Student-edited UTokyo Faculty of Engineering PR Brochure

2020 WINTER

Ttime!

Engineering across Borders

Map of All 16 Faculty of Engineering Departments

Inter-departmental Interviews
Programming Used at the Faculty of Engineering
Energy and Engineering

Comparative Departmental Interviews
Civil Engineering, Architecture, Urban Engineering

Faculty of Engineering × Faculty of Agriculture Inter-faculty Interview

Special Feature
UTokyo Project Sprint

FACULTY OF ENGINEERING
THE UNIVERSITY OF TOKYO

At the Faculty of Engineering, students edit and publish the PR Brochure Ttime!

UTokyo Faculty of Engineering Homepage
https://www.t.u-tokyo.ac.jp/foe/index.html

東京大学工学部
FACULTY OF ENGINEERING
THE UNIVERSITY OF TOKYO

Ttime! Archived Editions

Ttime!
2020
Summer Edition

“Candid Researcher and Student Insights!”

In this program, you will learn candid professor and student insights into their reasons for selecting the Faculty of Engineering and their normal lifestyles.

Archived Editions: 2019 and before

https://ut-ttime.net/archives/

Ttime! is distributed at no charge at high schools and preparatory schools throughout Japan.

Contact Us
ttime.todai@gmail.com

Ttime! Web

Department introductions and event reports are posted on Ttime!Web!

You can also read about the experiences of students who transferred from technical colleges and those who pursue higher education or transferred from the liberal arts faculties into the Faculty of Engineering!

https://ut-ttime.net/

Editor's Note

What did you think of our special features on Engineering Across Borders and UTokyo Project Sprint? We were able to interview a total of 28 people in this brochure, probably the most ever for a single Ttime! brochure. Our hope in planning this brochure was that presenting Faculty and Department relationships would benefit people choosing which career path to pursue. We thought this was a particularly appropriate time to offer a special feature on UTokyo Project Sprint and to tell you how project members struggled and made great efforts despite their activity being restricted.
Although the brochures have been produced online this year, numerous meetings have been required to make the content in these two brochures richer than usual. We are relieved to have managed to finish the production of both brochures as usual. We sincerely appreciate those of you who have picked up or downloaded a copy to read, those who cooperated for the interviews, and everyone involved in the production of this brochure!
From the upcoming brochure onward, the brochure will be produced under a new structure. It will be produced by a new team, and since all the members will continue to work hard, we hope you will keep checking Ttime!

Please share your feedback!

Planning, Editing and Reporting:
Faculty of Engineering PR Office Student Assistants, School of Engineering, The University of Tokyo: Akihiro Takeshita (Editor); Chiaki Furusawa (Student Representative); Yukino Nanba (Web Editor); Taro Kayamori; Mai Hirata; Kohei Nishida; Takashi Ankyu; Ryo Kurokawa; Minaka Sugano; Atsushi Takada; Shunya Tabata; Sota Nagahara; Aoi Watanabe; Toki Kobayashi; Hinata Takeda; Yuki Tsuji; Koji Tokunaga; Mizuki Noguchi; Ayako Masuno; Shuichiro Koga

Cooperation:
Faculty of Engineering PR Office, School of Engineering, The University of Tokyo; Professor Kiyoshi Izumi (Director); Professor Tomoya Kawabata (Associate Director); Associate Professor Fumihiko Seta; Associate Professor Hiroyuki Matsuura; Tamae Kawase; Sumio Marukawa; Misuzu Kitahara; Katsuyo Nishi

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Engineering across Borders

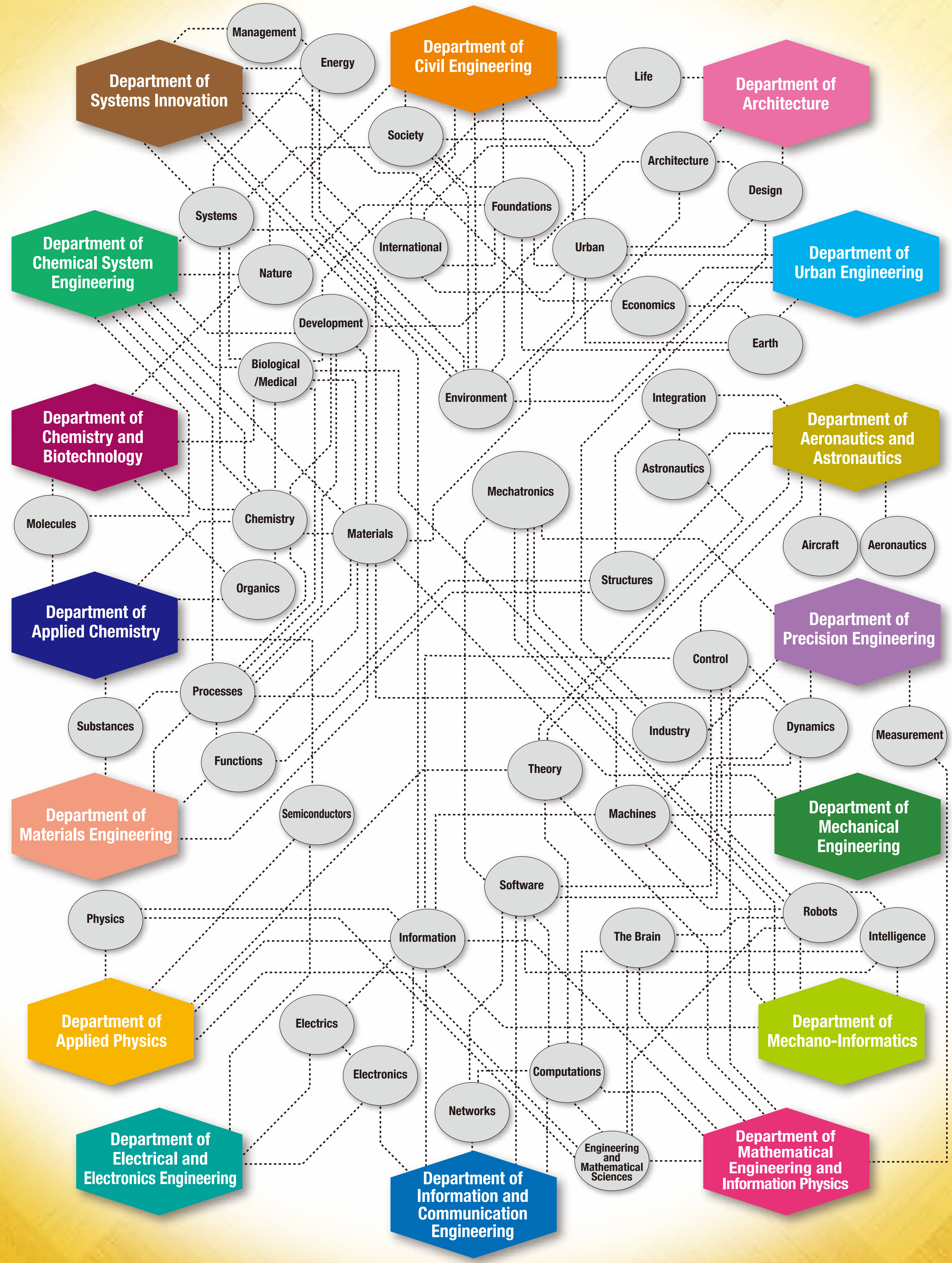
The Winter Edition theme is 'Engineering across Borders' and we will focus on Faculty of Engineering inter-departmental relationships and inter-faculty connections.
The discipline of engineering has an extremely broad range. Because of this broad range, the Faculty of Engineering is made up of more departments than any other faculty. However, rather than each department uniquely researching an entirely different subject, some common fields of study overlap. Even if multiple departments share a common topic, how are the focus and approach in various departments different and similar? Furthermore, how does the Faculty of Engineering collaborate with other faculties?
We hope that this brochure will help you understand how the departments relate to one another and that it will aid you in selecting your higher education major.

The map to the right shows keyword co-occurrence based on the introductory text for each department in the Faculty of Engineering Guidance Book and on the Faculty of Engineering website. Keywords with high co-occurrence coefficients are placed as close to each other as possible.
Keywords may help you to identify which department is the best for the subject you want to study, or tracing interrelated subjects may help you distinguish an approach a given department takes. Following keywords associated with the department you are interested in may unexpectedly lead you to another department.
Please look over the keywords that connect departments in the 'Engineering Across Borders' figure. As previously described, since the keywords presented in this figure are simply those based on words in departmental introductions, those closely relating different departments have been highlighted. Please note that these keywords neither represent everything each given department covers nor all relationships between departments.

Written by Atsushi Takada

Ttime!

Faculty of Engineering
Department MAP



Inter-department 1

Programming Used in the Faculty of Engineering

Among the various research projects in the Faculty of Engineering, this brochure focuses on inter-departmental themes that are being addressed by multiple departments.

The first theme is 'programming'.

Computer calculation capacity continues to improve year by year, and computers can perform complex calculations and processes in a short time, which humans cannot achieve manually. Programming is the process of figuring out how to get a computer to perform a process or calculation that we want it to perform (an algorithm) and expressing those instructions in the form that the computer can understand (code). As information technology has developed and expanded, the word 'programming' has become increasingly common in recent years, and it has become a compulsory subject in elementary schools.

