

【校正時ご確認をお願い致します】

□修士・卒業論文の2・4行目「*Sphingobium*」をイタリック体にしました。
ご確認をお願い致します。

17

Laboratory of Microbial Metabolic Engineering

Professor / MASAI Eiji Associate Professor / KAMIMURA Naofumi



- ▶ Realizing a low-carbon society through plant biomass utilization
- ▶ Cutting-edge research on lignin utilization through microbial metabolism
- ▶ Lead well-balanced and fulfilling university life



<http://bio.nagaokaut.ac.jp/~masai-l/>

Supervisor Professor / MASAI Eiji, Associate Professor / KAMIMURA Naofumi

Prof. Masai and Kamimura are very enthusiastic about research and are great role models. They are willing to give advice not only on research but also on university life. This support enables students to have successful academic lives.



Research Content

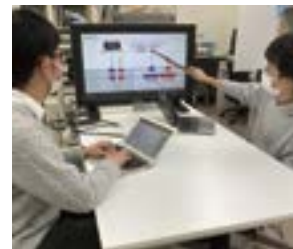
Establishing the use of plant biomass is a key to achieving a global concern of having a low-carbon society. Lignin, which accounts for about 15-30% of the cell wall components of plants, is the most abundant aromatic resource, but its effective utilization has not yet been established. In our laboratory, all aspects involved in the bacterial catabolism of lignin-derived aromatic compounds have been studied for many years. Our findings, obtained by elucidating the mechanism of lignin degradation by bacteria, can be applied in the production of useful substances. The efficient utilization of lignin is necessary to realize a low-carbon society.



Analysis of bacterial metabolites using a high-performance liquid chromatography-mass spectrometry

A Day in the Lab

In our laboratory, although each person utilizes their time differently, every student conducts research activities on their initiative. We have full and in-depth discussions with the professors about our research progress meetings with all the lab members and journal clubs. Through these activities, students become more motivated in their research, expand their abilities, actively participate in academic conferences, and present their research results. Apart from research activities, our laboratory is very active with many events.



Appearance of research meeting by students

Thesis Subjects

- ▶ (M) Identification of the genes involved in the catabolism of β -1-type lignin-derived aromatic isomers in *Sphingobium* sp. strain SYK-6
- ▶ (M) Development of bacterial sensors for lignin-derived compounds
- ▶ (M) Transcriptional regulation of the acetovanillone catabolism genes in *Sphingobium* sp. strain SYK-6

The number of
PhD Graduates

11

Major employers of Graduates

- Takasago Thermal Engineering Co., Ltd.
- Maruha Nichiro Corporation
- Daio Paper Corporation.
- NIPPON PAPER INDUSTRIES CO., LTD.
- Sanko-Seika Co., Ltd.
- NIPRO PHARMA HIDA FACTORY CO.,LTD
- Hirosaki University
- Forest Research and Management Organization
- Oji Paper Co., Ltd
- NISSIN FOODS HOLDINGS CO.,LTD.

Writer : KATO Ryo, Civil Engineering and Bioengineering
(Yokohama Shodai High School)

105

教員名

MASAI Eiji
KAMIMURA Naofumi

キーワード

lignin
microbial metabolic engineering
low-carbon society

Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

18

Laboratory of Applied Plant Engineering

Associate professor / TAKAHARA Yoshinori
Senior Technical staff / TAKAYANAGI Mitsuhiro

- ▶ Because it dose not move, sober ? Not at all !
- ▶ Culture ! Gene !! Field work !!
- ▶ Sample dose not grow suddenly



http://bio.nagaokaut.ac.jp/labo/labo_06.html

Supervisor Associate professor / TAKAHARA Yoshinori

Dr. TAKAHARA is a gentle teacher. He politely answers any questions and values communication with students. On the other hand, student who tend to be lazy would have some difficulties and may be testes by the students themselves.



Research Content

Plants are like a cradle that supports many lives on Earth. Mankind has also lived with plants for a long history and used its power. The Applied Plant Engineering Laboratory conducts research to contribute to society using the power of plants. As an example, the heat island phenomenon is one of the problems in an urban area with high-rise buildings. As a countermeasure to this problem, the development of rooftop greening materials using moss is required. Also, phalaenopsis is popular for gifts with beautiful appearance. If we make phalaenopsis with blue flower color, it will create new commercial value. Currently, students are conducting research on these two themes.



Electrophoresis profile of plant DNA

A Day in the Lab

Our laboratory has no core time, so you can use the time of the day as you like. In other words, you need to make your own research plan and proceed with responsibility. No matter how panic, the plant does not grow suddenly. We routinely culture and cultivate samples that we need to use on our own. If I am tired of my research, I enjoy chatting with my professor and everyone in the lab.



