

Contents

From the Dean

Professor Shinae KONDOH

On Retirement

Professor Satoshi NAKAMURA

Professor Yasunori TANJI

Professor Minoru SAKURAI

From New Staff

Associate Professor Naonobu FUJITA

Associate Professor Kanae ORIHARA

Assistant Professor Tran Phuoc DUY

Assistant Professor Xinyue CHEN

Assistant Professor Tatsuki NAGASAWA

Assistant Professor Keisuke HIRATA

Events

- Tokyo Tech Open Campus 2019
- The 8th Bioscience and Biotechnology International Symposium

Awards

- Humboldt Prize
- FY2019 Minister of Education, Culture, Sports, Science and Technology Award for Science and Technology Science and Technology Award (Research)
- Biomaterials Science Emerging Investigators 2019
- Tokyo Tech Challenging Research Award

Student Archivements

Tokyo Tech team extends medal record at iGEM 2018

From Foreign Student

Jyh Yea CHIA

Dean's Message

Overcoming COVID-19 as We Begin a New School Year

Shinae KONDOH
Professor, and Dean of the School of Life
Science and Technology



I have been appointed dean as of April 2020. Thanks to the wonderful leadership of our former Dean Mihara, we were able to overcome many difficulties brought on by the university reforms that began in 2016. Looking forward, we will do our utmost to develop further as a School that will contribute to achieving the University's primary objective of becoming "The World's Foremost Science and Technology University."

As an Olympic year, 2020 was supposed to have been an occasion for citizens to revel in festive celebrations to uplift the nation. However, owing to the impact of the suddenly emerged COVID-19, the whole world has been in fear of a pandemic, and the Olympics has been postponed. The curtailment of degree ceremonies and the calls for voluntary restraint with regard to graduation trips, events including farewell parties, and club activities,

to prevent the spread of the virus have caused many students to feel discouraged. We were robbed of the chance to show our appreciation for the efforts of former Dean Mihara and the rest of the outgoing school executive board, and of opportunities to express our gratitude and honor the achievements of retiring faculty. Not being able to give a fittingly colorful send-off to departing students and staff, has proven to be a lonely end to the academic year.

The new school year, which was supposed to have a bright start as we welcomed our new students, has instead had an unprecedented beginning marked by the cancellation of matriculation ceremonies and the possible postponement of the beginning of classes. A more serious question is how to handle international students. During entry restrictions and restrictions on travel from infected areas, it is likely that a considerable number of students will no longer be able to enroll as planned, and there are also concerns that some students will be forced to abandon plans to study at Tokyo Tech. The university administration, departments, and incoming faculty members are scrambling to respond.

While I dearly hope that containment measures are successful and that the infection will be over as quickly as possible, we are not yet able to predict what might happen in the future. For the time being, we need to have set precautions in place against the worst-case scenario while being patient and continuing to respond accordingly. I would like to ask for

understanding and cooperation on the part of all members of the School.

Although this new school year began with our response to COVID-19, I am happy to report that university reform initiatives have kicked into high gear following our receipt of five grants late last year to address administrative reforms, which means that the President's "Tokyo Tech Strategic Plan 2018–2023" has begun in earnest. The first of the four pillars set out by this plan is positioned as "enhancing creativity through diversity". In order to highlight the characteristic features of our school, I would like to do my utmost to raise the ratio of female student enrollment. Against the backdrop of Japan's declining birthrate, increasing the number of outstanding female students will be essential to realizing Tokyo Tech's goal of becoming a global university. To that end, I would like to fast-track our efforts to increase the number of female faculty and present a model for the whole university. Moreover, in order to respond to the pillars of "facilitating progressive student-centered learning" and "creating impact through robust research," our academic faculty will be reorganized into four groups according to their fields of teaching and research. In doing so, our aim is to develop creative research and to put in place an educational environment that takes advantage of the unique characteristics of the School of Life Sciences and Technology. Finally, I would like to promote the stimulation of research activities across our entire School in order for

us to advance into the field of medical engineering and contribute to society even further.

