Joint Seminar, a mini piano concert by both Japanese and German students was held for the first time. Using the grand piano in the Chemistry Lounge on the 2<sup>nd</sup> floor of the Noyori Materials Science Laboratory, at the site of the students' poster exhibition, the performers were able to show others their own characteristic piano playing.



Kanyo Shin



Adrian Schulte



Sota Nimura



Audience at the concert

## [Experiencing Traditional Japanese Culture]

At the reception held upon the conclusion of the Joint Seminar every year, this year's included mochi (Japanese rice cake) making activities. Not limited only to spectating, Japanese and German professors and students formed pairs in which they could experience pounding the mochi with large mallets.



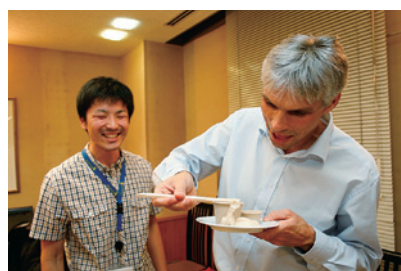
At the reception



Prof. Glorius and Prof. Saito



Japanese rice cake



Sticky!

\*\*\*\*\*

[Visit from the New Representative from the German Research Foundation's Japan Office]

Dr. Jörg Schneider, the new representative of the Japan Office of DFG (Deutsche Forschungsgemeinschaft – German Research Foundation), came to Nagoya University and visited RCMS Professors Kazuyuki Tatsumi and Shigehiro Yamaguchi, who are actively expanding the Japan-Germany Program. Five German students currently at Nagoya University as well as Japanese students and researchers soon to be dispatched to Germany participated in a meaningful discourse, where topics such as life in Nagoya and the wealth of research in Germany were discussed.

# 9<sup>th</sup> Yoshimasa Hirata Memorial Lecture and 2012 IGER-RCMS International Nagoya Symposium on Transformative Synthesis

The 9<sup>th</sup> Yoshimasa Hirata Memorial Lecture and the IGER-RCMS International Nagoya Symposium on Transformative Synthesis were held at the Noyori Conference Hall on Wednesday, January 9<sup>th</sup>.

The Yoshimasa Hirata Memorial Lecture was established in 2004, laying the foundation for natural products organic 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 organic synthetic chemistry have been presented with an award for their lecture. This year, for its 9<sup>th</sup> session, 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 organic synthetic chemical research.

This year's Hirata Memorial Lectureship Award was received by Harvard University Associate Professor Tobias Ritter, who continues to blaze a trail in innovative fluorination reactions. Dr. Ritter developed a novel electrophilic fluorination reagent and realized a fluorination reaction in the final stage of compound synthesis, something that was not able to be achieved through traditional methods. This technique is expected to bring about dramatic innovations in PET imaging technology used in the diagnosis of illnesses in pharmaceutical fields. Dr. Ritter was presented with a pure gold medal 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.

Lecturers invited to speak at the International Nagoya Symposium on Transformational Synthesis were Ruben Martin (Group Leader at the Institute of Chemical Research of Catalonia, Spain), Nagoya University Professor Takashi Ooi, Tehshik P. Yoon (Associate Professor at the University of Wisconsin, Madison), and Yoshiaki Nishibayashi (Associate Professor at the University of Tokyo), in which they spoke in easy-to-understand terms about the development of research at the forefront of organic synthetic chemistry.



Prof. Ritter and Prof. Uemura



Lecture hall



Group Photo

# Integrative Graduate Education and Research Program in Green Natural Sciences

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.

So far, the following initiatives have been implemented:

**Retreat Research Training:** By visiting actual research sites and holding mini-workshops and observational meetings (8 to date), this training aims to enrich research expertise, spread and accelerate joint research, and promote the exchange of ideas with researchers and faculty from cooperative research institutes (Institute for Molecular Science, National Institute for Basic Biology, Institute of Physical and Chemical Research, National Institute of Advanced Industrial Science and Technology, Toyota Central Research and Development Laboratory, Toyota Physical and Chemical Research Institute).

**Female Top Leader Promotion Program:** With a focus on top female scientists at Nagoya University and its partner institutions, a female scientist promotion team was created to assist with career and research guidance. In September of last year, a seminar training camp was held with themes such as “How to find and raise a research theme,” “Looking for a job,” “Supervising over a laboratory,” and “Achieving work-life balance,” and a wide range of opinions were exchanged while reviewing the distances one goes in the life of a researcher (Picture 1).

**Overseas Dispatch:** This program has dispatched members overseas on 47 occasions for participation in international conferences and short-term assignments, and on 15 occasions has dispatched members for long-term assignments and to conduct research at overseas research institutions. Furthermore, as a part of corporate and research laboratory research, 14 members were sent to train at North Carolina State University and Research Triangle Park in North Carolina.

**Career Path Symposium:** This symposium, held in August of last year in collaboration with the Nagoya University Business Capacity Development Center, featured poster presentations from the program’s doctoral students, along with joint enterprise information sessions. As a result, 6 people (one from this program) found their future jobs here.

**Annual Meeting:** In January, 500 participants gathered at the Annual Meeting to view and discuss 167 posters exhibiting reports of the results of various efforts and research reports of selected students (Picture 2).

In addition to these initiatives, global leader English training, “IGER Green Natural Science Lectures” from top researchers from outside Nagoya University, skill seminars, and other initiatives are lined up for the future.



Picture 1 Seminar Training Camp



Picture 2 Annual Meeting

# Visiting Professors 2012

## Prof. Carlo Mealli

Professor, Istituto di Chimica dei Composti Organometallici (ICCOM)



The second from left, Prof. Mealli

### Period of Stay:

March 5 – May 31, 2012

### Research Theme:

Electronic Structures and Reactions of Organometallic Complexes

In 1969, Dr. Mealli received the degree of “Laurea” (highest degree at that time – the same level as a doctorate) from the University of Florence, and has since been continuing his research over a great number of years at the Italy National Research Council’s Istituto di Chimica dei Composti Organometallici.

