

Tokyo

Winter / Spring 2022

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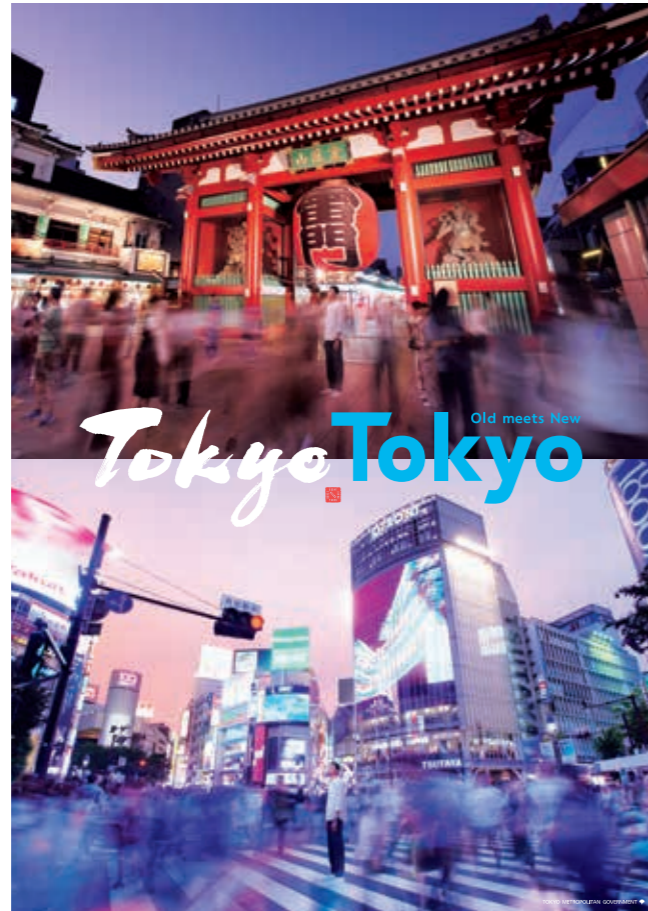
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Tokyo

Winter / Spring 2022



HOST CITY



The image above is the logo and slogan for Tokyo. The unique aspects of the city are conveyed in two different fonts representing the coexistence of old and new: the brushstroke expresses the traditions that date back to the Edo period (1603–1868), while the sleek block typeface expresses the cutting-edge culture of a modern city and is done in sky blue to represent an innovative future. The traditional square stamp in red that graces the logo illustrates the famed crossing in front of Shibuya Station, one of Tokyo's symbolic landmarks.

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Tokyo is a publication issued periodically by the Tokyo Metropolitan Government with the aim to provide readers with the latest information on various aspects of Tokyo, including events, programs, and experiences.

From Corporeal to Cerebral to Spiritual

The sporting spectacle of the Tokyo 2020 Games was given a scintillating cultural counterpoint in Tokyo Tokyo FESTIVAL.

by **Jordan A. Y. Smith**

While the world celebrated the athletic excellence on display in stadiums and other arenas during the Olympic and Paralympic Games Tokyo 2020, elsewhere in Japan's capital on streets, in parks, and even on buildings, a celebration of arts and culture was also taking place. The Tokyo Metropolitan Government and Arts Council Tokyo (Tokyo Metropolitan Foundation for History and Culture) planned and executed Tokyo Tokyo FESTIVAL (TTF) as a major showcase of art, architecture, music and technology, and more to promote Tokyo's appeal as a city of arts and culture in its Olympic and Paralympic year. The postponement of the Tokyo 2020 Games allowed TTF a second lease on life, and its reassembled lineup of attractions captivated the public over the summer of 2021.



Pavilion Tokyo 2021 was a world-first experiment to propose unrestrained and new urban landscapes by installing architecture or objects at locations mainly around the National Stadium.

- a: **Suimei / Kazuyo Sejima** photo: Kazuyo Sejima & Associates
- b: **The Obliteration Room / Yayoi Kusama** © YAYOI KUSAMA
Yayoi Kusama / The obliteration room 2002–present Collaboration between Yayoi Kusama and Queensland Art Gallery. Commissioned Queensland Art Gallery. Gift of the artist through the Queensland Art Gallery Foundation 2012 Collection: Queensland Art Gallery, Australia Cooperation: OTA FINE ARTS photo: Shuji Goto
- c: **Global Bowl / Akihisa Hirata** photo: ToLoLo studio
- d: **Kokage-gumo / Junya Ishigami** photo: Shuji Goto
- e: **Tokyo Castle / Makoto Aida** © AIDA Makoto photo: ToLoLo studio
- f: **Tea House “Go-an” / Terunobu Fujimori** photo: Hideki Ohtaka
- g: **“2020-2021” / Daito Manabe + Rhizomatiks** photo: Keizo Kioku
- h: **STREET GARDEN THEATER / Teppei Fujiwara** photo: ToLoLo studio
- i: **Cloud pavilion / Sou Fujimoto** photo: Keizo Kioku

Under the umbrella of TTF, TTF Special 13 was created in order to bring together original and innovative projects that enabled participation by as many people as possible. These 13 projects were selected from among 2,436 applications, both domestic and from overseas.

One of the projects, Pavilion Tokyo 2021 brought together six internationally renowned architects and two artists, giving them free rein to create installations mainly around the National Stadium. The area became a veritable treasure hunt for visitors who, map in hand, sought out the Pavilions in order to admire their artistry and ambition.

In the run-up to the lighting of the Olympic flame at the National Stadium, a quaint and inviting structure was erected outside. Sloping walls covered with green grass sod were topped with a scorched wooden structure; an elevated salon with a view of the streets around the stadium. Tea House “Go-an” (meaning the fifth hut) was designed by architect Fujimori Terunobu, who is famous for unique architectural creations with whimsical, fantastic lines, often positioned atop tree trunks or unobtrusively nestled into natural surroundings.

In the fashionable area of Aoyama off Ginkgo Avenue were two Japanese castles, with a twist at the level of materials—one was wrapped completely in blue tarps held down by ropes and cords, and the other appeared to be covered in old cardboard from packing boxes. “Tokyo



The sides of two massive skyscrapers became a pair of canvases. Each large-scale mural art had a distinct take on the theme, one of water and another of fire. Tokyo Tokyo FESTIVAL Special 13 “Super Wall Art Tokyo,” Drill Inc.

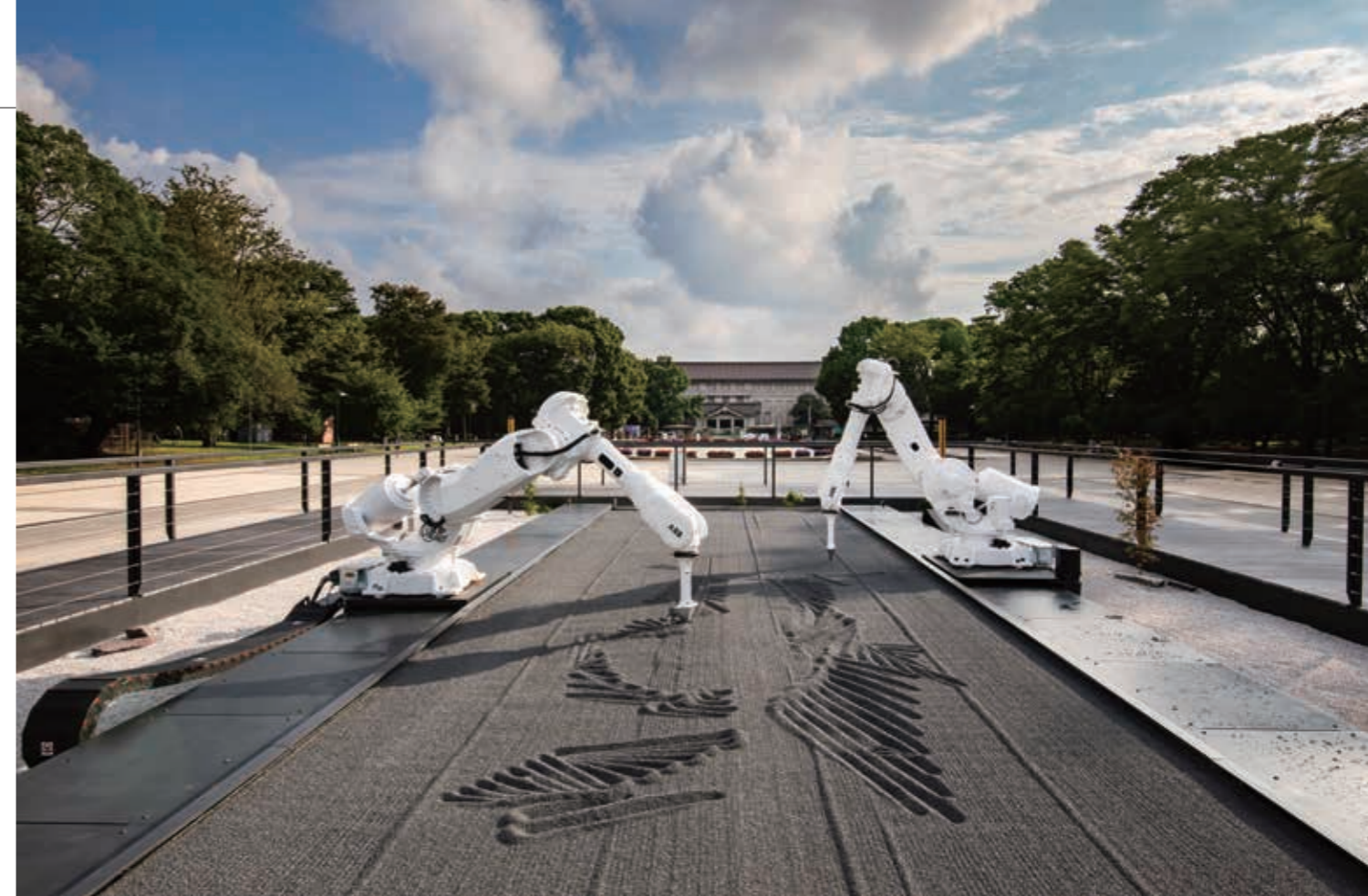
Castle” was created by provocative artist, Aida Makoto. Hope could be found here, yet with an edge. The title of this piece, and the substrates chosen in its construction—cheap recycled materials, rather than the enduring expensive substances used in much sculpture—spoke to the indomitable nature of the human race, while also acting as a prescient reminder of our precarious relationship with the natural world in all its power and unpredictability.