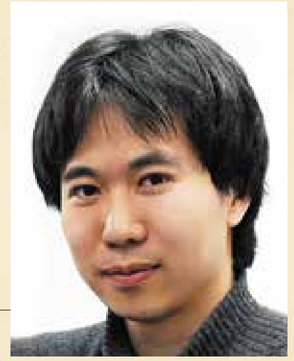
In many cases the programming that we learned in class was merely enough to perform whatever given calculation or process that had been set as the task and that may not have been enjoyable for some of us. However, many of the programming and computing techniques used in Faculty of Engineering research are designed for specific apps. In other words, programming is used as a tool to achieve a goal.

In this section, as specific examples, we will introduce approaches to research using programming from three different departments. Whether you don't excel at programming, are good at it, or have never attempted it before, please consider what can be done with it, and what you want to do with it.

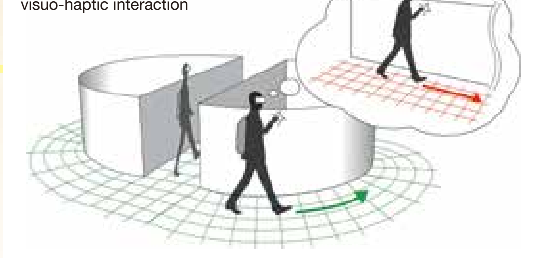
Written by Akihiro Takeshita

Human-centered VR Research

Associate Professor
Takuji Narumi
Department of Mechano-Informatics, FOE



Human Senses and VR



Redirected Walking using visuo-haptic interaction

I specialize in VR[※1], especially multisensory interfaces and human augmentation[※2]. I strive to create highly realistic VR systems for humans that do not require complex devices. To this end, understanding and using human sense mechanisms as well as studying technology itself is essential. For example, shaved ice syrup actually has the same taste, but various colors and fragrances alter the flavor. This is because information obtained through sight and smell affects the sense of taste. By incorporating this kind of interaction between the senses into VR, we aim to improve the reality that humans perceive from VR. For example, although in reality people walk along a circular wall, giving them the visual information that they are walking straight in VR allows us to make them feel as if they are walking straight for an extended distance. By using the senses of sight and touch, a huge virtual environment can be experienced in a small space.

Another theme we are working on is how changing one's body in VR affects the mind and cognitive abilities. For example, it has been found that the experience of flying as a dragon in VR, and internalizing the sensation of flying, the ability to finely control a drone can actually be improved. Although physical constraints bind and determine various human abilities, we are also researching how new abilities can be acquired and how abilities can be extended when our physical constraints are released in VR.

That we use VR to understand and utilize human mechanisms is the common denominator in our research. Although the strong image associated with VR is its use in games, we believe that experiences gained in VR can change the real world and will be useful to society.

※1 : Abbreviation for Virtual Reality.

※2 : An academic field that aims to supplement, extend, and augment human senses, motor functions, and skills.

Research and Programming

At our laboratory, many students use Unity as a development environment to design VR spaces. Since we sometimes also combine VR with self-made devices such as olfactory displays, we use a wide range of programming techniques. I think VR is interesting in that you can create a world with programming and then experience it yourself. Everything happens just as you have programmed it and things feel real immediately, so if you like programming, you will get hooked on this. Since programming is just a tool for research, one does not necessarily need complex programming skills to research VR.

When learning programming, I think it will be easier to master it if you first think about what you want to do and then learn that.

Olfactory display

In Closing

Particularly since you have an opportunity to select your higher education, please think carefully about what you really want to do. In the Department of Mechano-Informatics, we conduct cutting-edge research on a wide range of topics related to humans and machines, including not only machines and robots, but also human senses, brain science, and biotechnology. It is an interesting department because people are doing various kinds of research in close proximity, so connections can be made in unexpected places. All it takes is broadening your vista a little in order to notice connections between various disciplines, so let a variety of things attract your curiosity.

Written by Kohei Nishida

Using Computers to Explore Unseen Properties of Matter

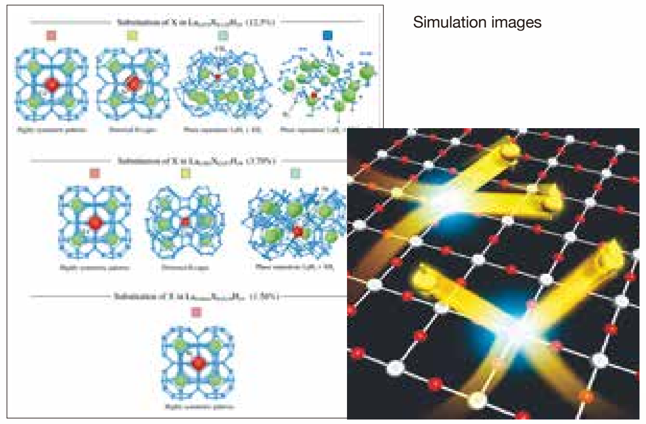
Professor
Ryotaro Arita
Department of Applied Physics, FOE

Finding Useful Properties of Matter

I conduct research on the properties of materials such as superconductivity and magnetism using a computational method called first-principles calculation.
The properties of solids can be generally understood by understanding the behavior of electrons in solids. Electrons move according to the principles of quantum mechanics, a field of physics that deals with the microscopic world of atoms.
Solving the motion of electrons mathematically with a pencil and paper is not an easy task. So we use computers to investigate the properties of matter. We use first-principles programs previously developed by researchers around the world for calculations to determine basic quantities such as electronic states. When we want to develop our own program or perform our own calculations, we create our own program.

What Are First-principles Calculations?

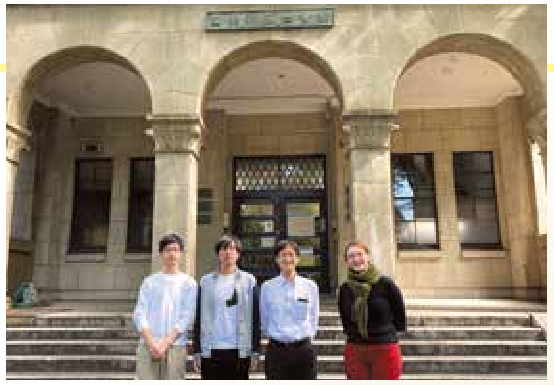
First-principles calculations are called non-empirical calculations, meaning that they are based on the most fundamental principles.
What are non-empirical calculations? To help you understand this, we will first discuss empirical calculations.
Suppose we have an experimental result that a certain substance behaves in a certain way at a given temperature. In this case, empirical calculations are used to create a theory by assuming parameters that can explain the 'experience' of the experimental results. In this method, you can hypothetically create any number of special materials by setting up convenient parameters and creating physical models, but that does not necessarily mean that those materials can actually be created.
Non-empirical calculations, on the other hand, calculate the properties of matter without 'experience' such as experimental results, using only the fundamental equations of quantum mechanics and information such as atomic positions and atomic numbers. Therefore, non-empirical calculations have the advantage of being able to predict the properties of real materials without conducting experiments, and being able to simulate what will happen in extreme environments which are difficult to achieve in experiments.
For example, computer simulations predicted that hydrogen sulfide would turn into a solid metal and become a superconductor when it was subjected to the ultra-high pressure of about 2,000,000 atmospheres. The actual experiment turned out to be as predicted by the simulation, and based on theoretical prediction the discovery of superconductors was realized.



Simulation images

About the Department of Applied Physics

The Department of Applied Physics provides relatively mathematics and physics education within the Faculty of Engineering. The value of studying the basics is acquiring the ability to deal with changes over time. Even though trends may change, I believe the importance of the fundamentals remains unchanged.
Applied physics has the capacity to significantly transform the world. I once saw a TV interview with Dr. Isamu Akasaki who won the Nobel Prize for the development of the blue LED. Dr. Akasaki, who well knew what it was like right after the war to have no lights at night whispered, "That is so satisfying" as he looked at the night scenery lit up with the blue LED he had developed. In this way, I believe that the field of applied physics can change the world and make people happy.



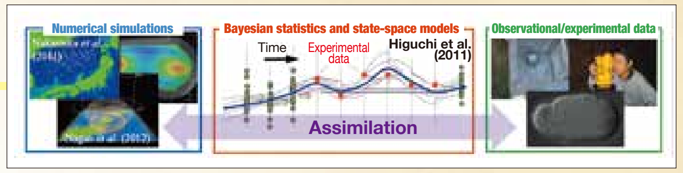
Lab members (in front of FOE Building No. 6)

Written by Toki Kobayashi

'Exploring' Earthquakes with 'Data X Simulation'

Associate Professor
Hiromichi Nagao
Department of Mathematical Engineering and Information Physics, FOE

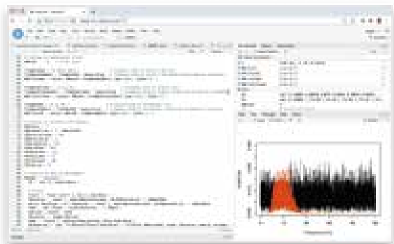
Highly Accurate Predictions from Data



Data assimilation figure

I study 'data-assimilation' algorithms for earthquake research. Data assimilation makes use of a statistical theory called Bayesian statistics to combine 'data' and 'simulations' in order to make highly accurate predictions.
This data assimilation technique is used for weather forecasting in our daily lives. It is able to predict the weather one week in advance by combining 'atmospheric data' from observation satellites and ground stations with 'meteorological simulations'. In my case, I am developing a method to create detailed reproductions of seismic waves by estimating underground structure based on the data assimilation of earthquake observation data and seismic wave propagation simulations.

