Contents

From the Dean

Bioscience and biotechnology–an increasingly international discipline

Hisakazu Mihara
Dean,
Graduate School of Bioscience and Biotechnology

My name is Hisakazu Mihara. I succeeded Professor Mitsuo Sekine as Dean of the Graduate School of Bioscience and Biotechnology in April 2015. As a member of the Department of Bioengineering, my research has specialized in bioorganic chemistry, specifically peptide engineering.

In 2015, the move to achieve university/education reform at Tokyo Institute of Technology (Tokyo Tech), which started during Dean Sekine's term, reached its climax. The Graduate School of Bioscience and Biotechnology teamed with the other faculties and departments to prepare for an overhaul of the university organization and curriculum. The university's all-new education system begins on April 1, 2016. For more detailed information on these reforms, please refer to the Tokyo Tech website. These reforms merge our former undergraduate schools with our graduate schools, creating new organizations referred to simply as schools. Currently, Tokyo Tech runs three undergraduate schools comprising 23 departments and six graduate schools comprising 45 departments. Under the new organizational structure, we will have six schools comprising 19 departments. The purpose of this new structure is to give a wider perspective to and create seamless transitions between educational programs in our academic departments and graduate programs. In addition, all courses will be numbered. All general courses from the 100- to the 200-level and all specialized courses from 300-level will be part of the undergraduate program. All 400- and 500-level courses will be part of master's degree programs, while 600-level courses will be part of PhD programs. Under the new school system, fourth-year undergraduates will be able to get a head start on master's program work by taking 400-level courses. School terms are also changing. Instead of a first and second semester every school year, there will be four quarters, which will allow students to earn credits in about two months. Under this system, a two-credit course will have lectures twice a week. Another advantage is that students can combine their summer vacation with either the second or third quarter to study abroad for a period of about four months. This will facilitate internships at businesses and other organizations. At the same time, students from abroad will be able to take courses at Tokyo Tech on any number of schedules such as individual quarters or summer vacations.

In the new School of Life Science and Technology, even faculty such as those from the Interdisciplinary Graduate School of Science and Engineering will be involved in student education. About 120 faculty members from 75 research laboratories will be part of the new School. The Graduate School of Bioscience and

Biotechnology's five departments (Life Science, Biological Sciences, Biological Information, Bioengineering, and Biomolecular Engineering) will also merge into a single organization known as the Department of Bioscience & Biotechnology.

In January 2016, the Graduate School of Bioscience and Biotechnology held its fourth Bioscience and Biotechnology International Symposium on the theme "Multifaceted Approaches to Disease Intervention." Many graduate students and faculty members took part in the event, which featured presentations and stimulating discussions on the contributions of bioscience and biotechnology to medicine. The International Graduate Program of the Graduate School of Bioscience and Biotechnology has included about 10 international students annually, most of whom have been from Asian countries. In addition, graduate and undergraduate students from Asia, Europe, and North America use Tokyo Tech's short-term study-abroad system. Quite a few of these students join our bioscience and biotechnology program at the graduate and undergraduate levels for three months to a year. During that time, they take classes and pursue a variety of research topics.

Starting in 2016, most of the graduate-level courses in the School of Life Science and Technology will be taught in English. This means that the graduate teaching and research in the School of Life Science and Technology will become increasingly international. I would like to invite our graduates overseas to come back and visit Tokyo Tech again.

From New Staff

Greetings

Kazushi KINBARA
Professor
Department of Biomolecular Engineering

I moved from Tohoku University and was appointed as a full professor of Department of Biomolecular Engineering last April. I have been involved in development of functional molecules based on synthetic organic chemistry. In recent years, a particular focus has been put on proteins so as to develop novel molecules for regulating and mimicking their sophisticate functions. Since proteins are diverse in their structure and function, the designed molecules are diverse as well. Just like painting a picture on a canvas, there is no limitation in molecular design, and I can often get an inspiration from biological molecules. Unexpected properties are frequently found in such designed molecules, which give further inspiration toward molecular design. This process is very stimulating. There are so many specialists in various bio-related fields in this faculty, and I hope to start new collaborations with colleagues in near futures. Since a new education system will start from this April, I would like to make contributions as much as I can do for this faculty.

