

# 東工大 クロニクル



Tokyo Tech Chronicle

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## Access to data science and AI training for all graduate-level students

—Tokyo Tech teams up with Yahoo! JAPAN and others to launch new program—

All graduate-level students of Tokyo Tech will be eligible for data science (DS) and artificial intelligence (AI) training from academic year 2020 onwards. The program, launched in collaboration with Yahoo! JAPAN and other global businesses, aims to develop professionals who combine their advanced specializations with a solid knowledge of DS and AI to create societal solutions and new industries.



Image

Tokyo Tech already provides the basics of information literacy to its bachelor-level students, and the new DS/AI initiative will be the first of its kind among Japanese universities. It treats data science and artificial intelligence as not only useful tools but also bridges that encourage sharing, collaboration, and co-creation across disciplines and specializations.

Specifically, the Progressive Graduate Minor in Data Science and AI will include both basic and applied courses. Basic courses will be organized mostly by the School of Computing, while lectures and exercises in the applied courses will be led by visiting lecturers from Yahoo! JAPAN and other companies. Students who meet all the requirements at the end of the course will receive a certificate of completion from Tokyo Tech. Trial classes are already underway, and the full launch of the program will take place in April 2020.

In addition, Tokyo Tech is working with Hitotsubashi University and Ochanomizu University to develop their own DS/AI training programs. The Institute will also offer its DS and AI expertise to working professionals through corporate training sessions and lifelong learning programs.

(Tokyo Tech news published : Public Relations Section • January 7, 2020)

## Prof. Akira Chiba receives the IEEE Nikola Tesla Award (IEEE Field Award)

The Institute of Electrical and Electronics Engineering (IEEE) has announced Professor Akira Chiba as the recipient of the 2020 IEEE Nikola Tesla Award, one of the IEEE Technical Field Awards. The citation is "for contribution to bearingless and reluctance motors. "

The IEEE is one of the largest technical non-profit organizations and is the most prestigious, with 430 thousand members in electrical, electronics and computer engineering. IEEE provides the

Technical Field Awards in 32 fields every year. Most of the field awards are named after a famous person in the field. Nikola Tesla invented the AC power transmission system and induction motors in the age of Thomas Edison. The tesla, a unit for flux density, is named after him. The IEEE selects persons who have made outstanding contributions to electric power consumption and generation for the Nikola Tesla Award. It is a long-running IEEE Technical Field Award, with 44 individual recipients since its inception in 1976.

Many IEEE Technical Field Award recipients have ties to Tokyo Tech. Former Presidents Suematsu and Iga, Specially Appointed Professor Akagi, and Emeritus Professors Fukao, Furui, and Iwai received awards in 1986, 2003, 2008, 2009, 2010, and 2015, respectively. Chiba is the third to be selected in his 50's joining Suematsu and Akagi. Other notable Japanese persons who have received IEEE Technical Field Awards include, Dr. Esaki, Dr. Akasaki, Dr. Nakamura, all Nobel award recipients, in 1961 and 1998.

### Comments from Akira Chiba



Prof. Akira Chiba

The "bearingless motor" is a magnetically suspended motor. This motor was invented while I was a Ph.D. student in Tokyo Tech. Since 1989, continuous research has been supported by grants from the Ministry of Education. It is well-known that electric motors generate rotational torque, but radial attractive forces are generated between a rotor and a stator. The radial forces are not very effectively used. By taking advantage of the radial forces, the motor rotor can be magnetically supported without mechanical contact. In the early days, people just commented that it was a unique motor, but these days, many international researchers are studying it. Bearingless motors have been applied for use in pumps in the semiconductor and liquid crystal display fabrication process.

As for reluctance motors, switched reluctance motors and generators are designed and tested to verify the fact that performance such as torque density, efficiency, and operation area of leading permanent magnet motors in automotive applications can be realized without rare-earth permanent magnets. These motors are called "rare-earth-free-motors."