In another part of the uptown area, in front of the United Nations University in Omotesando, “Global Bowl,” by architect Hirata Akihisa, was one of the most seemingly simple sites in the Pavilion collection: a wooden construction standing about four meters tall. The bowl-shaped structure was actually a set of interconnected, twisted beams of wood, inviting views of the city through the many “windows” it presented, each changing in angle and shape.

Close by, inside the branch office of Shibuya Ward Office, a whole other dimension was exhibited by internationally celebrated artist Kusama Yayoi: “The Obliteration Room,” which was a set of completely white rooms equipped with “normal” household objects, from cookware to toys to furniture—every single thing a blank white. Upon entry, visitors received a sheet of stickers, each sticker a dot of different sizes in single colors. Stickers could be placed anywhere, and the resulting spirals of dots came to decorate the room in a uniquely chaotic, yet orderly way.

Pavilion Tokyo 2021 also featured impressive and varied works by Fujimoto Sou, Fujiwara Teppei, Sejima Kazuyo, Ishigami Junya, and Manabe Daito + Rhizomatiks, the panoply of Pavilions bringing a sense of artistic discovery and excitement to the metropolis.

Besides the myriad delights of Pavilion Tokyo 2021, the Marunouchi and the Shin-Marunouchi Building, two skyscrapers standing in front of Tokyo Station, received an artistic makeover as colossal as it was magnificent during the summer of 2021. Another offering of TTF Special 13, “Super Wall Art Tokyo,” the effort of father and daughter artists Yokoo Tadanori and Yokoo Mimi, was one of the largest of its kind in the world (at approximately 150 by 35 meters each!), repurposing one side of



These robots actually appeared to pause and think, retracing their path to consider the best approach. Tokyo Tokyo FESTIVAL Special 13 “The Constant Gardeners,” Jason Bruges Studio
Photo: Jimmy Cohrssen Courtesy of Jason Bruges Studio

each skyscraper as a pair of canvases showcasing public art. The vertical real estate of the two Tokyo landmarks and the creativity of the artists allowed the creation of a cultural talking point of monumental proportions.

A daring amalgam of robotics, sports, and Japanese garden culture, “The Constant Gardeners,” by innovative interactive designers Jason Bruges Studio was another standout of TTF Special 13. In Ueno Park, surrounded by museums, art galleries, and a zoo, four gleaming white factory robots moved methodically using their one arm to draw patterns representing athletes’ movements in a rock garden similar to those seen in temples, often connected with the Zen tradition, where the constant raking of patterns in a bed of pebbles can be a route toward enlightenment.

Not only were the parks, streets, squares, and buildings of Tokyo used as locations for TTF Special 13 installations, the art unit 目 [mé] (meaning eye), used the skies above the metropolis as the location for their “masayume” (or prophetic dream) project. Inspired by a dream experienced by Kojin Haruka, artist and member of 目 [mé], during her adolescence, the team created a huge face that graced parts of the Tokyo skyline. The selection process

for this face was rigorously inclusive, with public submission of different faces, regardless of nationality, gender, and age, from around the world.

TTF was an all-together entrancing artistic event that gave culture a platform alongside the Tokyo 2020 Games to be enjoyed by all. This summer of such creative output has reaffirmed Tokyo as a city to watch in the future, when culture-hungry visitors can once again roam its streets in force.



The face of “masayume” overwhelmed observers as it hovered over the skyline in the city center. Tokyo Tokyo FESTIVAL Special 13 “masayume,” 目 [mé], 2019-21
Photo: KANEDA Kozo



Nishikawa "Charles" Chiharu poses proudly outside the National Stadium.

Managing a major sporting event like the Olympic and Paralympic Games Tokyo 2020 is no easy feat. An important part of this process were the volunteers—a group of people often overlooked, whose friendly faces and congenial presence gave proceedings a human dimension.

For the Tokyo 2020 Games, volunteers were managed in two groups: Field Cast, who directly supported the operation of the Games in ways such as running the competitions and providing information to concerned parties at the venues and the Olympic and Paralympic Village, and City Cast, tasked with being guides around the Olympic flame and assisting at Tokyo Sports Square, which was an information center set up to promote the city during the Tokyo 2020 Games.

“People who were able to work well in teams, with a sense of consideration and compassion, came together in great numbers—regardless of age, gender, or impairment—to support the competition,” explained one training manager. A cumulative total of over 76,000 people worked as Field Cast and more than 20,000 as City Cast.

as well as how to balance health and safety concerns while pleasing those attending and participating.

Field Cast member Awada Shuhei, a wheelchair user, had attended three previous Games, and been struck by the level of support he received there, so for him, his stint as a volunteer was about giving back. Reflecting on his experience at the Tokyo 2020 Games, he said he learned how to utilize his knowledge and experience to add value to the event. He described how volunteers in his team went the extra mile to make the experience enjoyable. For example, they decorated their workstations with origami cranes and also distributed handwritten messages to visitors as *omotenashi*—an expression of wholehearted Japanese hospitality.

City Cast member Sugisaka Tsutomu acted as a guide for international media at the Tokyo Media Center set up by the TMG. He applied because people who came from overseas for the Tokyo 2020 Games might be less familiar with Japan compared to usual tourists, and they might need more help. “I was glad to play a small role in international relations by showing that Japanese people are



Gika Akiko giving directions with a radiant smile at the entrance of Tokyo Sports Square.

Sharing the Experience

Field and City Cast members talk about their participation in the Tokyo 2020 Games.
by **Anne Lucas**

The lengthy and extensive training of the volunteers began well before the Games, with the Tokyo 2020 Organising Committee handling the Field Cast and the Tokyo Metropolitan Government (TMG) managing the City Cast. All volunteers were educated in the history and significance of the Games and given an outline of the upcoming Tokyo 2020 Games. They were instructed in the quality of tone and manner expected of them, as well as methods of support for people with impairments. The COVID-19 pandemic necessitated training to be moved online, and thorough infection prevention measures were added to the curriculum.

Being a volunteer is a significant role, but unremunerated. So, what inspires a person to sign up for the role?

One Field Cast leader, Nishikawa “Charles” Chiharu, was extremely grateful to have witnessed the gold medal being won, a number of times. A seasoned volunteer and provider of language support who had worked at the past three Games interpreting in events such as table tennis, Nishikawa believes the pandemic has been instructive in how to handle large international events going forward,

friendly, positive, and helpful.” Another valuable lesson he learned during training was how to engage with people with impairments. “It is more important to ask them what specific help they need rather than simply learning how to assist with wheelchairs and so on.”

Gika Akiko, another one of the City Cast, said that as soon as the Tokyo 2020 Games were announced, she knew immediately she wanted to be involved, seeing it, amongst other things, as a chance to promote Shibuya Ward in Tokyo, where she lives. In preparation for the Games, she volunteered for a wide range of other events. “I find volunteering as enjoyable as someone might find playing tennis or golf. I love how it allows me to come into contact with people I wouldn’t necessarily have a chance to meet in my daily life.”

The contribution of the volunteers was one of the factors that led to the success of the Tokyo 2020 Games. While the scope of their activities may have been reduced from what had originally been planned, the sense of satisfaction they gained was far from inconsequential. As Nishikawa put it: “Working as a volunteer changes you as a person in a positive way. It becomes a true vocation.”



Sugisaka Tsutomu was a beacon of helpfulness at Tokyo Media Center.

Awada Shuhei volunteered at Ariake Arena, which hosted the wheelchair basketball events.



Precision on Every Level

An important factor in the development of Para sports has been the expertise of the Japanese manufacturing industry.

by **Jordan A. Y. Smith**

The roots of boccia (pronounced “botcha”) can be traced back thousands of years to Europe. However, its latest peripheral refinements were made here in Japan, with the Japanese Paralympic medal-winning teams of the Rio 2016 Paralympic Games and the Tokyo 2020 Paralympic Games benefiting from equipment produced by a Tokyo-based engineering and design company specializing in cases and containers.