Development and differentiation studies using pluripotent stem cells

Nobuaki SHIRAKI
Associate Professor
Department of Biological Information

I have joined the Department of Biological Information from March 2015. In a former post Kumamoto University we have conducted research with Pro. Shoen Kume since 2002 . I was born, grown up and studies in Kumamoto without moving, I moved with my family (wife and three daughters), now we enjoys the life of the first time in the Kanto region. We have performed development and differentiation studies using pluripotent stem cells (PSCs) and established efficient endoderm differentiation methods. Recently, we have focused on amino acid metabolism of human PSCs cells and found that methionine metabolism is essential for maintaining undifferentiated PSCs and regulates their differentiation. Methionine deprivation results in a decrease in S-adenosyl-methionine (SAM), universal methyl donor for DNA, RNA, and protein. However, the molecular mechanisms of methionine deprivation induced above events is nuclear. So, In Tokyo tech, I want to convey the fun of stem cell research to students, and promote the stem cell research with a new cut of methionine metabolism with students. I'll do my best with education and research in our faculty.

Greetings

Masato NIKAIDO
Associate Professor
Department of Biological Sciences

I was assigned as an Associate Professor at the Department of Biological Sciences in April 2015. After receiving the PhD at Tokyo Institute of Technology, I spent three years at the Institute of Statistical Mathematics (ISM) as a JSPS Research Fellowship for Young Scientists (PD). Then, I returned to this department in 2006 as an Assistant Professor and was promoted as an Associate Professor in 2015. Since the starting of my research for undergraduate course, I have focused on adaptation or diversification of animals, so called "Evolution". The goal of my research is to link various interesting phenotypes to genotypes by using the Darwin's theory of natural selection at the DNA level. One of my biggest achievements is the elucidation of the extant closest relatives of whales. Namely, the molecular phylogenetic study of whales and artiodactyls (even-toed ungulates) suggested that whales are genetically closer to hippopotamus than to any other extant mammals. After decades of heated debate, my hypothesis was accepted by paleontologists. Besides this, I studied on various animals, such as bats, elephants, moles, and coelacanths. I spent very exciting research life during 9 years at Tokyo Tech.

At present, I am focusing on the lip and

pheromone of the East African cichlids (tropical fish) and also the spine of hedgehogs. I guess someone wonder if such question is really important or not. But I promise that those questions are very important to understand the molecular mechanism underlying adaptive evolution. I hope we get many interesting data and publish more papers in the next few years. Finally, I want to emphasize the importance of understanding what the evolution is, and what the biodiversity is, to promote the research area of not only biology itself but also biotechnologies that include medical and pharmacological studies. Let's enjoy Evolution!

Greetings

Daisuke SAKANO
Associate Professor
Department of Biological Information

I was assigned as an assistant professor of Department of Biological Information on March 16, 2015. I have moved from Institute of Molecular Embryology and Genetics, Kumamoto University. My research is focused on differentiation of pancreas from ES・iPS cells. It's expected to make insulin producing cell for diabetes treatment now. I established the system to produce insulin producing cell efficiently using small molecules.

Recently, I'm also interested in control of differentiation, reproduction and insulin secretion of the pancreatic beta-cell by monoamines.

In the past, I studied a mechanism of diapause system in insect's eggs and a left-right patterning of Xenopus embryo. These experiences deepened my interest to embryology.

I am excited when I found the developmental mechanisms managed well.

I wish our student to feel the same emotion in their research and study, too.

I'd like to devote myself to a study for regenerative medicine.

Greetings

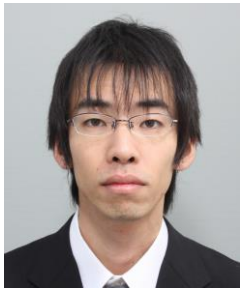
Rei KAJITANI
Assistant Professor
Department of Biological Information

I obtained PhD from Tokyo Tech in March 2015 and joined to Itoh and Kotera laboratory as an assistant professor in April 2015. My research fields are bioinformatics and genomics, and the theme of my PhD thesis was the development of the method to construct genomic sequences from fragment data of DNA sequencers. In the beginning of the study, I assumed the theme just as "tool making"; however, I have progressively understood the relation between the obstacle and the interesting features for the genome evolution, such as repetitive sequences and differences between homologous chromosomes. It was the good opportunity to consider how genomes and random sequences are different. The

targeted organisms of my research consist of bacteria, yeasts and multicellular organisms that are classified in Cnidaria, Arthropoda, Echinodermata, Vertebrata and so on. Through the genome projects I joined, I have been motivated by the attitudes of the co-researchers and able to broaden my perspective. In addition, I also hope to determine and research a certain organism as my specialty. To be sure, I recognize the obligation to educate students as a faculty member, and I would like to give biological knowledge not to make the laboratory a factory of string-processing programs.

