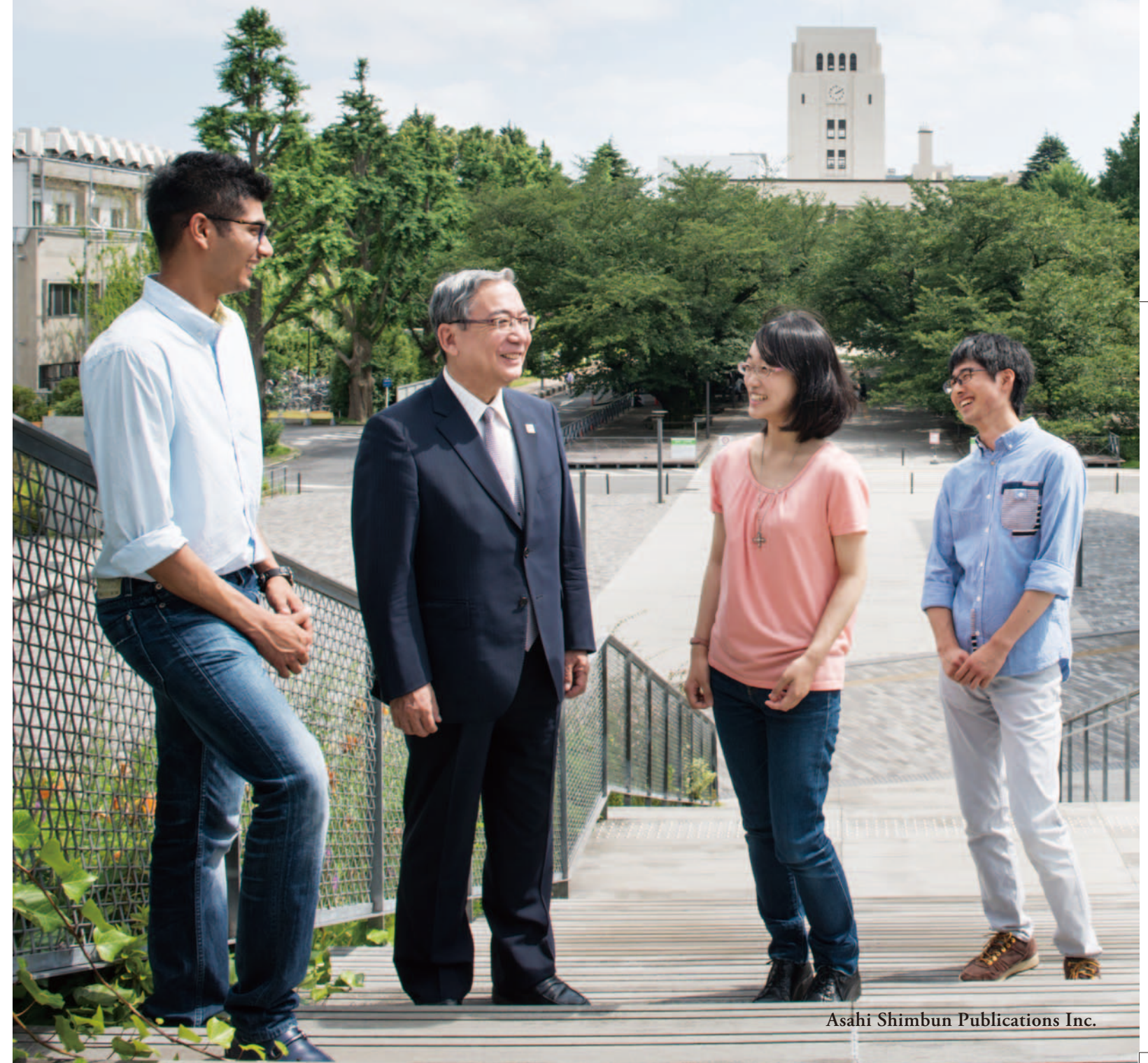


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Tokyo Institute of Technology by **AERA**



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Tokyo Institute of Technology

Tokyo Tech





Yoshinao Mishima

President, Tokyo Institute of Technology
Born in 1949 in Tokyo
Received his Ph.D. from University of California, Berkeley
Tokyo Tech president since 2012

Round-table talk between the president and students of Tokyo Tech

Tokyo Tech unleashes the potential of students

Tokyo Institute of Technology integrated undergraduate and graduate education as part of its education reform, aiming to develop talented individuals in the fields of science and technology with the expertise and skills to lead. The president and three Tokyo Tech students discussed the new curriculum and the attractions of life at Tokyo Tech.

President Mishima: Thank you for coming. Today, I would like everyone to speak frankly about what you like about Tokyo Tech and what improvements you would like to see. Can I start by asking everyone to share their first impressions after enrolling in Tokyo Tech?

Asanuma: At first, I was disappointed that Tokyo Tech only had schools for science and technology since I wanted to have interactions with humanities students as well. However, I learned through discussions with friends and senior students that many people here have a profound knowledge of not only science but also a variety of other disciplines. I also got the impression that, surprisingly, quite a few students do not have a clear idea of what they would like to do yet.

