

BIO T.I.T.

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News Letter

Graduate School of Bioscience and Biotechnology
Tokyo Institute of Technology



“Bioscience and Biotechnology” making great strides

Since its foundation in 1991, the Graduate School of Bioscience and Biotechnology (Biotitech) has achieved a number of successes in researches and education, as a result of efforts by the professors, staff, students, and alumni. Thanks mainly to these successes, Biotitech was selected for “The 21st Century COE (Center of Excellence) Program”, which was launched initially as “Top 30” by the Ministry of Education, Culture, Sports, Science and Technology, and which supports departments of Japanese universities based on careful screening of their achievements and future plans. In consequence, we have established a new system for research associates and postdoctoral fellows and for student support. It should be emphasized that this system has contributed greatly to executing a higher level of research work and to providing a better education.

On the occasion of the 10th anniversary of Biotitech held at Suzukake Hall which is a student union building opened in October 2003, Professor Masuo Aizawa who is now President of Tokyo Institute of Technology and was a former dean of Biotitech, gave a talk which was impressive in that he spoke of the pride and enthusiasm of the faculty members for academic research and education, which have contributed to the prestige of Biotitech, and emphasized that Biotitech was greatly influential in education and academic study within Tokyo Institute of Technology.

The Biotitech Seminar is a semiannual colloquium, which restarted last year with a hope that the seminar would provide opportunities for free discussions and cooperative works. Eight speakers from the professors in Biotitech have presented their works briefly.

A new program was also started to support a research group organized beyond the usual borders of the research areas in order not only to establish close relationships with foreign research institutes and universities, but also to obtain a world-wide reputation such as, “Biotitech is a leading research center of”. Five groups selected have been working actively and had opportunities for mutual discussion with foreign universities as well as those in Japan.

We started another type of seminar by a prominent scientist, who is nominated by the faculty staff and students. To date, two outstanding persons in the areas

of biology and pharmaceutical science have given talks.

Nowadays, bioscience and biotechnology are highly advanced and the advance will be continued further for better life. As is apparent from being selected for “The 21st Century COE program”, Biotitech is requested to be a world-class base for education and academic research with marked individuality or outstanding characteristics. I would greatly appreciate your further cooperation for our continuous efforts to improve and upgrade Biotitech.

Professor Ichiro Okura

Dean, Graduated School of Bioscience and Biotechnology
Tokyo Institute of Technology

設立 10 年を越え、益々発展していく生命理工学研究科

平成 3 年に生命理工学研究科が誕生して以来、各教官・職員・学生・卒業生諸氏の絶え間ざる努力により、生命理工学研究科は生命科学に関する研究学府として確実にその名を高めてきました。そして、2 年前、それまでの研究・教育活動が認められ、かつ今後さらに発展する見込みが強いと判断され、21 世紀 COE に採択されました。これにより、教官やポストドクターの雇用、各種機器分析の充実、リサーチアソシエートとして博士課程学生の援助等が可能になり、生命科学の分野を先導する研究・教育の発展に大いに貢献したことはいうまでもありません。

昨年度の秋、設立 10 年を記念して行われた 10 周年記念式典では、相澤益男学長が祝辞を述べられ、その中で、研究科スタッフの情熱と誇りによって研究・教育活動が発展的に行われてきたこと、さらにはそうした努力によって、新制研究科でありながら東工大の中で確実にその地位を築いてきたことに触れられていた点が印象的でした。相澤学長も学長に就任するまでは本研究科の一員でした。この式典にあわせ各教官の研究業績を中心にして出版した『スーパーサイエンスとテクノロジーの融合』は東工大内外の各方面の方々から好評を頂いております。

しばらく休んでいた研究科セミナーを昨年度再開し、これまでに研究科の先生 8 名にご講演していただきました。このセミナーは半年ごとに教授会の後に行ない、御発表された先生のご研究を研究科の先生方に知っていただき、さらには共同研究に発展すればと願っているものです。本研究科の理念の一つである理工融合につながる機会になればと考えています。