On Retirement

Looking back on my Tokyo Tech life

Satoshi NAKAMURA

Vice President, Professor



After graduating from Tokyo Tech undergraduate and master courses, I joined Teijin Limited Research Laboratories. Ten years later, I moved to Tokyo Tech as an assistant professor. At that time, the Faculty of Bioscience and Biotechnology was just established, and I spent a lot of time on designing the new laboratory in B1B2 building and moving to the Suzukakedai campus. Since I became an associate professor, my most important job was to obtain research funds for my laboratory, and I was busy writing many applications for KAKENHI and other foundation grants. Since I became a professor, I engaged in many on-campus administrations. Thanks to this, I have been able to build close personal relationships with many faculty members of other departments and many administrative staffs.

In operating my laboratory, I focused on laboratory branding that would give my students pride. The number of the graduates is about 160 people. There are 16 graduates who have won the Tokyo Tech Academic Excellence Award and the Izumi Kamada Prize. Regarding research, I consistently engaged in research on extremophiles and extremozymes. To date, I have isolated eight kinds of novel extremophiles and found over 50 kinds of novel extremozymes. In addition, I had been an adviser to Tokyo Tech Kendo Team for 18 years. It is also an impressive memory that the Tokyo Tech Kendo Team has won third consecutive victories at the Judo and Kendo Competition for Japanese National University of Technology.

Last but not least, I would like to thank all the faculty members, administrative staffs, and graduates and active students of my laboratory. Best wishes for the further development of the School of Life Science and Technology.

On Retirement

Yasunori TANJI
Professor



I retired from steel company (present name is JFE, at that time named NKK) on December 31, 1995 and moved to TIT as an associate professor on January 1, 1996. I was enrolled in a company for 14 years and 9 months. At first in NKK, I was engaged in a coal gasification project (production of fuel gas from coal powder in the fluidized bed reactor). According to the babbling of economy, research babble was also swelled. NKK started to invest in new fields such as biotechnology, IC chip production and regional development. Most of those projects vanished according to the burst of economical babbling. However, I got a chance to study in University of Medicine and Dentistry of New Jersey, Tokyo Metropolitan Institute of Medical Science, and National Cancer Center Research Institute. Those experience didn't contribute to the profit of the company, but I gain profit from the babble. I was engaged in a study of Hepatitis C virus in National Cancer Center Research Institute. The research theme was [Processing mechanisms of nonstructural proteins of hepatitis C virus]. By summarizing those data as a doctoral dissertation I got a PhD degree. My age when I got degree and moved to TIT was 40.

I increased my interest to a virus through a study at cancer center. When starting an original study in TIT, I thought I'd like to continue the study of virus. But an expensive reagent such as serum is necessary for virus research, and a study of an animal virus isn't the theme which can be recommended to a student easily from the view point of safety.

Therefore, I have a thought to start Bacteriophage work. Bacteriophages or "phage" are viruses that invade bacterial cells and, in the case of lytic phages, disrupt bacterial metabolism and cause the bacterium to lyse. However the idea of phage therapy, use of phage for controlling pathogen, was burned down according to the discovery of antibiotics. Even though a pharmaceutical company invests a lot of money for developing new antibiotics, soon after the discovery of new antibiotics resistant strain against to the new one appear. When I started phage work, the idea of phage therapy did not attract interest. Recent emergence of life-threatening antibiotic-resistant bacteria has led to increased interest to phage therapy. After my retirement from TIT, I will continue phage work in Waseda and Kyorin Universities as a guest Professor.

46 years in Tokyo Tech

Minoru SAKURAI
Professor



I entered Tokyo Tech in April 1974, belonged to the department of polymer engineering within the faculty of engineering, and graduated in March 1978. Subsequently, I

entered the graduate school of polymer engineering at Tokyo Tech, and completed its master's course in March 1980 and its doctor's course in March 1983. Soon after, my research career started with Professor Riichiro Chûjô, who invited me as an assistant professor in his lab at Tokyo Tech. I became an associate professor in April 1990 and a professor in October 2003 at Tokyo Tech. Therefore, I was enrolled at Tokyo Tech for 46 years in total, which is longer than the two thirds of my life so far.