During his time at RCMS, Dr. Mealli participated in discussions with and offered much advice to laboratories such as the Inorganic Chemistry Laboratory and Quantum Chemistry Laboratory. Having previously studied under Nobel Laureate Roald Hoffmann with Prof. Tatsumi, and conducted the CACAO program adopted throughout the world as a package of 3D Molecular Orbital Contour Map, Dr. Mealli was knowledgeable about a diverse number of chemical fields. From the two sides of theoretical calculations and experimental chemistry, Dr. Mealli could close in on the essence of chemistry, and through his guidance we were able to learn a great deal and improve our research results.

In addition to his bright and cheerful personality, Dr. Mealli’s curiosity and interest in Japan inspired him to explore many places throughout Nagoya. For both all of us and for Dr. Mealli, his time here at Nagoya University was engaging and meaningful.

\*\*\*\*\*

### My great 2012 experience at the RCMS of Nagoya

In three months (March–May 2012), I almost adapted to the rhythms of a Japanese laboratory, working many hours per day. It was no burden because of the exciting chemistry, carried out under optimal working and living conditions. Knowing Japan from previous visits, we did not travel much to the famous touristic areas, but enjoyed a full immersion into the Japanese everyday life. In any case, our occupations did not prevent us from frequent visits to the magnificent parks in Nagoya to watch the spectacular tree blossoming at springtime. In no other place of the world, we enjoyed comparably beautiful views.

I learned new pieces of experimental information, important for my electronic structure studies. Other stimulating aspects came from the renowned crystallographer Rogers Cramer from Hawaii, who also visited at the time and helped solving difficult structures, most intriguing for me. The highly satisfying work in Nagoya seems to be the basis for relevant joint publications.

In summary, my experience in Japan has been highly positive and for sure I shall accept the open invitation from Kaz Tatsumi to return soon to Nagoya.

Carlo Mealli



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## Prof. Vincent Robert

Professor, the University of Strasbourg



Period of Stay:

August 20 – December 17, 2012

Research Theme:

“Quantum Chemical Calculation of Molecular Magnetic Substances”

Professor Vincent Robert of the University of Strasbourg (research theme: “quantum chemical calculation of molecular magnetic substances”) came to RCMS for four months from August 20<sup>th</sup> of last year. Professor Robert is a researcher of theoretical calculations of materials such as molecular conductors and magnetic substances, crossing freely between the fields of physical science and chemistry as he advances the theoretical elucidation of various systems. In his joint research with us, through his efforts in calculating the interaction

between magnetic molecules of the anion radical ligand of [1,2,5]Thiadiazolo[3,4-*f*][1,10]phenanthroline dioxides (tdapO<sub>2</sub>), Professor Robert was able to reproduce the results of his experiments with great success. Furthermore, as a theoretical study, from comparing the anion radicals of tdap he discovered that the SO<sub>2</sub> region of the molecular end contributes ferromagnetically to intermolecular forces.

In addition to advancing our joint research, Professor Robert also gave a spirited lecture with the theme of “Methods: Hartree-Fock and Beyond” in the Department of Chemistry. He also gave his lecture “Manifestation of Chemical Bonding: Structure, Magnetic and Transport Properties” at the IGER-RCMS seminar on December 7<sup>th</sup> and played an active educational role during his stay here.

Professor Robert absolutely loved Japan, and anywhere he went – shops, restaurants, anywhere – he always had a smile on his face and brought with him a pleasant atmosphere. In addition, his wife accompanied him along with his daughter, who made many friends while attending Nagoya International School (elementary school) daily, and these friends were able to come and visit them at their apartment at the Noyori Conference Hall.

Professor Robert returned to France on December 17, 2012, but we look forward to the next opportunity to further advance our joint research together.

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This 4-month sabbatical August-December 2012 at the Research Center for Materials Science corresponded to my third visit in Japan. The scientific environment provided by Professor Awaga and his group has been a source of personal enrichment in scientific and cultural areas. I was much moved by the outstandingly warm welcome that all the people at the RCMS have manifested. Evidently, the daily life was a continuous excitement, driven by a very stimulating scientific community. The presence in a close vicinity of different expertises, ranging from synthetic chemists to condensed matter physicists, allowed me to strengthen my collaborations and widen my fields of interest. Finally, one cannot mention a sabbatical in Japan in autumn without mentioning the exceptional daily show that Nature offers to foreigners. I strongly believe that my pleasure of being in Nagoya has also been very much influenced by the beauties of Japan.

This experience at the RMCS will definitely remain a milestone in my scientific carrier and personal life. For all those reasons, I am much indebted to this scientific community and the exceptional hospitality at the RCMS, a place of excellence, friendship and enthousiasm. Nagoya University and RCMS are definitely places to visit.

Vincent Robert

## Prof. Tadashi Sugawara

Kanagawa University Faculty of Science Designated  
Professor · University of Tokyo Emeritus Professor



Professor Tadashi Sugawara (Kanagawa University) is serving as a Visiting Professor at RCMS from 2012 through 2013. Professor Sugawara has been conducting research into the development of organic materials having electronic physical properties such as magnetic properties, dielectric properties, and electric conductivity, from the viewpoint on organic chemist. He is well-known for his pioneering work on organic ferromagnets and ferrimagnets, giant dielectric response in hydrogen-bonded system, and the development of organic coexistent systems of magnetism and conductivity showing giant magnetoresistance.

In recent years, Professor Sugawara has been pouring much energy into the construction of molecular assemblies which can be regarded as models of life, and he has been seeing great success and garnering much attention for his endeavors, such as the construction of tubular vesicle spiral superstructures through pH variation, oil droplets that automatically swim in aqueous

solution, “self-replicating systems” (giant vesicles made up of artificial bilayer membranes expand and divide spontaneously and repeatedly), and “proto-cell models” (where PCR cycle of embedded DNA is synchronized with the self-production/division of enclosing giant vesicles). Since Professor Sugawara has been investigating various classes of “molecular systems”, from small molecules to crystals, and biomolecular assembly, there are many overlaps with RCMS members. Through this two-year exchange, we believe both RCMS and Professor Sugawara will benefit, and see fruitful results.