Boccia was introduced at the New York 1984 Paralympic Games as a competitive sport. It is played on a flat court by individuals, pairs, or in teams of three. After the white target ball (the “jack” ball) is rolled, opposing players or teams roll their six blue or red balls toward it, with the team or individual getting closest to the jack ball being deemed the winner. In the Paralympics, athletes with severe cerebral palsy or other limb impairments roll or kick their balls, or they use ramps. Ramps are pieces of adjustable equipment that allow the player to funnel the ball on to the court and toward the jack ball at a specific incline.

The number of people playing boccia in Japan grew from around 100 at the time of the Rio 2016 Games to nearly 300 at the time of the Tokyo 2020. Japan was able to showcase its prowess at the Tokyo 2020 Games with a trio of medals: in the individual competition Sugi-



The boccia ball cases—specially designed by a Tokyo-based engineering and design company—gave the Japanese team a distinct advantage.

mura Hidetaka took home gold, with silver being earned in the pairs and bronze in the team competition.

While the athletes’ success is a testament to their skill and dedication, the company also played a significant supporting role in that success. Headquartered in Setagaya Ward, a leafy residential area in Tokyo, the company’s innovative and sturdy manufacturing has aided a variety of Para athletes, having previously produced protective cases for seats used in Para alpine skiing and Para canoe.

In the run-up to the Rio 2016 Games, the company received a request via the Japan Boccia Association to produce a special ball case for the Japanese boccia team. (Boccia

balls must be controllable down to the millimeter, and if the balls had sustained any damage on the way to Rio de Janeiro, it could have put the team’s chances for success in jeopardy.) The timeline was tight, and the company did not at that time have the ideal circular blades with which to carve the hemispherical indentations necessary to hold the balls snugly. Nevertheless, the fabrication team persevered, and within three weeks they were able to produce the necessary expanded polyethylene inlays that could be fitted inside one of their existing hard cases. For the Tokyo 2020 Games, the company was able



Boccia can be enjoyed by people with severe impairments and also across generations from kindergarten students to the elderly.

to refine their techniques and produce a space-saving case that was within the size limit for players to carry on to the boccia court themselves.

Boccia balls are made of leather and are susceptible to changes in atmospheric pressure, temperature, and humidity. They are especially vulnerable to the marked fluctuations in humidity caused by altitude changes on international flights, so a drying agent was placed inside the case. This protected them from absorbing moisture and increasing in weight beyond the strict competition limits.

The cases drew admiration from foreign athletes at the Rio 2016 Games. Also, the ace of the silver-winning 2016 team, Hirose Takayuki, even visited the factory to thank the fabrication team for their hard work.

As another topic related to the Tokyo 2020 Paralympic Games, the Tokyo Metropolitan Government (TMG) has also supported small- and medium-sized enterprises

and local communities that are working on the development of excellent technologies and products for Para sports. At the Games, Japanese Para athletes won medals using newly developed competition wheelchairs manufactured by these businesses. The TMG will continue to support the development of Para sports equipment produced by small- and medium-sized enterprises, as well as equipment that can be used by a wide range of people in their daily lives.

The Tokyo 2020 Games were a great opportunity to see the breadth of modern athletic competition. They also gave witness to the manufacturing team whose fabrication skills made the Japanese Paralympic team’s experience at the Games as smooth as possible. Such technical expertise will continue to elevate sports, as well as people’s lives, to new heights in the future.

Sports for All

How Edogawa Ward has helped to create a more inclusive environment for people with impairments through its initiatives for the Paralympic Games.

by **Anne Lucas**

Tokyo is notable for, among countless other things, being the only city to host the Summer Paralympics twice. Throughout its sophomore effort preparing to host the Tokyo 2020 Paralympic Games, the city was determined to promote Para sports as widely as possible, and due to the great strides made towards the realization of a fully barrier-free environment, Tokyo has consolidated its



The archery facility in Edogawa Ward is used by many Para athletes.

commitment to diversity and inclusivity.

The easternmost of the 23 special wards that make up the Tokyo Metropolis, Edogawa is an idyllic ward traversed by rivers and imbued with a sense of history. In 2016, Edogawa Ward became the first municipality in Tokyo to establish a dedicated division in charge of sports for the impaired. In the run-up to the Tokyo 2020 Games, the ward was tasked with creating awareness of Para sports and fostering better understanding of persons with impairments. Some of the events they arranged include art exhibitions, seminars, and classes.

Edogawa took its cue from the Netherlands—a country where Para sports are well integrated into society—and from 2017 on, invited Para athletes and educators to the ward in order to draw on their expertise. Through

various workshops, participants gained insights into how sports can effectively be used to increase self-confidence and improve interaction between those with and without impairments. In acknowledgement of these efforts, the ward was approved by the national government to be registered as a Leading Host Town of a Harmonious and Inclusive Society in 2019. The Host Town Initiative aimed to connect Japanese local towns with countries and regions that were taking part in the Tokyo 2020 Games and to encourage various exchanges in terms of sports, culture, economy, and so on.

Edogawa achieved a national first in the creation of a program to ensure that all 22 Paralympic sports could be practiced within the ward. Named the Tokyo Paralympic 22 Sports Declaration, the project—started in



The ward is endowed with waterways and makes an ideal location for experiencing Para canoe.

December 2020—was challenging in terms of acquiring appropriate locations and equipment, and in defining the requirements and approaches to be taken in its realization. However, by facilitating positive collaborations with various sports groups, clubs, and athletes, the ward successfully enabled an environment in which people with impairments could learn about and experience a wide range of sports including canoe and archery, which

are comparatively more difficult to organize.

The various workshops the ward has organized invite people—with or without impairments—to participate in fun forms of exercise. The ward hopes people will be encouraged to make the most of sporting activity, and that their quality of life will be improved as a result.

One teenager who has participated in the wheelchair track and field workshop shared her experience. “I have gained confidence through athletics,” she said. The

association member commented: “Equipment such as fixing plates—that firmly fix the wheels to the floor—are indispensable for wheelchair fencing, but there are not many facilities nationwide equipped with them. I am very grateful that the ward has prepared the environment so that we can practice the sport.”

“People with impairments still have fewer options when it comes to playing sports,” said a ward official. “We would like to continue to foster an environment in which



Edogawa Ward also has various sports arenas where Para athletes were able to practice for the Tokyo 2020 Games.

14-year-old, who has lower limb impairment, said the workshops had helped her grow as a person, as well as made her aware of the kindness of those around her. She also offered words of advice and encouragement to those who might doubt their abilities: “If I can do it, then anyone can do it. Don’t narrow your possibilities.”

The Tokyo Wheelchair Fencing Association has also been running workshops in order to welcome new participants and increase their visibility in the public eye. One

they can play sports.”

Five athletes from Edogawa Ward took part in the Tokyo 2020 Paralympic Games, and each shone in their respective sport. Likewise, the ward as a whole showed its dedication in facilitating the most inclusive Games ever. There is no doubt that Edogawa Ward will continue to be a flame of hope in the creation of a fully inclusive society.



The Toei Oedo Line is working to ensure safety by installing platform doors and reducing the gap between the platform and the carriages.

The Tokyo Subway: Making One of the Best Even Better

Becoming further barrier-free for the Tokyo 2020 Games and beyond.

by **John R. Harris**

To call the urban rail system in Tokyo “one of the wonders of the world” is no idle boast. The vast web of train lines stretches from central Tokyo into the neighboring prefectures. With electric trains handling the bulk of vehicular journeys in the region, the network carries passengers with world-leading standards of punctuality, safety, and cleanliness. Of the 13 subway lines in Tokyo, four of them make up the Toei Subway, which is operated by the Tokyo Metropolitan Government (TMG). Spurred on by the Olympic and Paralympic Games Tokyo 2020, the Toei Subway resolved to make its facilities as accessible as possible to all users.

In 2017, working closely with the TMG, the national government and various organizations supporting people with impairments, the Tokyo 2020 Organising Committee published the Tokyo 2020 Accessibility Guidelines. This document outlined the ways in which the Tokyo 2020 Games competition venues, hospitality facilities, and the transport network in the city would be constructed or upgraded to be user-friendly for people with a range of special needs. Their recommendations included spatial specifications for wheelchair users, enhanced support for those with special visual needs, and accessibility training for staff.

Accessibility on transport networks has always

been an issue for the elderly, for passengers with children, and particularly for those with special physical needs. With the release of the guidelines, the Toei Subway expedited its efforts to upgrade its four subway lines to provide an even more barrier-free environment.

Movement: Even with elevators and escalators facilitating an access route from ground level to the platforms at each station, the width of electronic fare gates was still an issue. All stations now feature one wide gate and a ticket machine positioned at a lower height. Another challenge was addressing the gap between the platform and the trains.

In order to enable people with special physical needs to board and alight trains independently, the Toei Shinjuku Line has raised the height of the platform edges, and where there were wide gaps between the carriages and the platform, rubber gap fillers have been installed. Similarly, on the Oedo Line and part of the Mita Line, slopes have been added to the platforms to reduce the height differential with the train carriages. Inside the cars at these designated entry points are dedicated wheelchair areas. In addition, stations are being fitted with universal toilets that everyone can easily use, including wheelchair users.

