

Faculty of Engineering Highlight

2014+15
Highlights

Yokohama National University
Faculty of Engineering

<http://gakufu.eng.ynu.ac.jp/english/index.html>
<http://kenkyuin.eng.ynu.ac.jp/english>

Dean's Message —from Fiscal Year 2014 to 2015

Hiroshi FUKUTOMI

Dean, College of Engineering Science,
Dean, Graduate School of Engineering



I took office as Dean of the Graduate School of Engineering and College of Engineering Science in April 2015. During 2014–2015, our organization entered into a rebuilding period to meet higher standards for education, research, public contribution, and administration that were required for our next medium-term goals and plans (2016–2021).

On starting my duties as Dean, I announced that my major intention was to strengthen our faculty and graduate school at this research university. Our achievements in 2014–2015 should be the key for the future development of our university. Thus, our activities have been summarized briefly along with my considerations.

Globalization is now one of the necessary central aspects of all types of university activities. Hence, we have conducted various activities to acquaint our students with other aspects of the world. As shown in the later part of this document, we started providing all engineering graduate school lectures in English. The efforts in both learning and teaching are expected to produce major results. In June 2014, a double degree (DD) program for master of engineering was established with our Graduate School of Engineering and Changwon National University, Korea. Special selection prior to arrival in Japan was adopted for the first time, and we had two students in April 2015. A DD program for a doctoral degree was also launched in March 2015 in collaboration with University of São Paulo, Brazil. International internships and collaborative symposiums with overseas universities have also been promoted.

Research is the basis for excellent education as well as public contribution. To enhance our research activities, actions to increase the Grant-in-Aid for Scientific Research fund started in 2014 and caused an increase in the 2015 adopting rate. The increase in the fund is important not only to conduct the research but also to increase the financial resources for the improvement of research conditions in laboratories and related facilities.

In October 2014, the Institute of Advanced Sciences (IAS) was established with 11 top-level research units mainly in risk-related fields. Five units from our faculty enhanced IAS. Many research findings from our faculty members are contributing to various national level research projects by the Japan Society for Promotion Sciences, Ministry of Education, Culture, Sports, Science and Technology and other research-focused agencies.

I hope that all the faculty members realize the circumstances of our university and promote cooperation for the development of our university.

Faculty of Engineering

The number of the Teaching Staff (As of May 1, 2015 (in) as of last year May 1)								
Research Division	Professor	Associate Professor	Assistant Professor	Assistant Professor	Assistant Professor	Assistant Professor	Research Assistant	※ Visiting Professor, Visiting Associate Professor
Division of Materials Science and Chemical Engineering	23 (23)	25 (26)	3 (3)	4 (0)	6 (7)	0 (6)	1 (1)	6 (6)
Division of Systems Research	17 (18)	13 (14)	4 (3)	4 (0)	2 (2)	0 (5)	0 (0)	7 (6)
Division of Intelligent Systems Engineering	27 (24)	25 (24)	0 (1)	5 (0)	4 (6)	0 (5)	3 (3)	3 (4)
Total	67 (65)	63 (64)	7 (7)	13 (0)	12 (15)	0 (16)	4 (4)	16 (16)

*Cooperative course

Administrative Staff (As of May 1, 2015)

Technical staff: 39(39); Technology Department: 27(27); administrative staff belong to each department and office unit.

Lectures in English Begin: Effectiveness of Short Training Course by the British Council

YNU has provided a short English training course (for the faculty members) every year. This is designed to develop skills in English education. The course is composed of a seminar and group discussion, a lecture and presentation, and learning sessions focused on pronunciation and differences in global English languages. I participated in all of the classes, though no diploma or certification was granted. The lecturers come from the British Council in Tokyo.

Most of the faculty members in this graduate school regularly use English when writing papers, presenting their work in public, and communicating with foreign colleagues. English is always the language to use rather than the language to learn. The only thing many of us are not familiar with is teaching in English. This remains something special and deserves careful preparation. The British Council teachers are specialists in teaching various subjects in English and know key points for facilitating the comprehension of non-native speakers. They seemed to me reliable, which is why I decided to use this teaching-teachers service.

Of course, several days are not enough to one to acquire language skills. However, I did obtain many important solutions. After all, my lecture during the last spring semester was completely held in English. For students pursuing a master's degree, studying physical chemistry in English was as difficult as I had expected. This is mainly because they are not familiar with engaging in a foreign language. If we plan to change the language used in graduate courses to English, measures promoting the use of English are necessary also at the undergraduate level. This should be the second step of making English the "official" language of the graduate school.