Earthquake Research and Programming



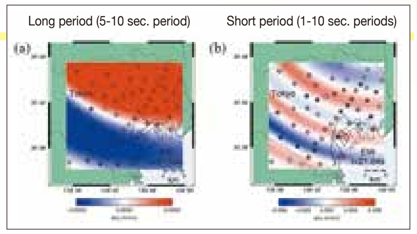
A program that uses artificial intelligence to analyze seismic data

In order to conduct research on earthquakes requires programming skills. For example, it is impossible with manual calculations to classify seismic waveforms into different types like P-waves and S-waves, or to simulate how seismic waves propogate. Furthermore, some people, such as those who study long-term or wide-area earthquakes, handle massive amounts of data (tens of gigabytes) and cannot complete their research without the help of programming.
Thus, many people who study earthquakes use FORTRAN※1 to process large amounts of data at a high speed. Recently, however, a variety of programming languages have made statistical processing easier, and I have started using statistical processing software, such as R, for simple analysis.

※1 : A programming language used for the numerical computation of data.

Difficulties in Algorithmic Research

When using programming in earthquake research, it is important to think about how to write the data so that it can be processed within the required time. For example, spending 10 or 20 days calculating an earthquake early warning is utterly meaningless (lol). In order to deal with such issues, programs must be skillfully developed. In my laboratory, we have developed the 4D variational method, a new algorithm for data assimilation that implements the second-order adjoint method (Ito et al., 2016). This method not only reduces analysis time, but also allows us to evaluate prediction uncertainty.



Imaging of seismic waves in the Tokyo metropolitan area (Kano et al., 2017)

Annual summer camp held by our laboratory

What I Hope Everyone Considers

I hope students and high school students will think about two or three topics they want to do in the future before they choose to pursue higher education. If you only have one thing you want to do, you will remain stuck if you get stuck. But if you have multiple things you want to do, even if you get stuck on one, you can do something else in the meantime, and the original problem may resolve itself while you are working on something else. Although I used to be primarily involved in seismic research, research projects I am currently involved in incorporate materials science and data assimilation, which are not fields I specialized in.
Thus, to find what you are interested in doing, cultivate a broad perspective at a young age and I hope you challenge yourself to do things that you find fascinating.

Written by Sota Nagahara

Inter-department 2

Energy and Engineering

Our second theme is 'energy'. When you hear the word 'energy', what image does it bring to mind? Some people may imagine energy sources comparable to fossil fuels or sunlight; some may picture different forms of energy such as electricity or heat; some may be reminded of things that store energy including batteries or things that use energy like automobiles, while others probably think of something else entirely. There are so many perspectives on energy, and it is addressed in a wide range of spheres.

Human beings first started using fire as an energy source. Since then we discovered various sources and forms of energy, such as digging for fossil fuels and discovering that mass is a form of energy, and have used those at will. Although energy is now so commonplace that we feel it is ever-present, many issues still need to be resolved in order for us to able to continue living in societies that use energy as a matter of course for many years to come.

In this brochure, professors from three different engineering departments were interviewed about research related to energy. Although these are merely examples of the many research projects conducted in each department, we hope they will present opportunities to understand the differences and similarities between departments, as well as the wide scope of energy research.

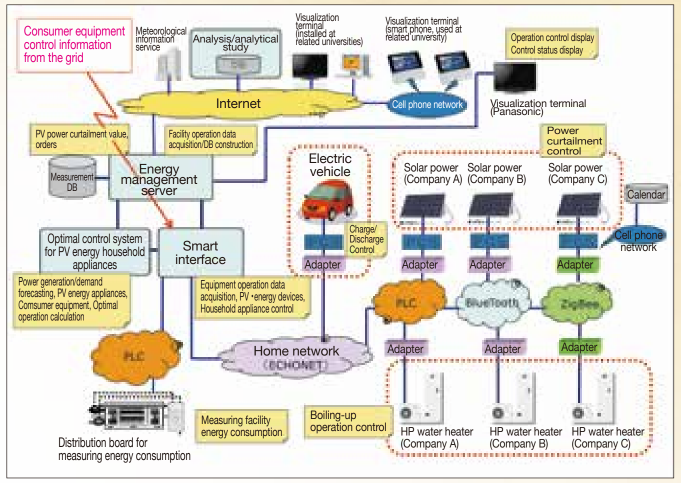
Written by Akihiro Takeshita

Smart Grids: Stable and Efficient Energy Systems

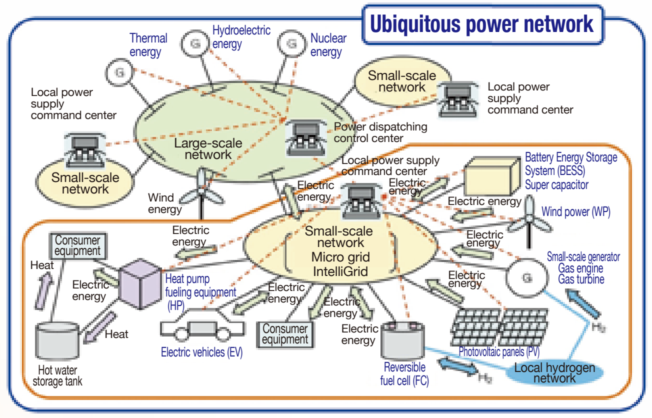
Professor
Akihiko Yokoyama
Department of Electrical and Electronic Engineering, FOE

What Are Smart Grids?

I conduct research on smart grids. Global warming has caused an increase in the demand for renewable energy in recent years and we now need to build a smart electric power system that competently takes it into account. The supply side including a variety of renewable energy sources and existing electric power generation plants, and the consumer side with controllable devices are regulated in an integrated manner through the use of bi-directional advanced information and communication technology (e.g., control of charging and discharging electric vehicles and storage batteries, and control of heat-pump water heater energy consumption). Smart interfaces, such as smart meters※1 that send and receive signals between consumers and suppliers, not only obtain information on the amount of electricity used by given households, but can also control electrical devices in homes to adjust the amount of electricity consumed. For example, the United States has in the past cycled power on and off in load control trials for air conditioners and refrigerators. Installing storage batteries in smart grids will allow those batteries to be recharged when there is a surplus of electricity, and will allow for electricity to be supplied from them during time frames lacking electric power supply. In addition, various problems arise when we attempt to distribute large amounts of this power from renewable energy sources directly through the network. For instance, the quantities of power generated by renewable energy sources including solar and wind energy are unstable and dependent upon weather conditions. We also aim to resolve these problems. Thus, the goal of using smart grids is to create stable, economical, and efficient networks that prevent power outages.



Smart control system for consumers



Smart grid image

Unlike disciplines producing results in a relatively short period of time, such as the field of semiconductor device development for instance, since electric power system facilities are rebuilt only every 15 to 20 years at the soonest, and since such technology calls for a high level of reliability, research results are not immediately applied to an actual field. As for how researcher motivation is maintained, in addition to what we find enjoyable and interesting, external incentives are crucial. As various underlying technologies emerge, such as the development of new power electronics and storage battery technologies, researchers investigate how they can be incorporated into smart grids. Since electric power system facilities are built all over Japan and around the world, one of the joys of our research is being able to visit sites and constantly come into contact with a variety of new things.

※1：Recently, electricity meters called 'smart meters', which are digitalized and can communicate with each other, have come into use.

Career Path Selection Advice

The Department of Electrical and Electronic Engineering comprises a wide range of academic fields, including information and communication systems, electrical machines, electric power systems, robots, electric trains, electric planes, satellite control, and even outer space in addition to nanoscale electrical and electronic materials and devices. In order to discover what you want to do, we recommend that you take courses that make you familiar with various spheres before it is time for you to choose to pursue higher education.
In addition to the basics of mathematics, physics, and chemistry, an understanding of information, economics, and social systems for example is also important in the field of electric energy systems which is my major discipline. I hope that by studying a wide array of fields, students will develop an ability to think versatilely about energy issues among other important social problems.

Written by Ryo Kurokawa

Research on Energy Systems from Microscopic and Macroscopic Perspectives

Associate Professor
Junichiro Otomo
Department of Chemical System Engineering, FOE

The Establishment of Energy Systems for Problem-Solving

In my laboratory, we conduct research on new energy technologies, from basic research through to their introduction into society. We aim to integrate chemical reactions and material development related to energy conversion and the effective energy systems based upon them. Through material development related to ion and electron transport in solids, and the observation of ion transport and chemical reactions at interfaces, we are developing new energy devices such as highly efficient fuel cells and electrolytic cells, proposing systems, and conducting evaluation studies on low-carbon technologies for introduction into society. Constructing diverse energy systems based on the widespread use of renewable energy is important to both resolve the climate change issue as well as to provide a stable supply of energy by diversifying energy source risks.