### <Career Summary>

- 1974: University of Tokyo, Graduate School of Science –  
Obtained Doctor Degree (Doctor of Science)
- 1975: University of Minnesota – Post Doctoral Research  
Fellow
- 1976: University of Maryland – Post Doctoral Research  
Fellow
- 1978: Institute for Molecular Science – Research  
Associate
- 1986: University of Tokyo, College of Arts and Sciences  
– Associate Professor
- 1991: University of Tokyo, College of Arts and Sciences  
– Professor
- 1996: University of Tokyo, Graduate School of Arts and  
Sciences – Professor
- 2010: Research Center for Complex Systems Biology –  
Project Researcher
- 2012: – Incumbency
  - 2008: The Society of Electron Spin Science and  
Technology SEST Award
  - 2012: Japan Society for Molecular Science Award

# RCMS Seminars

**April 3, 2012** Professor Dr. Bernhard Wünsch  
(Westfälische Wilhelms-Universität Münster)  
"Design, Synthesis and Pharmacological Evaluation of NR2B Selective NMDA Receptor Antagonists"

IGER, CAMPUS Asia and RCMS Seminar

"Design, Synthesis and Pharmacological Evaluation of NR2B Selective NMDA Receptor Antagonists"

Professor, Dr. Bernhard Wünsch  
(Westfälische Wilhelms-Universität Münster)

Date: April 3 (Tue), 2012, 16:00 – 17:00  
Place: Lecture Hall, Noyori Materials Science Laboratory

Host: Kentaro Tanaka (2940)  
kentaro@chem.nagoya-u.ac.jp

IGER/RCMS Seminar

Prof. Fuk Yee Kwong  
Department of Applied Biology and Chemical Technology,  
The Hong Kong Polytechnic University

Exploring facile and modular ligand synthesis:  
Applications of new phosphine ligands in challenging cross-coupling reactions

May 8th, 2012  
16:00-17:30

Host: Kenichiro Itami

**May 8, 2012** Professor Fuk Yee Kwong  
(Department of Applied Biology and Chemical Technology,  
The Hong Kong Polytechnic University)  
"Exploring facile and modular ligand synthesis: Applications of  
new phosphine ligands in challenging cross-coupling reactions"

**May 21, 2012** Professor Daniel J. Mindiola  
(Indiana University, U.S.A.)  
"Titanium Alkylidynes: Methane Activation and Dehydrogenation of  
Volatile Paraffins"

RCMS · IGER Seminar

Professor Daniel J. Mindiola  
Indiana University, USA

"Titanium Alkylidynes: Methane Activation and Dehydrogenation of Volatile Paraffins"

日時: 5月21日(月) 10:30より  
場所: 野依記念物質科学研究館2Fケミストリーギャラリー  
連絡先: 巽 和行 (内線2474)

RCMS Seminar

Professor Carlo Mealli  
(ICCOM-CNR, Italy)

"Correlations between Structures and Chemical Behaviours"

日時: 5月29日(火) 10:30  
場所: 野依記念物質科学研究館  
2階ケミストリーギャラリー  
連絡先: 巽 和行 (内線2474)

**May 29, 2012** Professor Carlo Mealli  
(ICCOM-CNR, Italy)  
"Correlations between Structures and Chemical Behaviours"

**May 30, 2012** Professor Jishan Wu  
(National University of Singapore, Singapore)  
"Low Band Gap Polycyclic Aromatic Compounds: From Closed-shell Near  
Infrared Dyes and Semiconductors to Open-shell Biradicals"

IGER & RCMS Seminar

Prof. Jishan Wu  
National University of Singapore,  
Singapore

Low Band Gap Polycyclic Aromatic Compounds:  
From Closed-shell Near Infrared Dyes and Semiconductors  
to Open-shell Biradicals

May 30th, 2012 (Wed) 16:30-18:00  
Noyori Materials Science Laboratory 2F, Lecture Room

Host: Akio Fukazawa (789-5019)  
Shigehiro Yamaguchi (789-2291)

IGER and RCMS Seminar

"Lessons from Nature about solar light harvesting"

Prof. Gregory Scholes  
D.J. LeRoy Distinguished Professor  
Department of Chemistry,  
University of Toronto, Canada

June 18 (Mon), 2012, 15:00 - 15:50  
Chemistry Gallery  
Noyori Materials Science Laboratory

Host: Akiyoshi Hishikawa (2494)  
hishi@chem.nagoya-u.ac.jp

**June 18, 2012** Professor Gregory Scholes  
(Department of Chemistry, University of Toronto, Canada)  
"Lessons from Nature about solar light harvesting"

**June 29, 2012** Dr. Neil Robertson  
(University of Edinburgh)  
"Molecular Control of Interfacial Electron Transfer In Dye-Sensitised Solar Cells"

**RCMS-IGER Seminar**

"Molecular Control of Interfacial Electron Transfer In Dye-Sensitised Solar Cells"

**Lecturer : Dr. Neil Robertson**  
(University of Edinburgh)

**Date : Fri. 29th June 14:00 – 15:30**  
**Place : Chemistry Gallery**

Dye-sensitized solar cells convert solar energy into electrical energy via photooxidation of dye molecules bound to a wide bandgap semiconductor such as TiO<sub>2</sub>. Following photo-induced electron transfer from the dye to TiO<sub>2</sub>, the dye is regenerated by electron transfer from a redox electrolyte or hole transport material (HTM). The power conversion efficiency is greatly dependent on the electron transfer processes occurring at the TiO<sub>2</sub>-dye-HTM interfaces, which can be controlled through the structure of the dye or other surface binding molecules. We will present results to illustrate the consequences of modification of the dyes on the interactions at the interface and consequent electron transfer processes in dye-sensitized solar cells. In particular, some common features of the dyes are often incorporated without detailed investigation of these aspects. These include the 4,4'-dialkylbipyridine ligand used as a binding unit to TiO<sub>2</sub>, and the NCS co-ligand which is believed to play an important role in dye-electrolyte interactions. Accordingly we have modified and probed these common dye features and will discuss the consequences on cell efficiency and stability.

