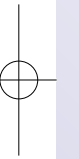
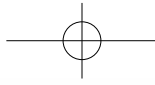


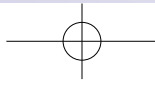
Bachelor's / Master's Program in Engineering

Mechanical Engineering

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Bachelor's / Master's Program in Engineering
Mechanical Engineering



~~【校正時ご確認をお願い致します】~~
~~□執筆者欄、学校名の英語指示をお願い致します。~~

1

Intelligent Measurement and Control Laboratory

Associate Professor / Wei DONG

- ▣ Aim world's first
- ▣ Stay hungry, Stay foolish
- ▣ Application oriented research



<https://mcweb.nagaokaut.ac.jp/~weidong/index.html>

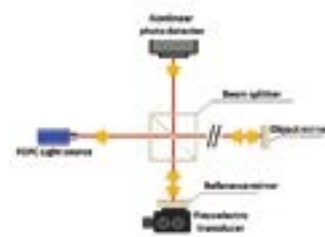
Supervisor Associate Professor / Wei DONG

The teacher basically respects the independence of the students. However, if you get stuck in your research, he will give you accurate advices.



Research Content

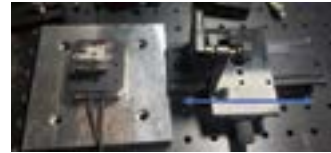
With the increasing technology of products due to recent technological advances, high-precision measurement technology at the nanometer order level is required. Our laboratory is conducting research on the development of high-precision measurement technology. In our research, we mainly conduct experiments using a device called an optical interferometer and analysis data using numerical calculation software.



An example of interference measurement using a femtosecond optical frequency comb laser

A Day in the Lab

Our laboratory has seminars twice a week. One is an English paper seminar. The purpose is to improve English proficiency by reading an English paper, and to understand the content of the paper and utilize it in our research. The second is a progress report seminar. We will correct the direction of our research by reporting on the current progress and exchanging our opinions with teachers and laboratory members. Since our laboratory does not have core time, students can proceed with their research at their own paces.



Construction of optical system

Thesis Subjects

- ▶ No data due to newly established laboratory

The number of
PhD Graduates

0

Major employers of Graduates

- No data due to newly established laboratory

Writer : FUJIYAMA Taiga, Mechanical Engineering
 (National Institute of Technology, Kagawa College, Takuma Campus)

17

教員名
Wei DONG

キーワード
Optical frequency comb
Precision measurement
Interferometer
Signal processing

Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

2

Noise and vibration control engineering laboratory

Associate Professor / Yasuhide KOBAYASHI



- ▣ To control wave with wave.
- ▣ Make steady progress in morning seminar.
- ▣ Robust control makes you radiant.


<http://c.nagaokaut.ac.jp>

Supervisor Associate Professor / Yasuhide KOBAYASHI

At morning seminar, discuss with student eager. He cared for student, so you can well have advice on your study. And you can have suggestion of study conference in Japan or other country. It is considered on your progress, so you don't worry about conference presentation.



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

Research Content

In order to control objects, we need to modeling the object, but if we include the sound and wave medium in the controlled object, it will be difficult to make an accurate model. However, by using robust control theory, it becomes possible to design a stable control system even for controlled objects that are difficult to model. Shown below subject of studies on laboratory.

Thermoacoustic: Experimental elucidation of thermoacoustic phenomenon apply active noise control theory.

Wave dissipating system: Active wave dissipating system using horizontal plate.

Servomotor: Build controller apply controlled object's physical parameter.

Vibration generation: Vibration control using vibration generator.



Thermoacoustic generator displayed on smart community 2016.

A Day in the Lab

Morning seminar is start at eight. This seminar is report that your progress of study on a week. English monograph seminar is once a week. A person in charge reading English monograph related the person's study, and explain simply about the monograph. The person changes every week. There is no restraint time other than the seminar above.

Participate in study conference for master's students, once a year as a guide. We are actively exchanging with universities at study seminars and so on and exchanging information to improve the quality of study.



A state of English seminar. Discuss the contents of the monograph while drinking coffee.

Thesis Subjects

- ▶ (M) Effect of asymmetry of electricity-feedback circuit on instability margin of thermoacoustic electric generator.
- ▶ (M) Frequency response measurement of thermoacoustic core using steady-state oscillation control and estimation of pressure amplitude for self-excited oscillation
- ▶ (M) Estimation of the critical temperature ratio for looped-tube traveling-wave thermoacoustic systems based on steady-state oscillation control

Major employers of Graduates

The number of PhD Graduates

0

- Mitsubishi Electric Corporation
- JEOL Technics Ltd.
- OMEON Corporation
- NIPPON SEIKI CO.,LTD.
- TSUBAKIMOTO CHAIN CO.

- ALPS ALPINE CO.,LTD.
- Mazda Motor Corporation
- YASKAWA Electric Corporation
- MEITEC CORPORATION
- YAMADA MANUFACTURING CO.,LTD.

18

Writer : Yoshitaka NOBUOKA, Mechanical Engineering
(National Institute of Technology, Tokyo College)

教員名

Yasuhide KOBAYASHI

キーワード

Thermoacoustic
Vibration
Wave
Servomotor

3

Mathematical Design Laboratory

Associate Professor / Takahiko KURAHASHI

- ▣ Solving engineering problems through mathematical optimization
- ▣ Computer simulation for micro and large scale models
- ▣ Thorough reporting, communication, and consultation


<https://mcweb.nagaokaut.ac.jp/~kurahashi/>

Supervisor Associate Professor / Takahiko KURAHASHI

Assoc.Prof. Kurahashi is a caring teacher. In spite of his busy schedule, he is always available for consultations with students regarding research, job hunting, scholarships, etc. In addition, once a week, there is a debriefing session where the teacher and students discuss their research together, so students can proceed with their research smoothly.



Research Content

We apply computational mechanics to engineering problems, solving inverse problems for design assistance and phenomenon estimation. For example, we study automatic design of structures that maximize stiffness under certain conditions and surface texture shapes of machine parts that minimize the friction coefficient. When analyzing structures and fluid motion by computer, we create calculation programs to analyze them, since general software is sometimes inconvenient. From these processes, we can learn how to formulate and analyze consistently.



Topology optimization

A Day in the Lab

In our laboratory, the first to fifth period is core time, and research is conducted during the time when classes are not in session. Also, weekly progress reports and research presentations are given every few months to enhance presentation and communication skills. Master's students participate in international conferences every year to develop their presentation skills in international settings. Other events such as the Nagaoka Fireworks Festival and welcome parties for new students are held as opportunities for interaction within the laboratory.



Research presentation

Thesis Subjects

- ▶ (M) Shape optimization for thermal deformation problems
- ▶ (M) Topology optimization of stent structure
- ▶ (M) Nondestructive testing based on the machine learning and the FEM

Major employers of Graduates

The number of PhD Graduates

0

- DENSO Corporation
- NSK Ltd.
- SUBARU CORPORATION
- SHIBAURA MACHINE CO., LTD.
- TOKYO SEIMITSU CO., LTD.
- Stanley Electric Co., Ltd.
- OILES CORPORATION
- Shin Nippon Air Technologies Co., Ltd.
- MinebeaMitsumi Inc.
- MEITEC CORPORATION

Writer :Hiroaki Arata, Mechanical Engineering
(NIT, Asahikawa College)

19

教員名

KURAHASHI Takahiko

キーワード

Computational mechanics
Mathematical optimization
Finite element analysis
Machine learning

5

Machine-Environment System Design Engineering Laboratory

Professor / ABE Masajiro Assistant Professor / YOKOTA Kazuya



- ▣ Aiming for Cooperation and Symbiosis of Mega Machines, Humans and Environments as a System
- ▣ Studying the System Dynamically and Scientifically from Macro and Microscopic Views
- ▣ Making Innovation of Safety and Comfort of the System



http://mcweb.nagaokaut.ac.jp/j/laboratory/laboratory_14

Supervisor Prof. / ABE Masajiro, Asst Prof. / YOKOTA Kazuya

Autonomy of each student is respected and we can study freely. However when we face difficult tasks, we can get many appropriate advices from professor that will help us very much. Our professor also has a humorous aspect, so you can study with comfortable conditions under less stress or pressure. Assistant Professor Yokota became a member of our lab in 2020. He is very kind and helpful to us in our research and personal life.