President Mishima: It is not a bad thing not to have a clear picture of what you would like to do at the time of joining the university. You can decide while you are here. When students enter Tokyo Tech, they join broad academic groups instead of being divided into departments. They decide which department to join by their second year. If they discover by their third year that the department they chose is not a perfect match for them, or that the course being offered in the classroom next door seems more interesting, they can still switch departments.

Sugawara: I was surprised to learn that Tokyo Tech offers many humanities courses even though it is a science and technology university. I decided to pursue science although I enjoy the humanities as well. It made me very happy when I joined the university and found out that I was able to select humanities courses.

Garhwal: Before I came here, I heard lots of good things about Tokyo Tech from alumni back home in India. After enrolling, I immediately joined the Tokyo Tech International Student Association (TISA).¹ I enjoyed the various activities



Seiya Sugawara

4th-year student,
Department of Inorganic Materials,
School of Engineering
Born in 1994 in Kanagawa Prefecture
2 dan in *Shorinji Kempo*, which he
started as an extracurricular activity at Tokyo Tech

I did there, and made many friends. Everyone was very kind and I felt very comfortable being at this university.

President Mishima: Are there any courses that left an impression on you?

Sugawara: I was impressed by the electrochemistry course taught by Prof. Akira Nakajima. There was a lot packed into this course, including many homework assignments. Each professor has his or her own style of teaching. Prof. Nakajima's course flowed very well, and he made the content very easy to understand. The Department of Inorganic Materials has many unique professors. They make the lectures very enjoyable.

Asanuma: I would say the Tokyo Tech Visionary Project.² I was most impressed by the class taught by the journalist Prof. Akira Ikegami. I think he is an excellent speaker. In the group discussion, I had the chance to speak with people who had very different views from me. It opened my eyes to new ways of thinking I had never considered until then. I would say, though, that overall, the level of the coursework could have been more challenging.

President Mishima: In some ways I would expect that. In the first year, the level of each student is different, and those who excel may need to find other ways to challenge themselves. The courses are designed to bring everyone to roughly the same level. As the courses become more specialized from the second year, I hope students use the first year to expand the breadth of their background knowledge as much as possible.

Garhwal: I found Prof. Shigeki Saito's Design Thinking Fundamentals course to be deeply interesting. It was my first project-based learning (PBL) course. Instead of classroom



Haruka Asanuma

1st-year student,
1st Academic Group (undergraduate)
Born in 1997, from Aichi Prefecture
Would like more female students to
know the benefits of university dorm life



Robin Garhwal

1st-year master's student,
Department of Mechanical Engineering,
School of Engineering
Born in 1992 in Delhi, India
Attended Japanese Language School of Tokyo University of
Foreign Studies before joining Tokyo Tech
Sixth year in Japan

lectures, you carry out a single project with other students. I learned both the enjoyment and hardships of accomplishing tasks in cooperation with students from various backgrounds.

All students are encouraged to study abroad

President Mishima: Do you have any opinion about the new education system launched this year? For example, what do you think about the quarter system?

Sugawara: My laboratory is at Ookayama Campus in Tokyo, but there was a course at Suzukakedai Campus in Yokohama that I was interested in. Therefore, I took this course for just two months in the first quarter. Had we still been using the semester system, taking the course would have been difficult due to the length of the semester. So for me, the switch to the quarter system was very useful.

Garhwal: It is now easier to take courses from other departments and majors. I am happy that more courses are conducted in English at the graduate level.

President Mishima: At the graduate level, our plan is to conduct all specialized subject classes in English by the 2019 academic year.

Asanuma: Oh, that will be tough.

President Mishima: Even if you think you are not good at English, you will gradually gain confidence once you start attending more classes in English. I sincerely hope that all students study abroad at least once.

Garhwal: I think that is a great idea. There are people who haven't studied abroad and are proficient in English, but

Round-table talk between the president and students of Tokyo Tech



Tokyo Tech's high research capacity has recently been internationally recognized. In 2016, Honorary Professor Yoshinori Ohsumi (center) was awarded a Nobel Prize. This photo was taken at a press conference with President Yoshinao Mishima (left) and Executive Vice President for Research Makoto Ando.

generally there is a considerable difference in communication skills between those who do and don't have study abroad experience. Above all, people who have studied abroad are confident in themselves.

President Mishima: You can even start by joining a short-term study abroad program for a few weeks over the summer break. I encourage everyone to make use of the various programs offered by Tokyo Tech.

Sugawara: In March, I went to Australia for ten days through the study abroad program of the Global Scientists and Engineers Course.³ I can recommend programs of this length as there aren't too many hurdles to surmount even if it is your first time.

Tokyo Tech students have a true passion for their specializations

President Mishima: Is there anything else that you like about Tokyo Tech?

Sugawara: Since I wanted to not only study but also do sports, I joined the Shorinji Kempo Team. The instructor is a Tokyo Tech alumnus. He says things like, "You throw your opponent based on the principle of the lever." It is amusing to see the scientist shine through in his teaching style.

