

# 東工大 クロニクル



Tokyo Tech Chronicle

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# Tsubame Scholarship for Doctoral Students established

In order to ensure sustainable financial resources that will enable the continuous enhancement of its education and learning environment, Tokyo Tech has decided to increase tuition from April 2019.<sup>1</sup> Alongside this change, the Institute has recently established the Tsubame Scholarship for Doctoral Students to provide outstanding students equal access to Tokyo Tech education. Through this new scholarship, which also comes into effect in April 2019, the Institute will be able to offer financial support to a greater number of doctoral students than in the past.

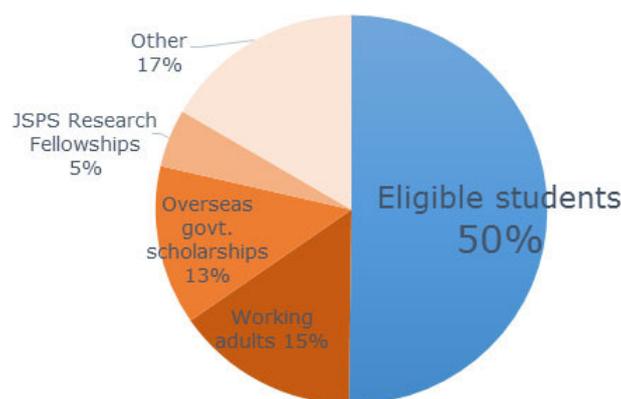
<sup>1</sup> Annual tuition at Tokyo Tech for bachelor-level students enrolling in or after April 2019 and master's, professional master's, and doctoral students enrolling in or after September 2019 will increase from the current 535,800 yen to 635,400 yen.

## Background of scholarship

In the context of fundamentally strengthening innovation in science and technology, Japan's 5th Science and Technology Basic Plan calls for enhanced financial support for doctoral students. Tokyo Tech introduced a new education system that facilitates seamless transition from one level of study to the next in 2016, a move that would contribute to the Institute being named a Designated National University two years later. In line with this progress, the Tsubame Scholarship for Doctoral Students is the Institute's latest attempt to support students in creating impact for Japan and the world.

In the past, the Institute provided financial support to doctoral students who completed teaching and research assistantships. However, with this change, Tokyo Tech expects to offer scholarships to 50 percent of its doctoral students, an over 25-percent increase compared to the previous system based on assistantships.

Ratio of students eligible for Tsubame Scholarship for Doctoral Students



Estimate based on number of enrolled doctoral students in AY2017

## Outline of scholarship

The Tsubame Scholarship for Doctoral Students does not exclude those who work as teaching or research assistants, nor those who receive tuition exemption, allowing financially disadvantaged students to secure financial support beyond tuition.

## Eligibility

Students who enrolled in a doctoral degree program in or after April 2018<sup>2</sup> are eligible. Awards are provided over the duration of a standard doctoral degree program.

<sup>2</sup> Recipients of the JSPS Research Fellowship for Young Scientists, MEXT Scholarships, overseas government scholarships, or other scholarships that do not permit funding from other sources, those receiving income as regular employees of a company or individuals who own a business, and those who have exceeded the standard period of a doctoral degree (unless illnesses and other extenuating circumstances were involved) are not eligible.

## Award amount

In the first year of doctoral studies, all recipients will receive the standard award of 480,000 yen per year. In the second and third years,<sup>3</sup> students who show outstanding academic performance (approximately 20 percent of recipients) will be granted a special award, which is equivalent to their annual tuition of 635,400 yen.

<sup>3</sup> As the new scholarship system is phased in, only the standard award will be made available in AY2019. Therefore, all doctoral students who enrolled in April 2018 and become scholarship recipients in April 2019 will receive the standard award in AY2019, despite entering their second year. Retroactive payments will not be awarded for AY2018.