また、昨年度からグループ研究支援制度を開始しました。これは専攻の垣根を越えた特定テーマに対するグループ研究を奨励し、国内外の研究機関との交流を通して、「・・・の研究といえば東工大生命理工」といった世界での認知度をより強固なものにしていこうとする制度です。現在、5 つの研究グループが組織され、国内の他機関の研究グループとの交流、さらには英、仏、米国の主要大学とも交流をもち、確実に東工大生命理工の認知度アップに貢献してきました。今後もこの制度が充実するとともに、新しいグループ研究の発足のきっかけになればと考えています。

昨年の秋、『著名人による講演会』を発足させました。研究科のスタッフや学生からのアンケートをもとに国内外に名の通った先生による文字通り、著名な方の講演です。これまでに 2 回実施し、いずれの講演も大変好評でした。今後は教育の一環として単位認定も可能になる方向で実施していきたいと考えています。

21 世紀になって、生命科学が爆発的な勢いで進歩しています。その中であって生命科学研究科は生命科学の発展を担う学府として益々発展していくものと信じています。

東京工業大学大学院生命理工学研究科長
大倉一郎

Look at organisms, then they will tell us something

Dear all,

Let me start with a bit about me. I am a former associate professor in Department of Biosciences in TITech. I moved to Department of Biology in Osaka University nine month ago. I spent twelve years in Suzukakedai campus since I started my first lab as an associate professor. I love Suzukakedai campus and now I miss it because the campus is beautiful and full of nature and green. I myself am a biologist and interested in how various organisms live their wonderful lives. There I can feel the four seasons and lives of plants and animals including antler beetles. I have been studied embryogenesis and developmental biology. I am always amazed how elaborate biological forms are, and wondering how the detailed and sophisticated forms are able to be created from simple eggs and how they evolved. I am attracted to animal embryos when I am looking at morphogenesis of developing embryos.

Recently, in biological studies, the opportunity to look at morphologies of organisms has been decreased. Living organisms are marvelous, especially when one look at them under microscope. There are a lot of mysterious things other than simple DNA. It is my dream to understand how biological form develops. Even in my lab, current researches are full of molecular techniques, and I myself often lost the way to study. But at that time looking at living organisms under microscope refreshes my dream. I am trying to start my new lab with refreshed motivation.

Now current biology is very detailed and molecular oriented. Students would easily lose the central issues and their motivation in the woods of complicated techniques. I would suggest all young biologists to look at living organisms, then they will tell us something
With best regards,

Hiroki Nishida

Professor
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For Future !

Dear Colleagues:

In April of this year, all the national universities in Japan will become independent administrative entities. This constitutes a big change in our university system. However, I believe that it presents a great opportunity and challenge to the Tokyo Institute of Technology and the Tokyo Medical and Dental University. I arrived here six months ago, and I have been at the Gene Research Center for twelve years, which means that I have been present from the Center's inception to its conclusion. Presently, it is one of the three Divisions of the Center for Biological Resources and Informatics.

Many graduate and undergraduate students in the Departments of Biotechnology and Bioscience have joined my project on mammalian genomic imprinting at this Center. I am very proud of all their achievements over the past twelve years, achievements that have helped to establish the new field of science of mammalian epigenetics in Japan. I moved to the Medical Research Institute, at the Tokyo Medical and Dental University, just before the big change in our university system that I mentioned earlier takes place, a change that is intended to encourage researchers to become more active and to shine in their professions, as members of the new universities. In the next phase of higher education in Japan, it is my sincere hope that our research will continue to contribute to medical science, and to the development of basic science.

In the fields of biotechnology and medical science, both the Tokyo Institute of Technology and the Tokyo Medical and Dental University hold a privileged position, with a lot of advantages that will enable us to promote new projects for the 21st century; we should become, therefore, the top runners in these fields. Fortunately,

as members of a confederation among the top four universities in Tokyo (四大学連合), we will have many opportunities for collaboration. We should make a united effort to ensure rapid progress in the future. With best regards.