Contact : Kunio Awaga (ext. 2487)

**IGER & RCMS Seminar**

**Prof. Kuo-Wei Huang**  
King Abdullah University of Science and Technology (KAUST), Kingdom of Saudi Arabia

*A New Class of PN3-Pincer Ligands for Metal-Ligand Cooperative Catalysis*

**July 12nd, 2012 (Thu) 16:00–17:30**  
Noyori Materials Science Laboratory 2F, Chemistry Gallery

**Host: Shigehiro Yamaguchi (789-2291)**

**July 12, 2012** Professor Kou-Wei Huang  
(King Abdullah University of Science and Technology, Kingdom of Saudi Arabia)  
"A New Class of PN3-Pincer Ligands for Metal-Ligand Cooperative Catalysis"

**IGER & RCMS Seminar** Nagoya University

Theoretical Chemistry Colloquium

Time: August 7, 2012, 16:00-17:00  
Place: Chemistry Gallery, RCMS 2<sup>nd</sup> Floor

**Endohedral Metallofullerenes: Interplay between Experiment and Theory**

**Prof. Dr. Xiang Zhao**  
Institute for Chemical Physics & Department of Chemistry Graduate School of Science Xi'an Jiaotong University

Contact: Prof. Dr. Stephan Irie  
sirie@chem.nagoya-u.ac.jp, Tel.: 6397

**August 7, 2012** Professor Dr. Xiang Zhao  
(Institute for Chemical Physics & Department of Chemistry Graduate School of Science Xi'an Jiaotong University)  
"Endohedral Metallofullerenes: Interplay between Experiment and Theory"

**IGER/RCMS Seminar** RCMS

**Prof. Igor Larrosa**  
Senior Lecturer in Organic Chemistry  
School of Biological and Chemical Sciences  
Queen Mary University of London, UK

**From C-H to C-C Activation: New Methodologies for Organic Synthesis**

September 11th, 2012  
16:00–17:30

Host: Kenichiro Itami  
Platform: Green Material Conversion

**September 11, 2012** Professor Igor Larrosa  
(School of Biological and Chemical Sciences Queen Mary University of London, UK)  
"From C-H to C-C Activation: New Methodologies for Organic Synthesis"

**September 21, 2012** Professor A. S. K. Hashmi  
(Organisch-Chemisches Institut Ruprecht-Karls-Universität Heidelberg, Germany)  
"Gold Catalysis: New Horizons"

**RCMS IGER SEMINAR**

**Professor A. S. K. Hashmi**  
Organisch-Chemisches Institut  
Ruprecht-Karls-Universität Heidelberg, Germany

**Gold Catalysis: New Horizons**

Friday, September 21st, 2012  
16:30

Graduate School of Pharmaceutical Sciences,  
Nagoya University  
野依記念物質科学研究館 2F 講義室  
Noyori Materials Science Laboratory  
2F Lecture Room

Host: Professor Masato Kitamura

**RCMS-IGER Seminar**

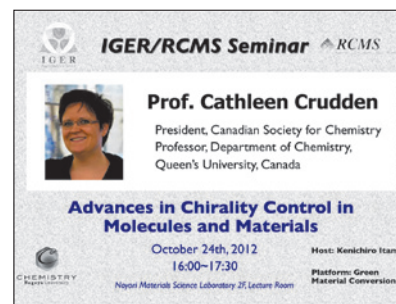
**Dr. Stéphane Ménage**  
CNRS, France  
IRTSV (Institute of life sciences research and technologies),  
LCBM (laboratory of bioinspired redox chemistry)

**"A Green Approach for Oxidation Catalysis: Design of Artificial (mono)dioxygenases"**

日時: 10月16日(火) 16:30より  
場所: 野依記念物質科学研究館 2Fケミストリーギャラリー  
連絡先: 眞 和行 (内線 2474)

**October 16, 2012** Dr. Stéphane Ménage  
(CNRS, France / IRTSV (Institute of life sciences research and technologies) / LCBM (laboratory of bioinspired redox chemistry))  
"A Green Approach for Oxidation Catalysis: Design of Artificial (mono)dioxygenases"

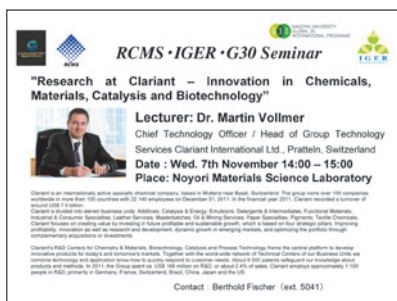
**October 24, 2012** Professor Cathleen Crudden  
 (Canadian Society for Chemistry /Department of Chemistry, Queen's University, Canada)  
 "Advances in Chirality Control in Molecules and Materials"



**October 29, 2012** Professor Chii-Dong Lin  
 (Kansas State University, U.S.A.)  
 "Ultrafast Dynamic Imaging of Molecules with Laser-induced Electron Diffraction Method"



**November 5, 2012** Professor Nobert Krause  
 (Dortmund University of Technology Germany)  
 "The Power of Gold"



**November 7, 2012** Dr. Martin Vollmer  
 (Chief Technology Officer / Head of Group Technology Services Clariant International Ltd., Pratteln, Switzerland)  
 "Research at Clariant - Innovation in Chemicals, Materials, Catalysis and Biotechnology"