(Tokyo Tech news published : Public Relations Section • February 22, 2019)

# Naohiro Yoshida attends AGU Honors Ceremony

Dr. Naohiro Yoshida, a professor at the Department of Chemical Science and Engineering and principal investigator at the Earth-Life Science Institute, attended the American Geophysical Union (AGU) Honors Ceremony to receive his Fellow Medal on December 12 at the Walter E. Washington Convention Center in Washington D.C.



Yoshida (right) with Dr. Eric Davidson, AGU President

AGU, established in 1919, is an international non-profit scientific association for the promotion of Earth and space science with approximately 60,000 members in 137 countries. Headquartered in Washington, D.C., it is the largest international association in its field.

Established in 1962, the Fellows program recognizes less than 0.1 percent of AGU members who have made exceptional contributions to Earth and space science as valued by their peers and vetted by a committee of Fellows. The Honors Ceremony, which included a talk by Yoshida, was held in the midst of a weeklong Fall Meeting with over 28,500 attendees, the largest ever. The 2018 Fall Meeting marked AGU's centennial, a celebration of AGU members' accomplishments over the last 100 years and the vision for the next 100 years.

### Comment from Professor Naohiro Yoshida

I am honored to be elected as a Fellow “for being the world's leading biogeochemist and atmospheric chemist studying bio-element cycles through innovative isotope exchanged molecule tracers,” as is written in the certificate this time. I have developed this fundamental research idea from when I was a student in the Department of Chemistry at Tokyo Tech, and I sincerely appreciate my supervisors, lab members, domestic and international collaborators, students, and governmental funding agencies. I would also like to thank Tokyo Tech for encouraging me to do research and education for over 20 years. As 2018 marks AGU's centennial, this year's medal is not only a celebration of the medalist, but also the history and future of AGU.



Fellow Medal, lapel pin, and certificate awarded to Yoshida

(Tokyo Tech news published : Naohiro Yoshida • February 15, 2019)

## Tokyo Tech teams lead way in ARLISS rocket launch



Tokyo Tech teams placed first and second at this year's ARLISS Mission Competition, held from September 10 to 13 in Black Rock Desert, Nevada, USA. One of these teams also accomplished second place in the Overall Category.

ARLISS — A Rocket Launch for International Student Satellites — is a collaborative project between Stanford University, other institutions of learning, and rocketry enthusiasts held annually since 1999 to demonstrate technologies used to develop man-made satellites. Teams of students from around the world design and create CanSats — models of satellites the size of soda cans — and launch them 4,000 meters into the atmosphere. These CanSats then execute various missions either during the flight or after landing. This year, 25 teams from Japan, Mexico, South Korea, India, Peru, Costa Rica, and the US participated.

In the championships, CanSats competed in two competitions — the Mission Competition and the Comeback Competition. In the former, participants are free to design their own missions, competing on the basis of creativity, scientific significance, and mission accomplishment. In the Comeback Competition, teams are ranked based on how near their CanSat arrives to its preset target.

**Tokyo Tech teams**

From Tokyo Tech, Team Rosette, a five-member team led by 4th-year Mechano-Aerospace Engineering student Teruaki Hayashi, and Team RASTICAS, a 10-member team led by 3rd-year Mechanical Engineering student Hiroyuki Kobayashi, joined the championships. The teams put to use what they had learned at the Institute's Practical Space Engineering Project and Space Systems Design Project.