Fortunately, I encountered many wonderful teachers as soon as I entered Tokyo Tech. In particular, Professor Shigeru Aoyagi taught me the rudiments of quantum mechanics and statistical mechanics, and that various chemical and biological phenomena can be understood on the basis of these first principles theories. In my master's course and doctoral course studies at Prof. Chûjô's lab, I tackled a research theme which aimed to quantum-chemically elucidate the spectral tuning mechanism (so-called opsin shift) of a visual pigment rhodopsin. As soon as I took a post as an assistant professor at Prof. Chûjô's lab, I started to develop a new solvent effect theory based on a boundary element method. This theory was implemented into molecular orbital calculation programs, and later developed into the hybrid QM/MM theory. These theories successfully applied to solve many biochemical problems including the opsin shift, enzyme catalytic mechanism, and so on. However, it took about two decades to

obtain a quantitatively accurate answer to the opsin shift mechanism, because we had to await the development of more powerful supercomputer and more efficient computational programs. This work received a paper award of the Biophysical Society of Japan in 2015.

In parallel with the above theoretical and computational studies, our group intensively investigated the desiccation tolerant mechanism of anhydrobiotic organisms such as a African sleeping chironomid, *Polypedilum vanderplanki*. According to Schrödinger, a living organism feeds upon negative entropy to compensate the entropy increase it produces by being alive and thereby to maintain itself on a stationary and fairly low entropy level. An organism in the anhydrobiotic state cannot assimilate negative entropy from its environment because it is in a state of suspended metabolism. How does it minimize any entropy increase due to bodily decay? Our group revealed that disaccharide trehalose and LEA proteins, which are much accumulated inside/outside cells in the dry state, work as an entropy barrier through both the water replacement mechanism and vitrification mechanism. This work received the society award of the Japanese Society for Cryobiology and Cryotechnology in 2016.

Finally, I sincerely acknowledge students, post-doctoral fellows, staff and collaborators of other research institutes, who contributed to researches in my laboratory.

From New Staff **Mechanisms shaping organelles**

Nanobu FUJITA
Associate Professor



I was appointed to Cell Biology Center, Institute of Innovative Research in March 2019. Thanks to the great help from people at Tokyo Tech, my lab is now almost setup. Since the Suzukakedai campus is a wonderful environment without temptation, I make a fresh resolve to focus on research stoically.

My research field is cell biology, and I am working on elucidating mechanisms to form unique shaped organelles and its physiological significance using *Drosophila* and mammalian cultured cells. Among a series of organelles, we are focusing on the membrane structure called T-tubules, that is essential for excitation-contraction coupling, and an extensive tubular autophagy-related network, which we discovered recently. Fundamental questions are still open in the field; therefore, I hope that we can enjoy a lot of intellectual excitement through our research. Besides, we are working on other projects to create new concepts.

In my experience, unexpected results have often led to exciting discoveries. Since I

became a PI, the number of experiments I do is rapidly decreasing, and I spend more and more time at the desk. I will try to maintain an environment where people freely discuss negative findings, to avoid missing out on serendipitous opportunities.

Finally, I would like to thank the support of the members of the Cell Biology Center and the Faculty of Life Science and Technology.

Controls the local clock to regulate symptoms in allergic diseases and infections

Kanami ORIHARA
Associate Professor



I was appointed as an Associate Professor in the School of Life Science and Technology in October 2019. At the same time, I began to hold down the fort, a big lab, which comes with an enormous responsibility. Establishing new projects in the different environment in parallel with mentoring students in the big lab was more than I expected, however, I managed to get through with all great support. Time flies and we are now sending graduates and welcoming new students. Although the spread of COVID-19 brought all of us a very tough period, once this crisis gets subsided, I would like to spend more time with students

and have our international lab to harmonize beautifully in their school life and research projects.

I am a pharmacist and immunologist, setting my research topic in allergy especially in investigating the molecular mechanism of steroid resistant or refractory allergy symptoms since my PhD study. During my research journey to here, I have received many supports from wonderful people, and met the new research fields of Neuroimmunology and Chronobiology (circadian system). Our body system maintains the homeostasis in a very complicated system. In this system, there are plenty of variables running in 24-hour-cycle oscillations, which is called circadian system; keeping good rhythms in our body is related to keeping our body healthy. Thus, recently, I am trying to coordinate to reset local rhythm in lesion site to control immune dysregulation. We know that some of the symbiosis brought us a great benefit to keep our health, however, some infections like COVID-19 are a threat to us. In our lab, we have projects on allergic models and infectious models both in vivo and in vitro to investigate the molecular mechanisms of control our immune system by resetting the dysregulated local clock. We are also targeting to investigate a new therapeutic method and a method to prevent the dysregulations.