Sight: The initial solution in Japan was the laying of now-ubiquitous yellow warning blocks on platforms—a Japanese invention that provides tactile feedback to people with canes. Other modifications include platform screen doors that Toei Subway and other Japanese operators are aggressively installing to retrofit their stations, and auditory cues, such as verbal announcements and bird calls that signal the locations of key facilities. Plus, braille signage is now in extensive use.

Language: Currently, audio and screened text announcements may be delivered in Japanese, English, Chinese, and Korean. A free smartphone app for foreign

tourists and the hearing impaired named *Omotenashi Guide* can also be used at 22 sets of ticket gates in 12 stations on the Toei Subway to pick up announcements and display the text in Japanese, English, Chinese, Korean, Thai, French, or Spanish. It works on rail systems across Japan, as well as at select airports and tourist attractions.

Ticket machines at all stations on the Toei Subway already offer guidance to visitors in eight languages. To complement these, large-screen ticket vending machines have been introduced at 32 locations. These machines—as well as dispensing a range of single tickets and day passes—also offer a variety of search functions to help users pick the optimum route. The ultimate step, though, is boldly futuristic.

Arisa is an AI-enabled robot concierge now on duty at Shinjuku-nishiguchi Station on the Oedo Line, and Sota, another AI-enabled robot, is located at Shimbashi Station on the Asakusa Line. With human-like gestures, they are already able to carry out simple conversations—so far in Japanese, English, and Chinese. While they still have much to learn, Arisa and Sota are already “selfie-magnets.”

The fruits of Toei Subway and the TMG’s efforts to improve accessibility for all in the run-up to the Tokyo 2020 Games are visible across the city. Building on its already established reputation, Tokyo is well-positioned to welcome an ever more diverse range of visitors in the coming decades.



Easily operated ticket vending machines with large 32-inch screens can display route maps, enabling anyone to purchase tickets without difficulty.

© Bureau of Transportation Tokyo Metropolitan Government

Making Hydrogen-based Society a Reality

The Tokyo Hydrogen Museum is a fun day out with educational benefits.

by **Kuv Ahmad**

Hydrogen is a colorless, odorless gas that is found in minute amounts in the air we all breathe. When used as an energy source, the only byproduct is nonpolluting water. This helps to reduce environmental pollution as well as diversifying the national energy mix, with spill-over effects on the economy and industry.

The Tokyo Metropolitan Government (TMG) has been promoting the creation of a disaster-resilient city with

lower environmental impacts. While analyzing and implementing various strategies for the future utilization of hydrogen energy, the TMG and the Tokyo Environmental Public Service Corporation opened the Tokyo Hydrogen Museum (Tokyo Suiso-miru) in 2016. It is the only facility in the metropolis with the role of increasing awareness of hydrogen energy technology, its significance, and safety profile, as well as the role of defining what it will mean to

live in a hydrogen-based society in the future.

The museum is not a traditional museum, but rather an information center. It was designed for children of upper-elementary to junior high school age, when they have developed a sense of themselves as members of society. Here, they can learn about the usefulness of hydrogen as an energy source, and how its use can change society for the better. The museum clearly explains the three main benefits of hydrogen in comparison to other energy resources such as fossil fuels and wind power: namely, that its only byproduct is water, that it can be produced from various other energy resources, and that it can be stored.

The first floor of the museum is split into six zones, each with colorful illustrations showcasing the stages of how this sustainable energy source is made, stored, distributed, and used in daily life. One of several interactive elements in the museum is actual hydrogen production. When a wheel on one of the displays is turned quickly, pure hydrogen is formed inside a clear, water-filled cylinder. Although the gas is colorless, the formation of hydrogen can be seen when bubbles appear inside the cylinder.

Another popular activity available in the museum gives visitors the opportunity to imagine life in a hydrogen-based Tokyo of the future. They have their photograph taken, then select a preferred persona, choose a profession and purpose, and then see their avatar go about its day on an interactive wall map. Finally, a printed residence card is presented for keeping inside the Tokyo Hydrogen Museum's original plastic folder that each visitor receives upon entry: a reminder of their day out at the museum.

The second floor of the museum also houses a life-size



model of a hydrogen dispenser and the side of a hydrogen fuel cell vehicle, where visitors are encouraged to enact the filling of the vehicle's tank. Besides certain hydrogen stations, in real life this task would only be carried out by a trained and qualified technician—definitely something for visitors to experience.

An example of how the TMG has been pushing forward with its plans for a hydrogen-based society in partnership with the national government, scientific institutions, and the private sector is parked outside the museum—a hydrogen fuel cell vehicle from Toyota named MIRAI. Water that has been emitted from the car when electricity is generated can clearly be seen. One of the greatest benefits of these cars is the ability to supply electrical power in the event of a natural disaster. The fuel cell of this car can create enough electricity to meet an average-sized family's needs for four to five days.

The move towards a hydrogen-based society is already becoming a reality in Tokyo. Directly in front of the museum is a hydrogen station—one of 22 in the city as of August 2021, including nine stations for buses. Among the TMG's objectives for 2050 is to increase the number of stations to 150 by 2030. As of March 2021, 85 hydrogen fuel cell buses are in service, with over 300 hydrogen and electric buses to be running by 2030.

After the entertaining and informative tour of the Tokyo Hydrogen Museum, visitors leave with a sense of anticipation for a cleaner, greener, low-carbon, hydrogen-fueled society of the future. Many of the younger ones, particularly elementary and junior high school students, will be the bearers of that society in its ascendancy.



Young citizens can learn about the cleaner, more sustainable future that they will inherit by engaging with some of the interactive exhibits at the Tokyo Hydrogen Museum.

Traditionally, being settled into the rhythms and patterns of life is a relatively common tendency for people in their late fifties. For Wakamiya Masako, a new journey was just beginning at the age of 58 (she is now 86) when she bought her first PC. After retiring, she spent a lot of time at home caring for her mother, often spending a few days in a row not being able to see or speak to anyone. Her PC became a way to connect with the outside world, and this opened a portal to a new life, new friends, and eventually, having the ear of Apple's CEO, Tim Cook.

Since buying her first PC, smartphones have become more widespread and have changed the lives of everyone significantly. Although she was able to fully embrace this new technology, she soon realized that it was difficult for older people to operate touchscreens. Sliding fingers across a screen is a rather difficult motion and is not as intuitive as it is for younger generations. After further research, she noted that there were no apps that really appealed to a whole generation of society. She could not do anything about the functions of the phone, but she *could* develop an app.

Apps can be made by anyone regardless of age, says Wakamiya. All you need is a program flowchart and help with coding. So, with help from an acquaintance, she built the app *Hinadan* (mean-

ing multi-tiered doll stand): a game requiring familiarity with a traditional Japanese festival, *Hinamatsuri*. The app focuses on knowledge rather than speed, an area in which older people often excel over the younger generation.

Her journey kicked off after *Hinadan* was approved on Apple's App Store in February 2017. It was covered by a major television station in the United States and spread



Never Too Old to Learn Something New

While many of her contemporaries may have retired and withdrawn, 86-year-old programmer Wakamiya Masako continues to boldly widen her sphere of influence.

by **Kuv Ahmad**

Her gentle spirit and incredible vitality is conveyed by Wakamiya Masako's sparkling eyes and cheerful smile.

across media in over 40 more countries. It was not long before word spread to Tim Cook, who reached out with an invite to Silicon Valley.

At first she was hesitant, but persuaded herself with the idea that the experience could ultimately be beneficial for people of her generation. After all, she thought, Apple builds their own tech, and if she could have access

to the president, then she could possibly influence their product design. Improving the lives of others has always been her main goal. As a senior citizen, she recognizes that the older generation needs extra help and time to better understand and utilize technology. This is a unique perspective that she has to offer.

The Tokyo Metropolitan Government (TMG) has

been implementing various initiatives to bridge the digital divide between the generations in recent years. Consultations and classes are being organized in order to help seniors better understand the settings and functions of their smartphones. Also, in partnership with local authorities and NPOs, ways to make various legal services accessible online are being trialed.

Having lived and worked in Tokyo for the majority of her life, Wakamiya wants to promote all the positive aspects of the city to the world at large. She believes that both the TMG and local initiatives play a vital role when it comes to fostering community spirit, and engendering a more connected, cohesive society in the future.

Being able to use computers and technology is crucial to this social development, she opines. As well as continuing in her position as vice-president of the Mellow Club—a website with an online community that offers IT training to seniors, which she has been involved with for over 20 years—she plans to use whatever time she has left to continue as a member of the national government's Digital Reform Related Bill Working Group, assisting older people with technology and making sure that, in her own words, "No one is left behind." She believes that one should dismiss the notion of being restricted by one's age or

gender. At the same time, "Skills are not the only important thing. One has to have the desire to help people."

With programming becoming more user-friendly, Tokyo is making strides in the actualization of a digitally literate society in all demographics. Wakamiya Masako will never be too old to help drive this change.

A jeweler in Tokyo has been turning heads with a technique that channels traditional metalworking to celebrate romantic unions in a unique way. Mokumeganeya Co., Ltd. creates custom-made wedding and engagement rings as well as exquisite jewelry with aesthetics that recall the Edo period (1603–1868).