Tokyo Tech teams with Prof. Saburo Matunaga (back row, 2nd from right) and TAs



Teams after breakfast meeting with Assoc. Prof. Hiroki Nakanishi (center, black shirt)

**Team Rosette**

**ARLISS result**

- Overall Award – 2nd place
- Best Mission Award – 1st place

**Team members**

- Teruaki Hayashi, 4th year, Mechano-Aerospace Engineering
- Hiroki Ando, 4th year, Mechano-Aerospace Engineering
- Tsuyoshi Nakashima, 4th year, Mechano-Aerospace Engineering
- Yuki Nakatsuka, 4th year, Mechano-Aerospace Engineering
- Kei Watanabe, 1st-year master's student, Mechanical Engineering



**Comments from team leader Teruaki Hayashi**

This was my second time in the competition, and I am very pleased that we were able to get our revenge. I am currently conducting research on new attitude control methods in reconfigurable space systems at Matunaga Laboratory, and therefore set our mission to observe a predetermined direction by using high accuracy attitude control by aerodynamic torque generated by variable shapes. This involved controlling the direction of cameras on our CanSat using paddles after the attached parachute deployed, and conducting observations in designated directions. During classes, we regularly reported our progress and carried out reviews, very much like during regular satellite development. Our team took longer than expected to decide on our mission, and therefore we continued to develop our CanSat until just before the launch. We completed the mission successfully, thanks to all the hard work of the team members and the guidance we received from faculty members and teaching assistants Yuhei Kikuya and Tsubasa Tsunemitsu. I hope I can use this valuable experience in future satellite development.

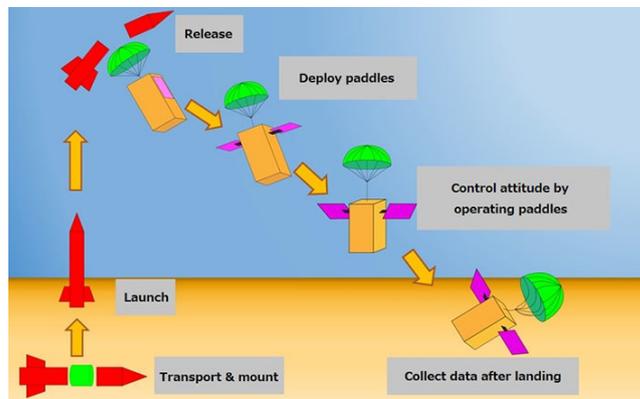


Image of mission

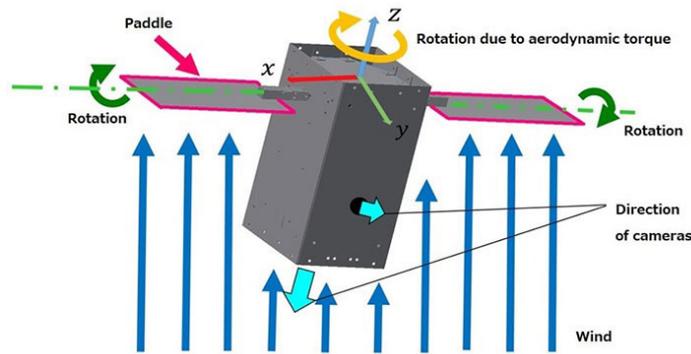
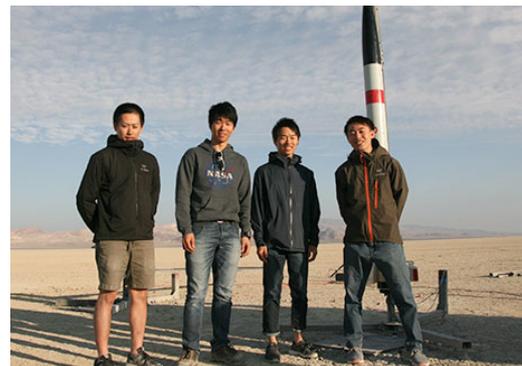


Image of CanSat during observation



Team Rosette transporting rocket



Team Rosette just before launch

### Challenges for Team Rosette

The main issue with Rosette's creation was high-accuracy attitude control. If torque due to atmospheric resistance was too low, the device would not move. If it was too high, it would remain unstable. The team was able to solve the problem by equipping the CanSat with two different modes — one to control angular velocity and stop rotation, and the other to control the angle itself and direct the device towards its target. By minimizing the friction in the rotating portion between the fuselage and parachute, the team were able to fine-tune the object's attitude under low atmospheric resistance. During the competition, the team successfully stopped high-speed rotation and maintained a visual of the intended direction.