Lastly, I would like to express my gratitude for kind and continuous supports and advice from faculty members and administrative staff since I joined. I look

forward to working with you and have some heated discussions on our future research topics.

Simulating the complex biological world

Tran Phuoc DUY
Assistant Professor



I am currently assistant professor of Kitao laboratory of School of Life Science and Technology, Tokyo Institute of Technology. With a full of fascination of computer, I started doing simulations in condensed matter physics from my third year undergraduate period, and switched to computational biophysics and bioinformatics from the master period. I was awarded PhD degree in computational biology from The University of Tokyo, spending time as researcher at Tokyo Tech, and postdoctoral researcher at The University of Tokyo before coming back to Tokyo Tech from April 2019 as assistant professor.

In Kitao lab, we focus on developing and using advanced simulation techniques, which are mainly based on molecular dynamics simulation, to construct the behavior of biomolecular polymers and their complexes *in silico*. In addition, we combine the bioinformatic tools with our developed

methods to design and control the functions of biomolecules.

It is my great honor to join our School of Life Science and Technology, and I am looking forward to carrying out more interesting researches and collaborations at Tokyo Tech.

Investigation in the pathogenic fungi

Xinyue CHEN
Assistant Professor



I was appointed as an assistant professor in the KAJIWARA · ORIHARA lab in February 2019. I joined the IGP-A course of TITECH and received both my master and doctoral degree here. After two years of post-doctoral fellow in the Jikei University School of Medicine, I came back TITECH and worked at the current position.

From the graduate school, I have been studying in field of medical microbiology.

I mainly focused on the molecular genetic study on the pathogenicity of fungi, *Candida* species. *Candida* species are the major causes of fungal infection for human. They can develop into surface-attached microbial communities called as biofilm. The biofilm formation by *Candida* species is one of pathogenic factors on human infections and is generally observed on the implant devices in human body. To understand the molecular mechanism of this process, I have been studying on several genes which encode the

proteins involved in the biofilm formation. At the same time, I have started the investigation in the interaction between *Candida* pathogenic factors and human host cells. Besides the research, I would like to try my best to help more international students learn and live well in TITECH. Thank you in advance for your support and cooperation.

Greetings

Tatsuki NAGASAWA
Assistant Professor



From August 2019, I was appointed at the School of Life Science and Technology as an assistant professor. The outstanding achievements of Tokyo Tech teachers have been seen everywhere. I am very honored that I was accepted to such an exceptional university.

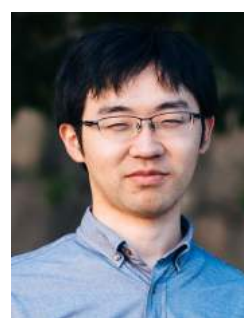
Previously, I was a postdoc at The Jikei University School of Medicine. My previous lab was a little bit strange because they study the evolution of fishes although they belong to Medical school. I have been especially interested in the adaptive radiation of teleostean fishes. Over 70% of the earth's surface is the hydrosphere environment, and there are various environments such as water temperature, depth, salt concentration, and water flow conditions.

Teleostean fishes live in almost all of these environments and are the groups that have successfully adapted and dissipated, accounting for more than half of our vertebrate species. My question is to figure out how these adaptive evolutions have become possible. I use a variety of fish and even amphibians for evolutionary comparing, and verify the hypothesis by using model organisms, zebrafish.

I cultivate a master's degree in Education and I also have an experience had taught in high school. So, I am also interested in the education. I would like to contribute to the development of our university. I'm looking forward to working with you.

Novel spectroscopic technology for molecular recognition systems

Keisuke HIRATA
Assistant Professor



I have got a Ph.D. degree at Department of Chemistry, Graduate School of Science, the University of Tokyo in March 2019. In April 2019, I joined the Fujii-Ishiuchi Laboratory, Institute of Innovative Research, Laboratory for Chemistry and Life Science. During my Ph.D course, I successfully probed electronic states

of chemically modified gold clusters using photoelectron spectroscopy. This opened up a new methodology for the development of metal catalysts with high functionality. I have been studying the molecular recognition in biomolecular systems using a new methodology called as cold ion trap spectroscopy after the appointment. I would like to be involved in interdisciplinary research and look forward to collaborating with you.