Greetings

Satoshi HARA
Associate Professor
Department of Life Science



I was assigned as an assistant professor of Department of Life Science on May 2015. I had been belonged to Hisabori laboratory at Chemical Resources Laboratory, Tokyo Tech for more than 10 years since laboratory assignment until last year. I have majored in protein science and focused on redox regulation of protein.

The redox regulation of protein is one of the essential mechanisms in order to perform the modulation of the activity and function for adaptation of cellular environment. My study had focused on the redox regulation of plant protein. Plants need to change the metabolic pathway in the day and night. The redox regulation plays a key role in this change as a mediator, and therefore the changes of the redox status are quite dynamic. Although such dynamic shifts of redox states are not occurred in mammalian cells, redox regulation and redox status of proteins are important subject of research. Since oxidative stress, failure of the normal redox status, causes cell death and diseases in some case, understanding the redox states of protein in the cells has essential and fundamental significance. I hope to reveal the behavior of the molecules come from oxidative stress.

In the wonderful environment, I hope to continue in my best efforts to research and education.

Greetings

Takahiro MURAOKA
Assistant Professor
Department of Biomolecular Engineering

I joined Kinbara laboratory in the Department of Biomolecular Engineering as an assistant professor in May 2015. My research interest is in the development of novel functional molecules for bio-related applications, where the molecular design is often inspired from nature.

So far, I have studied development of synthetic molecular machines with interlocked movable units at The University of Tokyo, and regulation of cell

adhesion by photo-responsive hydrogels at Northwestern University in USA. Since I had moved to Tohoku University, my former affiliation, as an assistant professor, I started projects to develop synthetic ion channels for membrane functionalization and fine-tuned poly(ethylene glycol) analogues for protein-related applications. Because of the high activity in our department, I expect lots of collaborations here to expand our researches to frontier.

Greetings

Yasuto MURAYAMA
Assistant Professor
Department of Biological Sciences

I have joined Prof. Iwasaki's lab from May 2015. I have studied the mechanism of maintenance of genome stability including DNA repair, homologous recombination and chromosome segregation. Chromosome contains all information to create the shapes and functions of organisms. All organisms must replicate the extraordinary long molecules, by repairing them from time to time, to descend their copy properly. To understand the mechanisms of these processes, I have purified and analyzed the proteins involved in genome maintenance. My research is a basic study and genome stability is closely related to cancers and genetic disorders. I would like to contribute both science as well as public from the basic science.

Events

Tokyo Tech Open Campus 2015

Toshjaki KAMACHI
Associate Professor
Department of Bioengineering

Tokyo Institute of Technology held Open Campus day on August 8, 2015 at Ookayama campus. Open Campus has previously been held together with the Tokyo Tech Festival in autumn, but the events are now separate occasions. Tokyo Tech Open Campus 2015 was 2nd in this manner. School of Bioscience and Biotechnology has been also attended to the Open Campus day at Ookayama campus since 2014. 1st Open Campus was held on Friday in August, 2014. There were more than 13,000 visitors, whereas it was held on Friday.

2nd Tokyo Tech Open Campus was held on Saturday, so number of estimated visitors was 15,000–20,000. Slightly decrease in the temperature due to the partial cloudy day was favorable for visitors to attend Open Campus, so more than 18,000 visitors was come to Tokyo Tech. Open Campus focused on introducing 7 academic groups

at undergraduate level to prospective students. This year's Open Campus also focused on introducing high school students to a new education system that will commence in April 2016.

School of Bioscience and Biotechnology held many events such as briefings on School of Bioscience and Biotechnology, lectures given by four professors (Profs. Hideki Taguchi, Yuichi Hongo, Kazunori Tachibana, Yasunori Aizawa), opening research labs and lab tour in Midorigaoka 6 building, and poster session of research projects, exchange meeting with undergraduate students. All events had a big crowds. We hope that many of the visotrs at this year's event were inspired and motivated to learn more about School of Bioscience and Biotechnology.