Close-up of device

### Team RASTICAS

#### ARLISS result

- 2nd Best Mission Award

#### Team members

- Ritsuya Aoki, 3rd year, Mechanical Engineering
- Naoki Kawaguchi, 3rd year, Mechanical Engineering
- Daisuke Kikuta, 3rd year, Mechanical Engineering
- Soh Kimura, 3rd year, Mechanical Engineering
- Hiroyuki Kobayashi, 3rd year, Mechanical Engineering
- Kherlen Jigjid, 3rd year, Mechanical Engineering
- Yuta Takahashi, 3rd year, Mechanical Engineering
- Keigo Nakamura, 3rd year, Mechanical Engineering
- Nobutaka Fukushima from The University of Melbourne, Mechanical Engineering
- Makoto Yoshioka, 3rd year, Mechanical Engineering

### Comments from team leader Hiroyuki Kobayashi

Under the guidance of Professor Saburo Matunaga and Associate Professor Hiroki Nakanishi, completed the design, creation, testing, and launch of our CanSat. Through this experience, I was able to systematically learn about practical space engineering methods and project management.

With a future sample collection from Saturn's moon Titan in mind, our mission was "the collection of soil samples and verification of loaded drone transport technology." At ARLISS, we collected sand from the desert, loaded it onto a drone inside our CanSat, and transported it to its destination.

A big thank-you goes out to our professors and TAs Yuhei Kikuya and Tsubasa Tsunemitsu, who advised us throughout the process. We deepened our knowledge, united as a team to take on a big challenge, and learned so many things not possible in a classroom. This valuable experience topped off with us winning an award, which was fantastic.

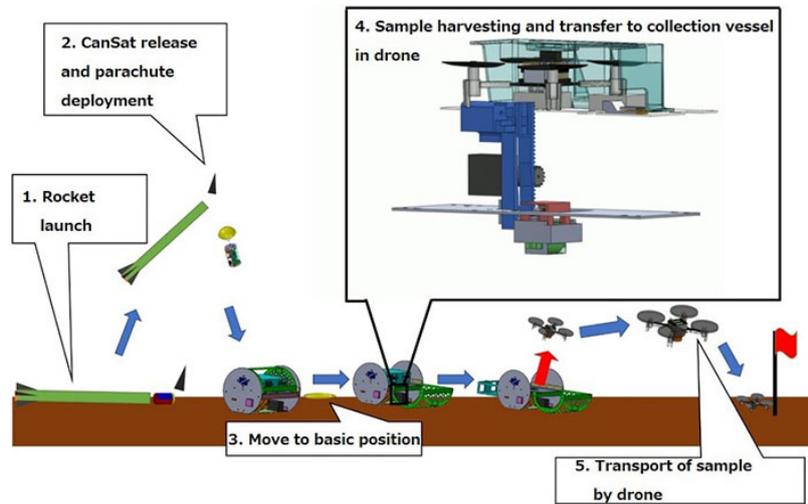
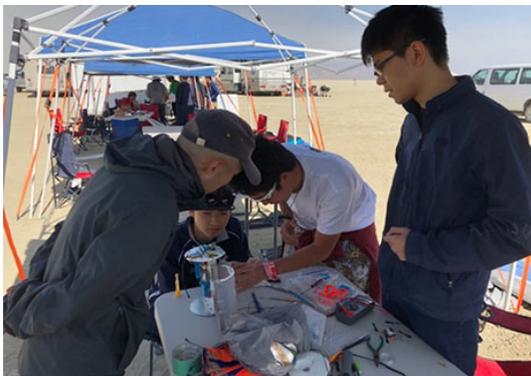