Research Content

According to subjects, we conduct research with using dynamic numerical analysis and experiments by the following three groups.
HSD (Hybrid Safety System Design and Development) Group
 For construction machines working on rough terrain, we are challenging to design and develop hybrid safety systems that can ensure the safety of the machines mainly related to rigid stability and structural failure while cooperating with human.
SDE (Symbiotic Design with Environment) Group
 We are researching cargo handling machines used in severe environments such as strong winds and earthquakes. We are aiming to establish design, development and management guidelines for harmonizing these machines with the environment.
GMD (Granular Materials Dynamics based Design) Group
 We are exploring optimum design methods based on dynamic analysis for many types of machines dealing with various granular materials such as snow, soil and waste.



Off-road working machine model for experimental analysis

A Day in the Lab

We are carrying out projects by each group mentioned above. Beside the project theme of the entire group, individual research theme is given to each member. The highest grade students become project leaders to promote research. According to each research theme, students autonomously make detailed research plan and put experimental and/or numerical analysis into effect with mutual guidance. Regularly, we have meeting and seminar once in every week. Then, we discuss about the status and progress of research and sometimes exchange views about related research trends abroad with our professor. There is no core time, so the students can study freely with self-management. We also plan and practice various events such as parties or summer trip at special occasion for deepening our member's friendship.



Group photo of laboratory members

Thesis Subjects

- ▶ (M) Experimental Analysis of Friction Characteristics between Gantry Crane Wheel and Rail in the Case of Water or Grease in Interface
- ▶ (M) Fundamental Development of MR Simulator for Off-road Working Machine Considering Effects of Wind
- ▶ (M) Effects of Shearing Velocity and Melted Water on Tribological Characteristics between Snow and SS400 at under High Pressure

The number of
PhD Graduates

2

Major employers of Graduates

- KOBELCO
- KYB
- TADANO
- DAIHATSU
- HITACHI
- NSK
- BOSCH
- HINO
- YOKOHAMA
- TOKYO
- Yamaha Motor
- Unicharm
- SoftBank

Writer : AKIMURA Manaya, Mechanical Engineering
(National Institute of Technology, Tomakomai College)

21

教員名

ABE Masajiro
YOKOTA Kazuya

キーワード

Construction Machine
Materials Handling Machine
Snow Removal Machine
Symbiotic Design with Environment

6

Laboratory of Machine Elements

Professor / OHTA Hiroyuki

- ▣ Solving problems, engineers's mission.
- ▣ Originality, ingenuity and practice.
- ▣ Always think the "why".


<https://mcweb.nagaokaut.ac.jp/~ohta/>

Supervisor Professor / OHTA Hiroyuki

He is a professor who guides and advises us in an enthusiastic and passionate way. If we don't understand something, he carefully explains us and makes us think the "why" of everything. Although he is quite strict regarding the research, when we have an event like a "nomikai" he is very gentle, and everybody have a good time.



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

Research Content

In the Laboratory of Machine Elements, we research about machine elements that are used in various places, such as automobiles, bullet trains, household electrical appliances, machine tools, etc. to improve their performance that directly leads to energy saving of machinery. Specifically, in collaboration with companies and by using softwares such as multibody analysis (MBA) or finite element method (FEM), we experiment and analyze the dynamics and tribology of machine elements that cause problems to the industry and propose a solution to their problems.



Multibody Analysis of Intersecting-Axis Type Trochoidal Gears

A Day in the Lab

The core time is 9: 00-17: 00. Morning seminar is held every day. In morning seminars, we discuss with the professor to deeply understand and confirm that our research is going in a good direction. Those who carry out experiments are often in the experimental room, and those who do simulations are often in the laboratory workstation. Everyone in the laboratory have a good relationship with each other.



Laboratory Workplace

Thesis Subjects

- ▶ (M) Expressions of Friction Forces of a Four-Point-Contact Linear Ball Bearing
- ▶ (M) Effect of Outer Ring Tilt on Displacements of an Inner Ring of a Ball Bearing
- ▶ (M) Rolling Traction in Line Contact

Major employers of Graduates

The number of PhD Graduates

2

- NSK LTD.
- MINEBEAMITSUMI INC.
- NABTESCO CORPORATION
- TSUBAKIMOTO CHAIN CO.
- TAKEUCHI MFG. CO., LTD.
- HITACHI CONSTRUCTION MACHINERY CO., LTD.
- AJINOMOTO FROZEN FOODS CO., LTD.
- NACHI-FUJIKOSHI CO., LTD.
- SHIBAURA MACHINE CO., LTD.
- O-M LTD.

22

Writer : KURAKADO Kota , Mechanical Engineering
(Tokyo Metropolitan College of Industrial Technology)

教員名

OHTA Hiroyuki

キーワード

Rolling Machine Elements
Machine Elements
Dynamics
Tribology

7

Precision Machining and Mechanism Laboratory

Professor / Hiromi ISOBE Associate Professor / Keisuke HARA



- ▣ Machining using ultrasonic vibration
- ▣ Observe internal stress in glass material
- ▣ Subtle machining with invisible force



<http://iprec.nagaokaut.ac.jp/>

Supervisor Professor / Hiromi ISOBE

He is a tough teacher, but he will guide us kindly when we face challenges. He is a National Institute of Technology and NUT's OB, so he understands our hobbies and actions.



Research Content

■Development of technology to photograph a machining phenomenon. There are many unknown points in a machining phenomenon in the ultrasonic band. Therefore, we elucidate a machining phenomenon by high-speed visualization technique of internal stress. ■Application to small diameter drilling technology The small-diameter-drill has low rigidity. The rotating drill superimposed with axial ultrasonic vibration motion reduces machining resistance and improves the machined surface and tool life. ■Creation of surface texture Lathe processing using ultrasonic vibration creates micro texture on the surface. Textures have the effect of improving the wear characteristics.

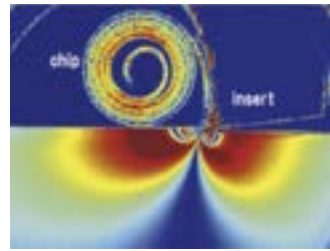


Image of "photoelastic method"

A Day in the Lab

Reserch is conducted by a team of two or three members. The morning of student begins by sending an email with the reserch plan of the day to teacher. There is a core time from 8:00 to 17:00. We have a seminar every morning, and students report their achievements once a week. Jigs and parts of equipment necessary for experiments need to be designed, analyzed and manufactured by yourself. New students can develop their abilities with the guidance of teachers and seniors.