Open Campus day in 2016 will be held on August 11th (National holiday).

Lectures on Bioscience and Biotechnology for high school students 2015

Hiroshi IWASAKI
Professor
Department of Biological Sciences

“Lectures on Bioscience and Biotechnology for high school students 2015” started at 1:00 p.m. in the Lecture Theater in Ookayama campus on November 23 (Labor Thanksgiving Day), 2015. This lecture, originally proposed by Honorary Professor Yoshinori Ohsumi who won the Canada Gairdner International Award 2015, the 31st (2015) International Prize for Biology and many other awards, was designed to convey the importance of basic science and the fun that can be had in studying science to junior and senior high school students, who will be the leaders of science in the coming generations. The 250-person capacity Lecture Theater was completely filled with high school students, resulting approximately 30 parents having to attend a remote lecture that was swiftly organized in another lecture room.

Prof. Yoshinori Ohsumi gave a lecture entitled “Autophagy research that began with yeast ~ Pleasure of life science study”. In an engaging and accessible manner, he told an interesting story about the discovery of autophagy and how he was excited with the first observation of autophagy. In short, he delivered a lecture that aimed to capture the

imagination and inspire the students in the audience who would pursue science in the coming era.

After a short break, four teachers from the Department of Bioscience and Bioengineering gave short lectures. Assoc. Prof. Masato Nikaido gave a lecture entitled "Evolving molecular evolution ", Assoc. Prof. Takeshi's lecture was entitled "Drug discovery by the innovative chemical synthesis", Prof. Sho-en Kume gave a lecture entitled "Stem cell biology (ES and iPS cells)", and Prof. Ken Kurokawa's lecture was entitled "Bioinformatics and future society". Each lecture was well-received and the students asked several thoughtful and insightful questions, evidence that The Lecture Theater was bubbling with excitement.

After the lectures, the all attendees moved to Kuramae Hall where an exchange party was held. The students enjoyed a pleasant chat with the professors who gave lectures. In addition, each laboratory of the Department of Bioscience and Bioengineering gave a short explanation of its own research to the students via a poster presentation. The students of BSC (BioCreative Staff, a student club activity of Tokyo Tech) introduced the student life in Tokyo Tech to high school students. Furthermore, the relevant members of staff held discussions with students about the admission criteria and process for Tokyo Tech and the career path after graduation.

Many professors as well as Prof. Ohsumi inspired junior and senior high school students to pursue biological science in this meeting. This event on Labor Thanksgiving Day created a perfect opportunity to feel invigorated by biology and become more familiar with the Tokyo Institute of Technology.

The 4th Bioscience and Biotechnology International Symposium

Yuki Yamaguchi
Professor
Department of Biological Information

Takeshi Hata
Associate Professor
Department of Biomolecular Engineering

On January 13, 2016, the Graduate School and the Education Academy of Computational Life

Sciences (ACLS) jointly organized the 4th Bioscience and Biotechnology International Symposium.

Under the theme of Multifaceted Approaches to Disease Intervention, two speakers from our university, three speakers invited from the other domestic institutions, and two speakers invited from overseas gave a talk on frontline researches – from basic biomedical research to drug development and to technology development using chemical biology and nanotechnology – to provide diverse perspectives on the theme.

In Session 1, Distinguished Professor Cornelis Murre (UC San Diego, USA), Team Leader Mariko Okada (RIKEN-IMS, Japan), and Professor Shoen Kume (Tokyo Tech, Japan) introduced their researches that uncover the mystery of life and reconstruct it *in silico* and *in vitro*. In Session 2, Team Leader Anthony D. William (A*STAR, Singapore) and Principal Research Scientist Kunitomo Adachi (Mitsubishi Tanabe Pharma, Japan) gave a talk on drug development against new molecular targets. In Session 3, Professor Nobuhiro Nishikawa (Tokyo Tech, Japan) and Professor Yasuteru Urano (The University of Tokyo, Japan) presented a talk on technology development for diagnosis and drug delivery using chemical biology and nanotechnology.