Meanwhile, I will distribute the summary and vocabulary of the day in my class, which will be useful for students to understand what is occurring in class.



Enrollment

Graduate School of Engineering

Number of graduate school students (As of May 1, 2015 (in) as of last year May 1)		
Department (Course)	Number of master's students	Number of doctoral students
Department of Materials Science and Engineering (Specialization in Advanced Materials Chemistry, Chemical and Energy Engineering)	233 (216)	47 (43)
Department of Systems Integration (Specialization in Mechanical Engineering, Ocean and Space Engineering, Solid State Materials and Engineering)	232 (226)	39 (39)
Department of Civil Engineering and Architecture* (Specialization in Civil Engineering, Architecture and Building Science)	0 (2)	1 (2)
Department of Physics, Electrical and Computer Engineering (Specialization in Electrical and Computer Engineering, Physics)	316 (282)	65 (62)
Total	933 (872)	152 (146)

*Exists until all students enrolled leaves or graduates.

College of Engineering Science

Number of undergraduates (As of May 1, 2015 (in) as of last year May 1)	
Department	Number of students
Department of Mechanical Engineering and Materials and Science (Mechanical Engineering Program, Materials Science, and Engineering Program)	613 (576)
Department of Chemistry, Chemical Engineering and Life Science (Chemistry Program, Chemistry Applications Program, Life Science Program)	751 (734)
Department of Architecture, Infrastructure, Ocean Engineering, and Ecosystem Science (Architecture and Building Science Program, Civil Engineering Program, Systems Design For Ocean-Space Program, Ecology, Earth and Environmental Science Program)	685 (665)
Department of Mathematics, Physics, Electrical Engineering, and Computer Science (Mathematical Science Program, Physics and Applied Physics Program, Electrical and Computer Engineering Program, Computer Science and Engineering Program)	1,198 (1,158)
Total	3,247 (3,133)

Awards Received by Students in the College of Engineering Science, College of Engineering, and Graduate School of Engineering

