

Organizer: Tsukuba Science Edge 2014 Executive Committee

Tsukuba Science Edge 2014



"Tsukuba Science Edge 2014," held at the Tsukuba International Congress Center. Starting in 2010, the number of participants has increased every year and the total attendees amounted to 831 including presenters, visitors, and 38 participants from overseas such as from Singapore, Thailand, South Korea and China.

Unique scientific ideas were presented by the 8 teams selected for the final Oral Presentation competition (of these, 1 team presented in English) and 163 teams for the Poster Session (121 presented in Japanese and 42 in English) at the Tsukuba International Congress Center, which is used by world-famous scientists on occasions such as academic conventions. The presentations were evaluated by the judges including Dr. Leona Esaki, Tsukuba University professors, and members of the Science Academy of Tsukuba and other research institutes and the winning teams were selected (See the inside pages for the names of the prize winners).



- Schedule**
- Thursday, March 20, 2014
Social gathering and cultural exchange between foreign students and Japanese high school students
 - Friday, March 21, 2014
Science Idea Contest / Science Workshop

- Organizer : Tsukuba Science Edge 2014 Planning Committee
- Co-organizer : JTB Corporate Sales Inc.
- Supporters : Ministry of Education, Culture, Sports, Science and Technology-Japan / Japan Science and Technology Agency (JST) / Ibaraki Prefectural Government / Tsukubai City Board of Education / Science Academy of Tsukuba / Science Communication Circle CAST



Science Idea Contest

Discussion with top scientists!

The Science Idea Contest, which is the main event of "Tsukuba Science Edge 2014," offers the opportunity to present any scientific "Ideas" conceived based on studies through class assignments or club activities. The eight finalists proposed their ideas; this was then followed by lively discussions with scientists including Dr. Esaki.

Oral Presentation

Creativity-oriented award:

"The dramatic change of agriculture by the mystic powers of various mushrooms"

by Fugakukan High School of Shizuoka Prefecture (Tanaka Natsumi / Mochizuki Mei / Kato Ryo / Sano Kanta / Imabuchi Yuria / Chouchi Kazuki / Naito Rei / Narushima Koki / Kariya Misaki)

Exploration-oriented Award:

"Is the harlequin ladybird (*Harmonia axyridis*) strong?—prey adaptation of three Japanese ladybirds and dropping behavior to escape from intraguild predatory ladybirds—"

by Joso Gakuin High School (Murata Atsushi)

Future-oriented Award:

"Analyzing the expression pattern of TERT in planarian toward elucidating the mechanism for acquiring a life span."

by Hiroo Gakuen Junior 6 Senior High School (Iwanaga Riku)

– Other presenters –

- "A study on the measurement method for performance of fuel cell catalysts"
by Chiba Prefectural Awa High School (Naoki Mitsuda, Shingo Hama, Mami Shiraoka, and Tomokazu Noju)
- "Ants in the harbor – Monitoring of non-native ants"
by Ikeda Junior High School and High School (Nanami Nishimata, Shoko Hatoya, Hiro Harada, and Taiga Yamaguchi)
- "About the development of measuring instruments for volcanic ash in Sakura-jima"
by Kagoshima Prefectural Kinkowan Senior High School (Kazuki Arakawa, Miki Nakamura, and Yu Nagatomo)
- "Awaken the latent power of pine needles!"
by Shizuoka Prefectural Shizuoka Agricultural High School (Rie Kume, Sumika Yamaguchi, Hiromichi Niwa, Juri Takasu, and Junnosuke Nakata)
- "Development of a new indoor wall coating material using waste powder of widely-distributed, local, high-quality stone (tuff) 'Tatsuyama-ishi'"
by Hyogo Prefectural Kakogawa-higashi High School (Yuka Iwamoto and Manami Ito)