Prof. Fumitoshi ISHINO

Medical Research Institute
Tokyo Medical and Dental University

The sense of smell

Dear Colleagues,

I am presently an Associate Professor at the Department of Life Science. My office is located on the ninth floor of B2 Building at Suzukakedai Campus, where I have been working since March of 1998. During this period, I stayed and studied at Dr Grazadei's laboratory of Florida State University for one year and at Dr Costanzo's laboratory of Medical College of Virginia for another year. I am interested in the nervous system that is one of the most remarkable examples of biological complexity. Neuroscience is one of the most rapidly expanding fields in biological research.

My interest lies primarily in the area of the olfactory system. It has unique properties among the five special senses. It is devoted to detecting chemicals in the internal and external environment. Human can detect many numbers of different chemicals that are perceived as odors or tastes. The senses of smell as well as taste, belonging to chemosensory systems, were the first of the five senses to evolve. Since most cells communicate using chemical signals, much can be learned from the study of the chemosensory system. Chemosensory neurons present in the olfactory and vomeronasal sensory organs have unique characteristics among mammalian neurons. These neurons continue to undergo neurogenesis throughout the life span of most animals. Olfactory neurons located in the nasal epithelium are responsible for the detection of airborne odor molecules. Sensory neurons in the vomeronasal organ serve to detect conspecific chemical signals, pheromones. Neurogenesis and replacement of olfactory neurons occur when precursor cells differentiate in response to neuronal injury or cell death. Replacement neurons have the capacity to reconnect to target cells in the olfactory bulb, resulting in the functional recovery of olfactory pathways. The research of the olfactory system will give us the fruits of basic studies such as cell fate determination, signal transduction, gene regulation, axonal outgrowth, and synapse formation. Ultimately, a better understanding of these mechanisms should help in the design of therapeutic strategies to treat neurological diseases.

With best wishes,

Toshiya Osada, Ph.D

Department of Life Science

My Life with Microorganism

Dear Colleagues:

I have been appointed to be an assistant professor of the Department of Life Science (Shishido & Kajiwara Lab.) on May 1, 2003. I am glad to introduce myself to you in the News Letter.

I was born in Osaka in 1976. And I had been there, except I stayed in the U. S. for two years, until I was graduated from Graduate School of Agriculture and Biological Sciences, Osaka Prefecture University on March 2003. After my graduation, I visited Yokohama for the first time, and this is my first living in Kanto area.

I studied a molecular biology of microbes, especially for filamentous fungi, in the graduate school. One of the fungi I chose for my research was Koji-mold, which is the most famous fungus in this country, as the fungus has been used for making Japanese traditional Sake from ancient time. Study on fungi is interesting, but I can't drink much sake /

In Tokyo Tech, now, I'm working on a molecular biology of yeasts, addition to the previous work in the graduate school. Researching for yeasts are also very interesting for me. If you have time, please visit our lab. I would like to introduce our work and lab.

With best regards,

Shin Kanamasa, Ph.D.

Department of Life Science

Train yourself through frequent transpositions.

Dear colleagues:

It's great pleasure to introduce myself here. I was appointed assistant professor for the 21st Century COE program on April 1, 2003, and started studies on retrotransposons (mobile DNA elements via an RNA intermediate) in the Okada lab. The current lab is my sixth lab; I studied in Osaka University (B.S. and M.S.), two labs in Biomolecular Engineering Research Institute for two years each (Ph.D. program), a New York State research institute (post-doc), The University of Tokyo (post-doc), and TIT. My studies in these places include bacterial genetics, biochemistry, and X-ray crystallography of DNA repair, recombination, replication, and transposition, RNA splicing, and protein splicing. Changing labs, which I refer here as transposition, was not by chance, but by my intention. Frequent transposition might not be advantageous for receiving a Ph.D. degree if you want to get it as soon as possible. You have to change subjects of your research at every transposition, but you still must get results sufficient for Ph.D., which means you have to work much harder than other students who stay in a single lab. On the other hand, however, you'll have opportunities to learn different kinds of methods and research fields from specialists. Labs in different fields have very different views, and even in the same field, individual