Prize Winner*	Supervisor	Name of Award	Granted Society
Seiya Mizushima	Prof. Atsuo Kawamura	Paper/Presentation Award	The Institute of Electrical Engineers of Japan, Industry Applications
Aya Matsuo*	Assoc. Prof. Toshimitsu Kanai	Student Paper Award (Gold Award)	The Society of Chemical Engineers
Koichiro Tanaka	Prof. Osamu Umezawa	Student Poster Award	The Iron and Steel Institute of Japan
Doan Thi Huyen*	Prof. Osamu Umezawa	Outstanding Student Poster Award	
Junichi Sanekata*	Prof. Osamu Umezawa	Student Poster Award	
Tatsuto Kageyama	Assoc. Prof. Junji Fukuda	Student Poster Award	The Electrochemical Society of Japan
Midori Saito*	Prof. Tomoharu Nagao	Student Poster Award	The Institute of Electronics, Information and Communication Engineers
Konatsu Kato*	Prof. Meguru Kaminoyama	Award for 6th Student Symposium	The Society of Sea Water Science, Japan
Jin Tanabe*	Assoc. Prof. Kazuhiko Nishi	Award for Outstanding Student	The Society of Chemical Engineers
Seiya Mizusima	Prof. Atsuo Kawamura	Outstanding Paper/Presentation Award	The Institute of Electrical Engineers of Japan, Industry Applications
Yusuke Noda	Prof. Kaoru Ohno	Best Poster Presenter Award	Asian Consortium of Computational Materials Science
Eriko Ohashi	Prof. Hiroyuki Arai	Award for Encouragement of Student	The Institute of Electronics, Information and Communication Engineers
Miki Asanagi	Prof. Hiroshi Itagaki	Student Poster Award	The Japanese Society for Alternatives to Animal Experiments
Makoto Akiba	Assoc. Prof. Takahide Oya	Poster Award	Materials Research Society
Kanchi Shimono*	Prof. Kazuo Konagai et al.	Idea for Liquefaction countermeasure method / 3rd Prize	Kanto Branch of the Japanese Geotechnical Society
Saori Yamamoto*	Prof. Kazuo Konagai, et al.	Idea for Liquefaction countermeasure method / 3rd Prize	
Yuzuko Tamura	Assoc. Prof. Koichi Matsuzawa	Student Presentation Award	Hydrogen Energy Systems Society of Japan
Masaki Tsuchiya, Hiroki Yano	Assoc. Prof. Toshimitsu Kanai	Student Award/Bronze (for Mr. Tsuchiya), Student Award/Special (for Mr. Yano)	Kanto Branch of the Society of Chemical Engineers
Makiko Nakagawa	Prof. Koji Tkahashi	Best Poster Award, Poster Award	Japan Society of Spring Engineers
Kae Iwanaka	Prof. Koji Tkahashi	Best Poster Award, Poster Award	
Yoshiki Makino	Prof. Akira Naito et al.	Poster Award for Young Researcher	The Nuclear Magnetic Resonance Society of Japan
Tomoki Hayashi	Assoc. Prof. Koichi Matsuzawa	Poster Award	Fuel Cell Development Information Center
Genki Ishibashi	Prof. Shoji Maruo	Presentation Award for Young Researchers	The Japan Society of Mechanical Engineers
Kenji Sugiyama	Prof. Shoji Maruo	Presentation Award for Young Researchers	
Moeka Hayashi	Prof. Kazuhiko Nishi	Award of Symposium, Award of Presentation	The Society of Chemical Engineers
Suazlan Bin Mt Aznam	Assoc. Prof. Shoji Mori	Student Presentation Award	The Japanese Society for Multiphase Flow
Kazuhiro Kajiware*	Prof. Kazuo Konagai et al.	Best Award in the Contest of Future T & I and T Technology	Japan Society of Civil Engineers
Shunsuke Tomiyoshi*	Prof. Kazuo Konagai et al.	Best Award in the Contest in Category of Technology on Future T & I	
Saori Yamamoto*	Prof. Kazuo Konagai et al.	Best Award in the Contest in Category of Technology on Future T & I	
Yuki Takeuchi	Assoc. Prof. Koichi Matsuzawa	Outstanding Student Poster Award	The Electrochemical Society
Katsumasa Yoshioka	Assoc. Prof. Ikufumi Katayama et al.	Best Student Paper/Presentation Award	39th International Conference on Infrared, Millimeter, and Terahertz Waves
Genki Ishibashi	Prof. Shoji Maruo	Award for Encouragement of Research	
Yuki Kitabashi	Assoc. Prof. Izuru Kawamura et al.	Best Poster Award	The 2nd International Conference of D-Amino Acid Research
Tetsushi Ota	Prof. Yasushi Takemura	Student Presentation Award, Sakurai Award	The Magnetics Society of Japan
Yuna Kinami	Prof. Kazuhisa Sakakibara et al.	Best Poster Award	Japan Association of Aerosol Science and Technology
Shen Wang	Prof. Hiroyuki Arai	Student Innovation Competition/2nd Prize	2014 IEEE International Workshop on Electromagnetics
Akane Masuko*	Prof. Haruhiko Siomi et al.	Best Presentation Award	Group of Epigenome Dynamics and Regulation in Germ Cells
Yoshiaki Naruse	Prof. Yasumi Kawamura	Best Presentation Award for Young Researchers	The Japan Society of Naval Architects and Ocean Engineers
Hitomi Sugiyama	Assoc. Prof. Toshimitsu Kanai	Best Poster Award	National Institute for Materials Science
Shuhei Toyota	Assoc. Prof. Izuru Kawamura et al.	Poster Award	Protein Science Society of Japan
Ryota Nishikawa	Assoc. Prof. Izuru Kawamura	Poster Award	
Ryutaro Fueki	Prof. Koji Takahashi	Poster Award	Japan Society of Spring Engineers
Taishi Sonoda	Prof. Takashi Ubukata	Poster Award	The Society of Polymer Science, Japan
Makoto Hamazaki	Prof. Tokusige Mitsushima	Poster Award	Fuel Cell Development Information Center

* Student of College of Engineering

Original Data: http://www.ynu.ac.jp/education/ynu_research/result/award.html

Research Highlights

(Vice Dean of Research) Masayoshi Watanabe

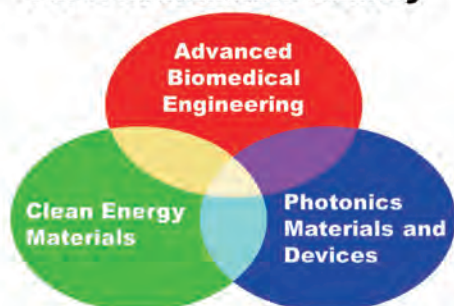
The engineering faculty is aiming to conduct cutting-edge international research through global collaboration under competitive conditions. We have also recently been strongly recommended by Ministry of Education, Culture, Sports, Science and Technology (MEXT) for having our own unique features that distinguish us from other universities. Herein, highlights of our research as well as our attempts to make our faculty more high-spirited will be introduced.