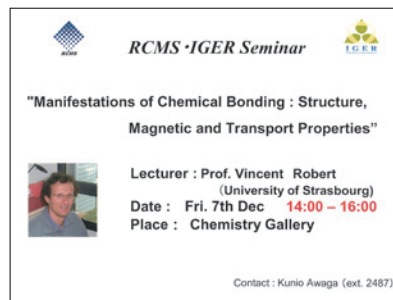


**November 20, 2012** Dr. John Bower  
 (Royal Society University Research Fellow at the University of Bristol)  
 "Catalytic Chirality Generation: New Strategies for N-Heterocyclic Chemistry"



**November 20, 2012** Professor Frank Würthner  
 (Universität Würzburg, Germany)  
 "Functional Nanosystems and Devices Based on Perylene Bisimide Dyes"

**December 7, 2012** Professor Vincent Robert  
(University of Strasbourg)  
"Manifestations of Chemical Bonding: Structure, Magnetic and Transport Properties"




RCMS-IGER Seminar

"Manifestations of Chemical Bonding : Structure, Magnetic and Transport Properties"

Lecturer : Prof. Vincent Robert  
(University of Strasbourg)  
Date : Fri. 7th Dec 14:00 – 16:00  
Place : Chemistry Gallery

Contact : Kunio Awaga (ext. 2487)



IGER & RCMS Seminar

Theoretical Chemistry Colloquium

Time: Thursday, December 13, 14:00-15:00  
Place: Chemistry Gallery, RCMS 2<sup>nd</sup> Floor


**Modeling of interfaces in anatase thin films**

Dr. Craig A. J. Fisher  
Japan Fine Ceramics Center, Nagoya

Contact: Prof. Dr. Stephan Irie  
sirie@chem.nagoya-u.ac.jp, Tel.: 6397

**December 13, 2012** Dr. Craig A. J. Fisher  
(Japan Fine Ceramics Center, Nagoya)  
"Modeling of interfaces in anatase thin films"

**December 18, 2012** Dr. Placidus B. Amama  
(University of Dayton Research Institute (UDRI) & Air Force Research Laboratory (AFRL), Dayton, OH, U.S.A.)  
"Rational Catalyst Design for Enhanced and Controlled Growth of Carbon Nanotube Carpets via CVD"



RCMS & IGER Seminar

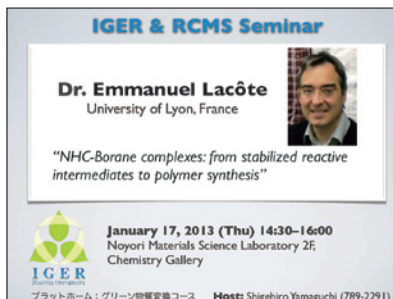
Theoretical Chemistry Colloquium

Time: December 18, 15:00-16:30  
Place: Chemistry Gallery, RCMS 2<sup>nd</sup> Floor

**Rational Catalyst Design for Enhanced and Controlled Growth of Carbon Nanotube Carpets via CVD**

Dr. Placidus B. Amama  
Research Scientist, University of Dayton  
Research Institute (UDRI) & Air Force  
Research Laboratory (AFRL)  
Dayton, OH, U.S.A.

Contact: Prof. Dr. Stephan Irie  
sirie@chem.nagoya-u.ac.jp, Tel.: 6397



IGER & RCMS Seminar

**Dr. Emmanuel Lacôte**  
University of Lyon, France

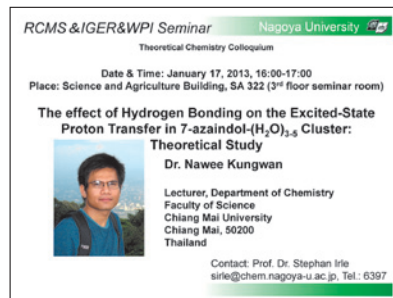
"NHC-Borane complexes: from stabilized reactive intermediates to polymer synthesis"

January 17, 2013 (Thu) 14:30-16:00  
Noyori Materials Science Laboratory 2F,  
Chemistry Gallery

Hosts: Shigehiro Yamaguchi (789-2291)

**January 17, 2013** Dr. Emmanuel Lacôte  
(University of Lyon, France)  
"NHC-Borane complexes: from stabilized reactive intermediates to polymer synthesis"

**January 17, 2013** Dr. Nawee Kungwan  
(Department of Chemistry Faculty of Science Chiang Mai University, Thailand)  
"The effect of Hydrogen Bonding on the Excited-State Proton Transfer in 7-azaindol-(H<sub>2</sub>O)<sub>3-5</sub> Cluster: Theoretical Study"



RCMS & IGER & WPI Seminar

Theoretical Chemistry Colloquium

Date & Time: January 17, 2013, 16:00-17:00  
Place: Science and Agriculture Building, SA 322 (3<sup>rd</sup> floor seminar room)

**The effect of Hydrogen Bonding on the Excited-State Proton Transfer in 7-azaindol-(H<sub>2</sub>O)<sub>3-5</sub> Cluster: Theoretical Study**

Dr. Nawee Kungwan  
Lecturer, Department of Chemistry  
Faculty of Science  
Chiang Mai University  
Chiang Mai, 50200  
Thailand

Contact: Prof. Dr. Stephan Irie  
sirie@chem.nagoya-u.ac.jp, Tel.: 6397



**February 8, 2013**

Professor Takayoshi Suzuki (Kyoto Prefectural University of Medicine)

“Small-Molecule Modulators of Disease-Related Epigenetic Mechanisms”

Professor Yuko Okamoto (Nagoya University)

“Towards Drug Design by Generalized-Ensemble Simulations”

**February 22, 2013** Guest Professor Tadashi Sugawara (Research Center for Materials Science, Nagoya University / Kanagawa University)

**February 26, 2013** Professor Dr. Predrag S. Krstić (Joint Institute for Computational Sciences & Department of Physics and Astronomy, University of Tennessee, Knoxville, TN, U.S.A.)