principal investigators (=professors, usually) possess different backgrounds, views, and directions of research. Thus, by transposition, you'll surely be able to improve your philosophy, with perspective of many biological phenomena. Of course, you can skim what have been studied in a certain field by reading published articles, but they do not tell you much about philosophies spread over the field. Penetrating a lab in that field, which I mean extensive discussion with specialists there and researching by yourself, would much better facilitate you to learn. In addition, each lab has different ways of administration and atmospheres, and you'll probably find both good and bad points in the respective labs. Thus, experience in many labs will help you when you start your own lab. To those of graduate and undergraduate students who intend to stay in the academic world, I encourage to transpose every two or three years, for instance, to enlarge your view. Believe me, that'll be fun. Don't hesitate when you have a chance.

Best regards,

Kenji ICHIYANAGI, Ph.D.

Department of Biological Sciences

Research is amazing

Dear Colleagues:

I am glad to introduce myself to you. I was a student of Okada's laboratory to last year. My student life in the Okada's laboratory continued for eight years. Now, I am research associate in the Okada's laboratory. The subject of my research dose not change from nine years ago. But I am not fed up with this subject and I enjoy this research even now. I am happy to find this work that suit to me.

My research area is bioscience. Now I am studying the amplification mechanism of transposable element. What is the transposable element? Transposable element is self-amplifying element and exists in our genome (genome is a blueprint of our body). This element, however, had been thought to be "junk" and the research concerning the transposable element was not so active. In recent years, transposable element has been thought to have big impact to the evolution of our genome. Therefore the research concerning the transposable element is active at present. I feel happy to concern myself in such a research.

With best regards,

Masaki Kajikawa

Graduate School of Bioscience and Biotechnology

I hope to make contribution to Tokyo Tech.

Dear Colleagues,

It gives me pleasure to introduce myself to you. My name is Nobuhiro Nakamura, a new assistant professor of the Department of Life Science. I have been in this

position since April 2003, but have spent 10 years in this institute. I entered Tokyo Tech as an undergraduate student in 1994 and joined Hirose Lab in 1997. I had the opportunity to learn a lot, not only new technical and scientific knowledge, but also cultural and social knowledge, which I can hardly estimate the value of. I am especially appreciative to this institute and lab for giving me delightful opportunity to meet a lot of foreign students. Through interacting with them, I could get to know more their thoughts, languages, religions, and lifestyle. My current area of interest is molecular and cell biology. I am making the effort to study how proteins localize to the specific intracellular compartments. This work is very exciting and challenging for me. Although I spend a lot of time working in the lab, I still manage to enjoy reading good books, listening to music, and 'if I have not wasted all of my energy' walking and jogging.

I really hope I will make significant scientific and educational contribution to Tokyo Tech. I am pleased to get to know you and look forward to exchanging ideas and experiences with each one of you.

With best regards,

Nobuhiro Nakamura

Department of Life Science

Regulation to Dispose of Laboratory Wastes

Dear Colleagues:

It has already past eight months since I joined Professor Shigehisa Hirose's lab as COE "Joshu". At first, I greatly appreciate all of the members in the lab. Without their help, I couldn't start challenging but exciting research. I needed time to adapt myself to the new circumstances. Especially, as I had spent in countryside in USA for seven years and as I never lived in the Metropolitan area or the suburban, I met many difficulties not only in the lab but also at home: why are apartments so expensive but so small? Why are there so many people in store? Why are so many cars on roads? Why is "Denentoshi" line so crowded? Why are so few restaurants around "Suzukake" campus? Now those are slight matters: I learned Internet shopping and delivery service of co-op. I gave up my own car. I don't ride in train in the morning or in the evening. I knew "Machikyu" lunchbox. However, I'm still facing a difficult matter. I have to master how to dispose of laboratory wastes, especially organic solutions. When I came back to Japan, I expected to separate house wastes by the materials, but I never expected that I would need to do more strictly in the lab. I was so surprised at many bottles and bags to collect the wastes separately. As I work in biological field, I understand biohazard with living materials from labs. Meanwhile, honestly, I didn't pay attention so much to waste of organic solutions. Of course, we had bottles to collect the chemical wastes in previous lab, but not so many. Here, there are lots of different bottles. When I started bench work here, I couldn't finish until I understood which bottle I had to pour each of organic solution. Surprisingly, I had to use