Just as weddings are a unique union between two people, the rings are made to order—each bespoke pair created according to the customer’s preferences—but they

Crafting Beauty, One Ring at a Time

A jeweler has revived traditional techniques to fashion unique wedding bands.

by **Tim Hornyak**



Some of the finished products of the *mokume gane* technique. Every piece is unique.

generally have a beautiful wood grain pattern formed via the heritage *mokume gane* technique, which involves layering, fusing, twisting, carving, and treating different metals. The pattern once forged can never be repeated, making the wedding rings an apposite artistic embodiment of love and matrimony.

The traditional techniques and handmade craftsmanship of the company are in contrast with their up-to-date sales platform and customer service. Virtual consultations and online quotations are easily accessible in English and other languages on their user-friendly website. Engagement and wedding rings are shipped all over the world to satisfied customers. All rings come with a lifetime warranty and digital records are kept of all the customers. Also, customers can now register on the Mokumeganeya app and get updates and information about cleaning and maintenance of their rings.

Mokumeganeya was founded in 1997 by metalwork artist and CEO Takahashi Masaki. During his studies at Tokyo University of the Arts, he discovered and was fascinated by the wonders of the traditional technique of *mokume gane*, a term that literally means woodgrain metal and signifies both the fabrication procedure and examples of the technique.

About 400 years ago after a time of upheaval, Japan entered an extended period of peace. Samurai began to value swords that were increasingly decorative rather than purely practical. The craftsman Shoami Denbei began making *tsuba* (sword guards) by layering metals of different colors on top of one another, yielding beautiful patterns in spirals and arabesques. Over time the technique was refined, producing exquisite *mokume gane* sword fittings in *shakudo* (an alloy of gold and copper), copper, gold, and silver. After an 1876 decree abolishing the wearing of swords, the method was applied to everyday items such as smoking and writing implements, but was gradually lost as Japan pursued a program of rapid industrialization.

Fast-forward to the 1990s when Takahashi sought to revive the technique. After painstaking efforts, he managed to reproduce a Denbei *kozuka*, the handle for a small knife in a sword fitting, as well as other items similar to those of the Edo period. Takahashi decided to apply the art to contemporary jewelry, and his creations have met with great success. He has produced unique concepts such as Tsunagaru Katachi— fashioning a pair of rings from the same *mokume gane* plank and then ceremonially separating and exchanging them during weddings. Takahashi’s work has gone on to receive a range of accolades and awards both in Japan and overseas.

In 2020 the company was selected to be part of the Tokyo Metropolitan Government’s Edo Tokyo Kirari Project. The initiative is based on the concept of “Old meets New.” It showcases the treasures of Tokyo—businesses in the capital that display excellence in craftsmanship, quality, and design as well as adopting new approaches to meet

present-day customer needs. Together, these businesses embody the Tokyo Brand; one that can be appreciated both domestically and overseas, and carry its treasures forward into the future.

As it has gained recognition, Mokumeganeya has continued to grow, opening numerous outlets domestically as well as one in California. Partly due to the pandemic, there is an increased focus on online sales. “Inquiries from other parts of Asia are on the rise,” says Takahashi. “We are increasing specialization in order to give a new generation of craftspeople a chance to show their skill and artistry, as well as increase the popularity of work involving handmade craftsmanship.”

Tokyo is home to many artisans drawing upon the rich legacy of traditional Japanese art forms to create innovative products and services. This mix of old and new is one of the elements that make the capital one of the most dynamic cities in the world.



The work in progress. Different colored metals are layered, fused, twisted, carved, and treated to attain a finish that resembles wood grain.

Pairing the Art of the Impaired

Artists with special needs enjoy a wider audience in the corporate world and beyond.

by **Ian Martin**



Space art graphic & design: andand+
Contributing Artist: Ohashi Enoki-en_Ichiro Ishikawa
Space design, design supervision: KOKUYO
Client: Mitsui & Co., Mitsui Fudosan

In this office cafeteria, translucent graphic art textiles divide the space, overlaying the background scenery and creating a sense of interactivity.

When you walk into a room, how do your surroundings make you feel? Maybe there is something in the richness of a texture, or the depth of a color palette, or the energy of brush strokes in a repeated pattern on the walls that somehow brightens your mood, that somehow revitalizes you. Who is the artist behind these adornments? What story do they tell?

For Asakawa Hiroki and his company, and and plus Corp. (andand+), questions like these guide his work, and have helped him carve a unique space in Tokyo's design world by acting as a bridge between commercial design and the creativity of artists with impairments.

Asakawa originally worked in product design with experience designing spaces for business enterprises, and had long been an admirer of art by people with impairments. Upon being given the opportunity to visit a special needs support facility for the impaired, he was shown boxes brimming with artwork made by some of the users, with the older works at the bottom of the piles being disposed of as the boxes filled up. "A big reason for starting this business was how impressed I was by the quality of the work of these artists. I was thinking, 'I could never do anything as good as this!'"

Andand+ is connected with a team of curators who are mainly involved in support activities for art produced in special needs support facilities. The company has the team visit such facilities and recommend works produced there. It has cultivated relationships with five or six such facilities and other individual artists. The focus of



Sometimes an impaired artist's postcard-sized original work can be the starting point for the large printed textiles and floor graphics created by andand+.

the company is to pair these artists' works with discerning clients, translating their paintings into design motifs in various working environments. A sizeable share of the income from these commercial pairings goes to the artists and the special needs support facilities that care for them, allowing the artists to further their creativity.

"The meaning of the name andand+ describes the concept of promoting impaired artists and, with the help of the designer's expertise, redefining their work and bringing their artistry and individuality to a wider audience in an easily understandable format," explains Asakawa. In order to do this, andand+ places no pressure on the artists themselves, but rather lets them build up their portfolio at their own pace. The company then digitizes select pieces and works to connect them with suitable clients. Asakawa likens his role to that of a storyteller, finding narratives that marry the work of the artists to the ethos of the client, creating a unique synergy.

Andand+'s work typically falls into one of three categories, the first of which is "space design." Here, the digitized art is incorporated into environments such as office spaces or cafeterias, a postcard-sized image sometimes being blown up to fill an entire floor, or the pattern of a vibrant painting becoming wall art or curtains.

Corporate branding is the second area andand+ explores. Artwork by affiliated artists is chosen as an abstract representation of a company's business philosophy and incorporated into its company logos and signage. This branding can act as a catalyst for employees to explain their company philosophy to clients, gaining a deeper understanding of their own company in the process.

The third outlet for andand+'s work is use in various types of products. While clothing is a relatively small part of his company's catalog, Asakawa feels it is an area with growth potential, mainly due to the vibrancy of the patterns produced by the artists he works with.

Asakawa is philosophical regarding the very concept of impairment. "We all have areas of expertise in our lives, and also areas where we may fall short. We all have talents that may be the envy of others. Rather than simply giving special treatment to people with impairments, I want to give the creative output of these people the spotlight it deserves. By turning art by people with impairments into commercial products and giving their work the exposure it deserves, andand+ can help support them financially, as well as bring their work into a wider social context. This can only be to the benefit of society as a whole."

Unmasking the Future

An innovative face mask is ushering in a new era of communication as well as safety.

by **Tim Hornyak**

As the coronavirus pandemic approaches the end of its second year, it is unclear if or when COVID-19 will become a thing of the past. Masks and other infection-prevention measures may be with us for some time. If that is the case, why do we not create value-added masks that do more than simply minimize infection risk?

That is exactly what Donut Robotics Co., Ltd. is doing. Founded in 2014 the startup, now based in Tokyo, is dedicated to creating new platforms and solving social issues such as communications

barriers. Drawing on Japan's long tradition of cutting-edge robotics, it developed a smartphone-controlled robot called Cinnamon that was trialed at Tokyo International Airport (Haneda). Cinnamon can swivel around on her base and nod her head, provide translation services, and has surveillance capabilities.

Donut Robotics' follow-up creation is C-FACE, a lightweight plastic and silicone electronic mask aimed at improving communication and combatting the coronavirus. Billed as Japan's first (patented) smart mask that works with smartphones, C-FACE is equipped with a microphone

and works by being attached to a standard face mask and then paired with a smartphone or other mobile device. When fully charged, its battery provides power for about 20 hours of continuous use.

A dedicated app can capture, amplify, and transcribe users' speech, which can also be projected to the phones of conversation partners. Speech can thus be clearly conveyed despite social distance, masks, or barriers. The C-FACE app can also translate speech into 100 languages, record the minutes of a meeting and transcribe speech for messaging apps. The pandemic served as the inspiration to provide frontline workers, including medical workers examining patients, with more functional masks.

"One of our engineers was researching translation through masks when he graduated from Tokyo University. I thought it would be possible to tackle social problems that are larger than inbound visitors, so I decided to go ahead with the

idea," says Ono Taisuke, CEO of Donut Robotics. "At first, I was concerned about being a robot company and making masks, but I was relieved when a major electronics maker began making masks as well. I think this can be an epoch-making product from Tokyo."