Professor Yamamura (Department of Computational Intelligence and Systems/ACLS) admired the symposium, saying, “I was surprised to find that the Langevin equation appeared in Session 1.” While this symposium series has been jointly organized by the Graduate School and ACLS, it was the first time that computer science was brought to the forefront. Professor Murre was also quoted as saying that he learned so much from Session 2 as he had never listened to the talks on medicinal chemistry. In addition, excellent presentations in Session 3 made us to believe that any types of cancer will be diagnosed at an early stage and cured in the near future.

We received more than 400 preregistrations, which was the largest number ever recorded. Although this symposium series needs a revision due to the educational reform from the next academic year, we hope to continue to provide an opportunity for graduate students and young researchers to interact with internationally renowned scientists.

2nd Top Leaders' Forum on Bioscience and Biotechnology

Nobuhiro HAYASHI
Associate Professor
Department of Life Science

The Top Leaders' Forum on Bioscience and Biotechnology, that is an occasional lecture series in which the Graduate School of Bioscience and Biotechnology in Tokyo Tech invites a distinguished scientist who has lead the world in the life science field to share his/her view, idea and passion to science and to enlighten graduate students and young scientists, has been launched as the second lecture. Aim of this forum is to invite a pioneering scientist who has been working at the cutting edge of life science globally as a leader of the field, and to learn the present situation and the future on the consideration of the problems and the expectations to young scientists of bioscience and biotechnology. Different from the other ordinal symposium, this forum where the speakers could talk their history with progress of the science is very rare and important chance for persons aiming to be scientists to hear the top leaders' true thinking and passion to the life science. Because histories of scientists are different each other, it is an attraction of this forum that we can expect to hear different exciting stories at every time.

After the first forum given by Professor Katsuhiko Mikoshiba (RIKEN Brain Science Institute) of last year, the second forum was held at the Suzukake hole on November 25 th , 2015. This time, the lecturer was Professor Kazutoshi Mori (Kyoto University) who is a top leader of cellular biology. Prof. Mori has revealed the unfolded protein response (UPR) that is a mechanism to avoid accumulation of inferior proteins in the cells. The discovery has brought not only an understanding of essential function of
the cells, preservation of the homeostasis, but also hopes for development of therapeutic methods of many diseases related to UPR. He has always been a leader of researchers of cellular functions.

For his notable achievements, Prof. Mori was bestowed with many awards including the Canada Gairdner International Award (2009), the Albert Lasker Basic Medical Research Award, etc.

In his lecture entitled "Discovery and elucidation of the UPR", his historical discovery of the UPR and the following research story of elucidation of the molecular mechanism were talked with episodes about severe research competitions. Before the forum,

a message “I hope you will understand importance of ‘ambition’, ‘preparation’, ‘challenge’, ‘patience’, and ‘health’ from my talk.” was sent from Prof. Mori. And, we could understand the intention after the forum.

Audiences of this forum could feel great sense and genuine delight of the achievement from his talk, and there is no doubt that everyone renewed his own resolutions. Although time of the lecture (90 minutes) was extended for long time, the audiences were not bored at all because every topic of the forum was a succession of exciting content.

As stated above, the second forum was very worthwhile. Graduate School of Bioscience and Biotechnology in Tokyo Tech will drastically change to School of Life Science and Technology next year. However, the task to draw life science globally will not change. As one part of the obligation, this forum will be continued after this as opportunities for top-leaders of 10 years later to make their first steps toward the scientists.

Awards

Challenging Research Award: Understanding the molecular mechanism underlying the diversification biological organisms

Masato NIKAIDO
Associate Professor
Department of Biological Sciences

It is my great pleasure that I was honored with the Challenging Research Award in 2015 from Tokyo Institute of Technology for my achievement in the study of evolutionary biology. The title of my research for the award is the “Understanding the molecular mechanism underlying the diversification biological organisms”.