Fuel cell power generation test

Molecules adsorbed on the electrode surface are observed with infrared light

Advantages of the Department of Chemical System Engineering

Energy research requires the study of underlying technologies and an understanding of entire energy systems. Innovating requires understanding principles as well as the exploration of new phenomena and materials. Then again, if we fail in incorporating these innovative underlying technologies into the energy system so that the entire system functions well, useful outcomes will not materialize in the world. In the Department of Chemical System Engineering and the Department of Environment Systems in the Graduate School of Frontier Sciences, you can study the more macroscopic and holistic views of systems theory concepts and methodologies, as well as researching microscopic underlying technologies.

Questioning Conventional Wisdom and Transdisciplinary Studies

Failure is not merely failure. It becomes the foundation for the next research approach. It is also important to question common sense and existing literature and put them to the test, which can lead to the creation of new principles and devices. Additionally, my research requires an understanding of chemistry, physics, mathematics, economics, sociology, and so on because systems have complex contents and involve many different issues. In such situations, people capable of mentally connecting and integrating what they have experienced and learned are strong. This is what we call transdisciplinary studies. Although this is not easy to do since transdisciplinary studies require mentally assimilating various fields of study, if you can do it, I think you will be able to make great progress toward solving problems. What you learn will surely be useful in the long run, even in fields that seem to be far removed from your major. Therefore, I hope that Komaba students will continue to learn whatever they are interested in, regardless of their academic disciplines.

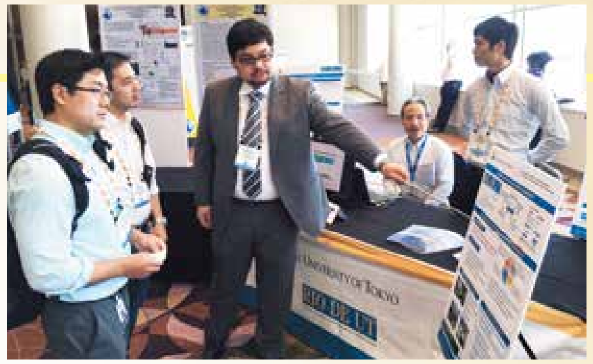
Written by Shuichiro Koga

Generating Energy from the Ocean

Professor
Ken Takagi
Department of Systems Innovation, FOE

Marine Renewable Energy as an Application of Ocean Engineering

In my laboratory, we research technological innovations in ocean engineering and as their application, a low-carbon society created by marine renewable energy including offshore wind power and ocean current power generation. Our ultimate goal is to make national ocean policy recommendations from a technological standpoint, rather than from the social sciences standpoint. The latest ocean engineering is based on technology that has been advanced through the development of offshore oil and gas energy resources. We were the only Japanese university participating in an international conference introducing the latest technology in ocean engineering, where our research was also introduced.



International Conference in Houston
(University R&D Show Case at Offshore Technology Conference)

Floating Type Ocean Current Turbine

As for ocean current power generation, we are conducting research on an underwater floating ocean current power generator in collaboration with IHI Corporation. The Kuroshio Current, one of the world's largest ocean currents, flows in the seas near Japan, and this project began with the idea of utilizing this unique current. A single device is outfitted with two turbines and the ocean current turns them to generate electricity. One of the distinguishing features of this device is that it floats in the water. The devices we are presently developing are approximately 20 meters wide with a power output of around 0.1 MW. In the future, we aim to triple the size of the devices to achieve a power output of roughly 2 MW.
Nevertheless, a 5 MW power output in progressively developing offshore wind power is considered small and ocean current power generation should also be large-scale. However, increasing the scale of power generation devices requires time. NEDO※1 subsidizes this project. As the scale of the device increases, the price per unit also rises, thus making it difficult for the government to fully subsidize the project. That in turn makes it difficult for corporations left to bear the financial burden to continue paying whatever amount the government is unable to subsidize. Moreover, marine energy upkeep is costly because of expenses incurred when going out to sea and diving under water, as well as maintenance and installation costs in the deep water where the technology has not been established. Therefore, it is difficult to increase the size of the power generation output to 2 MW or more. Requirements are to reduce the cost while taking advantage of the 2 MW device features.
In contrast, the advantage of ocean current power generation is that the amount of generated power is basically stable when compared to wind and photovoltaic generation. The reason is because even though the effects of tidal currents and wind cause ocean currents to vary, they do not fluctuate greatly over the course of a day, and to say the least they are predictable for about a week. Furthermore, Japan's dependence on foreign sources for oil and gas is a major energy problem, but ocean current power generation allowing Japan to produce its own energy makes this an overwhelmingly strong energy security option.

※1 : The New Energy and Industrial Technology Development Organization, a national research and development corporation.

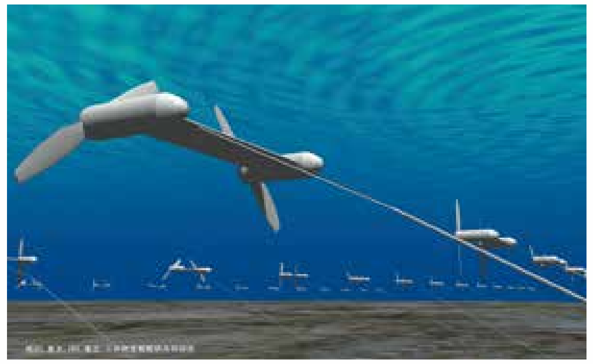


Image of ocean current turbine

Let Go of Your Preconceptions

In my laboratory, we strive to cultivate researchers with abilities to anticipate future technology as they engage in future-oriented research and development, and students with this kind of ability are needed by industry. Likewise, an attitude of assessing different things without preconceptions is crucial in cultivating an eye for future technology. I encourage high school students and Komaba students preparing to pursue higher education to broaden their perspectives and accept diverse matters without preconceptions.

Written by Mizuki Noguchi

Comparison of three departments related to architecture

Civil Engineering

Hiroki Kondo

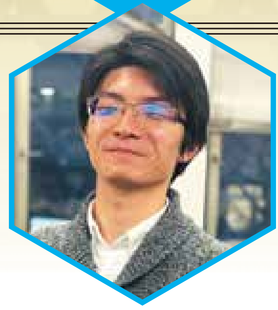
First year master's student
Department of Civil Engineering, SOE

Architecture

Akiko Fukuda

Second year master's student
Department of Architecture, SOE

Urban Engineering



Yuga Horigome

Second year master's student
Department of Urban Engineering, SOE

Please give us an overview of your department.

●Mr.Kondo (hereinafter Kondo) : The Department of Civil Engineering (Civil Engineering) has three courses, A, B and C. Course A mainly focuses on the design of huge structures such as bridges and dams. In contrast to structures, course B deals with humans and society such as construction management, landscape and urban transportation. Although the area covered by course C is similar to that of course B, it notably includes global themes.

●Ms.Fukuda (hereinafter Fukuda) : The Department of Architecture (Architecture) in the Faculty of Engineering covers a wide range of fields which include not only engineering but also culture and society. We study design planning, facility environments, material structures and history in addition to drawing building blueprints.

●Mr.Horigome (hereinafter Horigome) : The Department of Urban Engineering (Urban Engineering) deals with everything related to cities. We have two courses, the Urban Planning course and the Urban Environmental Engineering course. The former studies cities from diverse perspectives which range from civil engineering and architecture to fields in the humanities such as law, economics, society and history. The other course focuses on the circulation and control of water, resources and energy in the city, and primarily on fields such as environmental problems, the water cycle, microbial engineering and waste disposal.

Department of Architecture: the sample of models (Fukuda's graduation design (above) and her housing complex assignment (below))

How do scale and content differ between your departments?

●Kondo : I think Civil Engineering covers the most comprehensive content. My impression is that Architecture doesn't pay much attention to soft components that focus on people's movement and so on, and Urban Engineering scarcely deals with hard components such as concrete and bridges.

●Horigome : Indeed, since Urban Engineering has no close relationship with manufacturing, some students interested in it take Architecture and Civil Engineering classes. Though many of the specific fields studied in Urban Engineering are also commonly dealt with in other departments, Urban Engineering has the obvious target of 'cities', and emphasizes how knowledge from each field is implemented in society.