“DNA Control and Sequencing with Nanopore”

**March 8, 2013** Dr. Vladimír Sychrovský (Institute of Organic Chemistry and Biochemistry, Academy of Sciences of the Czech Republic, Czech Republic)

“Metal-mediated Nucleic Acids Base Pairs: Characterization with Theoretical Methods”

**March 20, 2013** Professor Dr. Henryk A. Witek (Department of Applied Chemistry, National Chiao Tung University, Hsinchu, Taiwan)

“Mathematical Chemistry: From ZZ Polynomials to the Electron Correlation Problem”



## Students from University of Münster



### Andreas Feldmann

Period of Stay:

April – July, 2012, September – December 2012

Research Theme:

Chemistry of Unsymmetrical Tetraarylphospholes – Switch from 2,5-Conjugation to 2,3-Conjugation and Its Beyond



### Christoph Rosorius

Period of Stay:

April – July, 2012, September – December 2012

Research Theme:

Reactivity of a Novel Pyridylidene/Borane Frustrated Lewis Pair



### Kristine Mütter

Period of Stay:

August – November, 2012



### Christian Radunsky

Period of Stay:

September – December, 2012

Research Theme:

Guanine-Tetrad in a Four-Fold Rotaxane



### Christoph Glotzbach

Period of Stay:

October – November, 2012

Research Theme:

Oligonitrile – Boron Compounds and their fluorescence properties





## Friederike Schröter

Period of Stay:

January – June, 2013

Research Theme:

Photocatalytic surface patterning via Microcontactprinting



## Tobias Greulich

Period of Stay:

January – June, 2013

Research Theme:

Development of Phosphorous-bridged  $\pi$ -electron Systems



## Friederike Sibbel

Period of Stay:

January – June, 2013

Research Theme:

Synthesis of Cycloparaphenylenes



## Michael Kurlemann

Period of Stay:

January – June, 2013

Research Theme:

Liquid crystalline cyclodextrins



## Janine Fröhlich

Period of Stay:

January – June, 2013

Research Theme:

New strategies for the synthesis of azacyclo[3.2.1]octanes as precursor of kappa receptor agonists

# 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 NMR, MS, and other spectroscopy. The CIF provides services to faculty, researchers, students and others through the operation and maintenance of measuring equipments, teaching of measurement methods, consulting for specific measurements, and taking requested measurements. In 2012, to show the "CIF Utilization Status", 76 research groups within Nagoya University registered, with the number of registered faculty, students, and researchers reaching 666. With the addition of the newly-established Graduate School of Pharmaceutical Sciences, the number of users of the CIF continues to grow year after year.

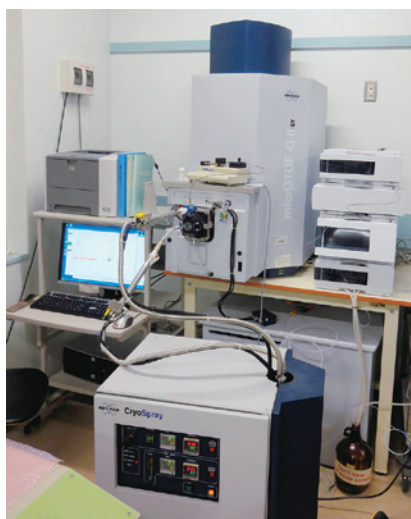


NMR 400 MHz (JEOL)

## [Introduction to the Setup and Equipment in the CIF]



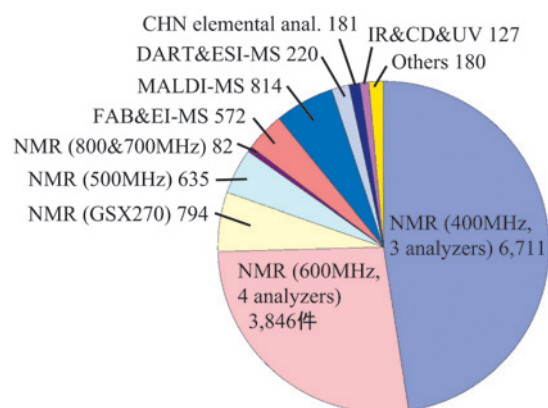
Experiment where Students Used the FT/IR-6100 (JASCO)



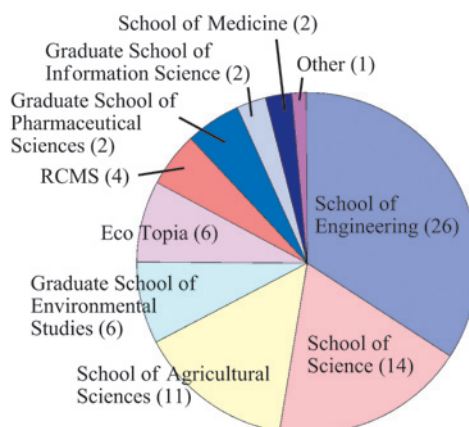
micrOTOF-QII (Bruker) (Cold Spray Ionization)

## [CIF Utilization Status]

Utilization Status for the Academic Year 2012  
(April 2012 – January 2013)



## Number of Uses/Measurements by Instrument



Utilization Status by Department  
(Total: 76 Groups, 666 People)

# Visits to the Chemistry Gallery

The Chemistry Gallery (2<sup>nd</sup> Floor of the Noyori Materials Science Laboratory) continued to host a large number of visitors in 2012 (in 2013, 660 people so far as of February). This includes many high school students and their parents visiting Nagoya University to tour the Chemistry Gallery and follow University Professor Ryoji Noyori's steps in his path to receiving the Nobel Prize, as well as people who came to see special exhibitions held at the Gallery. In addition, the Gallery held many events such as seminars and lectures by overseas guest researchers and press conferences related to research results.



At Science illustration exhibition



Display of the Nobel Prize ceremony



Press conference



Scientific Seminar



Young visitors



Prof. Noyori appeared in the Gallery!