Experimental scenery

Thesis Subjects

- ▶ (M) Examination of PLB induction method from various tissues of phalaenopsis
- ▶ (M) Genetic diversity and foliage differentiation of Ezonosagotake, a suitable species for building greening
- ▶ (M) Exploration and interspecies differences of cell pH-regulating genes and petal-specific transcription factors of phalaenopsis

Major employers of Graduates

The number of
PhD Graduates

11

- Yoshinogawa co.,Ltd.
- NAKABOHITEC CORROSION PROTECTING CO., LTD
- Bourbon Corporation
- Echigo Seika Co., Ltd.
- TREE OF LIFE CO., LTD.
- OMRON HEALTHCARE Co., Ltd.
- MEISEI INDUSTRIAL CO., LTD.

106

Writer : IGARASHI Toshihiro, Bioengineering
(National Institute of Technology, Gunma College)

教員名

TAKAHARA Yoshinori
TAKAYANAGI Mitsuhiro

キーワード

Genetic Transformation
Plant Tissue/Cell Culture
Biodiversity
Building Greening

【校正時ご確認をお願い致します】

- SDGs を日本語版と合わせました。
- 就職先が多く溢れてしまう為、フォーマット通り 10 個で選んでいただくようお願い致します。
- 修士・卒業論文の1・2行目「Trichoderma reesei」を前回に合わせてイタリック体にしました。
- 執筆者欄の所属を「Materials Science and Engineering/Bioengineering」に修正しました。

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HAKKO Science Laboratory

Professor / OGASAWARA Wataru Associate Professor / SHIDA Yosuke
 Technical Staff / TAKEDA Yuriko

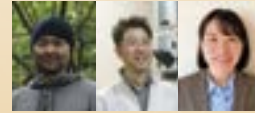
- ▣ Amazing microbial power hidden in fermentation
- ▣ Understanding and utilizing microorganisms
- ▣ Seriously and actively, opening up new frontier



<http://www.microorganisms.jp/ogasawara-lab/>

Supervisor Professor / OGASAWARA Wataru and Associate Professor / SHIDA Yosuke

Prof. Ogasawara and Shida are cheerful teachers who guide us sometimes strict and sometimes kindly. We are given various chances such as attending academic conferences and internships at universities and companies. They always encourage us to be independent in research activities.



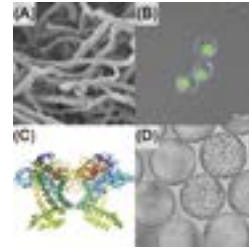
Research Content

We aim to deepen understanding about the world of microorganisms and how to exploit their promising potential for industrial applications. Filamentous fungi (mold): Analysis of enzyme production mechanism of filamentous fungi capable of decomposing plant biomass with the aim of producing useful substances.

Oleaginous yeast: Study on the production mechanism of yeast accumulate lipid in the cell for stable supply of edible lipid.

Bacteria: Drug development for periodontal pathogens and multidrug-resistant bacteria through investigation of proteolytic enzymes.

Screening of microorganisms: Establishment of state-of-the-art culture technology using emulsion and screening for useful microorganisms.



(A) Filamentous fungi, (B) Oleaginous yeast,
 (C) Structure of enzyme crystallized in space,
 (D) Screening of microorganisms by emulsion

A Day in the Lab

The core time in our laboratory is from 10:00 to 18:00. Seminars are held on every Monday, where students present their research progress and review a publication related to their research theme. We have great opportunities to share our research information with professors and students from other universities or institutes via domestic and international conferences. Because there are many seniors and assistants, we have an environment that supports how to conduct research and how to create presentation materials.



Microscopy

Thesis Subjects

- ▶ (M) Correlation analysis between enzyme productivity and morphogenesis in filamentous fungus *Trichoderma reesei*.
- ▶ (M) Establishment of CRISPR / Cas9-mediated genome editing method in the filamentous fungus *Trichoderma reesei*
- ▶ (M) Establishment of screening method based on the function and activity of microorganisms using two types of droplets.

Major employers of Graduates

The number of
PhD Graduates

11



Writer : MARUTA Kodai, Materials Science and Engineering/Bioengineering
 (National Institute of Technology, Nagaoka College)

107

教員名

OGASAWARA Wataru
 SHIDA Yosuke
 TAKEDA Yuriko

キーワード

Microorganism
 Fermentation
 Enzyme
 Genetic engineering

【校正時ご確認をお願い致します】

- 就職先が多く溢れてしまう為、フォーマット通り10個に選んでいただくようお願い致します。
- 修士・卒業論文の1行目「*Arabidopsis hda19-3*」の行目「*Arabidopsis thaliana*」をイタリック体にししました。ご確認をお願い致します。



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Laboratory of Plant Epigenetics

Associate Professor / NISHIMURA Taisuke

- ▶ "Epigenetics", a control mechanism of gene expression
- ▶ Positive action and Logical thinking
- ▶ Improvement of plant genetic engineering



http://bio.nagaokaut.ac.jp/~en/research/plant_epigenetics.html

Supervisor Associate Professor / Taisuke NISHIMURA

Dr. Nishimura always puts students first. He kindly helps us solve them, when we have difficulties in our research activities. He also gives us opportunities to develop logical thinking and presentation skills. We enjoy talking with him to get a lot of knowledge in various fields.