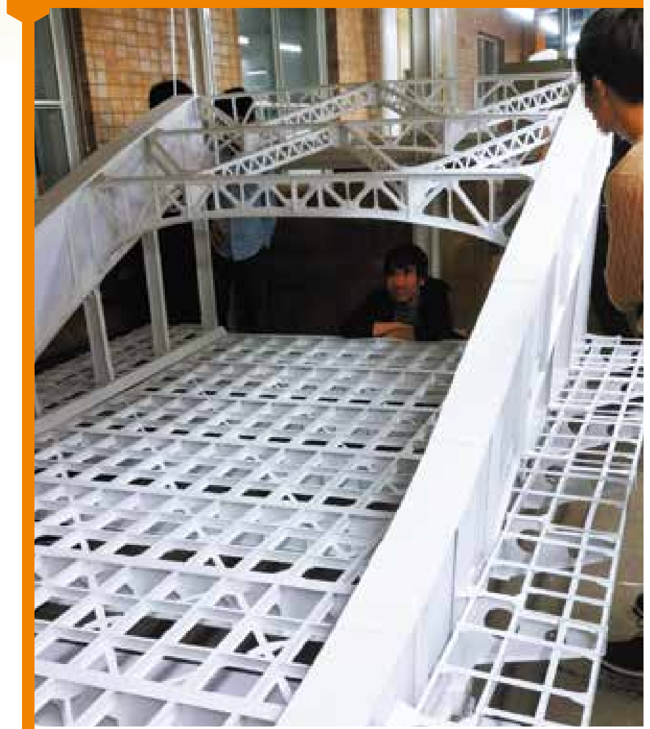
●Fukuda : I think one feature of Architecture is that our line of sight is at human height, that is, it's on the human scale. As for classroom learning, all three departments share many things in common about fundamentals, nevertheless, differences appear in scale and coverage when they are expressed in practical hands-on learning exercises. When I was involved in design with Urban Engineering and Civil Engineering students, each student having a different point of view was impressive to me. Civil Engineering students think about things on the widest scale, like river flow and topography; Urban Engineering students are concerned about comprehensive urban systems including town zoning, transportation, and how people move; and then Architecture students think about what kind of structure something will be when it is actually built.

●Kondo : Similarly,I feel that when making a model there is a difference in where effort is concentrated and the scale of the model. In Architecture, the focus is on soundly constructing buildings themselves, whereas in Civil Engineering buildings become abstract rectangular solid forms.

●Horigome : In that sense, Urban Engineering can be found between the other two.

Would you describe hands-on training in your departments?

●Kondo : We have a variety; all the students in the department built a one-tenth scale bridge together; and we go to Lake Yamanaka to think about imaginary town development. What I found particularly interesting was a hands-on learning activity in which we worked together in teams as imaginary general contractor companies. It was pragmatic; points would be deducted if cheap concrete that wasn't strong enough for the job was used simply to increase profits. I enjoyed all the fairly active scenarios in making low-cost products that perform well, including reading documents and conducting experiments.



Department of Civil Engineering: Making a one-tenth scale bridge model

●Horigome : New Urban Engineering students design housing complexes and multi-unit apartments, which seems a little like Architecture. After that, the content of our hands-on educational activities more closely resembles an image that people associate with a city. In one such exercise, we contemplate urban structure (population distribution, location of the central city and downtown areas, and so on) and in other active learning activities, we break into groups to identify issues in a target area, and explore solutions to them as we take various aspects into consideration, including the history of the area, the characteristics of the inhabitants and how to involve them, in addition to the spatial features of the buildings themselves and the surrounding environment.

●Fukuda : As for layout design, starting with detached houses, the scale gradually increases to housing complexes and public facilities. In the third year, we have an opportunity to invite architects from outside UTokyo to ask them to see our design proposals. Practical training sessions for architecture also involve components other than layout design; we visit actual buildings to learn about design, construction sites and construction methods and we investigate the interior acoustic and visual environments in our departmental buildings. Furthermore, our practical instruction includes content that one may hardly associate with architecture, such as sketching practice and practical learning activities with photographers.

What is the ratio of the classroom lectures to practical instruction?

●Horigome : Although we spend many hours in classrooms earning credits, the time spent on hands-on projects is actually longer (laughs). While I want to put more effort into classroom learning, I also think that many abilities can only be cultivated through active learning.

●Fukuda : There is no single answer in layout design, so once we pursue a project there is no end to the work until we reach the deadline. However, to some extent we can each decide how much priority we assign to practical training, so it varies; some people are devoted to it, and others are more moderate with their hands-on learning exercises while they focus on classroom learning and other fields.

●Kondo : Civil Engineering is similar; it all depends on the person.

What is the atmosphere of your departments?

●Horigome : My impression is that many Urban Engineering students are energetic and sociable. We often hold drinking parties and almost all students attend them, so it seems that everyone feels comfortable. The Urban Planning course alone has about 30 students in any given class year, which is about the size of a class, and everyone is on good terms.

●Kondo : Even in Urban Engineering, there seems to be a difference between the Urban Planning course, which is more closely related to the humanities, and the Urban Environmental Engineering course, which is closer to the sciences. Civil Engineering and Architecture are both located in the same building, and I can fairly easily distinguish which department a student belongs to when I see someone at the entrance.

●Fukuda ●Horigome : I know what you mean.

●Kondo : I feel that many Civil Engineering students are, in a good way, intelligent, highly communicative, typical UTokyo students, and that many Architecture students are fashionable.

●Fukuda : Come to think of it, I felt everyone was really fashionable the moment I began here (laughs). Architecture students come from various backgrounds, so I think we have many unique students with diverse perspectives. We work together on field trips and academic activities and there are many places, like drafting rooms, to spend time together on campus so we have many opportunities to get to know students in the same department.

Thank you Mr. Kondo, Ms Fukuda and Mr. Horigome!

Written by Chiaki Furusawa

Department of Urban Engineering: Constructing housing complex design prototypes

Engineering × Agriculture

Professor
Tsutomu Suzuki
Department of
Chemistry & Biotechnology,
School of Engineering,
The University of Tokyo

Insights into the functions of RNA

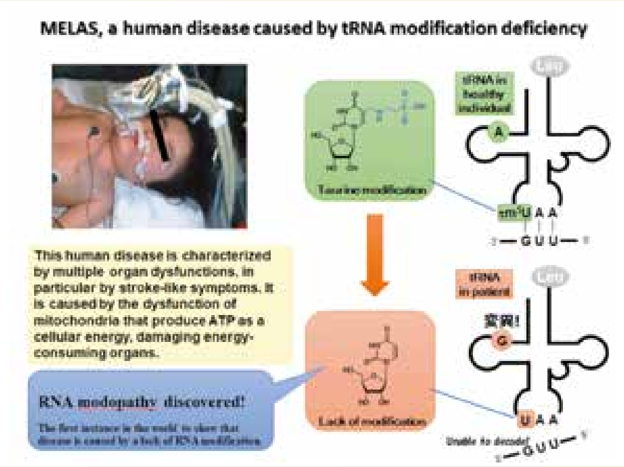
Associate Professor
Naoyuki Kataoka
Laboratory of Cellular Biochemistry,
Department of Animal Resource Sciences,
Graduate School of Agriculture and Life Sciences,
The University of Tokyo

— Would you tell us about your own research?

Professor Suzuki : In cells, genetic information on DNA is converted and synthesized into proteins. RNA is an intermediary molecule in this process. It undergoes various chemical modifications after transcription from DNA, such as enzyme-mediated reactions being used to add functional groups, for example methyl groups (methylation). We are studying how these RNA modifications are made and the role they play in RNA functions.

What is most interesting is the fact that when the enzyme that modifies RNA is genetically missing or when RNA is not modified properly for some reason, a disease is triggered. This category of diseases is called RNA modopathy, which we were the first to discover and report.

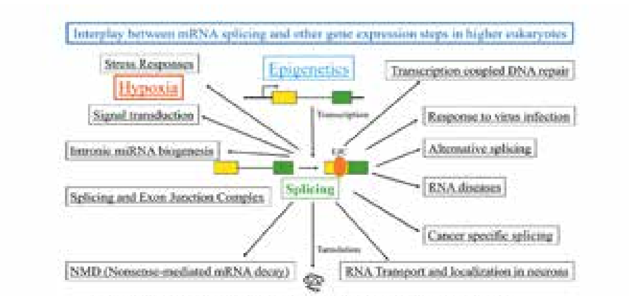
We are currently conducting basic research to find the cause of RNA modopathy, which might lead to future medical treatment, such as rectifying aberrant splicing. Throughout research, I have been fascinated by the fact that the presence or absence of just a single modification, which is less than 0.1% by weight of a huge RNA molecule, can affect the function of RNA, cause disease when coding is absent, and even influence an entire biological phenomenon.



Professor Kataoka : Splicing is the process of removing 95% of the intervening transcript sequences (introns) from between the protein-coding regions (exons) of a pre-mRNA molecule, which is produced at the beginning of the mRNA (messenger RNA) transcription process to produce a protein from DNA. In some cases, only all the introns are removed; and in other cases, multiple types of mRNA can be produced from a single pre-mRNA.

In the latter case there are many patterns, for example, depending on whether any given exon is skipped or included two types of mRNA can be produced. Thus, the actual protein combinations for the estimated 23,000 human protein-coding genes are so diverse that there are over 200,000. RNA splicing, which is the process of extracting information from the genome, interests me and is my primary focus of research. We now know that splicing is linked to other processes, so in addition to RNA splicing itself, I would like to study its linkage to epigenetics※1, differences in splicing patterns under hypoxic conditions, and the regulation of transcription.

※1 : Epigenetics: a system for controlling and transmitting gene expression without causing DNA sequence changes, as well as its academic field.



RNA splicing, the process of removing introns from pre-mRNA and joining exons together to form mRNA, is essential for gene expression in higher eukaryotes. Since discovering that splicing not only removes introns, but also deposits exon junction complexes (EJCs) near exon-exon junctions, it has been shown that splicing enhances mRNA nuclear export and is coupled with nonsense-mediated mRNA decay (NMD), and we have been investigating the relationships between splicing and other gene expression processes.