Cutting-edge International Research

Cutting-edge international research consists of star research projects selected by the faculty as *"Interdisciplinary Collaborative Research Projects."* We currently have 3rd-term research projects (2012–2016). The three major projects are related to *"Advanced Biomedical Engineering," "Clean Energy Materials,"* and *"Photonics: Materials and Devices,"* which commonly aim at the realization of a sustainable society.

To lay the foundation for cutting-edge international research, our faculty has promoted group research, which combines interdisciplinary yet related researchers onto one team. When a group research project achieves great success, such research will be recognized as an *"Interdisciplinary Collaborative Research Project,"*

For a Sustainable Society



which is our promotion system. Beginning this year, all group research will be conducted by *"Kakenhi groups,"* which aims to facilitate group research as well as get Kakenhi (Grant-in-Aid for Scientific Research by MEXT, the fundamental cornerstone of research funding in Japan) as a financial research resource. Simultaneously, we

designed a backup source of funding for when we fail to acquire a sufficient budget in spite of a relatively high ranking.

"2014 YNU Distinguished Researcher Awards" were presented to the following faculty researcher: Associate Professor Toshimitsu Kanai (Technological Progress Award).

Research Under Competitive Conditions

It is essential for research-focused universities to conduct research under competitive conditions, while at the same time award suitable positions to faculty members who have made honorable achievements. Our faculty created a strict guideline for promotion. We also established a tenure-track system to employ new faculty, especially young members, which was financially supported by MEXT. On November 27th and 28th, 2014, we organized a forum to discuss research activities and career paths for young researchers, where we invited tenure and tenure-track faculty members supported by MEXT not only from our university but also from all over Japan.

Global Collaboration

Global collaboration among our faculty has been conducted based on professional connections. We have signed a worldwide memorandum of understanding between numerous faculty members and universities. In addition, we embarked on systematic global collaboration in 2012, supported by the Japan Society for the Promotion of Science, under the *"Strategic Young Researchers Visit Program for Accelerating Brain Circulation"* program. We selected five overseas universities and national institutes for collaboration, focusing mainly on materials science. Young faculty and students (brain) frequently visit these institutions (circulation) to conduct global collaboration, and we also receive faculty and students to our own institution. The FY 2014 was the final year of this project, and a symposium to present research progress and achievement through these collaborations was held in March 2015.

2014 Ministry of Education, Culture, Sports, Science and Technology Japan Society for the Promotion of Science Grants—Aid for Scientific Research

(More than 10 million yen)

Research Item	Research Theme	Representative	Amount of Money Awarded (Yen)	Study Period
Research on Innovative Areas	Creation of molecularly integrated multi-responsive photochromic materials	Prof. Yasushi Yokoyama	10,500	2014–2018
Research (S)	Super-sensitive bio-marker sensors using ultimate light localization in nano-slot nanolasers	Prof. Toshihiko Baba	28,900	2012–2016
Research (S)	Study on sub- μ W microprocessors using adiabatic single-flux-quantum circuits	Prof. Nobuyuki Yoshikawa	27,500	2014–2018
Research (A)	Development of core technologies for human-friendly assistance systems using spiral motors	Prof. Yasutaka Fujimoto	11,000	2012–2015
Research (A)	Realization of one charge battery driving distance extension based on the high power density energy conversion system	Prof. Atsuo Kawamura	15,100	2014–2016
Research (B)	Sophistication of deformation damage evaluation of metallic materials by an electron and X-ray diffraction hybrid method	Prof. Yoshiaki Akiwa	10,300	2014–2018

Trust Study, Collaborative Investigation, and Furtherance Business with 2014 Ministry of Education, Culture, Sports, Science and Technology—the Government Bank

(More than 10 million yen)