Mechanical

Electrical

Management

Materials

Civil

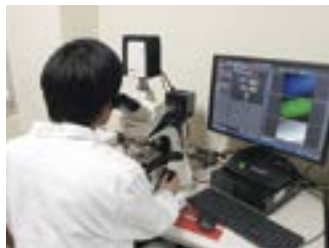
Nuclear Technology

System Safety

Innovation

Research Content

In eukaryotes, chemical modifications of DNA, such as DNA methylation, determine which genes are expressed from the genome. The determinant process by DNA methylation is often independent of any changes of DNA sequence itself. Such a regulatory mechanism is called epigenetics. In plants, DNA methylation patterns are maintained from generation to generation. We apply the epigenetic regulation systems to developing a new breeding technique using model plants; *Arabidopsis* and tomato.



Observation of transgenic plants expressing GFP fusion protein using fluorescence microscope.

A Day in the Lab

Because our experiments use plants as experimental materials, we need to grow plants of the appropriate stage for each experiment. Therefore, we need to consider plant growth when scheduling our experiments. The results of the experiments are shared at the weekly progress seminar. Dr. Nishimura gives us advices for the next step in the seminar. In weekly journal club, one of lab members introduce us interesting articles in biological field. Lab members get along well regardless of grade level, and the student room's atmosphere is always good.



Group photo

Thesis Subjects

- ▶ (B) Study on the mechanism of gene silencing that involves the *Arabidopsis hda19-3* mutant
- ▶ (M) Genetic analysis of epi-alleles on chromosome 1 involved in leaf development of *Arabidopsis thaliana*.
- ▶ (M) Transcriptome and genetic approaches to identify the epi-alleles responsible for high shoot regeneration activity.

Major employers of Graduates

The number of
PhD Graduates

0



108

Writer : NISHIWAKI Yusaku, Bioengineering
(National Institute of Technology, Nagaoka College)

教員名

NISHIMURA Taisuke

キーワード

Plant
Epigenetics
Genome
Genetics modification

【校正時ご確認をお願い致します】

□入稿画像が小さく、少しあらくなっています。よろしいでしょうか？

□研究内容、研究室の一日の本文とキャプション内の余計な改行を削除し、
よろしかったでしょうか？

21

Laboratory for Molecular Physiology

Professor / Koichi TAKIMOTO

- ▣ Exposing the mechanism of potassium channels
- ▣ Protease inhibitors as Kv channel gating modifiers
- ▣ Researching the how and why of adipocyte browning



http://bio.nagaokaut.ac.jp/labo/labo_02.html

Supervisor Professor / TAKIMOTO Koichi

Having worked in the United States for a long time, our professor emphasizes on nurturing self-management skills and advise his students to be free, but responsible for their actions. As the professor has a broad knowledge in various areas, he could give advices for both our research and daily studies.



Research Content

Our laboratory focus on investigating the mechanism of potassium ion channels, particularly those of the EAG subfamily group. These ion channels have been shown to be highly expressed in several types of cancer, and is considered as a potential target in cancer treatment. By researching these ion channels and the peptides derived from it, we hope to elucidate its effect on cell growth, and examine its viability as a treatment target.

In addition, our lab also conduct research on the browning of adipose tissues, by introducing various chemicals into the adipocyte and evaluating its browning reaction



Determining cell growth using alamar-blue reagent

A Day in the Lab

Students are allowed to do research at their own convenience, as there is no fixed schedule in our lab, although every lab members are required to attend the weekly journal club and report their research progress to the professor once a week. Students also have a lot of opportunities to discuss and ask for any advice from the professor regarding their research, studies, or life in general. Other than general lab work, we participate in the university's softball tournament and irregularly goes out for nomikai.



Group photo of lab members during softball tournament

Thesis Subjects

- ▶ (M) Effect of EAG2 channel-derived peptides on cell proliferation : Comparison with EAG1 channel and examination of cell specificity
- ▶ (M) Changes in Kv channel opening/closing mechanism by protease inhibitors : Identifying modified amino acids by drug admission

Major employers of Graduates

The number of
PhD Graduates

0

- Nipro Pharma
- Denka Seiken
- Toyo Roshi Kaisha, Ltd.
- Asahi Diamond Industrial
- Roche Diagnostics
- Showa Rekisei Industries
- Hokuriku Gas
- Beckman Coulter

Writer : Eisuke HARADA, Bioengineering
(National Institute of Technology, Numazu College)

109

教員名
TAKIMOTO Koichi

キーワード
Kv channel
Molecular Physiology
Potassium channel
Adipocyte browning

22

Laboratory for Molecular Neuroengineering

Associate Professor / SHIMODA Yasushi

- ▶ Unlock potential of the brain
- ▶ Unlock potential of ourselves
- ▶ Research hard, pray hard



<https://msb.nagaokaut.ac.jp/labo/neuroengineering>

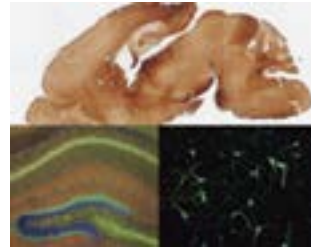
Supervisor Associate Professor / SHIMODA Yasushi

Dr. Shimoda is an earnest and gentlemanly teacher. Whenever we ask him about a problem in our research, he always has the precise advice. On the other hand, he is a very friendly teacher. He sometimes eats out and drinks with us.