— Would you tell us about the collaborative research you two have been doing together?

Professor Kataoka : I was conducting research on a disease called familial dysautonomia, which is an RNA disease (RNA diseases is a generic term for diseases caused by abnormalities in RNA-related processes). This disease is caused by abnormal splicing in the IKBKAP gene, in which the exons are normal, but a single nucleotide mutation in an intron affects splicing, causing the omission of a necessary exon. The IKBKAP-encoded IKAP protein homolog※2 influences the modification of tRNA (transfer RNA), which is responsible for reading mRNA and translating it into protein. Using a very elegant system in Professor Suzuki's laboratory, which employs column chromatography※3 to isolate various tRNAs, the tRNAs taken from patient cells were compared with normal types, and we found that tRNAs taken from the patient cells had low ratios of some types of modifications. We thus found that IKAP itself is involved in modifying tRNAs. Both abnormal splicing and the lack of tRNA modification were found to be causes of RNA diseases. Since we couldn't do anything about tRNA modification ourselves, we were able to clarify this in collaboration with Professor Suzuki, who uses engineering techniques.

※2 : Homolog: a group of highly similar genes derived from the same ancestor in an evolutionary lineage.

※3 : Column chromatography: a purification method in which a mixed compound to be fractionated is poured into a cylindrical container packed with absorbent.

RNA Diseases

RNA Disease Name	Responsible Genes	Affected Processes
Thalassaemia	α,β-globin	Splicing, Poly(A) addition
Cystic fibrosis	CFTR	Splicing
Marfan syndrome	Fibrillin-1	Splicing
Hereditary breast and ovarian cancer	BRCA1	Splicing
Frontotemporal dementia (FTDP-17)	Tau	Alternative Splicing
Ataxia Telangiectasia	ATM	Splicing
Familial Dysautonomia (FD)	IKBKAP	Splicing, tRNA modification
Duchenne muscular dystrophy (DMD)	Dystrophin	Splicing
Spinal muscular atrophy (SMA)	SMN	U snRNP biogenesis, Splicing
Myotonic muscular dystrophy	DMPK	Alternative Splicing
Myelodysplastic syndromes (MDS)	SF3B1, SRSF2, U2AF35, ZRSR2	Splicing
Oculopharyngeal muscular dystrophy	PABP2	Nuclear mRNA retention
Mitochondrial encephalomyopathy	mt tRNA	tRNA modification
B-cell malignant lymphoma	U50/U50' snoRNA	rRNA modification
Dyskeratosis congenita	DKC1	rRNA modification, Telomere
Diamond-Blackfan syndrome	S19	Ribosome
Rett syndrome	MeCP2	Epigenetics, miRNA biogenesis

— Would you tell us about your impression of each other?

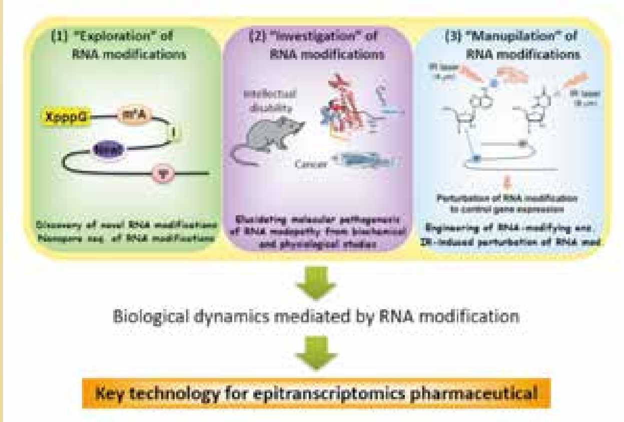
Professor Suzuki : RNA splicing is a very complex system involving hundreds of different factors, and I am impressed that Professor Kataoka has been studying its mechanisms and regulation in depth for so many years, and that he organizes and stores in his head such a large volume of knowledge of the functions and roles of the many proteins. My impression is that only someone who has performed a great number of experiments is able to comprehend and become an expert on antibody categorization and detailed experimental conditions, and when conducting splicing research, on protein interactions for example, he uses precise experimental techniques.

Professor Kataoka : While Japan has long been the world leader in tRNA, Professor Suzuki has established himself worldwide in terms of both its methods and research. To understand what goes on in living cells as closely as possible, we need both biochemistry※4 and chemistry. Although I am good at biochemistry, Professor Suzuki has a more chemical approach. Splicing and RNA modification may initially seem removed, but a common molecule known as RNA often links them.

※4 : Biochemistry: the chemistry of the structures and reactions of substances involved in living organisms

— Would you tell us your approach to the 2019 coronavirus disease based on your scientific field?

Professor Suzuki : I am working on a UTokyo COVID-19 project. Coronaviruses store their genetic information as RNA, as opposed to DNA. Once the host cells are infected by the virus, the viral genomic RNA replicates, proliferates, and is translated to produce viral proteins, thereby generating a large number of the viruses. The coronaviral RNA genome has an RNA methylation at its 5' end called a cap structure. We know that when this structure contains no methyl groups, the viral RNA cannot be translated. We thus thought we could make an inhibitor to target the methyltransferase enzyme in the coronavirus, in order to manufacture a therapeutic drug. In fact, we obtained a novel coronavirus methyltransferase, called nsp14, and confirmed that the enzymatic activity was completely inhibited by a general inhibitor for methyltransferases. We are now screening approximately 250,000 compounds in the UTokyo Drug Discovery Initiative to find specific compounds that inhibit nsp14. Once we obtain several lead compounds as potential drug candidates, we plan to collaborate with a pharmaceutical company, and from that point the road to development will certainly be a long one. After earning my PhD, I worked for a pharmaceutical company in drug development. Since returning to academic life and being immersed in fundamental research I have been looking for a way I could contribute to the COVID-19 outbreak as an RNA scientist. Now, with UTokyo support, I am deeply moved to be working on drug development again. I am giving serious thought to what I am able to do now so that it will benefit humanity.



SUZUKI RNA Modification Project (JST ERATO)

Professor Kataoka : In agriculture, people who measure allergens in urine are conducting specialized research in their quest to develop a safe COVID-19 diagnostic method that only requires a urine sample, rather than a blood sample or other method that carries a risk of infection. The Faculty of Agriculture, which provides services to both animals and people, can produce drugs for animals but is unable to create medicines for humans, so I imagine we can achieve a great deal in collaboration with the field of engineering.

— Professor Suzuki and Professor Kataoka, thank you very much!

Written by Minaka Sugano

UTokyo Project Sprint

Supported by EEIC from The University of Tokyo

Let's try to create something together using our spare time to contribute to society

Faced with the COVID-19 outbreak but supported by professors and UTokyo, six third-year Faculty of Engineering students oversaw and held the UTSprint program during the spring 2020semester.
Despite COVID-19 outbreak limitations, UTSprint project participants try to draft ideas, prototype and gain users. 'Creating something' from scratch in a mere six weeks is what UTSprint is all about.
Beginners and those with experience could both participate in UTSprint and about 80 teams participated. As long as each team included one member enrolled in the Faculty of Engineering, School of Engineering or the School of Information Science and Technology, the program was even open to students enrolled outside of UTokyo. The 6th class period was set aside each Thursday so that program participants could use web development to build a product.
In this special feature we bring you interviews with Organizing Committee members and five participating teams.

We Spoke with Organizing Committee Members!

Organizing Committee members Takuma Masuda Yuma Onishi Yuri Hayashi Yuto Yoshihara Yuri Kamiya Kohei Kumazawa

Organizing Committee support Professor Yoshihiro Kawahara Professor Takao Someya

In this section, we interviewed five of the six Organizing Committee members: Masuda, Onishi, Hayashi, Yoshihara and Kamiya.

Takuma Masuda

Third year undergraduate student Department of Information and Communication Engineering, FOE

He studied Django, a high-level Python web application framework, during spring vacation but he has hardly any work experience.
He has experience holding a business contest as a circle activity.

Yuma Onishi

Third year undergraduate student Department of Information and Communication Engineering, FOE

He studied programming in UTokyo classes and with self-study. He created a web service with Kumazawa during spring vacation but didn't release it because of the server fee.

Yuri Hayashi

Third year undergraduate student Department of Information and Communication Engineering, FOE

She had scant web development experience as product development and had only studied it on her own. She studied algorithms and front-end, which is the part web service and web application users directly see, in training programs offered by Google and Mercari.

Yuto Yoshihara

Third year undergraduate student Department of Electrical and Electronics Engineering, FOE

As a first year student, he and two classmates created a web service called UTES from scratch. His web development experience includes his high school cultural festival and a corporate website when he was an intern.

Yuri Kamiya

Third year undergraduate student Department of Mechanical Engineering, FOE

She started studying programming after she decided where she wanted to go for higher education. She has experience in creating web pages for personal use and was an intern at AWS.

How the program started

In mid-April Professor Kawahara, in the Department of Information and Communication Engineering where Masuda studies, wrote 'Is there anything we can do during this pandemic?' on the Slack team communication application to students in his department . Masuda thought just waiting around during the pandemic was a waste, so after he saw the professor's message he thought up the 'UTSprint' program and submitted a written proposal to Professor Kawahara. After his plan was revised, he and his department acquaintances Onishi, Hayashi, Yoshihara, and Kumazawa launched the program together.