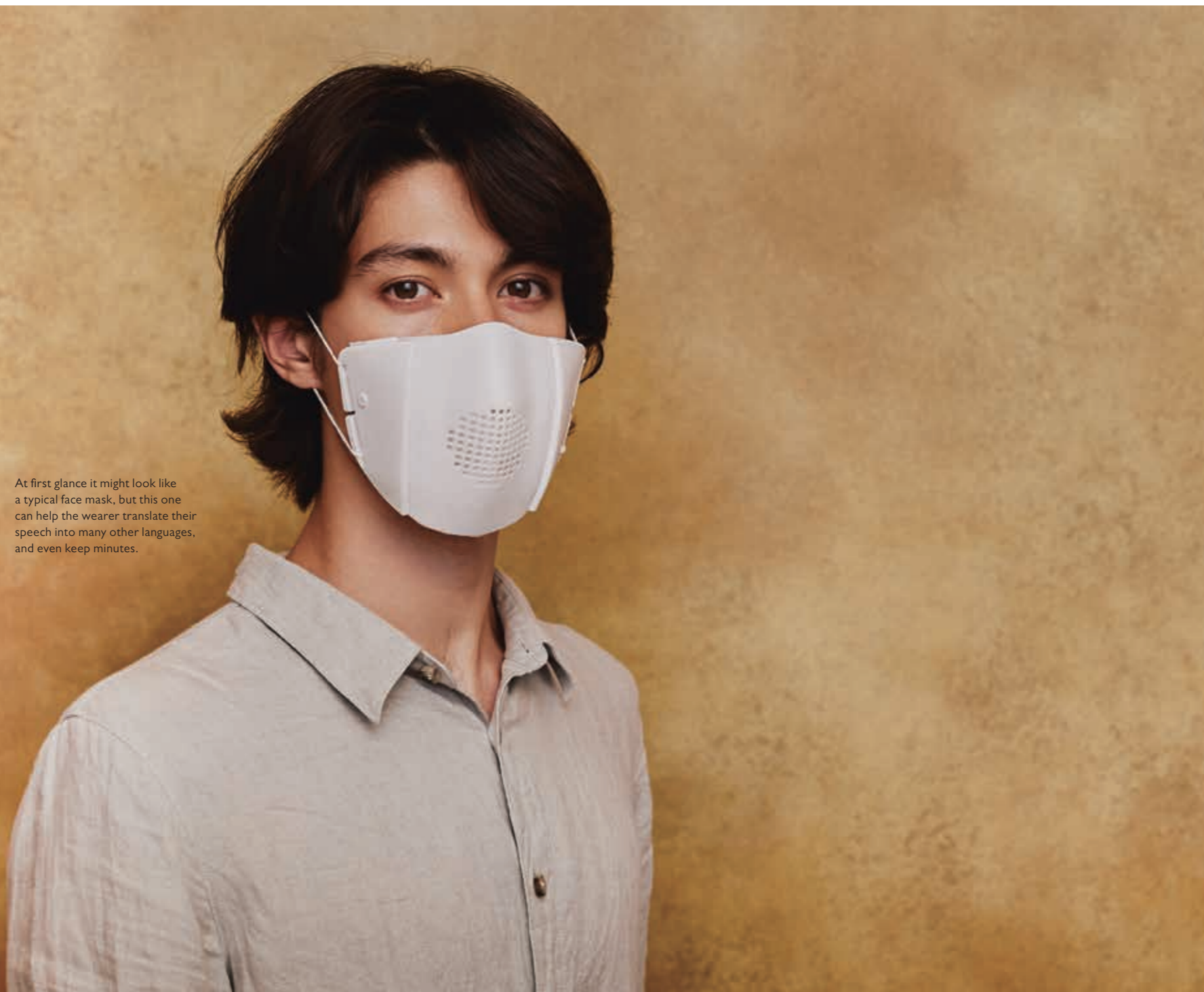
Sustainable Development Goals (SDGs) and corporate social responsibility are also an important factor in Ono's worldview. "The C-FACE re-enables communication for lip readers when masks obscure the lower face. It is also helpful in industries where a section of the workforce does not speak the local language." Six thousand units of C-FACE have already been sold worldwide. There are plans to introduce them at international airports in Japan as well as in major railway companies, and there have been many inquiries from overseas.

The company also has big plans for the future. Anticipating the end of the pandemic when masks are no longer as necessary, Donut Robotics is in the process of developing an in-ear version of its translation technology. Next year, it plans to demonstrate its prototype of a conscious humanoid robot, invoking a future where robots—including robotic clones of people—can engage in work and social relationships.

"One effect of the pandemic is that people's relationship with technology has changed in ways that have allowed our products to find their niche," says Ono, citing everything from the explosion in teleworking to VR vacations. "Looking ahead, we will need AI and robot solutions to address a whole host of issues including shrinking populations, and at some point in the future, our conscious minds may even move around in robot bodies." Ono credits Tokyo for facilitating the realization of his big dreams and being able to grow Donut Robotics, adding, "Even though we were founded in a provincial city, the richness of information and human resources available in Tokyo meant it was impossible not to come here. Tokyo has allowed us to introduce our ideas to the world."

Tokyo is full of visionary tech entrepreneurs who are passionate about making our world more resilient, and better capable of dealing with pandemics and other challenges. With Japan's expertise in robotics, AI and other technologies, there is no telling what kind of life-changing solutions they will surprise us with in the future.

At first glance it might look like a typical face mask, but this one can help the wearer translate their speech into many other languages, and even keep minutes.



Touching from a Distance

These Tokyo-based companies are leading the way in convenient and intuitive touchless technology.

by **Kuv Ahmad**

It would be an understatement to say that people's way of living has changed somewhat over the past two years. These days, alcohol spray can be found at the entrance of shopping malls and inside elevators. Pressing buttons, opening doors, and using ATMs come with a hesitancy that did not exist before the pandemic.

Tokyo is at the forefront of technological solutions that will help with these changes to peoples' daily lives. Leading the way with their touchless technology are two pairs of companies that have both formed partnerships: Dai Nippon Printing Co., Ltd. (DNP) and MIRAI BAR Inc., which debuted their floating display technology at the Shiseido Global Flagship Store in Ginza in 2020, and MT-planning, Ltd. and Tsubota Technica Co., Ltd., which came together to create a prototype sensor-based touchless kiosk in May 2021.

The joint development project between DNP and MIRAI BAR resulted in a product that showcases their technological strengths. Stakeholders at the former were fascinated by the one-of-a-kind patented display technology that the latter possessed, making possible floating displays that are bright enough to be used in well-lit stores. Leveraging DNP's extensive know-how for creating the projected content, the two companies joined forces to create a future where data can be inputted without touching anything physical.

MIRAI BAR created a product that projects a screen in the air capturing the attention of passersby. The infrared sensor that reads finger movement went through many iterations before it was accurate enough to be ready to market. For those who have used it, interacting with thin air has brought a mixture of confusion and surprise. However, as with much new tech, touchless inputting is something that can be understood intuitively and acclimated to quickly and easily.

As COVID-19 spreads throughout the world,



Like a magic trick, purchases can happen with a simple gesture made in the air. Left, the "floating display technology." Right, the "sensor-based touchless kiosk."

using a product like this in public facilities and shopping malls has many advantages, and inquiries about this new tech from them are on the rise. In a world where a vast amount of information is exchanged by IoT, the two companies have taken a step into a future in which novel ways of delivering information will doubtless be to humanity's benefit.

Another joint venture—this one between MT-planning and Tsubota Technica—further cements Tokyo as a global hub for touchless technology. When released, their touchless kiosk terminals will allow any number of customers to complete in-store purchases themselves without the need to touch the display panel.

The touchless kiosk terminal is similar to a conventional touch panel kiosk. However, instead of physically touching the display, the finger of the user hovers over the panel and "mimes" tapping the on-screen buttons. These gestures are picked up by a sensor, and translated into input data, allowing a whole host of interactions to take place.

MT-planning has plans to develop their own brand of kiosk terminals to further enhance the customer experience, and believes that because patrons can easily operate the terminals themselves, waiting times will be reduced. Their products will also help to provide solutions for labor shortages.

There is every reason to believe that contactless technologies will revolutionize a variety of industries. Our interaction with machines in the new normal will become fundamentally more hygienic and convenient, and companies like these are spearheading this change.

With their benefits in the prevention of infectious diseases all the more apparent now in the age of COVID-19, the future is bright, convenient, clean, and safe, and it is already becoming a reality in Tokyo today.



When the public toilets at Yoyogi Fukamachi Mini Park are unoccupied, the modern, clean, welcoming interiors are visible clearly from the outside.

Photo: Satoshi Nagare, provided by The Nippon Foundation

Rethinking Public Toilets

Tokyo is turning heads with restrooms that are beautiful, accessible, and innovative.

by **Tim Hornyak**

In Yoyogi Fukamachi Mini Park, a small park opposite the sprawling green of Yoyogi Park in Shibuya Ward, Tokyo, people seem to materialize out of thin air. It sounds like something out of a science fiction movie, but that is what happens when visitors to the park use its new public toilets. Each facility has transparent walls that become opaque when the door is locked. When they are unlocked, the walls become see-through again, and, to an outside observer, it looks like the person inside the toilet has appeared out of nowhere.

Designed by architect Ban Shigeru, the transparent toilets have been turning heads for their novelty, but they are designed to address two basic concerns of public toilet users: whether they are clean, and, before entering a toilet, whether anyone is inside. Besides doing that, the walls exude a warm lantern light at night, making them seem cozy.