Garhwal: I am an advisor to the organizing team of TEDxTitech.⁴

Asanuma: I live in one of Tokyo Tech's international dorms in Kajigaya, Kawasaki City. There are many friendly senior students there, and they have been very helpful. When I talk with them, I can feel the true passion they have for their specializations. Since I am a first-year student, all of them share interesting stories to try to attract me to their

specializations.

President Mishima: Talking to all of you today has reassured me that Tokyo Tech has a bright future ahead. The faculty at Tokyo Tech are always thinking about how to unleash the potential of the students and how to support them in every possible way. Please take in everything you can during your time here and enjoy your campus life to the fullest.

1. TISA: A student organization that provides support to international students and promotes international exchanges on campus.

2. Tokyo Tech Visionary Project: A program designed to develop students' ability to think independently and envision their future through a series of lectures by well-known figures and group discussions. The program was launched in the 2016 academic year for new incoming students.

3. Global Scientists and Engineers Course: A short-term overseas study and international internship program that was established to train scientists and engineers in global leadership skills.

4. TEDxTitech: A student organization at Tokyo Tech licensed by TED, a U.S. organization that runs conferences. TEDxTitech holds an event once a year.

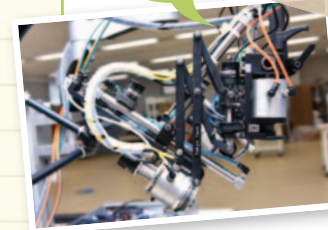


Institute Professor Akira Ikegami of the Institute for Liberal Arts

Tokyo Tech Innovations

The world's first surgical assist robot operated solely by the surgeon

EMARO moves in sync with the surgeon's movements.



Kotaro Tadano

Associate Professor,
Laboratory for Future
Interdisciplinary Research of
Science and Technology,
Institute of Innovative Research,
Tokyo Institute of Technology
Born in 1980 in Hokkaido.
Received his doctorate from the
Graduate School of Tokyo Institute
of Technology.

Daisuke Haraguchi

CEO,
Riverfield Inc.
Born in 1980 in Saga Prefecture.
Received his doctorate from the
Graduate School of Tokyo Institute
of Technology.

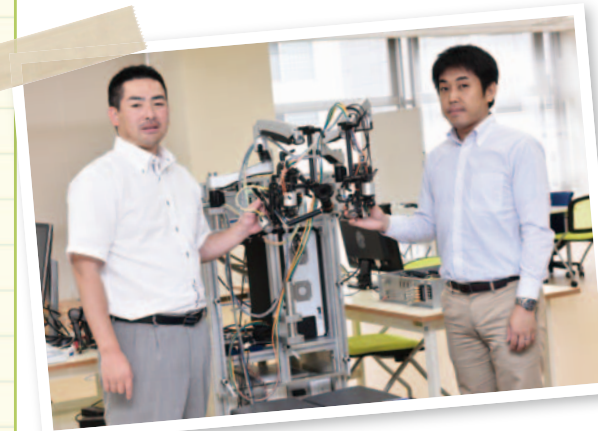
Riverfield, a startup company launched by Tokyo Institute of Technology and Tokyo Medical and Dental University, has created a pneumatic endoscope manipulator called EMARO.

Surgeries that employ endoscopes are becoming increasingly common in recent years as they leave small scars and promise rapid post-operative recovery. Until recently, such surgical operations have required not only a surgeon but also a scopist to operate the endoscope. EMARO replaces the scopist.

"If a surgeon wearing a sensor on his forehead tilts his head up, down, left, or right, EMARO moves the endoscope in sync with these movements using air pressure. The endoscope can be moved smoothly without camera shake caused by humans, resulting in more precise surgeries," says Tokyo Tech Associate Professor Kotaro Tadano.

As a scopist is unnecessary, EMARO enables endoscopic surgeries to be performed at medical facilities with a shortage of doctors.

Haraguchi (left) and Tadano with the surgical assist robot prototype



Artificial muscles applicable to power exoskeletons and other devices



Professor Koichi Suzumori of the School of Engineering carries out research on robotics and mechatronics. His research interests include thin artificial muscle that is used to move robots and other instruments. The structure of this muscle consists of a rubber tube covered with mesh fiber.

Supplying air inside the tube causes the muscle to contract. With an outer diameter of 2 to 5 mm, thin artificial muscle is considerably thinner and more flexible than conventional artificial muscles, and is expected to be applicable to a variety of devices.

"When people hear the word 'robot', they probably imagine something motorized and made out of metal. However, thin artificial muscle is not metal, and therefore, is both light and safe. We hope to make it available in nursing care power exoskeletons and supporters which are comfortable for the user as the muscle is weaved into fabric."

Suzumori and his team have been supplying manufacturers and research institutions with samples since August 2016, and expect to be mass producing and providing the muscle for a variety of uses by spring 2017.

Koichi Suzumori

Professor, Department of
Mechanical Engineering, School
of Engineering,
Tokyo Institute of Technology
Born in 1959. Received his
doctorate in engineering from the
Graduate School of Engineering,
Yokohama National University.
Previously employed by Toshiba
R&D Center and at the Graduate
School of Natural Science and
Technology, Okayama University as
professor.

The plain, string-like muscle provides amazing power.