Program Development

Since we didn't know how long COVID-19 outbreak would restrict in-person classes and the like, we were conscious of wanting to hold the program as soon as possible, and decided to start the first week of the program after Golden Week in May. We decided on a rough schedule ahead of time and held meetings at nighttime to revise the details in order to meet that schedule. Even after the program had begun, I could barely manage to keep everything going as I prepared materials for the upcoming lecture, assigned people to be in charge, and worked out the details for the final presentations.
As the project was underway, things did not go according to the original vision at times. Initially, the plan was that the participants would use the Faculty of Engineering server, but creating a virtual environment for the 80 participating teams was difficult, and the server rules stipulated that a UTokyo Faculty of Engineering student had to be a member of each team. However, a different server was selected for use because we wanted to include not only engineering students but also, for example, first and second year students enrolled in Junior Division general education courses. While we were considering various servers, Hayashi introduced us to Kamiya, an intern at Amazon Web Services (AWS) and she became a member of the Organizing Committee, after that we decided to use the AWS server.

Program history

Organizing Committee members	DAY	Participants
Masuda's proposal		
4 people join the Organizing Committee		Decided to hold UTSprint
Program announced; participant support	4/22	Participant recruitment begins
Kamiya joins the Organizing Committee	4/25	Guidance & briefing session
→Decided to use the AWS server	4/30	Week 1: Idea development
	5/2	Application deadline (idea sheet deadline)
Course materials Response to questions (4/30–6/4)	5/7	Week 2: Prototype (model) creation 1
	5/14	Week 3: Prototype creation 2
	5/21	Week 4: Launch service created
	5/28	Weeks 5 & 6: Students actually use service
Online presentation preparation	6/4	Improve service based on feedback
	6/13	Online presentations

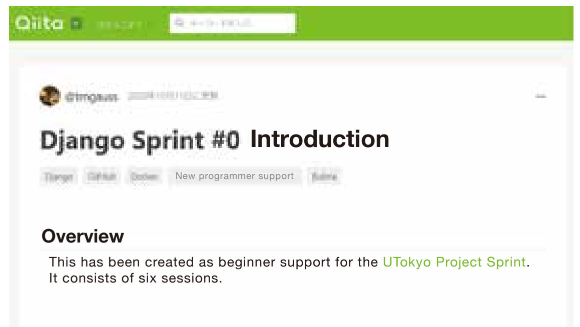
Organizer Difficulties

While professors and other UTokyo staff members offered support and advice, the Organizing Committee members basically came up with all the ideas and decided on policies according to given situations. We ran the program with attentiveness to not wanting participants to drop out. Since it was our first attempt, we had to consider which server to use; how the different communities we could recruit participants from depended upon which server we used; how to conclude the program; what Faculty of Engineering aspects would dictate what we could do; what kind of presentation would satisfy the participants, and consider how Faculty of Engineering professor support could be put to use; managing the program while giving these issues consideration was extremely difficult.
Furthermore, UTSprint participants were divided into 80 teams, and support from each of the six Organizing Committee members included answering questions from the teams they were in charge of. However, since this large-scale program had a total of 204 participants, scheduling was also difficult. In addition, a series of several presentations led up to the final presentations, and arranging preparations for those was also challenging. In addition, since many of the Organizing Committee members had no experience in product development, we created course materials for the participants while studying on our own in conjunction with UTSprint. There were days when the ever-increasing number of questions, on top of departmental assignments and exams, left us working in tears.
Since some Organizing Committee members were themselves team participants as well as involved in the course development, balancing the two was difficult.

What the Organizers Accomplished

UTSprint stands for providing an opportunity to try to create something, and we were able to involve a lot of people, not only from UTokyo but also from other universities. In the process of creating a product, the participants experienced how to sound out demands and consider what would meet them. In addition, I think some things can only be understood by actually creating a product. These experiences will likely be of help when creating something in the future.
Furthermore, as the COVID-19 outbreak has increasingly limited opportunities to meet new people, I feel that we were able to provide a valuable opportunity for individuals to come together in a community as a base for something they wanted to accomplish and to connect with others who have skills that they personally lacked.

Course materials (in Japanese) for programming have been posted!



The Qiita articles course materials (in Japanese) prepared by the Organizing Committee members for the participants have been made available to the public for a limited time! You are most welcome to check them out!

https://qiita.com/tmgauss/items/a0dbc8b90fd5c95732af

Written by Hinata Takeda & Ayako Masuno

We Spoke with Participants!

Approximately 80 teams participated in UTSprint this year.
Their final products can be accessed from the following link!

https://sites.google.com/g.ecc.u-tokyo.ac.jp/utokyo-project-sprint/products

Video presentations were used to determine the eight teams that qualified to advance to the finals, whereas presentations for the final competition were held in person. The results are as follows.

Finals

The final competition was scored by 10 judges who included UTokyo professors, the Vice Governor of Tokyo, and AWS and Sony employees. Of the eight teams that made it to the final competition, the teams with the highest score for each standard as well as the team with the best balance of those four standards are as follows.

Idea Model Award Tanma!
Awarded to the team with the most outstanding idea

Technology Award OnAcu
Awarded to the team with the best technology

Achievement Award Pororocca
Awarded to the team with the greatest achievement

Design Award Tanma!
Awarded to the team with the best design

Balance Award Tanma!
Awarded to the team with the best balance of these four standards

Qualifying

After Organizing Committee member deliberation, the following six awards were selected from teams other than those making it to the finals.

Partner Award Amithyst
Awarded to the team selected by the Organizing Committee based on overall evaluations

Pitch Award Compass
Awarded to the team with the best pitch

Corona Solution Award Corotomo
Awarded to the team with an idea most contributing to the current situation

Beginner's Award Hobby-share
Awarded to the beginner team with the highest completion in product building

Architecture Award Online Old Maid
Awarded to the team with the most interestingly conceived and constructed product

Topic Award UTinder
Awarded to the team with the most buzz

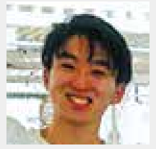
Students from five teams actually participating in UTSprint assisted with the interviews on the following pages, offer comments about UTSprint from a participant perspective. Some student teams took time away from their academic endeavors to participate with their friends. Some teams gathered new members for UTSprint to realize their ideas. Some teams took on the challenge of creating a web service for the first time. Some teams had significant project experience. We'll be introducing some of the products that these various teams built over the six-week period, along with a look at the teams themselves!

Written by Aoi Watanabe

Idea Model Award **Design Award** **Balance Award**

Tanma!

An app that allows instructors to check student comprehension during class in the form of a histogram



Yuki Kurimoto
Third year undergraduate student
Department of Information and Communication Engineering, FOE

UTSprint was his first time to build a web app. He was the team leader for development and also developed the backend (AWS AppSync, GraphQL).

Atsuki Hasegawa
Second year undergraduate student
Department of Mechanical Engineering, FOE

He was in the College of Arts and Sciences when he joined UT Sprint. He met team leader Kurimoto in the tennis circle, and was in charge of the front-end (Vue.js) for this project.
He had been involved in front-end development as an intern for about half a year before participating in UTSprint.

Minami Aramaki
Third year undergraduate student
Department of Electrical and Electronics Engineering, FOE

She was in charge of front-end and design for this project. She has exhibited at the Future of Play Factory[※1] twice in the past, where she built a product that allows children to enjoy cleaning up their toys and a product that uses projection mapping. This is her first time to build a web app.

※1: A hackathon considering what 'play' means and to create futuristic 'play', held at the Nakayama Future Factory, the UTokyo Interfaculty Initiative in Information Studies Openstudio.

— What inspired you to build this project?

[Hasegawa]: I came up with the Tanma! idea when online classes began and realizing that teachers might have trouble seeing student facial expressions. At the same time, a class might simply go on and on even though students might be dissatisfied with the professors' explanations. Tanma! was built to reduce difficulties in understanding one another particularly as applies to online classes.
The way the app works is by students indicating how much of the lecture they comprehend by sliding a bar, and the teacher checks the histogram to check overall student comprehension.

— How did you meet your project team members?

[Kurimoto]: I invited Hasegawa because we were in the same circle and had internships at the same location and I thought he would be dependable in this year's Sprint. Aramaki and I were in the same department, but we barely knew each other. I wanted to work with someone I didn't know for this project, so I asked her to join the team.

— How did you feel when your product was actually launched?

When we actually ran the system in class three or four times during the project period, various issues came to light. A variety of interview feedback revealed that the participation of over a minimum number of students was a prerequisite for making the histogram effective, and having to open new tabs to use the app was a burden for professors and students alike.
Although our focus on the problem was constructive, at the end of the project the three of us again discussed how appropriate this app was as a solution to that problem. Coming to the conclusion that even if we preceded any further we couldn't solve the problem, we terminated project development when UTSprint came to an end.

— How was your experience?