Events

Open Campus 2019 for high school and prospective students

Nobuaki SHIRAKI
Associate Professor

The 6th Open Campus (abbreviated as OC) was held on Saturday, August 10th, 2019. Many high school and prospective students participated in this 6th OC, which is recognized as an annual summer event. The 2017 and 2018 OCs were held on weekdays, but this time on Saturday, the number of participants was about 15,000, an increase of 3,000 compared to last year. The day was blessed with fine weather, and visitors had a fun day through various events, lectures, and laboratory tours.



Orientation for entrance examination

Tokyo Institute of Technology has changed the recruiting method for undergraduate programs since 2019, and this year, the university hosted the orientation for entrance examination focused on these changes. We also described the new university entrance exams, which will be introduced in 2021. Students who will experience this change listened eagerly to the briefing.

We had four lectures this year, given by Professors Yasunori Aizawa, Takafumi Ueno, Hiroshi Kimura, and Takeshi Hata. I am sure students have learned about our diverse and advanced research activities, such as drug discovery, imaging, and genomics engineering. Also, I am convinced they were able to simulate university lectures.

Other events included (1) consultations for the entrance exam, including the transfer admission exam from technical colleges, (2) poster presentations from all laboratories, open labs to visit the real labs the in Oookayama and Midorigaoka campuses, and an informal salon for discussions with undergraduate students and professors, (3) a hands-on corner to get in touch with real experiments, and (4) a video presentation to introduce our school. This video, which is created annually, introduces entrance exams and university life from the student's perspective, making it easier for high school and prospective students to understand. This video can be viewed on the university website. OC usually takes place in the summer, but in 2020, it will be held in May and November. A briefing for high school, third grade, and

prospective students will be held on May 31st, and we plan on holding the conventional OC on November 8th. While OC aims to explain entrance examinations and university life to high school and prospective students, it is also an excellent opportunity to convey our school's appeal. All members of our school will work together for these events under the next OC leader, Akihiro Ohkubo.

The 8th Bioscience and Biotechnology International Symposium

Nobuhiro HAYASHI

Associate Professor

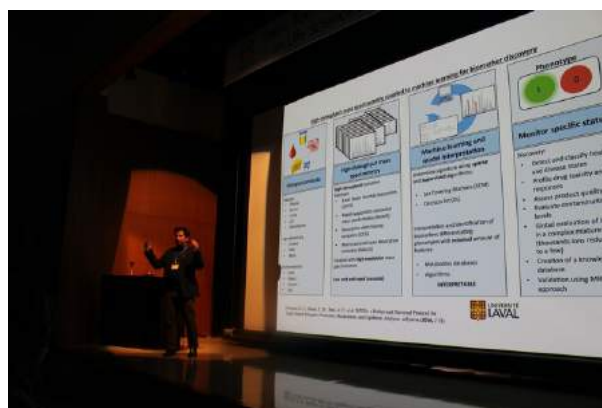
Yoich TAGAWA

Associate Professor

The 8th Bioscience and Biotechnology International Symposium was held on Jan 8th of 2020, at Suzukake-Hall in Suzukake-dai campus. This year, the title of the symposium was “What is Life? Catalogue (Omics) and Build (Synthetic biology)”, where we had two invited speakers were from abroad, two domestic invited speakers, and two invited speakers from Tokyo Tech. All the speakers gave excellent lectures on various aspects of omics and synthetic biology, including fundamental basis to understand the essence of the life. Two foreign speakers, Prof. Jacques Corbeil (University of Laval, Canada) and Prof. Chieh-Chen Huang (Chung Hsing univ., Taiwan) gave lecture on their pioneering work on the AI-aided proteomics using mass spectroscopic big data, and on understanding origin of life by

reverse of TAC cycle of bacterium, respectively.

The domestic speakers, Prof. Minoru KANEHISA (Kyoto Univ.) introduced researches on chromosome replication in bacteria and a novel DNA assembly technology, and Prof. Kim Yun-gi (Keio Univ.) introduced KEGG(Kyoto Encyclopedia of Genes and Genomes) and the applications. Prof. Shigeyuki YOKOYAMA (RIKEN) gave us a very exciting introduction on the Structural Genomics and Proteomics projects. Prof. Masayuki YAMAMURA, from Tokyo Tech, introduced research on usage of mathematical models in new biology. Also, Yasunori AIZAWA, from Tokyo Tech, talked about synthetic biology including introduction of GP-write (Genome Project–write).