Laboratory drinking party

Thesis Subjects

- ▶ (M) Study on cutting mechanism under ultrasonic vibration cutting by visualization of internal stress of workpiece
- ▶ (M) Consideration of ultrasonic vibration-assisted drilling using stress visualization method by two-direction imaging
- ▶ (M) Evaluation of starting friction of the surface texture generated by ultrasonic vibration cutting

The number of
PhD Graduates

1

Major employers of Graduates

- Makino Milling Machine Co.,Ltd.
- YAMAZAKI MAZAK CORPORATION
- DMG MORI Co.,Ltd.
- FANUC
- ADTEC Engineering Co.,Ltd.
- DAIKIN INDUSTRIES.LTD
- Honda Motor Co.,Ltd.
- Canon
- GS Yuasa Corporation
- TECH NAGAOKA

Writer : Kota TAKASHIMA, Science of Technology Innovation
(National Institute of Technology, Nagaoka College)

23

教員名

ISOBE Hiromi
HARA Keisuke

キーワード

Ultrasonic vibration
Photoelastic method
Surface texturing

8

Crystal Engineering Laboratory

Associate Professor / Hideo AIDA

- ▣ Research on next-generation optoelectronic single crystals
- ▣ Can make diamonds !
- ▣ COOL and STYLISH lab room


<https://mcweb.nagaokaut.ac.jp/~h-aida/CrystalEngineeringHP.html>

Supervisor Associate Professor / Hideo AIDA

Assoc. Prof. Aida is always there for us students, consulting with them on their research as well as their personal problems. When we get stuck in our research, he always offers a solution so we can pursue what we want to do with confidence.



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

Research Content

In our laboratory, we are conducting research on crystal substrates for semiconductors. Currently, Si (Silicon) crystals are used for mainstream semiconductors. The performance of semiconductors is determined by the substrate material. SiC (Silicon Carbide) and GaN (Gallium Nitride), which are called next-generation single crystals, have better semiconductor performance than Si, but the substrate processing technology is still in its infancy. Therefore, our laboratory focuses on substrate processing technology and aims to contribute to the practical application of next-generation single crystals. These researches are conducted by students who independently plan and conduct experiments. Students can be involved in joint research themes with many major companies. The latest equipment is being introduced one after another in our research facilities.



Optoelectronic single-crystal materials for the next generation (Bottom right: Brilliant-cut synthetic diamonds)

A Day in the Lab

In our laboratory, you will be provided with the necessary equipment for your experiments if you suggest it, so you can take on many challenges. The free-address student rooms are always neat and tidy. The professors pay a lot of attention to the environment of the students' living rooms. They listen to the students' opinions and make the facilities to make their laboratory life comfortable. Recently, various seating arrangements have been made, including sofas, counter tables, and dining tables, so that students can compile research materials, have lunch, and hold meetings in a comfortable environment. Therefore, although there are no core hours, it is a laboratory where you will always want to come every day!



Free-address student rooms with various seating options.

Thesis Subjects

- ▶ (M) Development of Polishing Process of Single-Crystal Diamond Substrate for Subsequent Homoepitaxial Growth
- ▶ (M) Processing of Hard-to-Fabricate Single-Crystalline Materials by Chemical Mechanical Polishing fused with Plasma Irradiation
- ▶ (M) High Efficiency Flattening Process of Sapphire Substrates by Honeycomb Structured Grinding Wheel

Major employers of Graduates

The number of PhD Graduates

0

- Shin-Etsu Chemical Co., Ltd.
- NSK Ltd.
- The Japan Steel Works, Ltd.
- SANYO DENKI CO., LTD.
- DAISHINKU CORP.
- Nippon Sheet Glass Company, Ltd

24

Writer : Junpei TOKUTAKE, Mechanical Engineering
(National Institute of Technology, Nagano College)

教員名

AIDA Hideo

キーワード

Semiconductor materials
Diamond
Crystal growth
Chemical Mechanical Polishing

9

Fluids Engineering and Rheology Laboratory

Professor / TAKAHASHI Tsutomu Specially Appointed Assistant Professor / SATO Yasunori
 Technical Staff / YAMADA Shuichi

- ▣ "Panta rhei" : everything flows.
- ▣ Manipulate the flow to any of needs.
- ▣ Study a lot, play a lot.



<https://whs.nagaokaut.ac.jp/fluid-mech/>

Supervisor Professor / TAKAHASHI Tsutomu

Professor Takahashi is a distinguished scientist of fluid engineering as well as rheology. Because of that, we can widely work on unique and challenging projects. His extensive and powerful knowledge enhances our research activities (conference presentation, studying abroad, etc.). We can grow up in the lab through his supportive teaching.



Research Content

Our laboratory is focused on characterizing matters which can flow. Many of these are used in industries, but we do not understand sufficiently how they flow. We have been investigating their characteristics using a rheometer and a nano-hardness tester.

As other projects, we also focus on developing the novel wind turbine system consisting of circular cylinders and a ring. It is attractive for its availability in a city because it can generate high torque at low rotational velocity. Now, we have been working on improving the performance.



A wind turbine with circular cylinder blades driven by longitudinal vortices.

A Day in the Lab

Our laboratory is currently conducting a wide range of research projects, and we have also various events (e.g., two seminars and one briefing session weekly). Therefore, it is a little bit busy. I think that we have many working styles in Takahashi's lab, I would be in the lab from 10 am – 8 pm. I basically carry out an experiment designed by myself and analyze the data collected from tests. Of course, I frequently make slides for a conference or seminars. It is much harder than I thought.

We always welcome you to become a part of our team!!



One frame of an experiment.

Thesis Subjects

- ▶ (M) Effects of a place of the Downstream Plate on the Formation of Longitudinal Vortex
- ▶ (M) Anisotropic Viscosity of a Wormlike Micelle Solution in Sinusoidal Shear Flow
- ▶ (D) Study on Flow Phenomena of Yield Stress Fluid

Major employers of Graduates

The number of
PhD Graduates

10

- YKK Corp.
- Hitachi Zosen Corp.
- Shin-Etsu Chemical Co., Ltd.
- ShinMaywa Industries, Ltd.
- Mitsubishi Electric Corp.
- Mazda Motor Corp.
- Kao Corp.
- Nissin Giken Co., Ltd.
- Dow Chemical Japan Ltd.
- Toray Industries, Inc.

Writer : KIMOTO Yunosuke, Mechanical Engineering
 (National Institute of Technology, Tokyo College)

25

教員名

TAKAHASHI Tsutomu
 SATO Yasunori
 YAMADA Shuichi

キーワード

Rheology
 wind turbine
 complex fluid
 viscoelastic

10

Snow and Ice Engineering Laboratory

Professor / Seiji KAMIMURA Assistant Professor / Yukinobu SUGIHARA

- ▣ Communication Skill
- ▣ Friendly, Warm Environment
- ▣ Time Management: Early Birds



https://www.nagaokaut.ac.jp/j/nyuushi/gb/e/01_mechanical/01_12.html

Supervisor Professor / Seiji KAMIMURA

Professor Kamimura is super friendly and encouraging teacher. He explains everything in the easiest way to understand, both in English and Japanese. Therefore, he always tell us an interesting story about our research during the seminar which helps us to make us interested in our research. Also, not only he is engaged in many other activities such as volunteering and lectures but also he has a wealth of experiences and knowledge of all specific, restricted field.



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

Research Content

At the Kamimura laboratory, we study about engineering includes snow and ice. Snow is a major obstacle for people living in snowy countries. Our laboratory has compiled damage data on snow and we research about how to prevent the disaster. On the other hand, snow and ice are also expected to be used as a renewable energy resource (snow). Also, we develop guns that emit environment-friendly ice bullets to repel harmful birds. Research subjects unique to the world-class laboratory called Snow and Ice Engineering, each of which is working on research.



Mobile Snow Cooler

A Day in the Lab

No Core time

Our laboratory has no core time, so we can advance our research at our own pace. You can also focus on activities such as part-time job and school club.