Research Content

The brain is an aggregate of nerve cells. Various higher brain functions such as vision, audition, and speech are produced by forming a complex network of the cells. Cell adhesion molecules on the surface of the nerve cell are necessary for these brain functions. Our laboratory focuses on cell adhesion molecules related to psychiatric disorders such as autism spectrum disorders and eating disorders. We aim to elucidate the mechanisms of a pathology of these disorders and brain development by revealing the localization and function of these molecules using molecular biology, cell biology, and immunohistochemical techniques.



Immunostaining of the mouse brain and neurons

A Day in the Lab

Lab's core time is from 10 am to 5 pm. Each of us reports the progress and the experimental plan of our study on Monday. We discuss the results of the experiment or introduce the latest papers on Tuesday to acquire knowledge. We take care of mice for the research every day. Our lab members get along well, we enjoy the fi reworks festival in Nagaoka every year which is one of the famous fi reworks in Japan.



Taking care of mice every day

Thesis Subjects

- ▶ (M) Analysis of the molecular mechanism of autophagy by Cntnap3, a molecule associated with autism spectrum disorder
- ▶ (M) Analysis of the molecular mechanism of neurite outgrowth by the cell adhesion molecule Cntnap2
- ▶ (M) Cntn5 in the promotion of neurite outgrowth by Analysis of intracellular signal transduction

Major employers of Graduates

The number of
PhD Graduates

1

- NBC Meshtec Inc.
- Aspark Co., Ltd.
- Nakabohtec Corrosion Protecting Co., Ltd.
- SEIKAGAKU CORPORATION
- Kobe Material Testing Laboratory Co., Ltd
- Nipro Pharma Corporation
- Yoshaindo Inc.
- Kodansha Scientific Ltd
- Nippon Ppaper Industries Co., Ltd
- Japan Nuclear Fuel Limited

110

Writer : KIKUCHI Hiroshi, Bioengineering
(National Institute of Technology, Hakodate College)

教員名

SHIMODA Yasushi

キーワード

brain
mental disease
neuron
cell adhesion molecules

23

Laboratory of Glycobiology

Associate Professor / Takeshi SATO

- ▣ Challenging to reveal the mechanism of the glycosylation.
- ▣ More experiments, more research.
- ▣ Social contribution by applying our research.



http://bio.nagaokaut.ac.jp/labo/labo_05.html

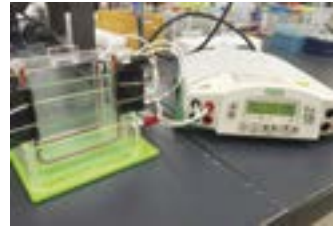
Supervisor Associate Professor / Takeshi SATO

Our boss likes watching sports such as baseball, Sumo and football. He is a kindness person who advises us about research, work and our life. He supports each of us with doing his best.



Research Content

Glycan consists of monosaccharide such as glucose, which is an important material for life phenomenon. For example, ABO blood type is determined by difference of monosaccharide of the glycan terminal. In addition, it relates to various disease. It is well known that glycan structure changes in cancer cell compared to normal cell. Our purpose is contribution by applying to the field of life science and medicine by revealing the function of glycan and expression mechanism.



An experimental equipment for western blotting.

A Day in the Lab

We work from 9:30 to 18:00 in laboratory. We research glycobiology by experiments of analyzing glycoprotein, glycolipid and gene. Our laboratory hold on seminar to report research progress and to introduce thesis related our research. In seminar and academic conference, we discuss our research with other people and get various knowledge. In addition, we enjoy a lot of events which are firework festival and get party. So our laboratory life is fulfilling.



Scene of experiment using cells.

Thesis Subjects

- ▶ (M) Function of highly branched N-glycans to spheroid formation of A549 human lung cancer stem cells
- ▶ (M) Effects of E-cadherin N-glycans on signal transduction of A549 human lung cancer cells
- ▶ (M) Transcriptional regulation of human β 4-galactosyltransferase 6 gene by transcription factor MZF1

Major employers of Graduates

The number of
PhD Graduates

2

- Nipro Pharma Corporation
- SEED
- Takesho Food & Ingredients
- WDB EUREKA
- Kure City
- TOA EIYO
- Miyazawa
- Chugai Pharma Manufacturing
- Denka
- CENTRAL

Writer : NIHEI Masanobu, Bioengineering
(National Institute of Technology, Asahikawa College)

111

教員名
SATO Takeshi

キーワード
Glycobiology
Cancer therapy
Glycosyltransferase
Lectin blot

24

Stem Cell Technology Laboratory

Associate Professor / OHNUMA Kiyoshi

- ▶ Producing high quality research related to regenerative medicine
- ▶ Investigating the mechanism of human embryogenesis
- ▶ Establishing a work-life balance in laboratory


https://bio.nagaokaut.ac.jp/~en/research/stem_cell_technology.html

Supervisor Associate Professor / Kiyoshi OHNUMA

Our sensei always share significant wisdom and great advice with us. He thinks about students' futures carefully. Sensei is dedicated to educating students even though he is very busy. He is a good-hearted sensei who teaches the student with a gracious speech. For this reason, students can discuss freely with him in everything, especially academic work and living.