I would like to give special thanks to Emeritus Professor Fukao at Tokyo Tech and Professor Rahman at Memorial University of Newfoundland in Canada. I thank Professor Akagi for letting me know about IEEE fellowship and Technical Field Awards. I would like to thank all colleagues and students who engaged in the research with me. I was hoping I could become a recipient close to retirement, but it is a surprise to be come one in my 50's. I would like to continue working on innovative motor projects.

(Tokyo Tech news published : Professor Akira Chiba • January 28, 2020)

## Tokyo Tech team wins SECCON CTF 2019 International

Four Tokyo Tech students comprising Team NaruseJun have won the Security Contest Capture the Flag (SECCON CTF) 2019 International, held in Tokyo on December 21 and 22. The team, which

finished second in last year's contest, has been acknowledged with an award from the Ministry of Economy, Trade and Industry.



Team NaruseJun with SECCON 2019 Chairman Tomohiro Hanada (right)

SECCON is a cybersecurity contest that aims to uncover and nurture the best information security talents around the world. The CTF portion is a hacking contest that tests the comprehensive security skills of teams through both attack and defense perspectives.

The international version of the CTF contest has been held since 2014. A total of 2,347 participants from 64 countries and regions joined the preliminary rounds of the contest in October 2019. Fourteen teams of four members each from Japan, China, Korea, Russia, Ukraine, Taiwan, Poland, and Thailand reached the finals.

#### Team NaruseJun members

- Yudai Fujiwara, 3rd year, Computer Science
- Riki Fukunari, 1st-year master's student, Information and Communications Engineering
- Shu Takayama, 3rd year, Mathematical and Computing Science
- Shohei Kuroiwa, 1st-year master's student, Computer Science

Fujiwara, Fukunari, and Takayama are all current members of the Digital Creators Club traP, an official Tokyo Tech student club. Kuroiwa is an alum of the student club.



Team NaruseJun: (from second left to right) Fujiwara, Fukunari, Takayama, Kuroiwa

### Comments from team captain Shohei Kuroiwa

I am very pleased that we emerged victorious at SECCON CTF 2019, one of the world's top cybersecurity contests. This was the second time a CTF team made up of traP members joined the international version of the contest. Last year, we finished second, which was a bittersweet result. With our victory this year, I feel our team has really grown.

At Tokyo Tech, I focus mostly on software engineering research. The other members of the team also study various areas of computer science, and I feel we achieved this result because we were able to utilize the diverse knowledge and experience of all our team members.



Kuroiwa (left) commenting after victory

### What is Digital Creators Club traP?

Digital Creators Club traP, an official Tokyo Tech Student Club, was established 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.

(Tokyo Tech news published : Public Relations Section • February 4, 2020)

## Team iGEM TokyoTech wins silver at international competition

Team iGEM Tokyo Tech has won the silver medal at the 2019 International Genetically Engineered Machine Competition (iGEM) held in Boston, Massachusetts from October 31 to November 4. Approximately 360 teams and over 40,000 students participated.



(from left) PI and Assoc. Prof. Tagawa, students Saito, Tsuruta, Takahashi, Fujita

The iGEM competition is an international synthetic biology competition for high school, undergraduate, and graduate-level students. Student teams are given a kit of standard genetic parts called BioBricks, and are asked to design and build a new biological system. Each team presents their results to a panel of judges.

In 2019, the Tokyo Tech team embarked on a journey to study Turing patterns, which offer a plausible explanation for the various stripes and patterns on animals such as zebras and giraffes. These patterns are simple enough to create using computer simulations, but are very difficult to recreate using cells.

In an attempt to elucidate the mechanism of pattern formation and understand morphogenesis, i.e. the appearance of an organism's body plan, the Tokyo Tech team programmed *E. coli* to form patterns by designing a new genetic circuit in which bacteria use N-acyl-L-homoserine lactone to communicate.

### **Comment from Tokyo Tech team leader**

#### **Moe Takahashi**

#### **3rd year, Life Science and Technology**

I have been part of the iGEM team since I was a first-year student. We have had our ups and downs, but the support from our academic supervisors and other team members has been fantastic. We have worked hard and we are proud of our silver medal.