Morning seminar

Every morning we do seminars from 8 o'clock. Contents are various. We do lightning talk and workshop for improving our research progress report and presentation skill, further study session of English etc.

Events

We have a lot of fun that performs various events every season such as cherry-blossom viewing in spring, fireworks display in summer, BBQ in fall, hot pot in winter. Also everybody in this Laboratory are all so friendly and talkative.



We are welcoming YOU!

Thesis Subjects

- ▶ (M) Development of Mobile Snow Cooler Using Stored Snow
- ▶ (M) "One Photo" workshop method for developing disaster response skills
- ▶ (M) Suppression of microbubble generation in the initial stage of radiant ice making by applying high voltage pulses

The number of
PhD Graduates

1

Major employers of Graduates

- East Japan Railway Company
- Nissan Motor Corporation
- Pioneer DJ
- Azbil Corporation
- East Nippon Expressway Company Limited
- KITAGAS
- JGS Corporation
- DAI-DAN CO.,Ltd.
- DOWA Holdings CO.,Ltd
- Subaru Corporation

26

Writer : BAYANMUNKH TSATSRAL, Mechanical Engineering
(Ulaanbaatar High School)

教員名

KAMIMURA Seiji
SUGIHARA Yukinobu

キーワード

Kamimura
Sugihara
Snow
Ice

11

Reactive Fluid Engineering Laboratory

Associate Professor / SUZUKI Masataro

- ▣ Student-driven research
- ▣ Learn combustion from scratch
- ▣ You will learn to think logically

Supervisor Associate Professor / SUZUKI Masataro

While respecting the autonomy of the students, he gives them appropriate advice to solve every problem they may face. In addition, he is a friendly professor who likes joking, which makes the teacher-student relation feel much closer



Research Content

· Acoustic Excitation

By applying sound waves from a speaker to a jet diffusion flame, the flame shape changes. In our laboratory, we are elucidating the mechanism of acoustic excitation phenomenon through measurement and analysis under various conditions.

· Thermophoresis

In any space where there is a temperature gradient present, small particles move in a strange way. If this movement can be clarified, control of soot particles in combustion engines could be expected.

· Smoldering

Smoldering is a form of combustion which involves a large amount of smoke that proceeds without the presence of a flame. In this laboratory, we are conducting experiments to elucidate the mechanism of smoldering.

· Re-ignition

In a fire, after extinguishing activities have ended, unburned combustible material may re-ignite. Re-ignition can be very unpredictable, which makes fireextinguishing activities extremely difficult. In our laboratory, we are studying how to extinguish fires without any risk of re-ignition, and how to prevent the re-ignition of flammable materials.



The experiment of acoustic excitation

A Day in the Lab

In this laboratory, there is no core time and there are no morning seminars.

For this, students can proceed with their laboratory activities at their own pace.

However, if they don't plan or work properly, leading to their research not progressing, they will most likely get in trouble when presenting their progress reports.

Progress report seminars are twice a week, and there is a preestablished order in which people present. Seminars are extremely important since there is also a Q&A session in which students get feedback regarding their research topic. This makes it clearer for them to know what to do next in their investigation.

This is a laboratory where you can develop the ability to find and solve problems by yourself.



A Laboratory Photo

Thesis Subjects

- ▶ (M) Experimental and Numerical Analysis of the Acoustic Excitation Phenomenon of Jet Diffusion Flames
- ▶ (M) Experimental and Numerical Analysis of the Thermophoresis Phenomenon
- ▶ (M) Limiting Characteristics of Smoldering

Major employers of Graduates

The number of
PhD Graduates

2

- Toyota Autobody
- Suzuki
- Japan Tabaco INC
- Toshiba
- Mitsubishi Electric

- Yamaha Motor
- Kobelco
- Hitachi Chemical
- Sanden
- Nissin Seiko Group

Writer : IWATA Musashi, Mechanical Engineering
(National Institute of Technology, Gifu College)

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12

Computational Fluid Dynamics Laboratory

Associate Professor / Wataru YAMAZAKI



- ▣ Search the ultimate fluid machine !
- ▣ Go to a new world faster than sound !!
- ▣ Chase best award !!!


<https://mcweb.nagaokaut.ac.jp/~yamazaki/index.html>

Supervisor Associate Professor / Wataru YAMAZAKI

Prof. Yamazaki is a very kind and friendly person. He often comes to check on the students and have small talk with students. He also let students free to decide the content and direction of their research. When students discuss and consult with him about their research, he gives them detailed and careful advice.



Mechanical

Electrical

Management

Materials

Civil

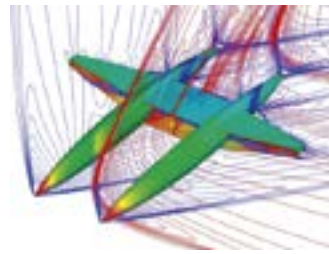
Nuclear Technology

System Safety

Innovation

Research Content

Our research topics are related with fluid dynamics, CFD technology and optimization technology. For instance, we are developing a new concept of supersonic aircrafts, a flapping wing micro air vehicle as dragonflies and a highly efficient vertical axis wind turbine. These researches will contribute to improving the fuel consumption of aircraft and the power generation of wind turbines. Furthermore, we are developing optimization methods, uncertainty analysis methods and CFD methods. These researches will help increase the speed of manufacturing by reducing the cost of computations.



A newly developed supersonic transport configuration

A Day in the Lab

Prof. Yamazaki respects student's personal life, so it's not decided ordinarily what time we should come to the laboratory. We can manage our own time. Thus, some students come to the laboratory in the morning and some come to the lab in the afternoon. We need to report weekly progress and have a seminar to introduce English journal papers. For that, there are a few hours of core time in a week that we have to spend doing research. Lab-mates are very friendly, so we often go to dinner and hang out together after the core time.



Laboratory members !

Thesis Subjects

- ▶ (M) Investigation of Indirect Reynolds Number Effect around Airplane Considering Influence of Roughness
- ▶ (M) Computational Fluid Dynamics Analysis of Ventilation System Including Diffusion of Micro Pollutant Particles
- ▶ (D) Advanced Multi-Objective Shape Optimization of Aircraft and Extraction of Design Knowledge by Dimension Reduction Technology

Major employers of Graduates

The number of PhD Graduates

2

- Nissan Motor Corporation
- Omori Machinery Co., Ltd.
- KITZ Corporation
- D&M Holdings Inc.
- CHUO ENGINEERING CO., LTD

- Suzuki Motor Corporation
- Sumitomo Heavy Industries, Ltd.
- NISHIKAWA KEISOKU Co.,LTD.
- i-system Co.,Ltd.
- Ebara Corporation

28

Writer : Ken'ya HIROSE, Science of Technology Innovation
(National Institute of Technology, toyota College)

教員名

YAMAZAKI Wataru

キーワード

Computational Fluid Dynamics
Design Optimization
Aircraft
Fluid Machineries

13

System Safety Engineering Laboratory

Professor / YAMAGATA Hiroshi

- ▣ Organizational management, leadership and policies for safety
- ▣ Danger flies from the sky
- ▣ Let's go outside



<http://safety-management.na.coocan.jp/>

Supervisor Professor / YAMAGATA Hiroshi

Professor Yamagata wore two pairs of straw shoes, a professor of this university and an official of Kasumigaseki, for about five years. He has been devoting himself to education and research at this university since August 2021. He makes use of the network of people, discusses with outsiders anyway, and values social contribution through research results.



Research Content

The people, money, and time available for safety are limited. We are studying efficient organization and management. We are also researching the mechanisms and preventative measures for fraud in organizations. These are applied by graduates in the real world.