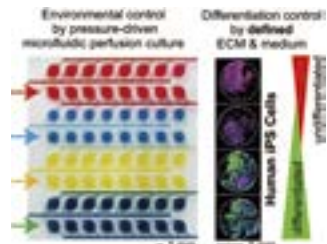


Research Content

Stem cells possess the ability to differentiate into all cell types and to self-renew continuously. We believe that stem cells are the key to success in regenerative medicine. Thus, we are committed to developing novel technologies alongside stem cells application for biomedical purposes. We utilize human induced pluripotent stem cells (iPSCs) to tackle the research both in vitro and in vivo platforms.

Our major research topics include;

- (1) Zebrafish models for cardiovascular research
- (2) Development of microfluidic devices to study the mechanism of human iPSCs differentiation
- (3) Effect of teratogenic drugs on human embryo self-organization
- (4) Planarian cell culture for understanding regeneration dynamics



iPSCs culture using microfluidic device

A Day in the Lab

Our laboratory starts at 9:30 am with a morning meeting. Everyone in the lab discuss the daily schedule and inform academic events. After that, we are free to do experiments according to the schedule. We progress the experiment with sensei and group members twice a month.

Normally, everyone gathers in the lab every day, and all members can become accustomed to each other. We work as a family by taking care, supporting, and helping each other. We also freely talk and advise on everything.

We sometimes have a party in the lab to celebrate the members who graduate (following the guidance of covid-19 prevention).



Good atmosphere in the laboratory

Thesis Subjects

- ▶ (M) High cell density suppresses BMP4-induced differentiation of human pluripotent stem cells to produce macroscopic spatial patterning in an unidirectional perfusion culture chamber
- ▶ (D) Effect of cell density on cardiomyocyte differentiation of human induced pluripotent stem cells
- ▶ (D) Thalidomide induces apoptosis during early mesoderm differentiation of human induced pluripotent stem cells

Major employers of Graduates

The number of PhD Graduates

3

- Micron Memory Japan, G.K.
- Japan Atomic Energy Agency
- Nipro Pharma Corporation
- Showa Denko Materials Co., Ltd.
- Moritan Co., Ltd.
- CoorsTek KK
- Japan Nuclear Fuel Limited
- Kobayashi Pharmaceutical Co., Ltd.
- Nipponham Delicatessen Ltd.
- Shinshin Pharmaceutical Co., Ltd.

112

Writer : LIMJANTHONG Nuttakrit, Integrated Bioscience and Technology
(King Mongkut's University of Technology Thonburi)

教員名

OHNUMA Kiyoshi

キーワード

Human induced pluripotent stem cells
Microfluidic
Self-organization
Human embryogenesis

25

Laboratory of Applied and Environmental Microbiology

Associate Professor / Daisuke KASAI



- ▶ Using microorganisms to change the global environment
- ▶ Development new microorganisms aimed at reducing environmental impact
- ▶ Pursuit future prospects of microorganisms



<http://bio.nagaokaut.ac.jp/~dkasai/index-e.html>

Supervisor Associate Professor / Daisuke KASAI

The assoc. prof. KASAI is emerging and very dedicated researcher. He explains and advises our questions carefully one by one. He also sometimes helps us by conducting experiments himself. Shall you try with him to discover new advances in environmental microbiology?

Research Content

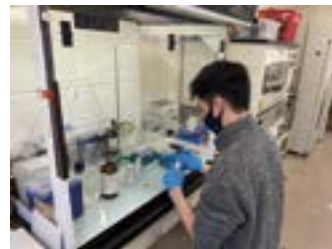
We are mainly researching on "rubber-utilizing bacteria" and "biodegradable plastic-biosynthetic bacteria" to solve the problems related to waste rubber and petroleum plastics, which are one of the causes of environmental pollution. These research include the creation of artificial mutations using PCR, cloning, and genetic recombination, and the analysis of degradants and biosynthetic substances using gas chromatography (GC) and gel permeation chromatography (GPC). Our goal is that the results of our research will contribute to the maintenance of the global environment, which faces a variety of problems.



Inside our laboratory

A Day in the Lab

Our lab day starts at 10:30 a.m. and ends at 3:30 p.m. Each experiment can be performed freely during the allotted time, and if there is extra time, students can help with other experiments or search for papers related to their research. The results of each experiment are presented in a group discussion, and with the advice of Dr. Kasai and senior students, the students move on to the next step. If you are interested in microorganisms and experiments with them, join us.