The iGEM competition appears to be experiencing a shift from science towards monozukuri, or the creation of things. For the Tokyo Tech team, which has a long history at the contest, there have been many obstacles, but the gains have also been significant. I sincerely hope our younger teammates and successors will continue to enjoy the challenges offered by the competition.

#### **Participating students**

- **Moe Takahashi** 3rd year, Life Science and Technology
- **So Tsuruta** 3rd year, Life Science and Technology
- **Akito Machida** 3rd year, Life Science and Technology
- **Ryoto Matsuda** 3rd year, Life Science and Technology
- **Yan Ming Voon** 3rd year, Life Science and Technology
- **Shin Ying Ng** 3rd year, Life Science and Technology
- **Kazuya Izawa** 3rd year, Computer Science
- **Masaaki Nakano** 3rd year, Electrical and Electronic Engineering
- **Takato Saito** 2nd year, Life Science and Technology
- **Yusuke Kato** 2nd year, Life Science and Technology
- **Yumi Kitano** 2nd year, Life Science and Technology
- **Ayano Tabira** 2nd year, Life Science and Technology
- **Koki Date** 2nd year, Life Science and Technology
- **Aoi Shinkai** 1st year, School of Life Science and Technology
- **Ryohei Ruhu** 1st year, School of Life Science and Technology
- **Akari Kuroishi** 1st year, School of Life Science and Technology
- **Tamaha Ogawa** 1st year, School of Life Science and Technology
- **Hajime Fujita** 4th year, Life Science and Technology

#### **Instructors**

Assoc. Prof. Yoh-ichi Tagawa, School of Life Science and Technology

Assoc. Prof. Nobuhiro Hayashi, School of Life Science and Technology

Prof. Masayuki Yamamura, School of Computing

Assoc. Prof. Yoshihisa Matsumoto, Institute of Innovative Research

Akifumi Nishida, Research Staff, School of Life Science and Technology

Shoya Yasuda, Research Staff, School of Life Science and Technology

(Tokyo Tech news published : Public Relations Section • January 30, 2020)

## Women cycle-ballers inaugural champions at all-Japan contest

Tokyo Tech cycle-ballers Sayaka Kizawa and Moku Fujito have won the women's category at the 50th All-Japan Indoor Cycling Championships, held on December 14 and 15, 2019. This was the first Championships to include an all-women's contest, and the Institute's women now stand proud as the inaugural champions.



Kizawa and Fujito (center, middle row)  
with other top performers

The All-Japan Cycling Championships is open to all members of the public. This year, eighteen male and four female cycle-ball teams competed. Kizawa, a 4th-year Architecture and Building Engineering student, and Fujito, a 3rd-year Physics student, formed one of all-female teams in the competition.

On the first day, the ladies battled it out in round robin format. On day two, the Tokyo Tech duo met a joint Kansai University-Ritsumeikan University team in the finals. After a scoreless first half, the second half was tense. With one minute left in the match, Tokyo Tech was awarded a free kick in a good position. They scored and took home the first ever Japan women's championship in cycle-ball.

In the men's action, 4th-year Systems and Control Engineering student Kakeru Masuda and 3rd-year Architecture and Building Engineering Keita Ichihashi — the winners of the All-Japan Collegiate Cycle-ball Tournament — reached the top eight before bowing out.



Tokyo Tech women (in grey) during final match



Kizawa and Fujito forcing the opponent to defend

### Comments from Sayaka Kizawa

#### 4th year, Architecture and Building Engineering

I am very happy to have won this commemorative event. We could not have achieved victory without our teammates who so often practiced with us. Thanks to them, I have been able to continue playing this sport.

It took a lot of hard work from many people to form a women's category, but we achieved it and were finally able to hold a formal competition. Thank you very much to all those involved! I hope we can continue to attract more female players and hold even bigger contests in the future!

Cycle-ball is not a very popular sport, but that in itself is an advantage. We really have an opportunity to book our place in the world championships, which will probably include a women's category soon. I look forward to gaining more experience and developing myself further through cycle-ball.