To ensure safety, we must prepare for external threats as well as countermeasures against breakdowns and mistakes. We propose a protection method that protects people and equipment from collisions of high-speed flying objects (flying objects due to tornadoes, missiles, aircraft, etc.), and search for a more effective protection method by verifying the effect of the idea by computational simulation.



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

A Day in the Lab

The laboratory holds regular seminars every week. In the seminar, there is a time of "chaos" to come up with various unexpected ideas about the research theme and a time of "logic" to organize the thoughts. Of course, we will also check the progress of your research. Stimulating each other leads to unexpected jumps. External stimulation is also important. We will actively discuss with external research institutes, universities, and companies.

By the way, the teacher loves Niigata sake. Some of the recent sake is like wine, which is popular with students.

Thesis Subjects

- ▶ No data due to newly established laboratory

Major employers of Graduates

- No data due to newly established laboratory

The number of
PhD Graduates

0

Writer : Professor Yamagata Hiroshi, System Safety Engineering

29

14

Advanced Light Metallic Materials Laboratory

Industry-Academia Fusion Specially Appointed Lecture / NAKATA Taiki



- ▣ The lightest material : Magnesium
- ▣ Comprehensive research : from Manufacturing Technology to Analysis
- ▣ Take actions whenever you want to



<https://mcweb.nagaokaut.ac.jp/~mgcenter/>

Supervisor Industry-Academia Fusion Specially Appointed Lecture / NAKATA Taiki

Has an uncompromising honesty to research development. Work with students for some experiments such as casting, wrought processing and microstructural characterization. Students sometimes get strict opinion against their data and consideration if they poorly understand the results.



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

Research Content

The main purpose is to develop high-performance magnesium alloys that can be used as structural components of transportation vehicles. We try to do collaborative works with industries. The "industry-academia" collaboration helps us to tackle issues which hinder wide application of magnesium alloys. We are doing some national projects as well. They motivate us to focus on challenging studies.



An application example of newly developed Mg alloy; bumper reinforcement for automobiles.

A Day in the Lab

We have machines for casting, extrusion, and rolling. They enable us to freely design new alloys and processing conditions. Also, various microscopes (optical microscopes and electron microscopes) are available as well as mechanical testing machines. Without setting core time, students can start experiments whenever they want to try. Such work environment encourages us to improve the planning ability of research.



A scene from daily experiments; SEM observation

Thesis Subjects

- ▶ (M) Development of room-temperature formable and corrosion-resistant Mg alloy sheets
- ▶ (M) Elucidation of texture formation in Mg alloy sheets.
- ▶ (M) Development of super-ductile Mg alloy extrusions.

Major employers of Graduates

The number of
PhD Graduates

13

- Sumitomo Electric
- Shin-Etsu Chemical
- TOSHIBA MATERIALS
- Hitachi High-Tech Science
- Nippon Kinzoku
- Kobe Steel
- Suzuki Motor Corporation
- Hitachi Metals
- Daido Steel
- Isuzu Motors

30

Writer : KAIBE Keigo, Mechanical Engineering
(National Institute of Technology, Tsuyama College)

教員名
NAKATA Taiki

キーワード
Magnesium
Metallic Materials
Manufacturing
Rolling

【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 個で選んでいただくようお願い致します。
- 修論・卒論テーマの2行目[Cr₂O₃]、日本語に合わせて下付き文字にしましょう。よろしかったでしょうか？



15

High Temperature Materials Laboratory

Professor / NANKO Makoto Assistant professor / KUO Yen-Ling

- ▣ From Local to Global
- ▣ From Forging to Nanotechnology
- ▣ Looks are also important



<https://www.facebook.com/NankolabNUT/>

Supervisor Professor / NANKO Makoto and Assistant professor / KUO Yen-Ling

Professor Nanko is an energetic person. He loves enriching his students in various fields of both scientific and general knowledge. Being an open-minded person, He tends to accept and challenge some strange and wild ideas of his students at all times. Asst. Prof. Kuo is a kind person, she will help and guide you in research with her smile.

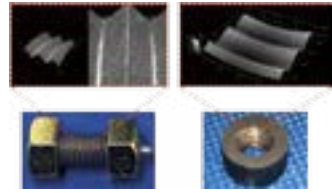


Research Content

MAX phase ceramics: The MAX phase ceramics have good properties such as good electrical and thermal conductivity. MAX phase ceramics are stiff and lightweight materials. It can be machined easily like metal materials.

Self-healing ceramics: This material can heal its crack automatically at high temperatures. In this research, we aim to improve self-healing ability and we want to apply self-healing ceramics in both high and low-temperature applications.

Metal 3D printer: or AM (Additive Manufacturing) is attracting attention as a new method of modeling. Evaluation tests are carried out on the microstructure and mechanical strength after building.



Bolt and nut made from Ti₂AlC MAX phase ceramics with their laser scan images

A Day in the Lab

The workdays start at 8:00 in the morning with progress seminars and an English paper seminar in the evening every Thursday. After the morning seminar, we can go to class or conduct our experiments until 17:30. Using of equipment is free, we can use all of the equipment at any time. We usually give a presentation at domestic and international academic conferences. The working environment is friendly, laboratory members are talkative people and well communicated in English. We often held and join some activities for example new year party, graduation party, hamburger party and the department softball competition.



Our lab members held 3rd place in the department softball competition

Thesis Subjects

- ▶ (M) Seizure Resistance of Various Surface Treatments on Austenitic Stainless Steel by Hot Hammer-die-forging
- ▶ (M) Influence of steam on high temperature static fatigue of Cr₂O₃ bulks
- ▶ (D) Yttrium Silicate Ceramics Dispersed with SiC Particles for Self-healing Environmental Barrier Coating Applied to Si Based Ceramic Composites

Major employers of Graduates

The number of
PhD Graduates

9



Writer : KHLAISONGKHRAM Phanuwat, Material Science
(Nagaoka University of Technology)

31

教員名

NANKO Makoto
KUO Yen-Ling

キーワード

Nanocomposite
Self-healing ceramics
MAX-phase ceramics
Additive manufacturing

16

Material strength/Bonding strength laboratory

Professor / Yukio MIYASHITA



- ▣ Small multinational society
- ▣ Making a real breakthrough in material science
- ▣ Removing language barrier



<http://sdfrs.nagaokaut.ac.jp/sdfrs/>

Supervisor Professor / Yukio MIYASHITA

Miyashita sensei is really considerate of the students. He gave his students respect and freedom. Despite his busy working schedule, he always tries to take care of his students not only in their study but also other problems from all walks of life. Miyashita sensei has been respected by many students including graduated students because his great support and encouragement in research work.



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

Research Content

Our laboratory have many research topic that are: our laboratory have many research topic that are:

1. strength characteristic of dissimilar materials joint by using friction stir welding
 2. Relationship between fatigue and welding process of welded and improved joints of Mg-Al-Zn-Ca Alloy
 3. Producing Green composite by using friction stirring
 4. The fatigue characteristics of automotive engine component
 5. Friction stir welding and making composite during joining of thermoplastic resin
 6. Laser welding of dissimilar joint between resin and metal
- The research area is extent that is relative to materials strength, interface strength and technique of machining processes.



Developed Magnesium alloy Rearframe for motorcycles (Joint research with Yamaha Motor Co.,Ltd.)