Signing the autograph to young visitors.

# Retirement address Professor Kazuyuki Tatsumi, director of RCMS

The final lecture by Professor Kazuyuki Tatsumi, who will be retiring at the end of this year, was held at 10:00am on Tuesday, March 19 at the Lecture Hall in the Noyori Materials Science Laboratory. Professor Tatsumi's final lecture was delivered to a packed room, where an audience including faculty from the Graduate School of Science Department of Chemistry and Research Center for Materials Science, as well as a great number of other participants from both within and outside Nagoya University, listened to the lecture with highly attentive ears.

After the lecture finished, Professor Tatsumi was awarded flower bouquets and various mementos from RCMS and left the lecture room to thunderous applause. From April 2013, Professor Tatsumi will be continuing his research at RCMS as a Designated Professor.



Prof. Tatsumi at his final lecture



A large audience



Receiving the memorial gift from Prof. Yamaguchi



Receiving the flowers from German students



From left, Assoc. Prof. Yoshihisa, Assoc. Prof. Ouchi, Prof. Tatsumi, and Asst. Prof. Miyata

# Resignation Address

## [Associate Prof. Tohru Yoshihisa]

It has been decided that, after 15 years with the Nagoya University Research Center for Materials Science, I will move to a new position at the University of Hyogo. I have been with RCMS since its foundation, and I am writing these remarks with deep emotion as I realized that I was one of the few original members of the Center. At the time of its establishment, through a part of the publicity work, I was able to take some role in the creation of a new organization. Furthermore, with Professor Noyori being awarded the Nobel Prize, the completion of the Noyori Materials Science Laboratory Building, and the many events around RCMS, I was fortunate to have many great experiences during my time here. In addition, as a researcher towards life sciences, I am extremely grateful for being given opportunity to keep close contact with the forefront of core chemical sciences performed in the Center. In the future, I will continue to watch the Center from the outside, and I will cherish and utilize my connections with RCMS to enrich my own research, and I would be extremely grateful to be able to contribute in any way possible to the Center from the outside. It is my hope that RCMS will continue to play an active part and show its presence in chemical research not only in Nagoya University, but also in Japan and throughout the world.

## [Assistant Prof. Yasumitsu Miyata]

It has been decided that from this April, I will move to a new position at Tokyo Metropolitan University. First of all, let me take this occasion to express my heartfelt thanks to everybody who has helped and supported me. More than anything, I have been fortunate to have worked with these wonderful staff and students, and when I reflect over my experiences of the past four years, I find my time has been both fun and productive. Regarding the research atmosphere, I never felt limited in the use of funds or equipment for experiments and was always able to focus on my research. I would especially like to express my gratitude to Professor Shinohara for employing me as an Assistant Professor. In my remaining month here, I am excited to participate with everyone in experiments and discussions as much as possible.

At my new place of employment, I will continue to utilize my experiences at Nagoya University in the development of novel nanomaterials and solid-state physics research. So far, I have had the opportunity to participate in discussions and joint research with many professors of the very different fields in the Department of Chemistry, and I would be very grateful to be contacted for such opportunities in the future (and insist anyone finding themselves nearby to drop by and visit my research laboratory). From April, I believe I will have many chances to visit Nagoya University, and so I humbly thank you as I look forward to meeting with you again in the future.

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## Farewell Party March 19, 2013

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Toast !



Assoc. Prof. Yoshihisa in the middle



Prof. Tatsumi in the middle



Thank you !



Assoc. Prof. Ohuchi and Asst. Prof. Miyata



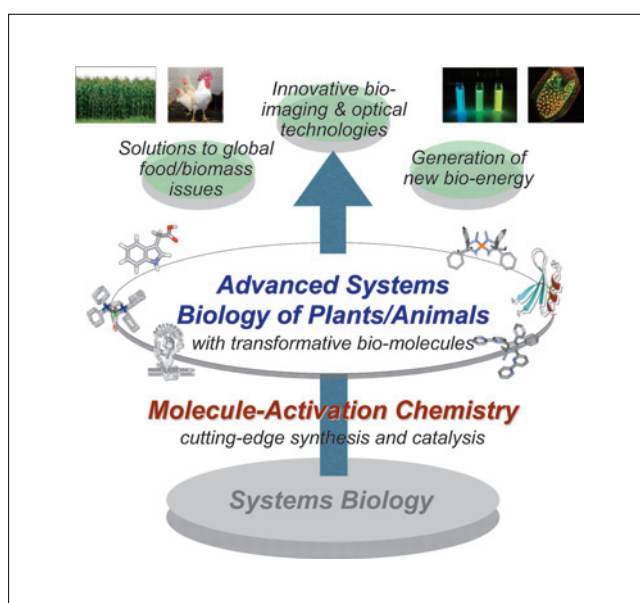
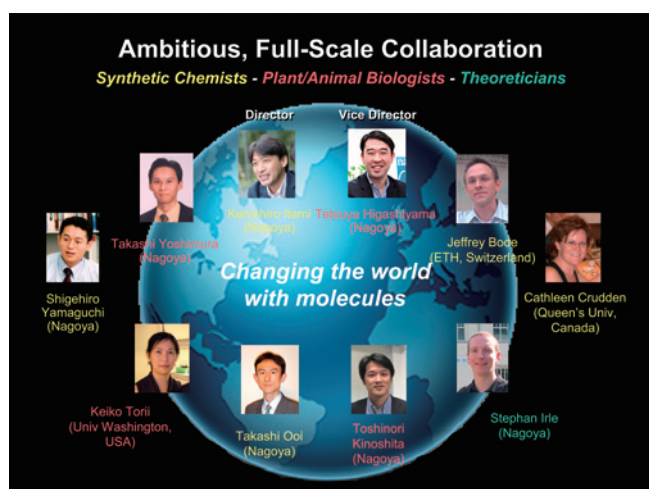
Group Photo

## Selected as New WPI Center!

The Nagoya University Institute of Transformative Bio-Molecules was selected by the 2012 World Premier International Research Center Initiative (WPI).