I feel that I have developed by patience and ability to try new things — especially things that many others have not tried — through this sport. I will strive to utilize these qualities and skills not just in future cycle-ball events, but also in my studies and life after leaving Tokyo Tech.

### Comments from Moku Fujito

#### 3rd year, Physics

This was the first time the All-Japan Indoor Cycling Championships included a women's cycle-ball category, and I am very pleased that we are the inaugural winners! I would like to thank all my teammates, practice partners, and the people who helped in making the women's category a reality.

Until recently, female cycle-ball players, who are still hard to find, had to compete in mixed teams with men. This was a disadvantage due to the gap in physique between the sexes. I think this official contest for female teams was a huge step in the right direction for the sport. It truly has been a valuable experience to be involved in creating cycle-ball history.

While there are few competitive cycle-ballers, the sport is both intense and enjoyable. It can provide players with a variety of rich experiences, and I sincerely hope the sport continues to gain popularity.

I will be a 4th-year student in April, which means I will be joining a lab within the Physics Department. This transition will bring with it new challenges, but I hope I can find time to continue playing cycle-ball alongside my research.

### What is cycle-ball?

Cycle-ball is a soccer-like sport played indoors by two teams usually consisting of two players each. Using a specially adjusted bicycle with no gears or brakes, players dribble, pass, and shoot the ball

using the wheels of their bicycles. As most of the action takes place while standing on the pedals, the handlebars face upwards and the bike allows players to pedal backwards.

The special cloth ball used during games is 17 to 18 cm in diameter and weighs 500 to 600 g. The court measures 11 m by 14 m, and teams of two play two seven-minute halves. Feet should never be touching the ground, and hands can be used only at the defensive end. Most players in Japan get to know the sport while at university.

### Tokyo Tech Cycling Club

The Tokyo Tech Cycling Club is an official student club that includes members from not only the Institute, but also other universities such as Ochanomizu University and Tokyo University of Foreign Studies. The club consists of a touring group, a racing team, and a cycle-ball team, totaling over 100 members. The cycle-ball team trains at Ookayama Campus twice a week.

(Tokyo Tech news published : Public Relations Section • January 28, 2020)

## Male archers move up tiers after Tokyo League 3 win



Practice at the Kyudo hall

The men of the Tokyo Tech Kyudo Club have been promoted to League 2 by the Tokyo Metropolitan Intercollegiate Kyudo Federation for academic year 2019. The team secured their place in the second highest tier after winning League 3. Tokyo Tech defeated Toyo University 121-108 in the final on October 19 and Rikkyo University 126-114 in the promotion-relegation game on the next day.



Tokyo Tech Kyudo Club men

The team, led by Captain-Elect Ryo Isobe, a 2nd-year Computer Science student, officially reported the result to Tokyo Tech President Kazuya Masu on January 20, 2020. Joining Isobe in the meeting were 4th-year Materials Science and Engineering student Yuta Aida, 3rd-year Mathematics student and retiring Captain Kosuke Kashimura, and 3rd-year Electrical and Electronic Engineering student Mizuki Takeuchi, all top performers during the 2019 season.



Kyudo Club members with President Masu (3rd from right)

Aida was awarded the Kaichu Award after hitting the target with all 20 arrows in a league match against Tokyo University of Science. Takeuchi was commended in the women's league for her overall 0.813 accuracy rate, earning her 10th place in the league. Kashimura also had a strong final year before retiring from the club.

## Ryo Isobe

### Captain-Elect

2nd year, Computer Science

I am extremely happy that we not only won League 3 but were promoted to League 2 this year. While I did not participate as much as the others this season, this promotion has been our goal for a long time, and seeing it happen was very emotional. The upperclassmen who taught me so much will retire, which mean that next academic year, I will be captaining the team. I feel both excited and inspired. It will be my job to unite and push the Tokyo Tech Kyudo Club to new heights while balancing these activities with my studies. We thank everyone for their continued support.