Japan is renowned for its high-tech, robotic toilets with functions such as cleansing sprays and heated seats. Now public restrooms are being elevated to a new standard. THE TOKYO TOILET is an initiative to rethink, redesign, and beautify public restrooms in Tokyo's Shibuya Ward. The project involves a total of 17 toilets, and 12 have been completed so far. It is man-

aged by The Nippon Foundation, the largest foundation in Japan. The Nippon Foundation aims to be a hub of social innovation by connecting various entities such as corporations, nonprofit organizations, and governments in order to solve social issues.

“Although ‘public’ is in the term ‘public toilet,’ not everyone can use them easily,” says a Nippon Foundation spokesperson. “Compared to toilets in airports or train stations, few park toilets have universal accessibility, making them hard to use for people with impairments as well as the elderly, families, and children.”

When the door is locked, the transparent walls become opaque, emanating warm, earthy natural tones.



Photo: Satoshi Nagare, provided by The Nippon Foundation



Photo: Satoshi Nagare, provided by The Nippon Foundation

The unassuming bubble-shaped exterior of the “Hi Toilet” in Hatagaya harbors a plethora of voice-activated touchless technology.

“All THE TOKYO TOILET facilities have universal private rooms so they can be easily used. In addition, we want to dispel negative images of toilets and we want to rethink them through the power of design and creativity. Since public toilets belong to everyone, we also aim to foster the spirit of keeping them clean for the next user.”

A total of 16 architects and designers from Japan and overseas are bringing their artistic vision to this often-overlooked piece of public infrastructure, and have produced some startling results.

In Hatagaya alongside the bus stop, Nanago Dori Park has a new white, hemispherical public toilet that also has a futuristic aesthetic. Apart from looking slick, it has smarts. The facility is fully voice-activated and bilingual (Japanese and English). On voice command, it can open the door, flush the toilet, and even play music. The “Hi Toilet” is contactless, addressing user anxieties by eliminat-

ing the need to touch surfaces.

“This idea has been in place long before the arrival of COVID-19, but COVID accelerated the acceptance of this unique user experience in terms of ‘toilets being contactless,’” says creative director Sato Kazoo of Disruption Lab Team. “If this toilet could deliver a ‘clean city Tokyo’ image to the world, I would be extremely happy.”

To further illustrate the enthusiastic efforts of the Tokyo Metropolitan Government to improve the lives of all in the metropolis, consider the Ueno Toilet Museum. Separate from THE TOKYO TOILET project, an existing public toilet facility in Ueno Park has been renovated with the cooperation of Tokyo University of the Arts. Ueno is an area with many cultural attractions such as museums and a zoo, and students have decorated the private toilet rooms with bright, cheerful murals depicting some of the animals in the zoo, and their natural habitats. Audio mim-

icking the sounds of the animals and their environments, created and performed by the students, has also been incorporated into the design.

With these remarkable, surprising public toilets, Tokyo is reaffirming its commitment to providing a safe, welcoming environment for residents and visitors alike, one that is imbued with the spirit of *omotenashi* Japanese hospitality.

The Ueno Toilet Museum is a renovated public toilet, with beautiful murals inspired by the nearby Ueno Zoo's pandas and other animals on the cubicle walls.



Another Successful Delivery

How keeping their heads “in the cloud” brought two men from Sri Lanka to Tokyo, and how Rapyuta Robotics is bringing change to the world.

by John R. Harris



Arudchelvan “Arul” Krishnamoorthy’s drive and perseverance have opened the door on a bright future with robotic technology in Tokyo.

In 2001, at the height of Sri Lanka’s civil war, a small seed was planted when the Japanese government’s scholarship program gave two bright young boys from the island nation the chance to study in Japan. Twenty years later that seed has blossomed into Tokyo-based Rapyuta Robotics, a successful startup co-founded by Gajan Mohanarajah (CEO) and Arudchelvan “Arul” Krishnamoorthy (CFO).

“First year we went through intensive language training, learning 20 kanji a day,” Arul remembers. “It was tough, but we learned enough to enter one of Japan’s top engineering schools, Tokyo Institute of Technology, and pursue our shared passion for robotics.”

Armed with engineering degrees after five years of tuition and living expenses supported by their scholarships, the pair went on to do post-graduate work abroad: Arul doing an M.A. in Financial Mathematics at Columbia University in New York; Gajan studying robotics at the Swiss Federal Institute of Technology in Zurich (ETH Zurich).

That might have been the end of their links to Japan, except that work with Nomura Securities as a derivatives analyst drew Arul back to Tokyo in 2010. And when Gajan came back to Tokyo for a conference in 2013, the two began to brainstorm a bold idea.

“Japan is famed for robotics,” Arul explained. “But as it’s much stronger in hardware than software we saw an opportunity to close that gap. Plus, Japan is a large market with growing demand for automation as its labor force shrinks. It has great internet infrastructure and a deep IT talent pool. We have the language and cultural skills to navigate this market. And Tokyo feels like home to us. So, we decided to do it here.”

With that rationale, Rapyuta Robotics Co., Ltd. was founded in 2014. Today, the company—selected as an Innovation Tokyo Project of the Tokyo Metropolitan Government in 2021—has 80 employees in Tokyo with 30 more in Bengaluru, India, and its software is used by a growing range of corporate clients.

“Our key insight is that truly intelligent and capable robots require much more computing power than

you can reasonably put onboard a compact, cost-effective machine,” Arul said. “The brainpower needs to be in the cloud. So, we set out to build rapyuta.io, a cloud-based operating system that can effectively manage and coordinate a fleet of robots.”

Rapyuta’s key target market is warehouse operators such as parcel-delivery companies and online retailers. The goal is to maximize the intelligence of today’s warehouse robots within the limits of their current physical capability. So far, robots can automatically transport goods around a vast facility, but they still need humans to pick boxes off the shelves and load them onboard.

Rapyuta has focused on that man-machine interface. For a radically simplified example, the software might tell the robot to go to position X on aisle Y where a particular product is located and a human worker will meet it. Once the robot’s screen tells the worker how many units of which product it needs, he/she loads the items and sends the robot off to the next picking location or packing line.

To enable this procedure, Rapyuta had to master three key functions: localization (where each robot is); navigation (moving around a complex environment without hitting anything); and multi-robot coordination (efficient fleet management). Again, this is a radically simplified description.

The true elegance of Rapyuta’s cloud-based platform is the scope it affords to grow and flexibly adapt in pace with robots’ physical capabilities, which are sure to increase rapidly. Rapyuta’s long-term ambition is to stay at least one step ahead of the game.

Who can doubt that Gajan and Arul will stay several steps ahead of the game? Driven by a shared passion for robotics since their high school days in war-torn Sri Lanka, they came to this country without a word of Japanese, quickly mastered the language, and rose to the top of highly demanding disciplines. Now their company is set to take on the world.

For us, Gajan and Arul are wonderful proof of what can grow from one small seed, and what can grow in Tokyo, a city where even the most ambitious dreams can be achieved.

The Spice: Wasabi

One of Japan's iconic foods, sushi is known around the world, but many people visiting Japan express surprise when they try fresh wasabi here. That is because most wasabi sold abroad is simply Western horseradish colored green. Fresh wasabi grated immediately before enjoying a seafood meal can be an eye-opening, and eye-watering, experience. Part of the Brassicaceae family, which includes broccoli, kale, cabbage, radish, and turnip, wasabi can pack a mighty mustardy punch.

Those wishing to search out wasabi in situ need look no further than Okutama, a mountainous region in western Tokyo. A two-hour journey from the center of the metropolis by train or car, its lush, picturesque scenery is a far cry from the city skyscrapers, and its cooler climes are beloved by hikers. Wandering through the forests, one may come across inclined terraces buttressed by rocks with streams of cool spring water running through them. Carefully tended by local farmers, the paddies are studded with green, broad-leaved plants. These are wasabi plants, an essential condiment when eating sushi.

Standing by a wasabi terrace just outside the town of Okutama, Hoshina Masahiro, head of the Okutama Wasabi Cultivation Society, points to the leafy stems of the wasabi, their knobby rhizomes irrigated by a steady stream of pure clean mountain water. Clean flowing water is essential for wasabi cultivation, and this

True fresh wasabi in sushi can pack a punch that literally throws your head back, and it grows in the clear mountain streams of Okutama in western Tokyo.

by **Tim Hornyak**

beautiful area of Tokyo provides that in abundance. Okutama's climate and environment supports many wasabi terraces where the crops are planted in spring and harvested in autumn of the following year.

"The difference in temperature between Okutama's cold winters and hot summers is the crucial element that makes wasabi spicy," says Hoshina, who, rather than smearing on sashimi, recommends grating the vegetable and mixing it with soy sauce and bonito flakes to use as a dip. "One characteristic of the wasabi of Okutama is that they are firm and spicy."

Wasabi farmers must tend to their terraces often, protecting their crop against weeds and animals such as deer and boar. Hoshina is one of 57 members of the local wasabi farmers' union, whose ranks once numbered in the hundreds. The lack of successors is a problem for many Japanese farmers, but the demand for wasabi is always strong. The Okutama region still boasts over 100 wasabi paddies, and specialty shops such as Yamashiroya—just five minutes' walk from Okutama Station—do a healthy trade.