A Day in the Lab

Our lab and Otsuka lab spend a lot of time together, there are many international students coming from other nations so English is often used for communication. Being member of our lab, it would be a great chance for students not only to broaden their academic knowledge but also to make friends and understand the custom and culture of many other countries in the world. We are day by day making great effort to create professional and friendly working environment.



laboratory trip

Thesis Subjects

- ▶ (M) Fabrication of TZM alloy matrix composite by spark plasma sintering
- ▶ (M) Relationship between fatigue strength characteristics and welding process in TIG welded non-combustible Mg-Al-Zn-Ca extruded alloy joint
- ▶ (D) Microstructural Factors Influencing Fatigue Crack Growth Mechanism in Low-Carbon and High-Carbon Steel

The number of
PhD Graduates

6

Major employers of Graduates

- Mitsubishi Motors Co.,Ltd
- TODA CORPORATION
- Hitachi Metals, Ltd
- NIPPON SEIKI Co.,Ltd
- MITSUI MINING & SMELTING Co.,LTD
- Toshiba Materials Co.,Ltd
- Nippon Light Metal Company, Ltd
- Sumitomo Chemical Engineering Co.,Ltd
- Kobe Material Testing Laboratory Co.,Ltd
- Globeride, Inc

32

Writer : SHAO XUANYI, Science of Technology Innovation
(Meitoku-gijuku high school)

教員名

MIYASHITA Yukio

キーワード

strength
fatigue
bonding
welding

【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。

□ 修士・卒業論文の3行目、「b-type」を「 β -type」に修正しました。ご確認をお願い致します。

17

Nano and Atomic Scale Analysis Laboratory

Associate Professor / Tomoyuki HOMMA



- ▣ Living for others and for oneself are the true forms of engineering.
- ▣ Failure is an opportunity to start again so keep going.
- ▣ Explore the nano-scale world with TEM.



<https://mcweb.nagaokaut.ac.jp/~thonma/>

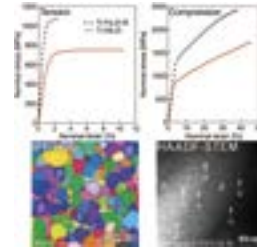
Supervisor Associate Professor / Tomoyuki HOMMA

Our professor is a cheerful and also an optimistic person. His optimism motivates us to never give up and strive to be a useful person in the community. He gives full attention to all students' research and always gives feedback or suggestions while giving some hints to persuade us to think. He is the best educator one could ever have.



Research Content

Our laboratory focuses on improving the mechanical properties of materials from observation with an optical microscope to nano-scale observation with a transmission electron microscope (TEM). The materials that we are using are aluminum (Al) and titanium (Ti) alloys, nickel (Ni) base superalloys, and thermoelectric materials. The use of Al alloys for car body parts is increasing drastically to improve fuel efficiency and catch up with hybrid and electric cars development. Meanwhile, improvement of the creep properties of Ti alloys and the heat resistance properties of Ni base superalloys for higher performance in jet engines is essential. Lastly, we are developing thermoelectric materials to transform heat waste into power in an effort to combat global warming.



Excellent strength and ductility of the new β -type Ti alloys by microstructure control

A Day in the Lab

We are doing our research on our own time management. In other words, we don't have a core time. However, we are trained to start our day at least at 9 a.m. to prepare ourselves as members of society in the future. We have a research seminar once a week but will present every 2 weeks as we will be divided into 2 groups. The graduate students are required to make presentation slides in English to improve their English proficiency. In addition, we actively participate in conferences to build confidence and gain new knowledge while receiving valuable advice from professionals. Due to COVID-19, a lot of activity has been suspended, but our professor always finds some time for a one-on-one coffee break to have some discussion and refresh.



Normal situation in our laboratory

Thesis Subjects

- ▶ (M) Effects of twins on the heat resistance of powder metallurgical Ni-Co base superalloy
- ▶ (M) Effects of Ge substitution on thermoelectric properties of CoSi thermoelectric materials
- ▶ (M) Improvement in mechanical properties by elemental substitution for β -type Ti alloys sintered by pulsed electric current sintering

Major employers of Graduates

The number of
PhD Graduates

0

- Ahresty Corporation
- Sumitomo Electric Industries, Ltd
- Mazda Motor Corporation
- Daido Steel Co., Ltd.
- YKK AP Inc.
- Hitachi Metals, Ltd.
- Mitsubishi Motors Corporation
- Rengo Co., Ltd.
- Union Tool Co.
- Nippon Steel Logistics Co., Ltd.

Writer : AMALINA AINA Binti Kaharudin, Science of Technology Innovation
(University of Kuala Lumpur)

33

教員名
HOMMA Tomoyuki

キーワード
Nano and atomic scale analysis
Transmission electron microscopy
Light metal materials
Improvement of mechanical properties

18

Energy material lab.

Professor / Masatoshi TAKEDA Assistant Professor / Masaaki BABA

- ▶ "MOTTAINAI" Don't waste the heat !!
- ▶ Creating a future through materials research
- ▶ Where there's a will, there's a way


<https://mcweb.nagaokaut.ac.jp/~takeda/index.html>

Supervisor Prof. Masatoshi TAKEDA and Masaaki BABA

Prof. Takeda is always gentle to us and he always gives us earnest advices even if he is busy. He tells us instructive stories (sometimes funny stories) based on his experience. We can feel free to ask to Prof. Baba because he is very friendly, and he gives us valuable suggestions.



Mechanical

Electrical

Management

Materials

Civil

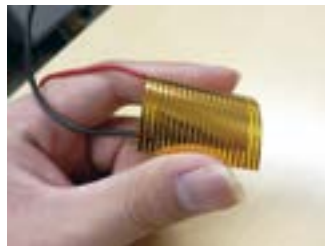
Nuclear Technology

System Safety

Innovation

Research Content

We are studying about "Thermoelectric material and device", "Electrocaloric effect" and "Heat storage material". Thermoelectric materials and devices can directly convert thermal energy (such as waste heat from power plant, vehicles and body heat) into electricity. Electrocaloric effect is a physical phenomenon which absorbs / generates heat by applying periodic electric field to a ferroelectric material. This is one of promising technologies for miniaturized cooling system. VO₂, which is a solid-solid phase change material, can be utilized for solid-state heat storage system and temperature leaving technologies.



Flexible device developed in our laboratory

A Day in the Lab

We have a morning seminar from 8 am on every weekday to present and discuss about our research progress. The aim of this seminar is to get advices and opinions from professors and other members, and is to broaden our horizons by listening to different research topics. After the seminar we carry out research at our own pace. In addition, even if you have no specialized knowledge when you are assigned to this laboratory, you can get enough knowledge to proceed your research by attending seminars held in our laboratory every week.



Measurement of thermal properties by laser flash method

- ▶ (修) 金属四ホウ化物MnB₄の合成と熱電材料としての可能性
- ▶ (修) シリカの還元により合成したシリコンナノ粒子を用いて作製した焼結体の熱電特性
- ▶ (修) 相転移材料VO₂を用いた電圧リミット機能を有する熱電発電素子開発
- ▶ (修) 材料組織がチタン酸バリウムの電気熱量効果に及ぼす影響

Thesis Subjects

- ▶ (M) Synthesis of metal tetraboride(MnB₄) and its potential as thermoelectric material
- ▶ (M) Feasibility study of thermoelectric generator with voltage limiter function using phase transition material VO₂
- ▶ (M) Influence of microstructure on the electric calorific effect of barium titanate

Major employers of Graduates

The number of PhD Graduates

0

- Nippon Telegraph And Telephone West Corporation
- Daihatsu Motor Co., Ltd.
- Tokyo Electron Ltd.
- Twinbird Corporation
- Yamaha Corporation
- Oki Electric Industry Co., Ltd.
- Koki Holdings Co., Ltd.
- DOWA TECHNOLOGY
- Mitsubishi Materials Techno Corporation
- Anritsu Corporation

34

Writer : Syohei ARAI, Mechanical Engineering
(National Institute of Technology, Fukui College)

教員名

TAKEDA Masatoshi
BABA Masaaki

キーワード

Thermoelectric materials
Heat storage materials
Thermal management
Electriccaloric effect

19

Laboratory to evaluate structural safety

Research Content

A Day in the Lab

Thesis Subjects

Major employers of Graduates

The number of PhD Graduates

Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

20

Energy Engineering Laboratory

Professor

Professor-/ Noboru YAMADA



- ▶ Make it speedy!
- ▶ No pain No gain!
- ▶ We love renewable energy!


http://mcweb.nagaokaut.ac.jp/~n_yamada/

Supervisor Professor / Noboru YAMADA

Professor Yamada takes care of students and teaches carefully. He often advises students about research, future and so on. His office door is always open to accept questions from student.



