

THE FUTURE OF

Visions towards achieving
the Sustainable Development Goals



JAPANESE SCIENCE



東京大学
THE UNIVERSITY OF TOKYO

nature research

Japan is a nation with a long tradition of scientific discovery. Building on this tradition, Japan has the opportunity to reinvigorate its basic research and tap into the true potential of its early career researchers. Now is the time for Japanese science and technology to look into the future and focus on building a sustainable and equitable society. By prioritizing the future of humanity and the planet, Japan has the opportunity to become a leading model in the global community and play a key part in advancing Sustainable Development Goals (SDGs).

Ultimately, delivering SDGs will require academia, business, policymakers and civil society to work together to address the world's most pressing problems. *Nature* and its publisher, Springer Nature, play an important role in advancing discovery and the dissemination of evidence-based sustainability research.

2019 marks *Nature's* 150th anniversary. We wish to take *Nature's* 150th anniversary as an opportunity to invite the nation's renowned researchers to look into science in Japan and discuss how it can best serve society.



MAGDALENA
EDITOR IN CHIEF OF NATURE
SKIPPER



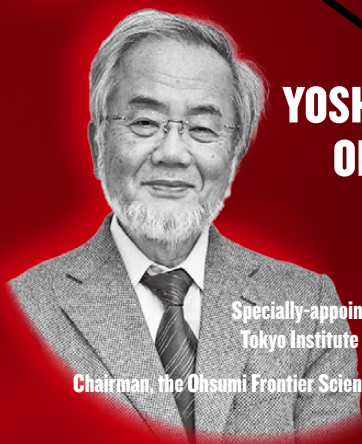
Japan has a rich history of science, technology, and innovation (STI), and the societal expectations for basic and applied sciences are as high as ever. Accelerating innovation in information technology such as artificial intelligence and big data does not only extend our intellectual horizon but also acts as an enabler for achieving the widely agreed Sustainable Development Goals (SDGs), which enshrine crucial societal, environmental, and economic objectives. On the other hand, rapid innovation, especially that in big data, presents risks of data absolutism.

Universities, as hubs of research and academic activities, can allow innovations to reach their

full potential while fostering critical discussions to deal with risks of emerging technologies. In this spirit, The University of Tokyo established the Future Society Initiative (FSI) in 2017, in which STI, social sciences and humanities contribute the knowledge basis for meeting the SDGs. By fostering critical interactions across academic disciplines and among policymakers, businesses, and civil society, the FSI will provide a university-based platform for envisioning societal changes and shaping a better, sustainable future. In collaboration with researchers across Japan, the FSI will help Japanese science contribute to the global quest for a better society.



MAKOTO
PRESIDENT OF THE UNIVERSITY OF TOKYO
GONOKAMI



YOSHINORI OHSUMI



Specialty-appointed professor,
Tokyo Institute of Technology

Chairman, the Ohsumi Frontier Science Foundation

Dr. Yoshinori Ohsumi was born in Fukuoka in 1945. In 1963, he entered The University of Tokyo and chose to study molecular biology due to the influence of Prof. K. Imahori. As a graduate student, he enrolled in Rockefeller University to study under Dr. G. M. Edelman in 1974. He returned to The University of Tokyo as an assistant professor under Prof. Y. Anraku at the end of 1977. In 1988, he opened up his own small lab and started to work on the lytic function of the vacuole, and then found yeast autophagy by light and electron microscopy. After leaving The University of Tokyo he continued his research at the National Institute for Basic Biology at Okazaki. Then he moved to Tokyo Institute of Technology in 2009 and received the Nobel Prize in Physiology or Medicine in 2016 for elucidating the mechanisms for autophagy.

Dr. Masashi Yanagisawa (born 1960, Tokyo, Japan) is a medical scientist. In 1988, as a graduate student at the University of Tsukuba, he discovered “endothelin,” a hormone that raises blood pressure, and reported it in *Nature*. His remarkable achievement allowed him to establish an independent lab as an HHMI Investigator at the University of Texas Southwestern Medical Center in 1991. In 1998 he discovered the neuropeptide “orexin” and opened up a new era of sleep studies. Both endothelin and orexin later became targets for clinically approved medicines. Since 2012, as Director/Professor of WPI-IIIIS, he continues to work on the mysteries of sleep, one of the biggest black boxes in today’s neuroscience. Recently, his group published two papers suggesting a biological basis for sleepiness in *Nature*, attracting attention from the general public as well as the research community.

MASASHI YANAGISAWA



Director / Professor,
International Institute for
Integrative Sleep Medicine
(WPI-IIIIS),
University of Tsukuba



Magdalena Skipper is Editor in Chief of *Nature* and Chief Editorial Advisor for Nature Research. She has considerable editorial and publishing experience, having started at Nature Publishing Group in 2001. She was *Nature Reviews Genetics* Chief Editor, *Nature* Senior Editor for genetics and genomics, Executive Editor of Nature Partner Journals and Editor in Chief of *Nature Communications*. A geneticist by training, she obtained her PhD from the University of Cambridge for studies on sex determination at the MRC Laboratory of Molecular Biology, Cambridge, UK. She continued her research at the ICRF Laboratories (CRUK today), before turning her attention to scientific publishing. She is passionate about mentorship, transparent science and clarity in science communication. She has a keen interest in innovation in science publishing.