– Judges –

Leona Esaki (Physics / Director, Tsukuba International Congress Center),
Masatoshi Okada (Physics / Honorary Adviser, National Institute for Materials Science),
Keiji Kainuma (Agriculture / Senior Adviser, Graduate Faculty of Agriculture, Kyushu University), and
Pi-Chao Wang (Life Science / Professor, Tsukuba University)



Each team was allocated 10 minutes for their presentation. After that, from the judges they received feedback and advice regarding the course of experiments and how to draw conclusions from their results, and questions that could lead them to the next study topics. Dr. Esaki, especially, raised questions related to the core concepts of the Idea Contest, such as "How did you come up with this idea?", "Why do you think this idea is worth examining?" and "How do you think you can make this idea useful for the development of society or the social economy?"

– Judges for screening –

Kisaburo Kodama (Geoscience / Emeritus Adviser, National Institute of Advanced Industrial Science and Technology)
Susumu Nishimura (Medical Science / Visiting Researcher, Laboratory Animal Resource Center, Tsukuba University)
Kiyooki Maruyama (Biology / Visiting Professor, Tokyo University of Agriculture)
Miwako Kuno (Pharmacology / Special adviser, Joyo Industrial Research Institute Ltd.)
Toshiko Ohta (Biology / Adviser, Japan Aerospace Exploration Agency [JAXA])
Hiroshi Miyamoto (Biology / Coordinator, Tsukuba International Congress Center)
Kensaku Mizoguchi (Chemistry / Coordinator, Science Academy of Tsukuba)

Poster Session

Language Category – English

First Prize:

"Approach to the General Solution of the Jisugwimundo"

by Using the Maximum and Minimum Value" by CHANGWON SCIENCE HIGHSCHOOL, Korea (Sanghu Park and Gyunuk Kwon)

Second Prize:

"Creating Artificial Photosynthetic Animals Using Chlorella and How they Affect Animal Cells"

by Yokohama Science Frontier High School, Japan (Sosei Suzuki)

Third Prize

"Study of the nature of honey coiling: A meta-analytical review on the liquid rope effect observed in honey coiling"

by Raffles Institution, Singapore (Toh Wen Qi and Loke Yen Chin)

Language Category – Japanese

First Prize:

"Herbicides and the growth of nostoc, and their influence on soil"

by Yamagata Prefectural Murayama Agricultural High School (Tsuki Imai and Haruka Sato)

Second Prize:

"Investigation into 'greens' in traditional New Year's food in Japan – Let's eat chlorogenic acid!"

by Bunkyo Gakuin University Girls Senior High School (Saeri Nagakura)

Third Prize

"Influence of temperature extremes on the longevity and mobility of eelworms – With a view to applications for humans"

by Meikei High School (Ruko Etsumi)

– Judges – <Both Japanese and English Language Categories>

Hiroshi Miyamoto (Biology / Coordinator, Tsukuba International Congress Center)
Kensaku Mizoguchi (Chemistry / Coordinator, Science Academy of Tsukuba)
Tetsuo Tsuchiya (Chemistry), Tadashi Nemoto (Chemistry/Biology), Tomoyo Ochiishi (Biology/Brain science), Hidetoshi Inagaki (Biology/Brain science), Motomichi Doi (Biology/Brain science), Kouji Miyake (Physics/Mechanical engineering) and Kimio Sumaru (Chemistry) from National Institute of Advanced Industrial Science and Technology
Mitsuhiro Ebara (Chemistry), Genki Yoshikawa (Physics), and Renzhi Ma (Chemistry) from National Institute for Materials Science
Sosaku Ichikawa (Biology), Marcos Neves (Biology) and Takayuki Shibata (Physics) from Tsukuba University
Brian Landberg (Cell Biology / Senior Engineer at Intel K.K.)
Tetsuya Muramoto (Cell Biology / Director, NPO Nippon Science Service; Researcher at RIKEN)
Masayuki Takahashi (Ecology / Principal Director, NPO Nippon Science Service; Emeritus Professor at University of Tokyo and Kochi University)
Nobuhiro Umeda (Pharmacology / Researcher, Astellas Pharma Inc.)