As Charles Darwin proposed in his famous book, the origin of species, the biological organisms have acquired morphological and ecological diversity through adaptation to various environments. We call it evolution (I guess most of the people know this term). However, molecular mechanism of evolution and/or adaptation actually remains mostly unresolved. How and where in the genomic regions does natual selection operates is one of the biggest question in modern evolutionary biology. To resolve this very traditional but unanswered question, I focus on the parallel evolution in east African cichlids as one aspect of adaptive evolution. One of the most interesting phenomena describing the evolution of east African cichlids is the occurrence of morphological parallelisms within the context of adaptive radiation. We are now focusing on the fleshy lip, which was evolved independently in each Lake, as a textbook

example of parallel evolution. We constructed a hybrid cross of two Lake Victoria cichlid species, which are distinct in the degree of lip thickness. By using this hybrid cross, we performed a Quantitative Trait Locus (QTL) analysis to identify the genomic region(s) that affects to the lip thickness. As a result, we detected one major QTL in which the candidate gene encoding one of the major component extracellular matrix proteins exist. Our group members are still working very hard on this project. We hope this work will become milestone to unveil the mechanism of adaptive evolution at the molecular level.

By the way, you can find various cichlids of Lake Victoria, which are very rare in commercial pet shops, in our laboratory. Please come to see them!

Challenging Research Award: Signal detection for early stage colorectal cancer using human gut multi-omics data

Takuji YAMADA
Associate Professor
Department of Biological Information

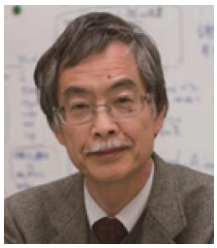
It is my great pleasure that I have received the Challenging Research Award from Tokyo Tech (2015) for my research project entitled “Signal detection for early stage colorectal cancer using human gut multi-omics data ”.

The main purpose of this research project is to detect signals for colorectal cancer in its early stage based on a series of multi-omics data obtained from human fecal samples. This multi-omics data including metagenomic data and metabolomic data can quantify the states of the human gut microbiome. I believe this research project will lead to the development of new cancer therapies.

Finally, I would like to thank my colleagues related to our projects.

Biophysics and Physicobiology Outstanding Paper Award from the Biophysical Society of Japan

Minoru SAKURAI
Professor
Department of Biomolecular Engineering



I received the 4th Biophysics and Physicobiology Outstanding Paper Award from the Biophysical Society of Japan for the following paper:

T. Hayashi, A. Matsuura, H. Sato, M. Sakurai, Full-Quantum chemical calculation of the absorption maximum of bacteriorhodopsin: a comprehensive analysis of the amino acid residues contributing to the opsin shift, *BIOPHYSICS*, 8, 115–125 (2012).

I would like to thank my colleagues and Global

Scientific Information and Computing Center (GSIC) for use of a supercomputer TSUBAME.

The aim of this paper is theoretical elucidation of the mechanism of spectral tuning (so-called "opsin shift") in retinal proteins such as bacteriorhodopisin (bR). In this paper, we developed an all-atom quantum chemical method for calculating the excitation energy of a protein and applied it to bR. We successfully evaluated the contribution of each amino acid to the excitation energy and found that the electron transfer from opsin to the chromophore upon light absorption is important for the spectral tuning of bR.

Chorafas Foundation Awards

Kenta FUJITA
(2015 graduate, PhD)
Department of Biomolecular Engineering

I express my great pleasure to receive the EPFL Dimitris N. Chorafas Foundation Award in 2015. A title of the awarded study is "Development of Protein Assembly-Based Artificial Cellular CO Releasing Scaffolds". This study mainly focused on developing a novel method for releasing carbon monoxide (CO) in living cells.

In recent years, CO has been attracted attention as an intracellular signaling gas molecule, such as oxygen (O_2), nitric oxide (NO), and hydrogen sulfide (H_2S). Since CO shows several effects to protect cells from inflammatory or apoptosis, many chemists and biologists has been tried to utilize CO as therapeutic drugs. Metal carbonyl complexes have been developed for achieving dose- and temporal-regulated CO release in living cells. However, there are several issues on utilizing the metal carbonyl complexes, such as cytotoxicity, fast degradation, and low uptake efficiency.

In my doctoral study, protein assemblies were utilized as carrier molecules for delivering metal carbonyl complexes into living cells to overcome the problems of previous method. CO released from a composite of proteins and metal carbonyl complexes can activate a nuclear factor which has an important role for showing cytoprotective effects. It will be expected that the developed system of CO delivery leads to reveal functions of CO and realize a utilization of CO as therapeutic drugs.

Currently, I am trying to improve my scientific skills as a researcher on company. I would like to enjoy the world of life science from various overview. Finally, I would like to thank to my supervisor, Prof. Takafumi Ueno, all collaborators, and the members of Ueno laboratory.