Mechanical

Electrical

Management

Materials

Civil

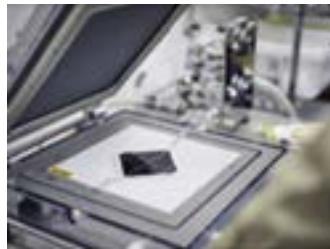
Nuclear Technology

System Safety

Innovation

Research Content

In this laboratory, we focus on sustainable energy utilization technologies related to solar energy, heat engine, energy conversion / storage / transportation, heat transfer phenomena. The main research contents are as follows. Research on solar power generation, which is drawing attention as "renewable energy". Development of compact heat engine for temperature difference power generation using high-temperature thermal energy called "waste heat". Research on large heat transport device "to recover and transport heat in a large space". Developed a highly efficient mechanical battery system that enables "reciprocating conversion of electric energy and kinetic energy".



Solar cell module that increases power generation efficiency by converging sunlight with a lens.

A Day in the Lab

There is no time restriction in this laboratory. Therefore, you can create your own research style that suits your own life. It is roughly divided into two teams, a research team related to photovoltaic power generation system and thermal engineering, and both teams cooperate each other. Even if there is something you can not understand, your seniors will guide you kindly and carefully. Even at the seminar, regardless of grade, various opinions are overflowing and it is exciting.



It is a usual laboratory. Some graduate students teaching undergraduate students, others reading papers

Thesis Subjects

- ▶ (M) Effect of temperature change of silicone-on-glass micro lens array on optical efficiency of concentrator photovoltaic module
- ▶ (M) Characterization of gerotor expander for micro organic Rankine cycle power generation system -- Comparison with scroll expander --
- ▶ (M) Rotation speed improvement of light-driven micro-motor and investigation of effective application

Major employers of Graduates

The number of PhD Graduates

9

- Nissan Motor Co., Ltd.
- UACJ Corporation
- Hitachi Astemo, Ltd.
- Azbil Corporation
- Shin-Etsu Chemical Co., Ltd

- Tohoku Electric Power Co.,Inc.
- ASAHI KOHMATSU CO., LTD.
- MAYEKAWA MFG. CO., LTD.
- Hitachi Chemical Company, Ltd
- NACHI-FUJIKOSHI CORP.

36

Writer : Yutaka Watanabe, Science of Technology Innovation
(National Institute of Technology Kisarazu)

教員名

YAMADA Noboru

キーワード

Energy
Photovoltaic
Heat transfer
Energy storage

21

Nanosecond Nanotechnology Laboratory

Professor / NAKAYAMA Tadachika

- ▶ Improvement of creativity by challenge to the unknown territory !
- ▶ Improvement of communication skills with international exchange!!
- ▶ Improvement of resourcefulness with a extensive experience!!!



<https://etigo.nagaokaut.ac.jp/people/staff/nky15/index.html>

Supervisor Professor / NAKAYAMA Tadachika

Prof. Nakayama gives you many chances. There are opportunities for domestic and foreign academic conferences, joint research with companies, and foreign internships. In addition, Prof. Nakayama himself shows "work hard and play hard", and during the softball tournament is working hard in the entire laboratory.



Research Content

This laboratory has a well-developed research environment at the top level in the world, and is characterized by the ability to conduct a series of research from creation of new materials, evaluation of properties, and commercialization in cooperation with companies. Materials and technologies that have been studied and developed in this laboratory are evaluated and sometimes awarded by companies, enabling them to engage in cutting-edge research.

<Recent research subjects> Fabrication of microstructure using 3D printer, development of electric field treatment method using nanosecond pulse power supply, creation of organicinorganic hybrid pressure sensor, etc.



One frame of the experment

A Day in the Lab

This laboratory can offer you not only technical and research skills but also resourcefulness, and the labo values student autonomy and no core time. The unique point is many international students, so there are many opportunities to work international. In addition, many opportunity of the work with the companies makes you can be involved in cutting-edge development of commercialization. At academic conference, you can not only participate in international conference, but also be involved in the planning and management of the conference, and learn skills other than research.



One frame of after the end of softball tournament

Thesis Subjects

- ▶ (M) Synthesis of ceramic 3D structures using laser CVD and nano-level 3D printer
- ▶ (D) Development of sewage water purification method using nanosecond pulse electric field
- ▶ (D) Design of material for pyroelectric power generation from low-grade waste heat sources

Major employers of Graduates

The number of
PhD Graduates

15

- Kao Corporation
- Mitsubishi Electric Corporation
- Panasonic Corporation
- Shin-Etsu Chemical Co., Ltd
- Sumitomo Electric Industries, Ltd
- Ricoh Japan Co., Ltd.
- Central Japan Railway Company
- Tokyo Electric Power Co., Inc.
- Hino Motors, Ltd.
- Toyohashi University of Technology

Writer : Okawa Ayahisa, Science of Technology Innovation
(National Institute of Technology, Tomakomai College)

37

教員名

NAKAYAMA Tadachika

キーワード

Ferroelectric ceramics
3D stereolithography
Nanostructure control
Pulse electric field orientation

22

Combustion and Energy Laboratory

Associate Professor / KATSUMI Toshiyuki



- ▶ Let's study space propulsion engineering in Nagaoka
- ▶ Proceed your research setp by step every day
- ▶ Exprosion is art!


<https://mcweb.nagaokaut.ac.jp/~kadowaki/index.html>

Supervisor Associate Professor / KATSUMI Toshiyuki

Dr.Katsumi is kind and very friendly. He always gives us much useful advice related to our research. In the lab party, he talks a lot of interesting stories and enjoys with us. In addition, his singing is wonderful!



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

Research Content

Our laboratory focuses on the research field of combustion and energy. The research topics are as follows. ①Research and development of green propellant for a rocket engine ②Combustion characteristics of Hydrogen premixed gas for hydrogen safty ③ Combastion characteristics of woody biomass



Thruster test preparation at JAXA Noshiro test site

A Day in the Lab

We don't have core time, so we can decide a schedule by ourselves. Laboratory members promote research in cooperation with seniors and/or juniors. Through activities with seniors, you can learn about research subject and experiment method. General meetings are held twice a week. We report the progress of research at those. We have many fun events including BBQ, sport, parteis, and famous Nagaoka firework festival. Combustion and Energy laboratory is suitable place to do what you want.