From time of the prosperity of molecular biology to the completion of the Genome Project, there is a growing expectation that understanding of the constitutive factors could lead to the construction of a living system. The purpose of this symposium was to connect fields of the comprehensive understanding of constituent factors (omics) to those of the synthesis (synthetic biology), and to provide an

opportunity for the rise of new life science. I hope that it will be a good stimulus not only for researchers including speakers, but also for students who will lead the future.

The number of registered participants is 311, as many as those for the past seven symposiums. We also had many participants in the reception. The organizing committee considers to provide this attractive symposium to offer opportunities for young researchers and students to be exposed to cutting edge researches and world-leading researchers. And, we hope this symposium will be an opportunity for the emergence of new science



Awards

Humboldt-Forschungspreis (Humboldt Prize)

“Pioneering studies on molecular recognition phenomena and reaction dynamics in molecular clusters”

Masaaki FUJII
Professor

It is great honor for me to be awarded the Humboldt Prize at the 250th anniversary of Professor Alexander von Humboldt. This prize

is established by Alexander von Humboldt Foundation which is funded by German Government. The prize is given to researchers in the humanities, social science, science and engineering for their achievements and further expansion in future. 53 researchers were awarded in 2019 including two Japanese. Award ceremony was held in Schloss Charlottenburg, Berlin during Annual Meeting of AvH foundation. The opening speech of the annual meeting was given by Prime Minister A. D. Merkel. I felt high respect and pride of Germany for the fundamental academic research. My research topics shown in the title is time-resolved vibrational spectroscopy of intracuster photochemistry and application of gas phase spectroscopy to biological molecular systems. I deeply thank Prof. Dr. Otto Dopfer (TU Berlin and WRHI Tokyo Tech) who recommended me to avH, my hard-working collaborators, Tokyo Tech's Profs Shun-ichi Ishiuchi, Mitsuhiko Miyazaki, Makoto Sakai (current address: Okayama Science U), all postdocs and graduate students. Such achievements are possible under the superior policy and research circumstance for scientific research in our university, which are prepared by the Chemical Resources Laboratory / Laboratory for Chemistry and Life Science, the Institute of Innovative Research, the School of Biotechnology, directed by President Kazuya Masu (the foundation director of IIR), CLS Director Prof. Toru Hisabori, Head of School of Biotechnology Prof. Mihara, and all related professors. Here, I would like to express my

deep appreciation to all the people. Finally, I am grateful to my first supervisor Prof. Mitsuo Ito (Former President of Okazaki National Reserch Institutes, d. 2019), to my wife Kyoko (d. 2010) for her kind support and to my children for their encouragements.



Photo in Awards Ceremony of Humboldt Research Prize. Masaaki Fuji (Left) and Professor Dr. Hans-Christian Pape, President of Alexander von Humboldt Foundation, 27th June, 2019 at Schloss Charlottenburg, Berlin, Germany.



Photo at the Reception of the ceremony, with Prof. Dr. Otto Dopfer (TU Berlin and Specially appointed professor of WRHI Tokyo Tech) who recommended MF to the foundation.

FY2019 Minister of Education, Culture, Sports, Science and Technology Award for Science and Technology Science and Technology Award (Research)

"Study on creation of nanomachine based on polymer design and medical application"

Nobuhiro NISHIYAMA
Professor



In the era of super-aging society, the need for diagnostic and therapeutic technologies with a focus on QOL is increasing in the medical field. We integrate various functions such as targetability and environmental responsiveness into a platform consisting of synthetic polymers and their assemblies, to realize medical nanomachines that can achieve treatment with minimal side effects and maximum effect. Such medical nanomachines have been a dream of mankind, as featured in the science fiction movie `` Fantastic Voyage (1966) " and the book `` Nanosystems: Molecular Machinery, Manufacturing and Computation (1992) ". Recently, "Google X, the research division of Google, is working on

the practical use of nanomachines, called “nanobot”.

We have achieved epoch-making therapeutic effects that are difficult with conventional DDS technology (e.g., overcoming the interstitial barrier of pancreatic cancer) through the precise design of nanomachines. For diagnostic applications, we have developed nanomachines equipped with an MR imaging functionality that amplifies the signal intensity in response to weakly acidic pH environment within the tumor, achieving highly sensitive detection of micrometastatic cancer and non-invasive visualization of the hypoxic region. In addition, we succeeded in minimally invasive cancer treatment (so-called chemical surgery) by a combination of nanomachines delivering sensitizers and irradiation of physical energy as light, ultrasound, and thermal neutron.