A member who are experimenting

Thesis Subjects

- ▶ (M) Creation and functional analysis of mutant strains with enhanced productivity of biodegradable biomass plastic
- ▶ (M) Elucidation of poly(cis-1,4-isoprene) degrading genes in natural rubber-degrading bacteria

The number of
PhD Graduates

0

Major employers of Graduates

- Kyowa Kako Corporation
- Bourbon Corporation
- The Yokohama Rubber Corporation

Writer : Yukimura KAWAGIWA, Materials Science and Engineering/Bioengineering
(National Institute of Technology, Suzuka College)

113

教員名
KASAI Daisuke

キーワード
environmental microbiology
rubber-utilizing bacteria
biodegradable plastic-biosynthetic bacteria

Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

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Environmental Biochemistry Laboratory

Professor / Shouji TAKAHASHI

- ▶ Destroy common sense with microbial power!
- ▶ Do you like microbes? Well, welcome to laboratory!
- ▶ Your enthusiasm will be rewarded!



<https://envbiochem.amebaownd.com/>

Supervisor Professor / Shouji TAKAHASHI

Prof. Takahashi is a wonderful person like the sun with a bright smile. Also, he can takes good care like if you order beef bowl with no beef soup , he will spontaneously put double the accent of red pickled ginger on the beef bowl.



Research Content

Our laboratory investigates the bioproduction and bioanalysis technologies of amino acids and the bioremediation technologies for organophosphorus compounds. More specifically, we have isolated a lactic acid bacterium that can produce a large amount of D-aspartate, a valuable material for the production of antibiotics, and are developing D-aspartate production technology using the bacterium. We have also found various D-amino acid-degrading enzymes in microorganisms and are developing novel D-amino-acid detection methods using these enzymes. Furthermore, we have obtained bacteria that can degrade organophosphorus flame-retardant plasticizers, toxic environmental pollutants, and are developing a microbial removal technology for these flame-retardant plasticizers.



A student work in a clean bench.

A Day in the Lab

We introduce papers and report on research progress in weekly seminars. Our professor and students of our laboratory kindly give valuable and meaningful advice. Because we have no fixed working hours, we can conduct experiments according to their own determined schedule, making it easy to participate in clubs and other activities. Our laboratory also emphasizes various event activities to promote friendship among students.



Our lab. sometimes won the softball tournament in our department !

Thesis Subjects

- ▶ (M) Microbial degradation of a persistent and potential toxic flame retardant.
- ▶ (D) Studies on the functional expression of D-aspartate oxidase gene in yeast.
- ▶ (D) Studies on the high D-aspartate production of lactic acid bacterium.

Major employers of Graduates

The number of
PhD Graduates

5

- DuPont Japan
- HORIBA. Ltd.
- Swing Corporation
- KOKEN LTD.
- Stem Corporation
- Nippon Denko Co., LTD.
- EN Otsuka Pharmaceutical Co., Ltd.
- ADTEC Engineering Co., Ltd.
- Gold-Pak Co., Ltd.
- Chuo Kagaku Cpo., Ltd.

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Writer : SUGISAWA Ryouyuke, Materials Science and Engineering/Bioengineering
(Osaka Prefecture University College of Technology)

教員名

TAKAHASHI Shouji

キーワード

Biotechnology
Genetic engineering
Microorganism
Enzyme

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Wildlife Management Engineering Laboratory

Associate Professor / YAMAMOTO Maki



Let us nurture nature to have a nurturing future



<https://whs.nagaokaut.ac.jp/yamamolab/>

Supervisor Associate Professor / YAMAMOTO Maki

A person who has a divergent thinking pattern to establish the co-existence with the wild life by nurturing the environment to sustain the human life style. The updated knowledge, skills and the benevolent approach always fabricate a sustainable approach to reduce the conflict between wildlife and the human.



Research Content

The reserch studies which are conducted in the laboratory mainly based on the wild animal management to reduce the conflict between the wild animals and the human in various aspects by using the application of science and technology with engaing lower number of people. I am engaging with the study the effectiveness of using laser device and the bird fighter to reduce the wildfowl damage to the lotus root cultivation (Renkon) in Okuchi. Other than that the laboratory studies are engaged with the various animals such as wild Boar, Comorant, Japaneese monkey and birds.



Bird Fighter - Sound repellent device

A Day in the Lab

The laboratory has a friendly environment for the new commers in the semesters. The senior students as we as the experienced students help the foreign students very much in different aspects regarding research and the day to day life . The people who engaged with the research studies, they help each other in field work and all the people are working as one family to reach their goal. Apart from the educational approach, there are several gathering events organized by the students of the laboratory to balance general lives of the students as well as to build up the strong relationship among the students.



Setting up the equipment in the field

Thesis Subjects

- ▶ (M) Understanding the damage caused by thr waterfowls in the lotus root cultivation and establishing an effective control measure.