Image of mission



Final preparations on site

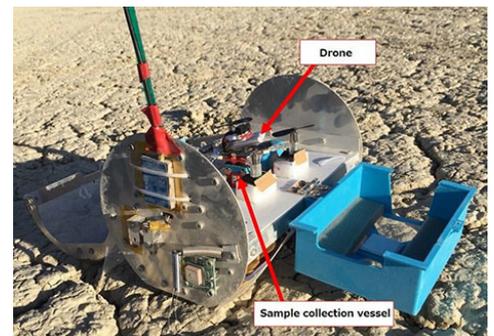


Team RASTICAS just before launch

### Challenges for Team RASTICAS

A mechanism inside the CanSat of Team RASTICAS collected a sample using an adhesive. The vessel containing the sample was then received by a drone, which departed the CanSat fuselage and transported the sample to its destination.

Each member of the team was responsible for creating subsystem components within the CanSat. For RASTICAS, integrating these components turned out to be the biggest challenge, requiring countless corrections and improvements. The team also experienced malfunctions when at the actual competition site in Black Rock Desert.



Close-up of fuselage

### Courses at Tokyo Tech

The Practical Space Engineering Project, aimed mainly at graduate-level students, and the Space Systems Design Project, intended mainly for bachelor-level students, both aim to provide students with the engineering knowledge and project management techniques to design and create satellite models, conduct experiments, and overcome the demanding conditions required during rocket launch and CanSat missions. Capacity is roughly 10 students for each course.

## Tokyo Tech Hult Prize winners book place in regionals

Tokyo Tech hosted its first Hult Prize competition on Ookayama Campus on December 8. Team ITHE were crowned the winners with their idea of building a platform that enables creators to outsource all steps of product development.

Held annually since 2009, the Hult Prize is a year-long competition that crowdsources ideas from university students after challenging them to solve a pressing social issue. The global winners receive one million US dollars as seed capital to start their social enterprise. This year's contest focuses on youth unemployment. It challenges students to "build the foundations of a venture that will provide meaningful work for 10, 000 youth within the next decade."



Tokyo Tech's Hult OnCampus participants

On the day of the event, 17 Tokyo Tech teams presented their ideas on how to alleviate the youth unemployment problem in front of judges from both within and outside the Institute. The winning team, ITHE, will join competitors from around the world at the regional finals in Melbourne, Australia in April 2019.



Tokyo Tech's winning Team ITHE - (from left) Nagata, Akagi, Spalthoff, Kai

## Members

- Kohei Kai, 2nd-year doctoral student, Computing
- Kaya Akagi, 2nd-year doctoral student, Computing
- Peter Spalthoff, 1st-year master's student, Computing
- Ayano Nagata, 2nd-year doctoral student, Mechanical Engineering

## The idea

Team ITHE want to provide young changemakers with the tools they need to turn their idea into reality. Finding the right partners is almost always a major hurdle for new projects.

The team will provide a web service where users can create a detailed workflow for their ideas and search for the right people or organizations to fill the skill gaps. People will also be able to search for workflows to which they can contribute. Distribution of profits and accounting can be handled on the platform. ITHE members believe that this will significantly lower the burden for young entrepreneurs, and allow individuals and small businesses easier access to new opportunities.

The future of companies is not monolithic, but highly distributed, according to ITHE. The current trend, for example with Uber, is that employees at the bottom have no way to grow as people. The team wants to change this trend by not only supplying people with diverse opportunities in their field, but also by giving them the chance to learn from others they connect with through the workflow.

## Comments from ITHE rep

### Kohei Kai

I am very glad our team ITHE won the Hult Prize at Tokyo Tech. This is the first time the Institute has held Hult OnCampus, and I really appreciate those who have supported this event.

Hult Prize at Tokyo Tech will allow our team, made up of information engineering and affective engineering students, to spread an idea that we have been planning and polishing for a long time. There are many ideas in the world. To keep our ideas from being buried and lost, I'd like to keep asking questions as to what our identity is and what kind of value we should offer.