– Judges – <Japanese Language Category Support>

Takeshi Fujita (Student, 2nd Grade of the Integrated Science Course, College of Science, Ibaraki University)
Yuuki Nishino (Student, 1st Grade of the Earth Science Course, Ibaraki University)



The Poster Session was conducted on different floors according to the language category: Japanese and English. Of the 163 participating teams, 42 presented their posters in English. Many scientific ideas were proposed at the Poster Session. The results were determined by the review of scientists and the votes of attendees. All presentations were unique and based on physical, chemical, biological, etc., investigations on diverse topics such as one familiar and directly connected to our daily lives, one related to local specialties, and one traditional at school science clubs.

*The next page introduces in detail the Poster Session of the English Language Category.





Poster Session Special Report

<Language Category – English>

The Poster Session (English Language Category), which was held near the main hall, was participated in by 42 teams from 26 schools in Japan, Thailand, Singapore, China and South Korea. The students stood in front of the posters showing their study results and explained the details to the judges moving around the venue. Post-presentation discussions subsequently took place. Their study topics varied, ranging from IT to medicine, biology, geology, astronomy, mathematics, physics and chemistry. English is the only eligible language used for posters and presentations. Some teams continued to practice until the last moment, but once the presentations were started their nervousness was nowhere to be seen. Enthusiastic discussions between the students and the judges took place, filling the venue with an air of enthusiasm.

Mr. Brian Landberg (Intel K.K.), one of the judges, commented "The study topics were highly diverse. It was good that many of the studies were initiated by the basic aspiration that 'they wanted to contribute to science by solving a puzzle.' Their English skills are generally very good and they had no problems handling Q and A sessions in English."

Mr. Testuya Muramoto (NPO Nippon Science Service), also a judge, said "Many teams, especially foreign teams, received support from professionals at universities, and therefore their levels were high. Properly investigate the background of the study topic, raise questions, carry out the research and obtain the results. If a team went through this course of research activities, the presentation was also very clear."

Find a topic in daily life!

The study topics of the English Poster Session were diverse. Many of the studies started from a simple question or awareness of everyday life. Cho Junggho and Yoon Hyungjune of Changwon Science High School (South Korea) realized that the cones of pine trees at a park near their school opened on fine days but closed on rainy days and used this characteristic of pine cones to develop a humidity controller. Toh Wen Sheng and Chua Eu Jing of the National University of Singapore High School of Mathematics and Science (Singapore) came to realize that many people lost their lives because they forgot to take their medicine and so built a less costly system that anyone could use to prevent such problem. At the presentations, both teams conducted demonstrations using the models they made, which attracted attention from the judges and attendees.



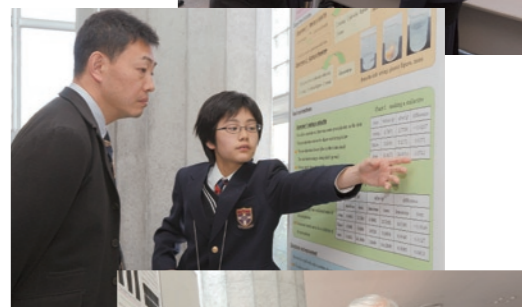
Presentation with a little twist!

Every single one of the posters surrounding the venue was a masterpiece. The posters made by Japanese teams were often characterized by the deliberate layout of paragraphs and images with black frames on a white background. In addition, the colorful posters of foreign teams were also impressive. By using images as a background, coloring the background, or changing the color according to the sections of the study abstract, method and results, they were designed to have a strong impact on viewers and make them easy to understand at a glance. For many Japanese students, "English", which is used for the presentations, is a foreign language. Shotaro Nakata of Hiroo Gakuen Senior High School described the difficulty he experienced, "To what extent and about what we should explain for a clear presentation, which is hard to judge in English instead of Japanese."