**Kosuke Kashimura**

**Retiring Captain**

3rd year, Mathematics

I am extremely happy about our results. We won Block A in League 3 like last year, but this time we also achieved a promotion to League 2, which had been our long-term goal. We sensed that this was our year before the season began, and our confidence grew throughout, which made this result possible. As the captain, I often felt that I was holding the team back, but the support from other archers, including those who had to sit out some competitions, gave us the strength to win the matches we had to.

This competition was my last, and I am now retiring from the club. This will give me more time to focus on my studies. I hope the other members will continue to develop and improve the Tokyo Tech Kyudo Club.



New captain Isoobe (left) with mentor Kashimura

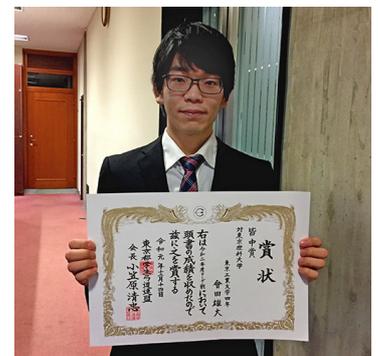
**Yuta Aida**

**Kaichu Award — All 20 arrows on target**

4th year, Materials Science and Engineering

I am a 4th-year student so this is obviously my last year in the Kyudo Club. I actually retired last year after joining a lab in the Department of Materials Science and Engineering, but I was encouraged to return after finding a good balance with my research life. I am extremely pleased to have made a comeback and produced a good result. What's even better is that I was able to contribute to the team's promotion to League 2, which is a big achievement for us.

I would like to thank my professors, teammates, and mentors for allowing me to end my time as a Kyudo Club member in the best possible way.



Aida with his sharpshooter certificate

**Mizuki Takeuchi****Overall Accuracy Award — 10th place**

3rd year, Electrical and Electronic Engineering

At this year's league matches, I was able to achieve tenth place in overall accuracy among individual female competitors. I felt uneasy as I was not performing well during practice sessions, but thanks to my fellow Tokyo Tech competitors and the support I received from other teammates, I was able to produce a good result. I could not have done this alone.

I will be leaving the Kyudo Club this year as I will soon be starting life in a lab. I will do my best to dedicate more of my time to research while continuing to watch over my successors at the club.



Takeuchi

with her overall accuracy certificate

**Tokyo Tech Kyudo Club**

The Tokyo Tech Kyudo Club studies and practices the Heki-ryu Insai branch of Japanese archery under the guidance of Masters Hiroko Urakami and Takashi Isobe. The club currently consists of fifteen male and five female members. Three practice sessions a week are held at the Ookayama Campus field, but members are also free to practice independently at a time that suits them best. Over two-thirds of current members began kyudo after entering university, and everyone is encouraged to participate in competitions.

(Tokyo Tech news published : Public Relations Section, Tokyo Institute of Technology • February 25, 2020)

## Students propose floor concept for Hisao & Hiroko Taki Plaza

The Hisao & Hiroko Taki Plaza (hereafter Taki Plaza), a new student exchange hub currently under construction on Tokyo Tech's Ookayama Campus, looks set to open its doors in late 2020. In line with the building's concept — a space where international and Japanese students connect, deepen ties, and create the future together — the Institute's students have been planning the best way to utilize the four floors of the facility. They have now released their proposed floor concept.

**A fruit-bearing student-centered building**

The Taki Plaza Student Working Group, made up of roughly ten students who were also present at the Taki Plaza planning workshop in October 2018, have proposed the following concept.