Some of these achievements are progressing to clinical trials, but most of them have been revealed using mice. I feel that receiving such a prestigious award indicates expectations for our research. We are devoting utmost efforts to realize future medicine based on nanomachines.

Biomaterials Science Emerging Investigators 2019

Toshinori FUJIE

Associate Professor (Lecturer)



Emerging Investigators 2019 was established by the Biomaterials Science published by the Royal Society of Chemistry in 2014, and is an influential international award. About 20 young researchers from around the world in the field of biomaterials have been selected as Emerging Investigators. This is the third selection following those made in 2014 and 2017, and is the first time that a researcher from Tokyo Tech has been selected.

To select recipients, members of the Editorial and Advisory Boards of the Biomaterials Science, which is prestigious academic journal in the field of biomaterials, as well as previous recipients conducted an examination to consider the potential and influence on the future of the biomaterials field. The journal published a special issue about Emerging Investigators, and this issue includes a minireview of "Printed Nanofilms Mechanically Conforming to Living Bodies" written by our group.

With this award, I am overjoyed that research I worked on has been highly evaluated.

I would like to take this opportunity to express my deep appreciation to my fellow researchers, members of the academic society, as well as students who have been studying day and night. The Fujie Laboratory was just established in the School of Life Science and Technology in November 2018. I am motivated by this to work even harder on the development of biomaterials. Our laboratory will continue to pursue research activities so that Tokyo Tech medical technologies can be delivered to patients and their families as well as to medical professionals as quickly as possible.

Tokyo Tech Challenging Research Award

Yoshiaki MASAKI
Assistant Professor



It is a great pleasure for me to receive the 2019 Tokyo Tech. Challenging Research Award. I would like to say thank you for Prof. Mitsuo Sekine, Assoc. Prof. Kohji Seio, all collaborators and the lab members for their supports, suggestions, and contributions. Synthetic oligonucleotides, which mainly target RNA, are used in nucleic acid therapeutics. Nucleic acid therapeutics can be used for

modulation of any protein expressions including intrinsically disordered proteins. It is also attracting that oligonucleotides can also be used for modulation of the splicing process. However, only a handful of oligonucleotides were approved so far.

We introduced a new concept to avoid adverse effects, which is one of the issues in the nucleic acid therapeutic field. The chemical modifications designed by TSUBAME 3.0 were synthesized and evaluated their properties. We believe our technology will contribute to the safety of nucleic acid therapeutics and practical development.

Tokyo Tech Challenging Research Award

“Dissecting redox-based regulatory network of plant photosynthesis”

Keisuke YOSHIDA
Assistant Professor



It is a great honor to receive 2019 Tokyo Tech Challenging Award. I greatly appreciate to Prof. Toru Hisabori and all collaborators for their contributions to my work. My research interest is the photosynthesis in plants. Photosynthesis is a complicated reaction that absorbs energy from the sun, fixes atmospheric

carbon dioxide, and produces carbohydrates. Because photosynthesis supports all life on Earth, it is important to understand how plants regulate their own photosynthetic reactions under changing environments. I have studied the regulatory mechanisms of photosynthesis with paying special attention to the “redox regulation”. By using comprehensive approaches from molecular biology and biochemistry to plant physiology, I could partially clarify the molecular basis and physiological importance of redox-regulatory system. I would like to advance my study to reveal novel aspects of photosynthesis regulation.

Students' Achievement

Student Team Won Silver Award at iGEM Competition

Moe TAKASHI

3rd-year,

School of Life Science and Technology

Our student team has won a silver prize at the International Genetically Engineered Machine Competition (iGEM). Extending the record of consecutive prizes to 14 years.

In this competition, a team of high school students and university students will design and build a new artificial life system by combining standardized genetic parts called BioBrick. The 2019 event was held in Boston from October 31 to November 4, with 353 teams from more than 40 countries and regions around the world.

This year, Team TokyoTech conducted research on Turing patterns, which are thought to be involved in the formation of giraffe meshes and zebra stripes. These patterns can be easily created by computer simulation, but are difficult to reproduce using real cells. Therefore, we believe that making *Escherichia coli* that can reproduce these patterns will lead to the elucidation of the mechanism of pattern formation and understanding of morphogenesis.