The number of
PhD Graduates

0

Major employers of Graduates

- mont-bell
- AMAC
- WILCO
- Yoshinosekko

Writer : Uchini. S. Bandaranayake, Bioengineering

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教員名
YAMAMOTO Maki

キーワード
Wildlife Management
Co-existence
Technology
Diversity

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Material engineering for biotechnology

Associate Professor / KUWAHARA Takashi Technical Staff / KONDO Mizuki

- ▣ Combining biomaterials
- ▣ Development of the novel functional materials
- ▣ Have a salubrious laboratory life!

Supervisor Associate Professor / KUWAHARA Takashi

Dr. Kuwahara has a friendly character and laughs a lot. You are free to talk to him on both research and non-research topics. He is also always willing to answer even the most trivial question. Ms. Kondo is like a mother to our lab. In addition, she has knowledge of various analytical instruments and will support you in your research.



Research Content

We study biosensors that detect biomolecules electrochemically. Electrochemical sensors have attracted attention due to its non-destructive and rapid target detection. These sensors performance varies greatly depending on the immobilization of biomolecules on the electrodes and transforming the information obtained through the biomaterials function into electrical signals. In short, our theme of research is how to combine biomaterials and organic/inorganic materials and make them function as sensors. We are also working on developing simple and rapid method for measuring the biological function and the concentration of target molecules in biological environments.



Electrochemical sensing by 3 electrodes system.

A Day in the Lab

Our professor wishes lab students to lead healthy lives. So, we work hard during day and get enough rest during night. Furthermore, he recognizes us as adults, so he doesn't force us to do anything; we can decide on our daily lives. Managing your time well will provide you time not only for research but also other activities. Moreover, we report our research progress in our weekly seminar. We emphasize an atmosphere in which students can actively express their opinions to each other regardless of their grade level. Thereby we can get along with each other regardless of age.



Here is a view of the student's room.

Thesis Subjects

- ▶ (B) Electrochemical evaluation of concentration of lignin-derived aromatics using trimethylammonio group-modified electrode
- ▶ (M) Application of spin-coated nitrocellulose films to an electrochemical biosensor
- ▶ (M) Preparation of stretchable and electron conductive hydrogel films

Major employers of Graduates

The number of
PhD Graduates

0

- NAKABOHEC CORROSION PROTECTING CO., LTD
- Fuji Systems Corporation
- Kawasaki Thermal Engineering Co., Ltd.
- TANAKA Kikinzoku Kogyo K.K.

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Writer : TOCHIGI Alisa, Bioengineering
(Kobe City College of Technology)

教員名

KUWAHARA Takashi
KONDO Mizuki

キーワード

Electrochemistry
Biosensor
Surface science
Biomaterial

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Molecular Biophysics Laboratory

Professor / KIDOKORO Shun-ichi / Assistant Professor / SAOTOME Tomonori

- ▣ "Biological nanomachine" Molecular design of proteins
- ▣ Complex field of biological and molecular thermodynamics
- ▣ Precise evaluation of the function and stability of biomolecules



<http://bio.nagaokaut.ac.jp/~mbp-lab/nsite/>

Supervisor Professor / KIDOKORO Shun-ichi

Prof. Kidokoro is a very student-friendly teacher. Even if you get stuck in an experiment or have anxiety in your personal life, he will give you advice.



Research Content

Proteins have different functions and stability depending on their structure (type, order, interaction) of amino acids, and play various roles in the living body. Our laboratory aims to establish technology for designing and developing new proteins with higher function and/or stability than natural proteins. Currently, we are focusing on evaluation and molecular design of the physical properties of industrial enzymes and a single-stranded DNA-binding proteins by making full use of a high-precision differential scanning calorimeter (DSC) and spectrometer.



Differential scanning calorimetry(DSC)

A Day in the Lab

In our laboratory, the core time is from 9:30 to 17:30. Research activities are left to individual students, and each student thinks for himself and acts flexibly. In addition, every Friday, seminars, progress report meetings, and literature introductions by students are held. There is a lively exchange of opinions at this place, which is a valuable opportunity to deepen one's own knowledge. The atmosphere of the living room is peaceful, and there are various topics for research and chat.



Experiment

Thesis Subjects

- ▶ (B) Development of low-concentration measurement method using molecular beacon for evaluation of binding between single-stranded DNA and cold shock protein
- ▶ (M) Effect of product on activity of protein hydrolase savinase on small molecule substrates

Major employers of Graduates

The number of
PhD Graduates

3

- JEOL Ltd.
- Joetsu Starch Co.,Ltd.
- AZ Science Co.,Ltd.
- CANON IMAGING SYSTEMS INC.
- JAPAN FINECHEM COMPANY,INC.
- NAKABOHEC CORROSION PROTECTING CO.,LTD.
- ADVANTEC CO.,LTD.
- OKINAWA PREFECTURAL POLICE

Writer : MEZAKI Taichi, Bioengineering
(National Institute of Technology, Nagaoka College)