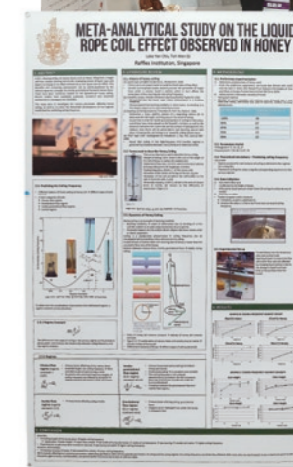
No research is without hardship

The Poster Session gives the opportunity to present research achievements. However, before reaching this point, every team had to overcome certain difficulties. According to Aika Maniwa of Tokyo Metropolitan Toyama High School, who worked on the development of test papers that can be used for simple measurement of sulfate ions contained in PM2.5, etc., the biggest problem she faced was to establish good reaction repeatability. The third prize awardees of the English Poster Session, Toh Wen Qi and Loke Yen Chin of Raffles Institution (Singapore) recorded "the coiling phenomenon of viscous liquids such as honey when falling from above" for observation, using a video camera with a high frame rate. The most painstaking part was to count the number of rotations of the liquid rope by watching the video frame by frame. They said, "We needed a lot of patience and it was really a quite laborious task!"



Lively, face-to-face discussion with the judges!

A characteristic of the Poster Session is the presentation and Q & A session that takes place directly between the students and the judges. Because of their proximity, the students, especially, were able to have valuable learning opportunities by receiving many questions, advice or insightful comments from the judges. Pitchayawee Kittitanuvong of Bodindecha (Thailand), who conducted topographical mapping based on three-dimensional analysis of aerial photographs, was recommended "checking the validity of the created maps by actually visiting the place concerned" by a judge. To improve photographic analysis skills, field work experience will also be important. Li Huiwen and her friends of the High School affiliated to Fudan University (China) said with a smile "We received a lot of questions from the judges, but they also pointed out a lot of good things (about our presentation). That was very encouraging."





Science Workshop

The "Science Workshop," which is favorably received every year. With the cooperation of companies, organization, universities, etc., which work at the frontier of scientific research, a total of 20 workshops covering various fields from natural science, such as chemistry and biology, to applied medicine were held.

List of workshops

Ube Industries, Ltd.	Learn about satellite thermal design! Conduct a thermal insulation test with materials used for an actual satellite.
CYBERDYNE Inc.	Human support technology and robot suit HAL®
Tangalooma Marine Education & Conservation Center	Deepen the understanding of marine animals through science to coexist with nature - Australian ecotourism with minimal impact on the natural environment. Increase motivation and take action for nature conservation -
Intel K.K.	Deliver the highest level of science presentations among high school students worldwide
Ushio Inc.	Adhesive of light!?! - How come? It's UV "optical coupling" to attach things together -
Inter-University Research Institute Corporation, High Energy Accelerator Research Organization (KEK)	Beginning of the universe, Big Bang, dark matter and dark energy
Kozo Keikaku Engineering Inc.	Control "oscillations"! - How to protect buildings and people from earthquakes -
Covidien Japan Group	Create a healthy society through science! - Aiming at the least invasive diagnosis and treatment -
Dai Nippon Printing Co., Ltd.	Regenerative medicine x Printing technology = Future adhesive bandages!?! - Let's experience cell sheets -
Hitachi Chemical Co., Ltd.	The latest "chemistry" is there in front of you!
National Museum of Emerging Science and Innovation	Explore the Earth through Geoscope! Future of the Earth according to the scenario of climate change
Japan Aerospace Exploration Agency (JAXA)	"How to build a spaceship"
Tokyo Denki University	Balancing technology - Feedback control -
Tokyo Denki University	Let's embark on a journey to explore spatial memories by listening to the sound of the "Acoustic barrel"
Tokyo University of Agriculture	The science of mushrooms with a variety of applications - From disease prevention/treatment to environmental remediation -
Kogakuin University	Micro-robots inspired by insects
Ochanomizu University	Birth of marine life and its evolution - Follow the evolutionary path from larva -
University of Tokyo, Science Communication Circle CAST	Let's learn about DNA, the program to connect life!
University of Tsukuba	The world of protein science under the guidance of Nobel laureates
Vixen Co., Ltd.	Experience making a handmade telescope