Softball championship

Thesis Subjects

- ▶ (M)Study on combustion characteristics of mono and bi liquid rocket propellant
- ▶ (M)Study on propagation characteristics of spherically expanding flame in hydrogen-air premixed gas
- ▶ (M)Study on gasification and combustion of woody biomass

Major employers of Graduates

The number of PhD Graduates

0

- IHI Aerospace Engineering
- The High Pressure Gas Safety Institute of Japan
- JGC HOLDINGS CORPORATION
- Mazda Motor Corporation
- ANRITSU INFIVIS
- IHI
- FUJITSU FRONTTECH LIMITED
- J-POWER
- TEPCO
- NIPPI Corporation

38

Writer : ITO Hisayoshi, Infotmation Science and Control Engineering
(Niigata Prefectual Nagaoka Highschool)

教員名

KATSUMI Toshiyuki

キーワード

Combustion
Space propulsion
Hydrogen
Biomass

【校正時ご確認をお願い致します】

- 研究内容の画像がダウンロードできませんでした。データ入稿をお願い致します。
- 修論・卒論テーマの1行目「Cu₂O」を下付き文字にしました。よろしかったでしょうか?

23

Micro/Nano processing Laboratory

Associate Professor / Mizue MIZOSHIRI

- ▣ Creation of novel micro/nano fabrication technologies
- ▣ "Big" achievements with micro/nano processing
- ▣ Working seriously and actively on research



<https://mcweb.nagaokaut.ac.jp/~mizoshiri/>

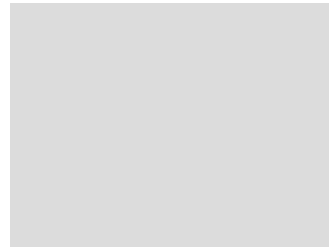
Supervisor Associate Professor / Mizue MIZOSHIRI

Professor Mizoshiri has great mind and strong passion on micro/nano processing research. She is really friendly and always taking care of students. She often talks and discussed with the students. Students can consult and ask for advice about research.



Research Content

In our laboratory we working on creating the next generation of microfabrication technology and application to novel and most advanced microdevices. In our lab, we have variety of research topics, for example, a research about fabricatin technique for micro 3D structures in air by using femtosecond laser pulses. The fabrication dynamics was analyzed time-resolved measurement by using a pump-probe technique. We also working on creaging devices to observe micro cells. At last, Microfabrication technology is not only focus on miniaturization but also solving problems of "size effect" that generated in micro and nano scale.



Laser system and micro device

A Day in the Lab

We have flexible time systems, students come in the lab to do research or study at any time. We have research seminar every week to explain about our research progress and discussed with professor and lab member. We also have meeting to talk about scientific article and a lot of changes to make presentation in academic conferences. Through all the presentations, we learn a lot not only about our research but also about how-to do-good presentation, how to explain our thought through well.



Zoom meeting

Thesis Subjects

- ▶ (M) Bonding mechanism of Cu₂O nanospheres to metal substrates by femtosecond laser pulse irradiation
- ▶ (M) Femtosecond laser direct writing of Cu patterns fabricated using glyoxylic acid Cu complex ink/ Cu nanoparticle ink mixed film
- ▶ (M) Co-Ni microfabrication by reduction of glyoxylic acid Co/Ni complex using femtosecond laser direct writing

The number of
PhD Graduates

0

Major employers of Graduates

- Konica Minolta
- JEOL Ltd.
- Mitsubishi Chemical Corporation
- Alps Electric
- Murata Manufacturing
- Ogacon
- AMADA WELD TECH
- Hitachi, Ltd.

Writer : HA PHUONG NAM, Science of Technology Innovation
(Hanoi University of Science and Technology)

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教員名
MIZOSHIRI Mizue

キーワード
microfabrication
femtosecond laser
MEMS

Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

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Nano Bio Integrated System Laboratory

Associate Professor / SHOJI Kan



- ▣ Integrating biology and mechanical engineering
- ▣ Proposing new concept
- ▣ Work hard, play hard !


<https://mcweb.nagaokaut.ac.jp/~kshoji/>

Supervisor Associate Professor / SHOJI Kan

Dr. Shoji is a young and energetic professor who started to manage his laboratory at NUT from 2020. He is knowledgeable in the fields of biology, electrochemistry, and mechanics. Thus, he always give us valuable advises when we need help. He also emphasizes English skills and gives us opportunities to present in international conferences.



Mechanical

Electrical

Management

Materials

Civil

Nuclear Technology

System Safety

Innovation

Research Content

Our laboratory is working on the development of bio-integrated systems that biomaterials and machines are combined. Specifically, we are developing probe-type artificial cell membrane sensors to detect chemicals with high spatial resolution. In others, we are studying microfluidic devices to generate and manipulate giant liposomes and insect cyborgs driven by biofuel cells. Although Shoji Lab. belong to mechanical department, we are using biomaterials such as DNA, proteins, and phospholipids. Even if you do not have knowledge of biology or chemistry, you can learn it after joining our lab.



Conducting microfluidic experiments

A Day in the Lab

Core time is 10:00-18:00, and we do not hold morning seminars. We have four different groups depending on research topics and hold a meeting every two weeks for each group. Because some researches require time to prepare for experiments, it is necessary to plan ahead. Dr. Shoji usually works in the student's office. So, we can easily ask him if you have any questions. As a new laboratory that started in 2020, we can experience things that other laboratories cannot, such as selecting experimental equipment and assembling devices. We also take the initiative in creating lab rules and planning events.



Student office

Thesis Subjects

- ▶ (B) Nanopore sensors using an automated artificial cell membrane formation system
- ▶ (B) Evaluation of strain-resistance characteristics of CNT yarns for construction of zebrafish heart rate sensor
- ▶ (M) Artificial cell membrane probe threaded DNA nanopores
- ▶ (M) Local chemical detection using biological nanopore probes

Major employers of Graduates

The number of PhD Graduates

0

- Naoetsu Electronics Co., Ltd.
- MANI, Inc.
- Outsourcing Technology, Inc.

40

Writer : HAYASHI Tomohide, Mechanical Engineering
(National Institute of Technology, Hakodate College)

教員名
SHOJI Kan

キーワード
Nanopore
Bio-integrated devices
Microfluidics
Scanning probe microscopy (SPM)

【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。

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Industrial design laboratory

Specially Appointed Lecturer / FUJISAWA KEI



- ▣ Industrial design
- ▣ International exchange
- ▣ Contribute to society

Supervisor Specially Appointed Lecturer / FUJISAWA KEI

Professor Fujisawa is a very kind, flexible, and patient professor. When I'm trying to do my best speaking Japanese and fail, I can speak in English, and there's no problem, even he can explain to you in English what he said in Japanese. He studied abroad in the United States, so he has English skills.



Research Content

In recent years, designing and modeling for the safety management of industrial systems have become an important research theme. In our laboratory, we are developing monitoring technology and analysis of complicated physical phenomena in industrial systems including nuclear power and thermal power plants by fusing experiments and technologies such as numerical calculation. Research themes include (1) droplet impact erosion, (2) wall thinning detection at nuclear and thermal power plants, (3) numerical analysis, (4) polishing, (5) monitoring technology, and (6) cavitation. The core time of the laboratory is from 10:00 to 16:00.



設計した実験装置を組み立てる様子

A Day in the Lab

In this laboratory, we work daily with a core time set to do our research theme. We have 3 research groups presenting their results in progress reports and conference presentations, we exchange ideas between us, regardless of the grade, to try to get new or better ideas.

The laboratory of Mr. Fujisawa's main objective is to focus on developing human resources with internationality. International students are enrolled in the laboratory, so we often use English. By staying in contact with various cultures, you can expand your international perspective. We apply the method of experimentation to build the equipment from the design to the processing of assembly.



Thesis Subjects

- ▶ No data due to newly established laboratory

The number of
PhD Graduates

0

Major employers of Graduates

- No data due to newly established laboratory

Writer : SOTO MORENO CHRISTOPHER, Mechanical Engineering
(University of Monterrey)

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教員名
FUJISAWA KEI

キーワード
Droplet impact erosion
Thickness detection
Numerical analysis
Polishing