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教員名

KIDOKORO Shun-ichi
SAOTOME Tomonori

キーワード

DSC (differential scanning calorimetry)
protein
enzyme activity
molecular design

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Laboratory for Biological Motility

Professor / HONDA Hajime Associate Professor / FUJIWARA Ikuko

- ▶ Motility of muscle proteins at the molecular level
- ▶ Novel Biodevices
- ▶ Design your research projects to be your style



<http://bio.nagaokaut.ac.jp/~honda-l/>

Supervisor Professor / Hajime HONDA

Prof. Honda and Assoc.Prof. Fujiwara visit the student's desk at least once a day. They answer our questions very carefully. In addition, they sometimes purify proteins and observe sample by themselves. Both of them treat us as independent scientists and enjoy free discussions that have yet to be revealed.



Research Content

Myofibril molecules, primarily myosin and actin, are essential for muscle contraction. In our laboratory, we are working on in vitro reproduction of muscle contraction and observation with an optical microscope equipped with various devices. These allow us to investigate the dynamic mechanisms of muscle contraction and force generation at the single molecule level. We are also developing biodevices such as cancer sensors that use actin and myosin in collaboration with companies.



Scenery of an experiment in progress

A Day in the Lab

Our laboratory has no core time. Therefore, we are free to conduct experiments during the daytime or, conversely, in the middle of the night. However, it is important to have independence. Because, we can plan their experiments flexibly, but it is the students to plan and carry out the experiments in fact. The atmosphere in the laboratory is cheerful, and we sometimes enjoy chatting with each other when we take a break. Also, the professors and senior students are kind and always answer even the most trivial questions.



Fluorescence microscope allowing observation of fluorescently labeled actin fibers

Thesis Subjects

- ▶ (M) Large mass loss of actin fibers measured by QCM is caused by sliding motion
- ▶ (M) Visualization of fluctuations inside actin fibers by FRET analysis and determination of P and B ends
- ▶ (M) Ring Patterns Formed by Collective Motion of Actin Fibers

Major employers of Graduates

The number of
PhD Graduates

5

- BOURBON CORPORATION
- Fujitsu Limited
- ECHIGO SEIKA, Co., Ltd
- Fuji Baking Co., Ltd.
- HOKURIKU GUS CO., LTD.

- Nagaoka City Official

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Writer : MATSUMOTO Naoki, Bioengineering
(national Institute of Technology, Gunma College)

教員名

HONDA Hajime
FUJIWARA Ikuko

キーワード

actin
myosin
biodevice
muscles

【校正時ご確認をお願い致します】

□キーワードの英語指示をお願い致します。

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Polymer Functionalization Laboratory

Associate Professor / Noritaka KIMURA

- ▶ Based on polymer chemistry and organic chemistry.
- ▶ We welcome persons having computational techniques
- ▶ There is no problem without expertise. You can learn from the basics.



http://bio.nagaokaut.ac.jp/labo/labo_15.html

Supervisor Associate Professor / KIMURA Noritaka

He is a devoted husband and likes to cook. He holds positively seasonal traditional events, often purveys dishes to students. He knows not only macromolecular science but also habitat such as temporary dwelling. He teaches politely, if not about research.



Research Content

We develop new material in imitation of creature and study a fundamental knowledge of natural polymers. For example, study on Yukisarashi, a photobleaching technique of Japanese paper in Oguni area in Nagaoka, mulberry barks are put on snow on a fine day the yellow barks turns white during only a few hours. This technique does not use any chemicals and is environmentally friendly. We study the photobleaching process in detail and apply the technique to bleaching cotton fabric.



Bleaching equipment

A Day in the Lab

Core time is usually from AM 10:00 to PM 5:00. Core time is set up basically, but we relatively study at liberty. Research seminar is held every Tuesday, students give a presentation of progress of each study and introduce research papers by turns. Master's students attend a scientific meeting at least once for a period of two years. Research theme is each independent so you can adjust your study to research theme and your lifestyle. This lab has a peaceful and happy atmosphere. We keep in mind to be important to clearly separate work and private life.



Research landscape

Thesis Subjects

- ▶ (M) Effects of Ultraviolet Irradiation on the Components of Japanese Paper
- ▶ (M) Phase structure analysis of rice and polymer

Major employers of Graduates

The number of
PhD Graduates

0

- Interfirm Ltd.
- PFU Limited
- ACHILLES CORPORATION
- ASAHI PRINTING CO.,LTD.
- Dai Nippon Printing Co.,Ltd.
- Arakawa Chemical Industries,Ltd
- Arisawa Mfg. Co.,Ltd
- TOMOEGAWA Co.,LTD
- Ebina Denka Kogyo Co.,Ltd.
- Polatechno Co.,Ltd.

Writer : MAKADO Haruna, Materials Science and Engineering/Bioengineering
(National Institute of Technology, Kisarazu College)

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教員名

KIMURA Noritaka

キーワード

高分子
有機化学
機器分析
自由