Division	Research Title	Representative	Amount of Money Awarded (Yen)	Study Period
Ministry of Education, Culture, Sports, Science and Technology	Establishment of in-vessel retention using novel passive cooling technology	Assoc. Prof. Shoji Mori	20,046	2014
Japan Science and Technology Agency	Fundamental technologies for the production and usage of chemical hydride/Development of an electrolyzer for electrohydrogenation of toluene and durable electrode for oxygen evolution, and elucidation of hydrogenation mechanism	Prof. Shigenori Mitsushima	78,301	2014–2016
	Optimization of ionic liquid electrolytes and high-capacity cathodes for Lithium-Sulfur batteries	Prof. Masayoshi Watanabe	49,400	2012–2015
	Development of novel ceramics possessing self-healing functions for turbine blades	Assoc. Prof. Wataru Nakao	20,800	2012–2015
	Understanding and boundary structure optimization of coupled phenomena of heat and mass transport and electrochemical reaction by micro-sensors and multi-scale numerical analysis	Assoc. Prof. Takuto Araki	14,430	2013–2015
	Development of novel wrought aluminum alloys concurrently strengthened by ultrafine-grained and precipitation hardening and establishment of guidelines for the innovative alloy designing	Prof. Shoichi Hirosawa	10,069	2014–2017
	CW laser sources for optical frequency combs and their applications	Prof. Feng-Lei Hong	16,900	2014–2017
	Development of oxygen barrier coatings by aerosol deposition method	Assoc. Prof. Makoto Hasegawa	14,000	2014–2016
New Energy and Industrial Technology Development Organization	Microdevices for culturing microbes and their uses for saving energy in wastewater treatment plants	Assoc. Prof. Junji Fukuda	11,385	2011–2015
	Strategic development of PEFC technologies for practical application/non-precious metal-oxide-based catalyst for PEFC	Prof. Ken-ichiro Ota	78,032	2010–2015
	Advancement of hydrogen technologies and utilization project analysis on comprehensive renewable energy systems	Prof. Ken-ichiro Ota	19,997	2014–2016
	Development of super 3D fabrication platform and production of high value-added products	Prof. Shoji Maruo	39,997	2014–2016
National Institute of Information and Communications Technology	Research and development for hybrid quantum repeater - Quantum Entanglement Purification -	Prof. Hideo Kosaka	23,847	2014–2016

Short-term Nikkei Student Visitors from Latin America and Caribbean Countries



JICA assists Japanese emigrants and their descendants (Nikkei) who have settled in Latin America and the Caribbean. As part of this effort, JICA has invited 20 Nikkei undergraduate students from nine countries in this area; eight students have been assigned to YNU for four days, starting on July 9, 2015, to experience life as a Japanese college student. Together with the Graduate School of Urban Innovation and the Graduate School of Environment and Information Sciences,

the Graduate School of Engineering has hosted these eight students for lab tours, seminars, and lectures in Japanese.

We hope that they cherish the experience at YNU, and on returning to their own countries, they reconfirm the importance of the Nikkei community.

Visit to the University of Danang and Danang University of Science and Technology

On October 22nd and 23rd, 2014, the delegation from the faculty of engineering at YNU visited the University of Danang (UD) and Danang University of Science and Technology (DUT) in Da Nang City, Vietnam. On October 22nd, they made a courtesy visit to Prof. Dr. Tran Van Nam, President of UD. On October 23rd, the workshop was held at DUT, and the delegation discussed in detail future international collaboration. We hope that this visit will boost the international exchanges between YNU and UD.



Courtesy visit to the President of UD



Workshop at DUT

List of Partner Universities

<http://www.ynu.ac.jp/english/international/agreement/index.html>

Member Register

Chief Professor SANADA Kazushi

Committee Professor ASAMI Masatoshi

Committee Professor OHNO Kaoru

Committee Professor SUZUKI Kazuya

Committee Professor HAMAGAMI Tomoki

Committee Professor MITSUSHIMA Shigenori

Dean Professor FUKUTOMI Hiroshi

List of Writers (Order of the Japanese syllabary)

Associate Professor SHIMONO Tomoyuki

Professor FUKUTOMI Hiroshi

Professor MATSUI Jun

Professor MAEKAWA Takashi

Professor YOSHITAKE Hideaki

Professor WATANABE Masayoshi

Editor Yokohama National University,
Faculty of Engineering

Publisher FUKUTOMI Hiroshi
Dean, Faculty of Engineering

Publishing office 79-1 Tokiwadai, Hodogaya-ku,
Yokohama 240-8501 JAPAN
TEL : +81-45-339-3804
FAX : +81-45-339-3819

Issue date December,2015

Design KIOI OFFICE
Printing office Vanfu.co.ltd.