Chorafas Foundation Awards

Rie SHIMIZU
(2015 graduate, PhD)
Department of Bioengineering

I really appreciate that I am awarded the 2015 prize of the Dimitris N. Chorafas Foundation. I am truly glad since my research deserves the award.

I studied at Fukui-lab during 6 years. When I was in high school, I'm interested in environmental issues so that I spent the 6 years for production of bio-based biodegradable plastic by microorganisms. My research revealed that this microorganism reuse oxidative decarboxylation CO_2 *via* Rubisco during plastic production phase. This result is also applicable for alcohol production by microorganism, and I'm really participated in such a meaningful time for research.

During my research, I often confused and failed to do experiments. However, I'm really lucky to have many chances for discussion with joint researchers. I think I could get this Chorafas foundation award through many discussions. Finally, I would like to thank my supervisor, Prof. Fukui, collaborators including Prof. Fukusaki at Osaka Univ., Prof Bamba at Kyusyu Univ., Dr. Nakayama at Sojo Univ., and Dr. Dempo at Osaka Univ. and all members for supporting everything.

Students' Achievements

Tokyo Tech team extends gold medal record at iGEM 2015

Hiraku Tokuma
3rd-year
Biological information
Department of Biotechnology

Team Tokyo Tech extended its world record of consecutive gold medals to nine since the inception of the medal system at the International Genetically Engineered Machine (iGEM). Of the 257 teams, there are only three teams that hold this record — Tokyo Tech, the University of Edinburgh, and the University of Freiburg.

iGEM is the world's premier competition for undergraduate synthetic biology in which student teams are given a kit of standard genetic parts called BioBricks which students assemble to design and build a new biological system. The competition is divided into 15 tracksouter, including 7 new tracks added this year. Results are shared in presentation form and evaluated by judges.

iGEM 2015 was held in Boston from September 24 to 28, with 257 teams from around the world

participating. These included students from renowned universities such as MIT, Heidelberg University, and Tsinghua University. The Tokyo Tech team consisted of 12 students from the School of Bioscience and Biotechnology and 2 students from the School of Engineering, who are currently enrolled in the Creative Design for Bioscience and Biotechnology II course.

This year's Tokyo Tech team genetically engineered two E. coli to act as prisoner A and prisoner B of the iterated prisoner's dilemma, a well-known example in game theory. The students created a gene library to provide the E. coli with their own strategies such as cooperation, defection, and tit-for-tat, as decision making is central to game theory. By investigating dilemma in the use of genetic modification techniques, the team also examined societal participation in the development of new technologies, hoping to demonstrate the importance of synthetic biology to the general public.

Team Tokyo Tech was nominated for Best Information Processing Project and Best Part Collection, Undergrad — again showing the outstanding abilities of the students on an international stage.

From Foreign Students

Greetings

Elle Liu

Department of Bioengineering

It's my fifth month since I came to Japan. Lots of thanks to Tokyo Tech and my home university NTU for giving me this opportunity to study in Tokyo Tech as an exchange student. The day I arrived at Tokyo was still like yesterday, I guess it's because happy time always flies. Although Japan is near from Taiwan and I had been to Kyushyu and Kyoto before, it's my first time being in a foreign country for more than a week therefore I was so nervous rather than excited in the first few days. Nevertheless, after the first 1 or 2 weeks, my nervousness was totally replaced because everything is so new and surprising, I'm so afraid that one year is not enough for me to discover every new thing, I don't have time to be nervous.

Tokyo Tech is a university full of students from everywhere around the world, it's my first time knowing lots of new friends from various countries. Taking the classes for international students gave me opportunities to work with foreigners. These experiences not only widen my eyesight of the world, but also help me understand how people from other countries think about Japan and my country Taiwan. Besides the classes, there are also various KENGAKU of Japanese companies, I am always impressed by the enterprise culture, conscientiousness and creativity of companies in Japan.

I have to thank to Prof. Mihara, Assist. Prof Tsutsumi and my MIHARA lab mates, I truly

appreciate their help and advice to the experiment, new knowledge of peptide and even help on daily life. And I'd like to express lots of thanks to Prof. Mihara for giving me freedom to manage my course schedule, therefore I can enrich knowledge in different fields.