In the process, we participated in open campuses, conducted a delivery class in high school, exchanged questionnaires and exchanged opinions on bioethics and gene editing.

We are grateful to the supervisor and other members and everyone who supported us. There were a lot of difficulties, but we got good experiences.



• Web Page

iGEM Headquarter

https://2019.igem.org/Main_Page

iGEM Tokyo Tech 2019 “E-Turing”

<https://2019.igem.org/Team:TokyoTech>

• Instructors

Yoh-ichi Tagawa (School of Life Science and Technology)

Nobuhiro Hayashi (School of Life Science and Technology)

Masayuki Yamamura (School of Computing)

Yoshihisa Matsumoto (Laboratory for Advanced Nuclear Energy)

Hiroyuki Ohta (School of Life Science and Technology)

Akifumi Nishida (Yamamura Lab Researcher, School of Computing)

Shyoya Yasuda (Yamamura Lab Researcher, School of Computing)

•Campus Support

Tokyo Institute of Technology Fund

Tokyo Institute of Technology Revitalization Aizawa Foundation

Tokyo Tech Alumni Association

Tokyo Tech Alumni Association Kanagawa Branch

Bio Creation Design Room

•External Support

Integrated DNA Technologies (IDT)

Cosmo Bio Co., Ltd

New England Biolabs Inc.

•Student Members

Moe Takahashi (3rd-year, School of Life Science and Technology)

Soh Tsuruta (3rd-year, School of Life Science and Technology)

Akito Machida (3rd-year, School of Life Science and Technology)

Ryoto Matsuda (3rd-year, School of Life Science and Technology)

VOON YAN MING (3rd-year, School of Life Science and Technology)

NG SIN YING (3rd-year, School of Life Science and Technology)

Kazuya Isawa(3rd-year, School of Computing)

Masaaki Nakano(3rd-year, School of Engineering Department of Electrical and Electronic Engineering)

Takato Saito (2nd-year, School of Life Science and Technology)

Yusuke Kato (2nd-year, School of Life Science and Technology)

Yuumi Kitano (2nd-year, School of Life Science and Technology)

Ayano Tabira (2nd-year, School of Life Science and Technology)

Koki Date (2nd-year, School of Life Science and Technology)

Aoi Shinkai(1st-year, School of Life Science and Technology)

Ryohei Yufu(1st-year, School of Life Science and Technology)

Akari Kuroishi(1st-year, School of Life Science and Technology)

Tamaha Ogawa(1st-year, School of Life Science and Technology)

Hajime Fujita(4th-year, School of Life Science and Technology)

From Foreign Student

Jyh Yea CHIA



It has been 3 1/2 years with Tokyo Tech. I choose Tokyo Tech for the reputation and sensitivity towards international students and approachable professors. I believe Tokyo Tech changed me as a person and it will always have a place in my heart. I entered Tokyo Tech as an integrated PhD student in order to obtain my second master degree and PhD degree. From here, I have learned many great deal of things and started a brand new research which I am not familiar with but having a strong interest in it. After graduated from my Master studies in Malaysia, I have become increasingly interested in peptide-material studies and cancer-related research. I was able to further pursue my interest by joining Mihara-Tsutsumi laboratory in

Tokyo Tech thanks to the support from Monbukagakusho (MEXT) scholarship.

In Mihara-Tsutsumi laboratory, I was given freedom to plan and pursue what I am interested with and heading to the research of interest under the guidance of Professor Mihara and Associate Professor Tsutsumi. Their passionate advices and inspirations as well as giving full support by encouraging me to attend conferences and events both locally and internationally including the UK Japan engineering education league (UKJEEL) in London.

Our laboratory has three main themes which related to cell membrane penetrating peptide, self-assembled peptide material and modified peptide phage library. I am currently engaging with the construction of functionalized self-assembling peptide materials for the application to cancer cells. Self-assembling peptide material can offer a powerful tool box for the development in tumor engineering and may contribute for the advancement in cancer research in the near future. I hope that coming to do science in Japan will be the best turning point for my life and knowing the strong team from Mihara-Tsutsumi laboratory will be a great pleasure and will mark as a memorable experience in Japan.