MAGDALENA SKIPPER



Editor in Chief, *Nature*

Karl Ziemelis received his bachelor’s degree in the natural sciences (specializing in physics) from the University of Cambridge, and then did four years of original research on the electronic properties of conjugated polymers under the supervision of Professor Richard Friend (Cavendish Laboratory, Cambridge), before joining the staff of *Nature* in 1992. Karl is the current Physical Sciences Editor of *Nature*, a position that he has held since 1997. He manages a team of eleven Associate and Senior Editors who, between them, are responsible for *Nature*’s output of original research papers in the physical sciences (which include astronomy, physics, materials, chemistry, Earth and environmental sciences). When time permits, he occasionally writes in a freelance capacity for *Nature* (having contributed to the news and “News and Views” sections of the journal) and also for the popular science weekly magazine *New Scientist*.

KARL ZIEMELIS



Chief Physical Science
Editor, *Nature*





TAKUZO AIDA

Professor,
Department of Chemistry
and Biotechnology,
School of Engineering,
The University of Tokyo

Deputy Director,
RIKEN Center for Emergent Matter Science

Dr. Takuzo Aida received his PhD on controlled polymer synthesis at the engineering school of The University of Tokyo in 1984, and then changed his research direction toward supramolecular sciences and soft matter. His research covers a broad range of science and technology, and he has developed a variety of innovative materials. Representative examples of his seminal achievements include bucky gels that contain a high concentration of carbon nanotubes in ionic liquids, extrusion polymerization of olefins using mesoporous silica, electrically conductive self-assembled nanotubes of a molecular graphene, aquamaterials, molecularly engineered biological nanomachines, and self-healable polymer glass. Also in RIKEN, he has been developing new material sciences including modernized colloidal science using metal oxide nanosheets as shape-persistent high-aspect-ratio 2D colloids. In 2018, Dr. Aida received the Japan Academy Prize. His cherished motto is "chance favors the prepared mind" (Louis Pasteur).

Professor Taikan Oki's research specializes in global hydrology and the sustainability of world water resources, including virtual water trade and water footprints. He was one of the coordinating lead authors for the chapter "Freshwater Resources" in the Intergovernmental Panel on Climate Change Fifth Assessment Report. He obtained his BEng and PhD degrees at The University of Tokyo, along with qualification as a weather forecaster. He became a Professor at The University of Tokyo in 2006. He is Senior Vice-Rector of United Nations University, Japan, and an Assistant Secretary-General at United Nations from 2016. He is the recipient of many awards, including the Biwako Prize for Ecology in 2011 and the Japan Academy Medal in 2008. He was the first Japanese researcher to become a fellow of the hydrology section of the American Geophysical Union in 2014.

TAIKAN OKI

Special Advisor to the President / Professor,
Institute for Future Initiatives,
The University of Tokyo
—
Senior Vice-Rector, United Nations University, Japan
—
Assistant Secretary-General, United Nations



SAWAKO SHIRAHASE

MODERATOR

Executive Vice President / Professor,
Graduate School of Humanities and Sociology,
The University of Tokyo

Professor Sawako Shirahase is a sociologist specializing in social inequality and social stratification taking into account demographic transformation, and is also a Vice-president at The University of Tokyo. Dr. Shirahase was a principal investigator in conducting the seventh National Survey of Social Stratification and Social Mobility (SSM) in 2015, which has been conducted every 10 years since 1955, and she is continuing further research on generating the structure of social stratification in the very aged society with low birthrate, using the 2015SSM data. Her publications in English include *Social Inequality in Japan* (2014, Routledge) and *Demographic Change and Inequality in Japan* (ed.) (2011, Trans Pacific Press). Professor Shirahase also serves as Vice-president of International Sociological Association at present.



KEYNOTE



PANEL DISCUSSION

SDGs: Sustainable Development Goals

These are the 17 Goals for sustainable development, ratified by the 193 member states of the United Nations in 2015, for delivery by 2030

THE FUTURE OF JAPANESE SCIENCE

Visions towards achieving the Sustainable Development Goals

4th April 2019

The University of Tokyo, Yasuda Auditorium

12:00 – 12:45 **POSTER SESSION**

13:00 – 13:10 **OPENING REMARKS**
Makoto Gonokami
President, The University of Tokyo

13:10 – 13:40 **KEYNOTE 1: Perspectives on the future of basic science after 50 years of research**
Yoshinori Ohsumi
Specially-appointed professor, Tokyo Institute of Technology

13:40 – 14:10 **KEYNOTE 2: Solving the mysteries of sleep**
Masashi Yanagisawa
Director / Professor, International Institute for Integrative Sleep Medicine (WPI-IIIS), University of Tsukuba

14:10 – 14:20 Break

14:20 – 14:50 **KEYNOTE 3**
Magdalena Skipper
Editor in Chief, Nature

14:50 – 15:20 **POSTER SESSION** (Screening by jury panel)

15:20 – 15:50 **PRIZE WINNER ANNOUNCEMENT / AWARDED POSTER PRESENTATION**

15:50 – 16:00 Break

16:00 – 17:30 **PANEL DISCUSSION: Searching for the future of Japanese science**

PANELISTS

Masashi Yanagisawa (*Professor, University of Tsukuba*)
Takuzo Aida (*Professor, The University of Tokyo*)
Taikan Oki (*Professor, The University of Tokyo*)
Magdalena Skipper (*Editor in Chief, Nature*)

MODERATOR

Sawako Shirahase (*Professor, The University of Tokyo*)

17:30 – 17:40 **CLOSING REMARKS**
Antoine Bocquet
Managing Director of Springer Japan and Nature Japan