different bottles by percentage of the organic. The regulation to dispose of the chemical wastes is incredibly complicated for me. In order to understand it, I have already spent time corresponding to significant amounts of my wage. Unfortunately, it's still hard for me to fulfill it correctly without memo. To avoid misunderstanding, I want to say that I don't have so much complaint against the regulation. I presume that it's built by great and sacrificed efforts of particular persons. I want to respect them. Also I want to mention that it's amazing that everybody in our lab understands and keep to the regulation well. I seriously need to master it before new comers join in our lab in this spring. Then I will be recognized as a true colleague!
With best regards,

Kazuyuki Hoshijima

Department of Biological Science

Nice Cafeteria, Nice Science

Dear colleagues,

On June 1, 2003, I was appointed to be a research associate of Department of Biological Information. Before coming here, I've spent a year in Stanford as a post-doc. Most things including an apartment and research environment were so good for me there, but only one thing was a problem. Food! Of course, you can find Japanese-like or Chinese-like food in some restaurants or cafeterias, even in the campus. But, that's a sort of fake food, but not real cuisine. That's why I decided to cook by myself every day during my stay in Stanford. Working hard all the day and cooking at night was tough for me.

But now, there is a very nice cafeteria in this campus, and I don't need to cook by myself. It's very helpful for me because I can concentrate on my research (don't say, "Get married"). Anyway, I'm very happy to work here, Suzukake-dai campus. I hope everything would be going well for me as well as you.
Best wishes,

Shuya Fukai

Department of Biological Information

From the Editors,

We are pleased to send you this news letter with the help of members of the committee of BIOTITECH News Letter and the alumni/alumnae of Faculty of Bioscience and Biotechnology in Tokyo Institute of Technology. We hope that this news letter gives you a good opportunity to keep your mutual communication. Now, a building of twenty stories high is under construction next to the G1 building. In the summer of 2005, it will be completed. Please visit at Suzukakedai campus, and you will see that our School is developing and growing.
With best wishes,

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Am I a duckbill?

Dear Colleagues,

I am grateful for this opportunity to introduce myself. I was appointed as an assistant professor in the Department of Biological Information, Tokyo Institute of Technology, in March 2003.

As a postdoctoral fellow, I studied an application to solve environmental problems using a magnetic material for three years at O-okayama campus after graduating from my master and doctoral programs. Several projects, such as characterization of synthetic materials using super-conducting magnets and development of a fuel cell using solar energy, are being performed there. Recently, a friend said to me, "Your career seems to be the duckbill, which is a wonderful middle life creature that evolved from a reptile into a mammal. Although a duckbill is a mammal, it is an unusual mammal that is raised on its mother's milk after laying an egg. This duckbill swims underwater and eats crayfish, shrimps, etc. It is also good at digging holes and building nests underground". In reply, I said to him, "Duckbill? That is interesting! I am happy to belong to the interdisciplinary field between material science and bioscience".

I majored in metallurgical physics, and studied the physical behavior of metals by thermodynamics in graduate school (the department of material science and engineering, TIT). From metallurgy to bioscience by way of environmental science, I have had the opportunity to study materials, and become acquainted with persons of a different field through discussion.

My scientific research environment is continuously changing. Therefore, I think that a highly specialist nature and broad flexible viewpoints are required to exploit a strange research field. I am trying to achieve a peculiar kind of evolution like the duckbill, and find in it an original theme. If you are interested in being a duckbill, start by observing natural phenomenon carefully.

With best regards,

Nobuyuki Gokon

Department of Biological Information