Supervised by Professor Kenichiro Itami (Graduate School of Science), a team of Principal Investigators (PIs) was made including 10 overseas researchers and has added Professor Shigehiro Yamaguchi (Research Center for Materials Science). Now, with the average age of the PIs 43 years old, a research team filled with youth and promise has begun. This research institute, through the formulation of "transformative bio-molecules," innovative functional molecules which change from the basis of life science and technology, is expected to bring great innovation to areas such as food/biomass issues, imaging technology, and new bioenergy.

Institute of Transformative Bio-Molecules  
<http://www3.chem.nagoya-u.ac.jp/ITbM/>



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

Professor Kunio Awaga of the Research Center for Materials Science (and Director from 2013) 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 2013, 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 and building dynamic cooperative alliances through research projects that are leading-edge in Japan and considered important globally.

(Project Title: Organic Electronics of Highly-Correlated Molecular Systems)

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## Prizes Awarded

Prof. Kazuyuki Tatsumi

### ***Selected as a Recipient of the 103<sup>rd</sup> Japan Academy Prize!***

At their 1067<sup>th</sup> General Meeting, the Japan Academy selected RCMS Director Prof. Kazuyuki Tatsumi as one of ten recipients of the Japan Academy Prize. The award ceremony, to be attended by Their Majesties the Emperor and Empress of Japan, will be held on June 17, 2013, at the Japan Academy Assembly Hall in Ueno, Tokyo.

Prof. Shigehiro Yamaguchi

### **Ninth JSPS Prize (February 2013)**

Prof. Shigehiro Yamaguchi has been awarded the JSPS Prize, given by the Japan Society for the Promotion of Science (JSPS) to researchers in the humanities and scientific fields below the age of 45 who are recognized for producing outstanding results through their contributions to academic journals, books, and other research work.

(Title of awarded research work: "Creation and New Functions of  $\pi$ -Electron Materials with Main Group Elements")



Assistant Prof. Yasutomo Segawa

### **Asahi Kasei Pharma Award in Synthetic Organic Chemistry (December 2012)**

*7<sup>th</sup> Wakashachi Encouragement Prize – Top Prize (February 2013)*

*Royal Society of Chemistry PCCP Prize (March 2013)*

*Chemical Society of Japan 93<sup>rd</sup> Annual Meeting – Young Chemists Forum Special Lecture (March 2013)*

Assistant Prof. Shohei Saito

### **IFOC-7 Top Poster Prize (November 2012)**



# Staff List

Director	Professor	Kazuyuki Tatsumi	(2474)	i45100a@nucc.cc.nagoya-u.ac.jp
Special Advisor	University Professor	Ryoji Noyori		
Organic Synthesis	Professor	Shigehiro Yamaguchi	(2291)	yamaguchi@mbx.chem.nagoya-u.ac.jp
	Assistant Professor	Yasutomo Segawa	(4525)	ysegawa@nagoya-u.jp
	Assistant Professor	Shohei Saito	(5750)	s_saito@mail.chem.nagoya-u.ac.jp
	Research Fellow	Namdev Vatmurge	(2960)	vatmurge@os.rcms.nagoya-u.ac.jp
	Research Fellow	Kengo Miyata	(2960)	miyata@os.rcms.nagoya-u.ac.jp
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	Associate Professor	Hideo Takagi	(5473)	htakagi@chem.nagoya-u.ac.jp
	Assistant Professor	Yasuyuki Yamada	(2471)	yy@chem.nagoya-u.ac.jp
Functional Materials	Professor	Kunio Awaga	(2487)	awaga@mbx.chem.nagoya-u.ac.jp
	Assistant Professor	Yasumitsu Miyata	(3660)	yas-miyata@nano.chem.nagoya-u.ac.jp
	Assistant Professor	Akitaka Matsuda	(2945)	amatsuda@chem.nagoya-u.ac.jp
Biomaterials Research	Professor	Yoshihito Watanabe	(3049)	p47297a@nucc.cc.nagoya-u.ac.jp
	Associate Professor	Tohru Yoshihisa	(2950)	tyoshihi@biochem.nagoya-u.ac.jp
Molecular Catalysis	University Professor	Ryoji Noyori	(2956)	noyori@chem3.chem.nagoya-u.ac.jp
	Assistant Professor	Hiroshi Naka	(5411)	h_naka@nagoya-u.jp
	Assistant Professor	Shinji Tanaka	(2960)	tanaka@os.rcms.nagoya-u.ac.jp
Collaborative Studies	Guest Professor	Tadashi Sugawara (Professor, Kanagawa University)		
	Guest Professor	Carlo Mealli (Professor, Istituto di Chimica dei Composti Organometallici [ICCOM])		
	Guest Professor	Vincent Robert (Professor, University of Strasbourg)		
Chemical Instrumentation Facility	Manager / Professor	Shigehiro Yamaguchi	(2291)	yamaguchi@mbx.chem.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, Cornell University – Laureate, Nobel Prize in Chemistry)		
		Henri B. Kagan (Professor, Paris-Sud 11 University)		
		Atsuko Tsuji (Editorial Writer, Asahi Shimbun)		
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	Professor	Kenichiro Itami (Graduate School of Science)	(6098)	itami.kenichiro@a.mbox.nagoya-u.ac.jp
	Professor	Akiyoshi Hishikawa (Graduate School of Science)	(2494)	hishi@chem.nagoya-u.ac.jp
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	Associate Professor	Susumu Saito (Institute for Advanced Research)	(5945)	saito.susumu@f.mbox.nagoya-u.ac.jp
	Distinguished Invited University Professor	Sumio Iijima	(6460)	ijimas@nagoya-u.jp
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	Administrative Staff	Sonoe Tankiku	(5908)	tankiku@os.rcms.nagoya-u.ac.jp