Yamashiroya began wasabi farming in the Edo period (1603–1868) and started selling wasabi products around 100 years ago. Aside from fresh wasabi, Yamashiroya sells a variety of wasabi products reflecting both a sense of innovation and a deeply felt love for the piquant root; their main focus being *wasabi-zuke* (pickled wasabi paste).

Wasabi-zuke is made by cutting up wasabi leaves and stems, seasoning them and pickling the mixture in matured sake lees (a paste byproduct of sake production). "Here at Yamashiroya, we use sake lees from locally produced sake and mature it at a low temperature for over a year," says Kaneko Yukihiro, senior managing director of Yamashiroya. "This gives it a smooth flavor, as well as bringing out the umami of the lees and allowing it to retain its characteristic whiteness. The wasabi and seasoning are



Proceed with caution. This unassuming rhizome packs a strong spicy punch.

then added and left to pickle for two-to-three days, and then it is ready to eat."

Yamashiroya's product inventory includes wasabi-zuke mixed with nori seaweed or miso paste, as well as various snacks that pair perfectly with a glass of beer such as wasabi cheese and smoke-flavored wasabi-zuke. One can also buy wasabi *senbei* rice crackers, and wasabi gelée dressing. "As for the best way to enjoy wasabi-zuke, I recommend having it with hot steamed rice and a *kamaboko*



Four types of the popular *wasabi-zuke* at Yamashiroya. There are also versions made with seaweed or herring roe.

fish paste cake: even a cheap one will do nicely."

More information about the diverse agricultural, forest, and fishery products Tokyo has to offer can be found on the TOKYO GROWN website. The site, for both domestic and overseas visitors, features timely information in reports from producers about the fresh and safe agriculture, forestry, and fisheries produce generated in Tokyo.

Of course, not all of Japan's wasabi comes from Okutama; however, the rich nature, misty mountains, and cool clear streams in this most beautiful corner of Tokyo can be called to mind if you try a smear of freshly grated wasabi next time you have sushi.

Few would suspect that a cool peaceful stream in an idyllic scene like this would make the perfect conditions to grow a spicy plant like wasabi.

Tokyo Basics

Population

Total Population of Tokyo (2021)

14,037,872

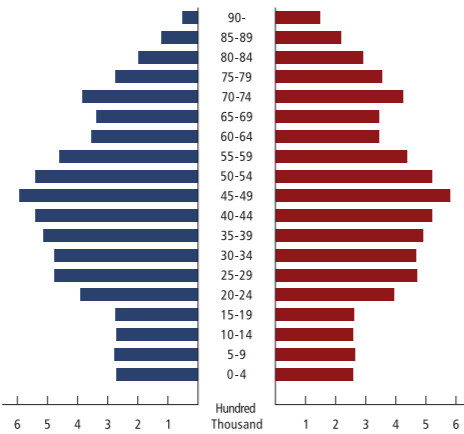
Population Age Structure by Gender (2021)

Men (2021)

6,884,819

Average Life Expectancy (2015)

81.07



Women (2021)

7,153,053

Average Life Expectancy (2015)

87.26

Foreign Residents (2021)

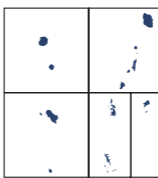
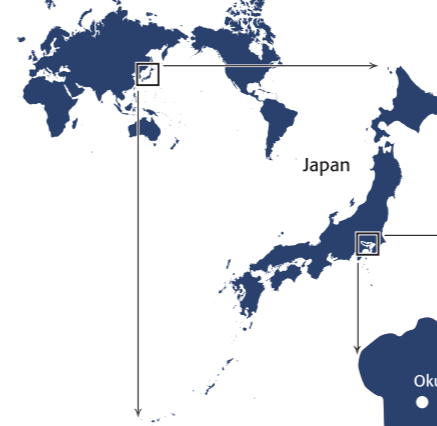
528,927

People Over 100 Years Old (2021)

6,641

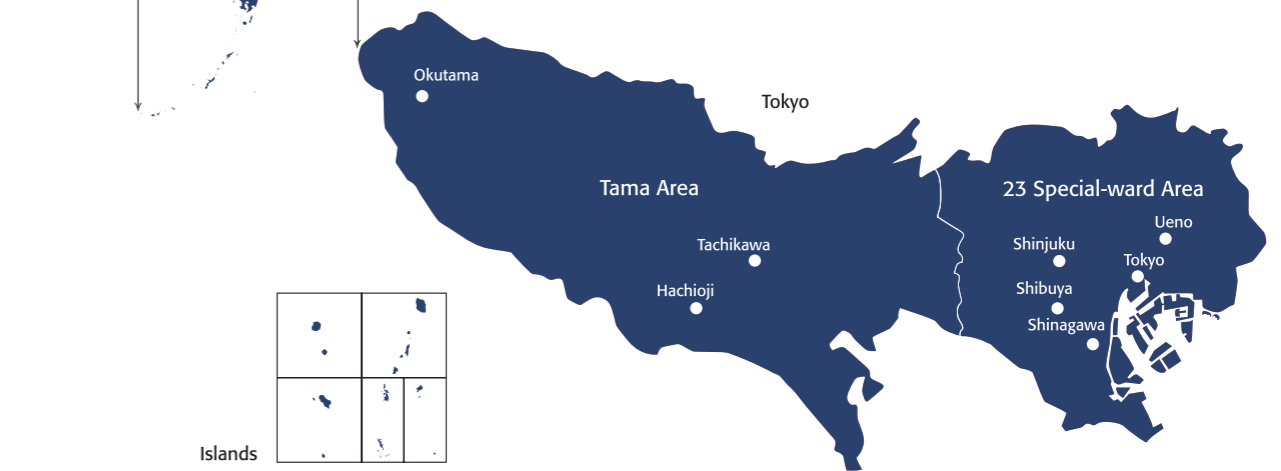
Location

World

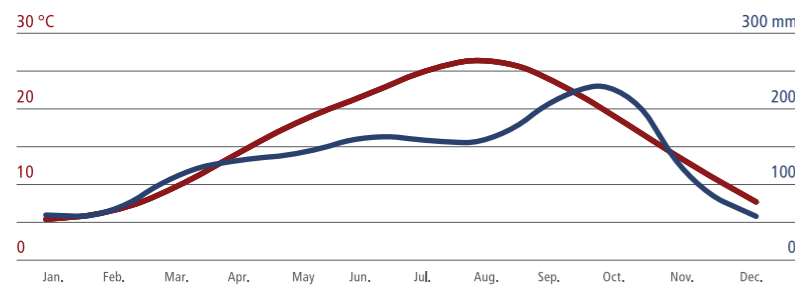


Area

2,194.05
sq. kilometers



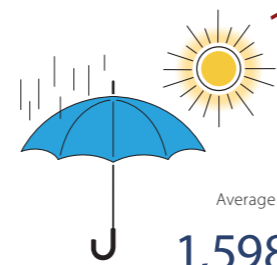
Average Monthly Temperature and Rainfall



Source: Japan Meteorological Agency, 1991-2020 ● = Average temperature ● = Average rainfall

Average Annual Temperature

15.8 °C
(60.4 °F)



Average Annual Rainfall

1,598.2 mm

Sister and Friendship Cities/States*

- ① New York (USA)
- ② Beijing (China)
- ③ Paris (France)
- ④ New South Wales* (Australia)
- ⑤ Seoul (South Korea)
- ⑥ Jakarta (Indonesia)
- ⑦ São Paulo* (Brazil)
- ⑧ Cairo (Egypt)
- ⑨ Moscow (Russia)
- ⑩ Berlin (Germany)
- ⑪ Rome (Italy)
- ⑫ London (UK)



Annual Foreign Tourists (2020)



2.52
million

83.4% decrease over 2019

Tokyo's GMP¹ (Nominal) as a Share of Japan's GDP (FY2018)

Japan ¥548.4 trillion



19.5% of
Japan's GDP

¥107.4
trillion²

1. GMP: Gross Metropolitan Product
2. US\$965.4 billion
2018 annual average conversion rate ¥1 = US\$0.0090

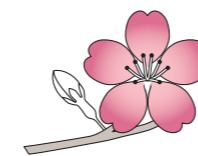
Tokyo's Budget (Initial FY2021)



¥15,157
billion*

* US\$132 billion
¥1 = US\$0.0087 (Bloomberg, October 18, 2021)

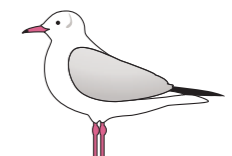
Symbols



The *somei yoshino* cherry tree was developed in the late Edo period to early Meiji era (late 1800s) by crossbreeding wild cherry trees. The light-pink blossoms in full bloom and the falling petals scattering in the wind are a magnificent sight to behold.



Ginkgo biloba is a deciduous tree with distinctive fan-shaped leaves that change from light green to bright yellow in autumn. The ginkgo tree is commonly found along Tokyo's streets and avenues and is highly resistant to pollution and fire.



The *yurikamome* gull has a vermilion bill and legs. It comes south to Tokyo in late October every year and sojourns at the surrounding ports and rivers until the following April. A favorite theme of poets and painters, it is also called *miyakadori* (bird of the capital).




TOKYO
METROPOLITAN
GOVERNMENT


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