I will continue pushing forward until our next pitch.

In addition to ITHE, two other finalist teams were selected to represent Tokyo Tech at other regional summits. Team AJIL, selected for the regionals in Tokyo, want to increase the profits of shepherders in Mongolia by increasing efficiency. Team Kizuna will present their idea of better connecting local guides with foreign travelers at the Paris regionals.



TEAM AJIL member presenting



Team Kizuna member presenting

## What is the Hult Prize?

The Hult Prize began in 2009 as the brainchild of Hult International Business School MBA student Ahmad Ashkar, who wanted to leverage the crowd to generate startup ideas from young people and sustainably solve the world's most critical social challenges. In 10 years, the prize has developed into a movement that has deployed over 50 million US dollars into helping solve problems in food security, water access, energy, education, healthcare, and housing. Contests have engaged over one million young people from 1,200 universities in over 100 countries across the world. Former US President Bill Clinton, who selects the topic for each year, noted in an interview with TIME Magazine that the prize is one of the top five ideas that are changing the world for the better.

## Students, faculty, companies working together

The first Hult Prize competition at Tokyo Tech was organized by a team led by Grace Kagho, a 2nd-year master's student in Transdisciplinary Science and Engineering, six other Tokyo Tech students studying at various levels, and one faculty member acting as an advisor. Tokyo Tech's participation in the contest is supported by companies with strong ties to the Institute, including Gurunavi, Inc. and Innovations and Future Creation Inc.



Daisuke Kaneko, Tokyo Tech alumni and co-founder of Innovations and Future Creation Inc.



Kagho (center) with other student organizers

## Comments from event organizer

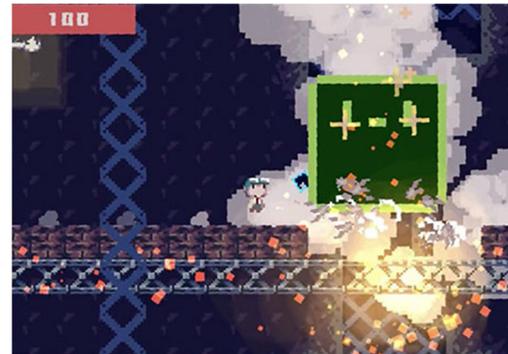
### Grace Kagho

Tokyo Tech students are amazing and have shown how much impact we want to make in the world. It has been an exciting experience working with everyone to organize such a platform for sharing and developing ideas to change the world.

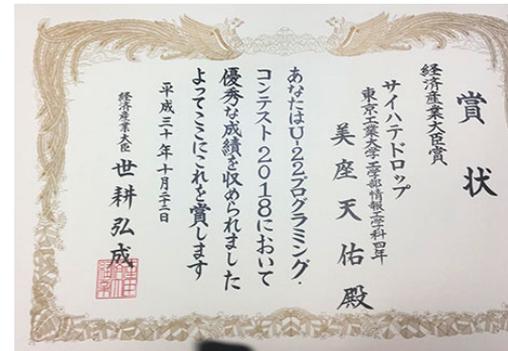
## Tokyo Tech student wins METI award in U-22 Programming Contest

Tenyu Miza, a 4th-year Computer Science student, has won the Ministry of Economy, Trade and Industry (METI) Award at the Under-22 (U-22) Programming Contest, held in Tokyo on October 21, 2018.

Miza, a member of the Tokyo Tech Student Club traP, collected the award in the Product Category for creating the game Saihate Drop, a scroll action game created almost entirely using JavaScript. "Among all the entries, Saihate Drop exhibited outstanding usability and artistic sense, and has great potential for business development," the judges highlighted. Miza also created all the audio content for the game.