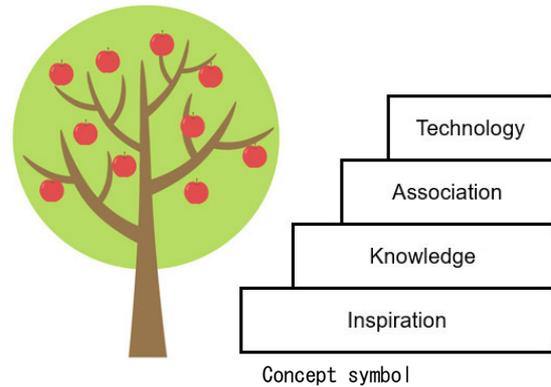
Floor concept proposed by students:

2nd floor: **T**echnology

1st floor: **A**ssociation

B1 floor: **K**nowledge

B2 floor: **I**nspiration



Inspired by the hill that Ookayama Campus sits on, the concept emulates a single tree with four distinct parts. The B2 floor represents the "roots" that absorb the nutrients and water required for life. It contains an event space and workshop area where peer interaction yields inspiration. The B1 floor is the "trunk" that withstands all the elements. It contains study abroad and career support functions, and offers students a place to learn about the world and themselves, research proactively, and attain the knowledge required to surmount all obstacles. The first floor — with its public cafe, art area, and other features — is a flourishing "branch" that deepens interactions and generates meaningful associations with the outside world. The second-floor group research area is the "fruit" of personal strength cultivated from the B2 level up to this crowning floor, where students and others ultimately yield the rich rewards of technology.

The Student Working Group has worked with faculty and staff since the planning stages of Taki Plaza. They have visited numerous other universities in search of inspiration and ideas. They have also joined forces with the student management team of Attic Lab, a co-working space that opened on campus in April 2019, to brainstorm the potential functions of the second-floor group research area in Taki Plaza.

The Student Working Group will also host sessions in the near future to collect opinions from other student groups regarding the potential uses of Taki Plaza.



Students visiting iCommons, the student exchange space at Konan University



Seeking inspiration from Academic Theater at Kindai University



At KUIS8, the independent learning support facility at Kanda University of Foreign Studies



Study abroad discussions and games with Konan University tutor



Students discussing ideas at Attic Lab

### Taki Plaza website

The Hisao & Hiroko Taki Plaza website, which was launched in November 2019, contains detailed information on the structure's floors and the progress of construction. The site also includes messages from various stakeholders such as the main donor, the architects, the Tokyo Tech president, and a student working group representative. The anticipated facility also has its own Facebook and Twitter pages.



Taki Plaza exterior after completion  
Image courtesy of Kengo Kuma and Associates

(Tokyo Tech news published : Support Planning Group, Student Support Division • January 23, 2020)

## Ronaldo S. Gallardo of DLSU elected Tokyo Tech Fellow

On December 6, 2019, the Institute's Board of Directors elected Tokyo Tech Philippines Office Advisor Ronaldo S. Gallardo of De La Salle University (DLSU) as a Tokyo Tech Fellow. Office Director and Global Scientific Information Center Professor Shin-ya Nishizaki presented Gallardo with a certificate in Manila on December 13.



Tokyo Tech Fellow Gallardo (left) and Philippines Office Director Nishizaki

Since the establishment of the Tokyo Tech Philippines Office on the campus of DLSU in Manila in September 2005, Gallardo has been instrumental in supporting Tokyo Tech's many activities in the Philippines. He has cooperated in the management of the Tokyo Tech Philippines Office, supported inbound and outbound exchange programs between Tokyo Tech and DLSU, promoted research exchanges between Tokyo Tech and the Philippines, and supported the activities of the Association of Tokyo Tech Alumni and Research Scholars (ATTARS), the Tokyo Tech alumni network in the island nation.

At DLSU, Gallardo has served in various roles over the years, including as associate vice president, associate vice chancellor, and technical advisor in the Office of the President and Chancellor.

Gallardo was awarded the title of Tokyo Tech Fellow in recognition of his years of dedicated service to the Tokyo Tech Philippines Office. He is the second to receive this honor, following Tsinghua University Professor Xinhui Xing, who was elected a Tokyo Tech Fellow in October 2019.

Nishizaki expressed appreciation for Gallardo's ongoing cooperation in education and research activities as a member of Team Tokyo Tech. He added, "We look forward to his further efforts to deepen cooperation between Tokyo Tech and the Philippines."

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