Cultural exchange meeting

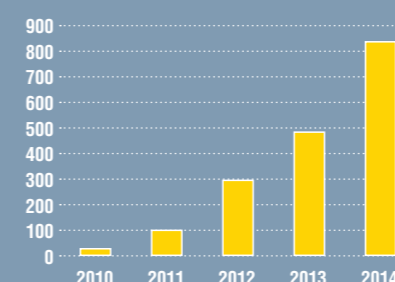
The day before the opening of Science Idea Contest, a social gathering and cultural exchange between the participating students from Japan and overseas was held at a meeting room of Tsukuba International Congress Center. The gathering and the program were planned and conducted by the students of Hiroo Gakuen Senior High School and Junten Senior High School. Introducing themselves and playing games together, the students from Singapore, Thailand, South Korea, China and Japan started talking in English about the latest trends in their own countries, schools, etc., and came to know each other much better.

In July 2014, "Global Science Link Singapore," a foreign version of "Tsukuba Science Edge" will be held. The top three teams of this year's Science Idea Contest (Oral Presentation) are invited to this scientific event in Singapore.

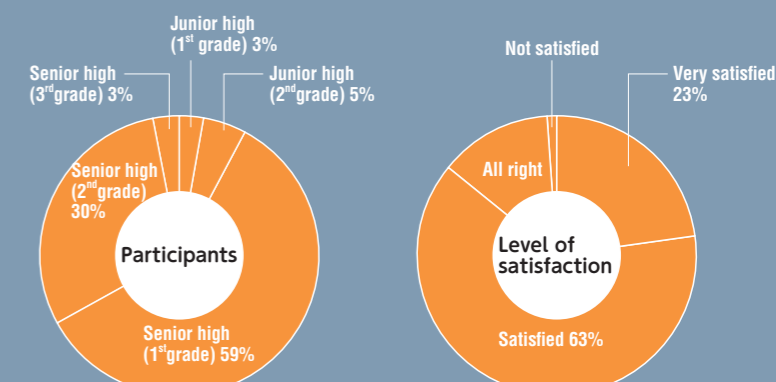


DATA

Change in the number of participants



*The given data in 2011 is referential (number of registrations)



The 5th meeting will be held on Monday, March 23 and Tuesday, March 24, 2015 (for two days).

International Science Idea Content for Junior/Senior High School Students Tsukuba Science Edge 2015

Come Join Us
For Science Fun



Attendee Eligibility

① Idea Contest (Oral Presentation)

- Register your Idea for screening.
- Eight teams will be selected to give an oral presentation in the final competition to be held on Tuesday, March 24.
- The awardees will be selected and commended based on the evaluated results by the judges. The unselected teams in the first screening can participate in the Poster Session.

*Oral presentations can be delivered in English.

② Poster Session for presentation of Science Idea or research activities (in Japanese)

- Presentation/introduction will take place at the poster exhibition hall.
- The awardees will be selected and commended based on the evaluation results and votes of the Poster Session judges and attendees.

*Participation on only one of the two days is also allowed.

③ Poster Session: presentation in English (10 min./team. *Presentations should be delivered in accordance with the Intel ISEF rules)

- Presentation/introduction in English will take place at the poster exhibition hall. (Scheduled in the afternoon of Monday, March 23)
- The awardees will be selected and commended based on the evaluation results by the judges.