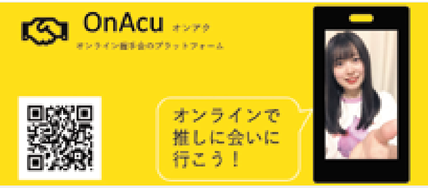
Our team initially intended to build an 'online study room', and in the first two weeks we had completed its MVP (Minimum Viable Product) and had it up and running. In the end, that product wasn't used very much, and at the point that a third of the short 6-week project had gone by, we suddenly changed course. Ultimately, we wanted to build a product that people would use.
Even though in the end, the Tanma! build ended with UTSprint, it became a good experience leading to subsequent activities. I think that people without any experience in making things should definitely participate in this project.

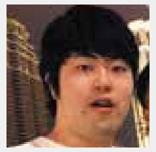
Written by Aoi Watanabe

Technology Award

OnAcu

An online video call platform app for celebrity handshake events





Kohei Nishida
First year master's student
Department of Precision Engineering SOE

He came to UTokyo to earn his master's degree after graduating from Osaka University in the spring of 2020. He has a little bit of programming experience, and has always been interested in web builds.

— What inspired you to participate?

I heard about this project through a Sony-UTokyo collaborative seminar I took. Since I had just started my UTokyo master's course in the spring and since I didn't know many people, I hadn't decided who I would team up with, but since I had already decided on a product concept, I decided to join the project after inviting an acquaintance I met in the seminar who had experience in app development.

— Did you have any difficulty during development?

I was previously interested in building web services. Since COVID-19 prevented me from doing geeky things, I thought about creating a service for pop idols. The division of labor facilitated a smooth project build, and user registration, ticket distribution, and video chat installation was almost finished within a month after we began the build.
As for product operation, Minaminton, a UTokyo YouTuber introduced to us by an acquaintance helped us run it three times. How to increase the number of users was the point that gave us the most difficulty. In order to expand the service, we needed to get more idols to use the service in order to bring in more fans. To that end, although we were able to talk with idol managers, getting them to agree to use the service was difficult and we realized just how high a hurdle getting them to use it was.

— How did you feel about participating?

For this project, we aimed to build a service from scratch and get people to use it, but we realized once again the difficulty of operating a service. From a developer's point of view, I have come to recognize the value of product and service originality as well as appreciate people who want to start new initiatives. Building and operating a web service has taught me a lot. I am extremely grateful to the Organizing Committee for giving me such an opportunity.

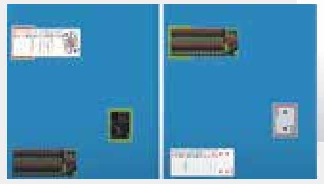
Written by Yuki Tsuji

We Spoke with Participants!

Achievement Award

Online Old Maid

An app for playing Old Maid, a timeless card game, with your friends online



Solutions
- Face-to-face tactical setting factor
  - Cards held in the order you determine
  - You know which card your opponent is going to draw
  - Watch your opponent's face when drawing a card

Tamaka Harada
Third year undergraduate student
Department of Integrated Sciences
College of Arts and Sciences

Through Monozemi, an introductory maker education course, she found pleasure in making things, and has been working on a project to develop a wearable input device with support from Mitou※1. She sometimes codes for her own research project that involves psychological experiments.

Shoki Hattori
Fourth year undergraduate student
Department of Aeronautics and Astronautics, FOE

He is a transfer student from a technical college and has been involved in many robotics projects. He is currently focusing on hardware design at the HarvestX project to automate strawberry cultivation.

※1: Sponsored by the Information-technology Promotion Agency, Japan (IPA) under the jurisdiction of the Ministry of Economy, Trade and Industry (METI), the project aims for the "discovery and development of human resources that have outstanding IT abilities" and to discover and nurture Japanese super creators who will change the world through the use of IT.

▲Page for the person drawing a card　▲Page for the person whose card is being drawn

— What inspired you to build this project?

[Harada]: Back in May I was stuck at home and starting to get bored of virtual parties as it had been a while since quarantine started. I thought it would be fun if we could play cards like we used to do, face-to-face, and decided to develop an app for playing Old Maid online as a UTSprint project.

[Hattori]: However, I thought that just being able to create a function for drawing the Old Maid would be an uninteresting game if the winner was determined by probabilistic factors, so we devised a way to generate tactics. For example, players checking one another's facial expressions or trying to make one card stick a little bit out of their hand could be used as tactics. We tried to keep that kind of gameplay online as well.

— How did you meet your project team members?

[Harada]: I joined a UTSprint Slack workspace looking for someone to work with on the online Old Maid project, and fortunately I teamed up with a like-minded person, Hattori-san.

[Hattori]: Although we knew each other by sight, we weren't acquainted with one other at all. Despite that, I think we were able to discuss whatever we needed to do to make online Old Maid work.

— How was your experience?

[Hattori]: The development language for the software project we worked on this time around was one that neither of us had much experience with, but I think that we were eventually able to make a certain amount of progress during the six-week period. It was an easy program to participate in for a beginner in manufacturing.

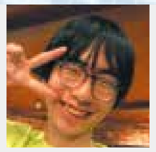
[Harada]: I am glad I participated in this program! Some skills that I acquired during the project turned out to be helpful in another project I am tackling now.

Written by Aoi Watanabe

Achievement Award

Pororocca

A problem-sharing service that allows users to submit quiz questions they have come up with as well as to solve problems posted by others, which earned the top number of users during the UTSprint period



Yusuke Ebihara
Third year undergraduate student
Department of Electrical and Electronics Engineering, FOE

He was the team leader. He is a member of the UTokyo circle named CAST that holds on-site science classes. He had taught himself about the backend of online games and had also created a circle website.

Norika Nakazawa
Third year undergraduate student
Department of Interdisciplinary Sciences
College of Arts and Sciences

She and Ebihara were in the same circle. This project was her first experience in web programming development, and when Ebihara was recruiting members on Twitter she offered to participate.

— What inspired you to build this project?

Suzuki, another team member, proposed the idea and we decided to build a service that would allow people to contribute and solve quizzes online. Many contributions were riddles and or mathematics-related, and the service was well received by UTokyo students, so even though UTSprint has come to an end, some people still regularly submit brainteasers, and we even now get together each month to tweak the service.

— Would you describe your team?

Since none of us had any experience in Django development, we used AWS to develop the project and referred to articles UTSprint provided. Instead of separating front-end and back-end work, we got together on Zoom every night to build the app. We have been an exceptionally close team from the get go. We couldn't participate in university circle activities, and to make up for that, this Sprint became a hub for deepening our friendships.

— How was your experience?

[Ebihara]: Since this was my first experience launching something I had built, I am glad that we were able to actually offer the product and have it used by many people. In addition, I had the opportunity to hear about things such as "How to find what users want" and "How to give feedback to user opinions" in the UTSprint Organizing Committee lectures I attended. The new perspectives I have gained have made this a good experience. I am very grateful to the EEIC students who voluntarily organized such an event, and I am glad that I chose this department.

[Nakazawa]: This project left me so curious about how web pages work that when I browse websites, I sometimes use the Developer Tool to view their source code. This project also gave me the urge to try to create another original product, which would not have happened if not for this experience. I gained a lot, so I am grateful to the people involved in this project as well as my companions.

Written by Aoi Watanabe

UTokyo Chiebukuro

An anonymous Q&A site exclusively for UTokyo students, the service it provides allows students to ask questions and seek advice about assignments, classes, college selection, job hunting, circles, and the like.

Tomoki Kurimoto
Third year undergraduate student
Department of Mechanical Engineering, FOE

Before joining the project, he had only a little experience with Python and no experience in development. He was the initial link between Kuroki and Murakami.

Takuo Kuroki
Third year undergraduate student
Department of Mechanical Engineering, FOE

Before joining the project, although he was interested in programming he didn't have any experience in development, so he took this opportunity to take up developing. He got to know Kurimoto through their hobby of tennis

Tomoki Murakami
Third year undergraduate student
Department of Mechanical Engineering, FOE

Like the other members, he had no experience in development before joining the project. He and Kurimoto are members of the same tennis circle.

— What inspired you to participate?

The impetus came when a Junior Division classmate joined the Organizing Committee. Two of us (Kurimoto and Murakami) first hit it off during tennis circle activities and became good friends and then because we needed someone else we decided to ask Kuroki, someone in our department that Kurimoto knew, to join our project and we three participated together.

— How did the product build go?

We were able to decide on an idea fairly quickly. Murakami commenting on how difficult he found it to work alone on his departmental assignment actually gave us a hint, and we decided to create a bulletin board. We didn't think that an online bulletin board would be too difficult for a team consisting only of web builder rookies to produce. Constructing the product itself went smoothly with Organizing Committee technical support and advice from others, and many people actually used our service during the S semester exam period.

However, we did have some difficulties. The effect of COVID-19 during the project period meant that development had to be carried out online. Communicating instructions and understanding team members' moods were both difficult, and coordinating did not go as smoothly as we had hoped.

— How was your experience?

We were involved with academic coursework and this was also the first time any of us had attempted web building, so we were strained to the limit (laughs). It was a lot of work, but we gained experience and knowledge, and a sense of accomplishment as well from finishing this project in a short period. With experience gained from this project, we participated in another web development program with the same team members in August. We hope that the Organizing Committee will hold this event again next year, and if anyone is hesitating to participate, we urge them to go for it.

Written by Yuki Tsuji