Screenshots from Saihate Drop



METI trophy and certificate

### Comments from Tenyu Miza

I am very pleased to receive such a prestigious award from the Ministry of Economy, Trade and Industry. I have plenty of experience creating games together with fellow traP members, but this was the first time I tried it on my own. It was a great experience. Saihate Drop is a 2D pixel graphics game that focuses on exciting effects. No game engine was used to develop it. In addition to the programming, the judges at the contest also appreciated the fact that I created all the pixels, fonts, sound effects, and background music myself.

I am constantly developing the game, but a PC version is available for testing at [kawasemi](http://kawasemi.uynet.trap.show/)(<http://kawasemi.uynet.trap.show/>).



I am current using OpenGL in my research, and plan to use that to boost the graphics of the game further.

### U-22 Programming Contest

The U-22 Programming Contest, which began in 1980 as the METI-sponsored Nationwide High School Programming Contest, aims to unveil and nurture outstanding programmers through a project submission-type competition. The contest changed its name in 2004, shifted to private co-sponsorship ten years later, and formed a collaboration with organizers of the programming contest for elementary and middle school students in 2018. Today, the contest continues to receive backing from METI while receiving generous support from IT and software companies.

All participants, who must be 22 or younger, are asked to submit an original piece of work to the contest judges. This year, there were 460 entries, 16 of which made the finals. Final presentations were held on October 21, after which judges rated the creation based on three criteria — Product (usability and artistic sense), Technology (algorithms and functionality), and Idea (originality and future prospects). The four winners — one for each criterion and one overall winner — received their trophies and certificates on METI premises on October 22.

### What is traP?

traP, which recently became an official Tokyo Tech Student Club, began its activities in April 2015. The club focuses on various activities including game programming, digital and audio content creation, 2D illustrations and 3D modeling, pixel graphics, and cybersecurity capture the flag competitions. traP shares its knowledge through various public engagement activities, including programming classes for middle and high school students. The club currently has over 250 members.

(Tokyo Tech news published : Public Relations Section • February 19, 2019)

## Tokyo Tech 5th in 2018 University Festival Grand Prix

The Tokyo Tech Festival, held on October 6 and 7, 2018, placed fifth out of 120 university campuses evaluated at the annual University Festival Grand Prix. The result was announced on December 20.



Tokyo Tech Festival committee members at the awards ceremony

Held under the auspices of Let's Enjoy Tokyo, a website jointly managed by Tokyo Metro Co., Ltd. and Gurunavi, Inc. that introduces places of interest in and around the Japanese capital, the University Festival Grand Prix ranks university festivals in the metropolitan area based on their offerings to prospective students, alumni, and the public. The festival celebrated its 10th anniversary this year

### **Comments from Tokyo Tech Festival committee president**

**Seiya Yamamoto**

#### **3rd year, Industrial Engineering and Economics**

We worked tirelessly to plan out the 2018 Tokyo Tech Festival, the theme of which was “Frontier” as chosen by popular vote. This outstanding result is thanks to the efforts of current students and faculty members, who all communicated their research to so many visitors in a clear and interesting manner. I am currently studying management and optimization at the Department of Industrial Engineering and Economics, and look forward to sharing the cutting edge that Tokyo Tech has to offer with future festivalgoers.

### **Tokyo Tech Festival**

“Tokyo Tech is a world leader in various academic disciplines, and our job is to raise awareness among the public regarding this fact, as well as the annual festival itself.” This was the mindset of the Tokyo Tech Festival committee members as they began planning the event in cooperation with various parties across the Institute.

In 2018, the “Best of Tokyo Tech Festival” vote went to the Nikaido Lab at the School of Life Science and Technology for their public exhibit, which aimed to clarify the mysteries of evolution through the examination of the ancient polypterus fish, the hedgehog, and other curious species. Tokyo Tech Festival 2019 will be held on October 12 and 13, 2019. The Institute invites all interested parties to come and experience pioneering science and technology research under the guidance of Tokyo Tech's numerous labs and student clubs.

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