④ Attendance as visitors in Idea Contest, Poster Session, and Workshop (free of charge)

- Registration can be made even if you wish to only participate in the Workshop. Walk-in attendance as visitors on the day is also allowed.

*To participate, every team has to choose one of the above four categories.

What to deliver in the presentation

Any "Idea" that is originally conceived by individuals or groups of junior/high school students (immediate feasibility does not matter, but it has to be an inspiring idea.) / The presentation should contain research or technological ideas and, if possible, plans for realization of the Idea. / Scientific findings and evidence should always be backed up by references (such as published research papers).

*PowerPoint should be used to give a post-screening slide presentation at "Tsukuba International Congress Center."

How to participate

How to register (Registration period: from the middle of October 2014 to the end of January 2015) (Not finalized yet)

*For details, please visit our website.

The post-registration procedures vary depending on the type of participation: Idea Contest (Oral Presentation), Poster Session for presentation of Science Idea or research activities (in Japanese), Workshop only, and attendance as visitors.

*In principle, no participation fees are needed. However, when registering for the Oral Presentation (OP) and Poster Session in English, a payment of JPY 5,000 per team is required as a screening fee. (If a team does not pass the screening but will still participate in the Poster Session in Japanese, the "evaluation result" will be delivered after participating in the Poster Session. The screening fees are not refundable.)

Team selection

The screening will be conducted based on the registered Ideas. The selected teams will be notified about the details.

In the case of Poster Session registration, the teams permitted to participate will be notified about the details.

Final competition

Tuesday, March 24, 2015 *Oral Presentation

The eight teams selected to compete in the Idea Contest will deliver a PowerPoint presentation at the "Tsukuba International Congress Center."

*Approximately 10 minutes are allocated to each team. After the presentation, a discussion (Q and A) will take place.

*Presentations by Poster Session teams will take place at a different venue.

*Participants in both the Idea Contest and Poster Session will attend the award ceremony.

About awards and prizes

From a strong desire of the Evaluation Committee to "encourage the perspectives necessary for scientific researchers," the Science Idea Contest has established three unique prizes for distinct attributes: "Inventive," "Explorative" and "Futuristic" (for the Oral Presentation). In addition to commemorative plaques and award certificates, extra prizes will also be presented. Commendations will also be presented for the Poster Session and exhibition of research achievements.

❁ Date : Monday, March 23 and Tuesday, March 24, 2015

❁ Venue : Tsukuba International Congress Center
(2-20-3 Takezono, Tsukuba-shi, Ibaraki Prefecture, Japan)

❁ For more information/registration : <http://www.jtbbwt.com/ScienceEdge/>

■ Organizer : Tsukuba Science Edge 2015 Executive Committee

■ Co-organizers : JTB Corporate Sales Inc. and Tsukuba Congress Center

■ Sponsors : Ministry of Education, Culture, Sports, Science and Technology-Japan / Japan Science and Technology Agency (JST) / Ibaraki Prefectural Government / Ibaraki City Board of Education / Science Academy of Tsukuba

■ (For the 2014 Meeting) Supporting companies/universities :

Intel K.K.; Ushio Inc.; Ube Industries, Ltd.; Kozo Keikaku Engineering Inc.; Covidien Japan Group; Tangalooma Marine Education & Conservation Center; Dai Nippon Printing Co., Ltd.; Vixen Co., Ltd.; Hitachi Chemical Co., Ltd.; Ochanomizu University; University of Tsukuba; Kogakuin University; Tokyo Denki University; Tokyo University of Agriculture; and Singapore Tourism Board

■ Cooperation : Japan Aerospace Exploration Agency (JAXA); Japan International Cooperation Agency (JICA); National Museum of Emerging Science and Innovation; CYBERDYNE Inc.; Inter-University Research Institute Corporation, High Energy Accelerator Research Organization (KEK); Ibaraki University; and University of Tokyo, Science Communication Circle CAST