Advisory Opinion

Remodeling science and society for the next 20 years:
Ten recommendations from Young Academy of Japan

Young Academy of Japan, Science Council of Japan

Sep 28th 2023
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This Advisory Opinion summarizes and publishes the results of the deliberations of Young Academy of Japan, Science Council of Japan.

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Shinsuke Imada (Associate Member)
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Naoki Irie (Associate Member)
Professor, Research Center for Integrative Evolutionary Science, SOKENDAI

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Makoto Iwamura (Associate Member)
Distinguished Researcher, Nippon Telegraph and Telephone Corporation

Sotaro Uemura (Associate Member)
Professor, Graduate School of Science, The University of Tokyo

Motomu Endo (Associate Member)
Professor, Nara Institute of Science and Technology, Nara, Japan

Ryosuke Endo (Associate Member)
Lecturer, Graduate School of Agriculture, Osaka Metropolitan University

Hisae Kasai (Associate Member)
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Shinsuke Kawagucci (Associate Member)
Research Institute for Global Change (RIGC), Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

Akihiro (Associate Member)
Associate Professor, Department of Applied Chemistry, Faculty of Engineering, Kyushu
Kishimura University, and Center for Molecular Systems, Kyushu University

Daisuke Komori (Associate Member) Specially Appointed Professor, Green Goals Initiative, Tohoku University

Yasuhisa Kondo (Associate Member) Associate Professor, Research Institute for Humanity and Nature, National Institutes for the Humanities

Nami Sakai (Associate Member) Chief Scientist, RIKEN Cluster for Pioneering Research

Kana Sasakura (Associate Member) Professor, Faculty of Law, Konan University

Wakako Sanefuji (Associate Member) Associate Professor, Faculty of Human Environment Studies, Kyushu University

Yoko Shimpuku (Associate Member) Vice President, Hiroshima University; Professor, Graduate School of Biomedical and Health Sciences, Hiroshima University

Masayo Soma (Associate Member) Associate Professor, Department of Biological Sciences, Faculty of Science, Hokkaido University

Akira Tai (Associate Member) Associate Professor, Faculty of Social and Environmental Studies, Fukuoka Institute of Technology

Kenkichi Takase (Associate Member) Professor, Department of Psychology, Graduate School of Letters, Chuo University

Tomomi Takada (Associate Member) Professor, Graduate School of Business Administration, Kobe University

Yasuo Takatsuki (Associate Member) Associate Professor, Research Institute for Economics and Business Administration, Kobe University

Hironari Takeda, (Associate Member) Associate Professor, Graduate School of Human and Environmental Studies, Kyoto University

Hitomi Takemura (Associate Member) Professor, Graduate School of Law, Hitotsubashi University

Taisuke Tsuchiya (Associate Member) Associate Professor, Institute of Humanities and Social Sciences (Faculty of Economic Sciences), Niigata University

Masanori Tohno (Associate Member) Senior Researcher, National Agriculture and Food Research Organization, Research Center for Genetic Resources and Livestock Research Division, Research Division of Fundamental Technology, National Institute of Agro-Food Science and Technology

Yoriko Tominaga (Associate Member) Associate Professor, Graduate School of Advanced Science and Engineering, Hiroshima University

Yumiko Nakajima (Associate Member) Professor, School of Materials Science and Engineering, Tokyo Institute of Technology
<table>
<thead>
<tr>
<th>Name</th>
<th>Position and Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waka Nakanishi</td>
<td>Senior Researcher, Polymer and Biomaterials Research Center, National Institute for Materials Science</td>
</tr>
<tr>
<td>Kazuyoshi Nishijima</td>
<td>Associate Professor, Disaster Prevention Research Institute, Kyoto University</td>
</tr>
<tr>
<td>Satoko Fujioka</td>
<td>Associate Professor, Department of Applied Chemistry, Faculty of Science and Technology, Keio University</td>
</tr>
<tr>
<td>Tomoki Maekawa</td>
<td>Research Professor, Graduate School of Medical and Dental Sciences, Center for Advanced Oral Science, Niigata University</td>
</tr>
<tr>
<td>Kouta Minamizawa</td>
<td>Professor, Graduate School of Media Design, Keio University</td>
</tr>
<tr>
<td>Akira S Mori</td>
<td>Professor, Research Center for Advanced Science and Technology, The University of Tokyo</td>
</tr>
<tr>
<td>Nozomu Yachie</td>
<td>Associate Professor, School of Biomedical Engineering, The University of British Columbia, Visiting Professor, Research Centre for Advanced Science and Technology, The University of Tokyo*</td>
</tr>
<tr>
<td></td>
<td>Specially Appointed Professor, Premium Research Institute for Human Metaverse Medicine (WPI-PRIME), Osaka University</td>
</tr>
<tr>
<td>Miyae Yamakawa</td>
<td>Associate Professor, Associate Professor, Graduate School of Medicine, Osaka University</td>
</tr>
<tr>
<td>Asuka Yamada</td>
<td>Professor, Department of Architecture, School of Science for Future Life, Tokyo Denki University</td>
</tr>
<tr>
<td>Naoko Yoshinaga</td>
<td>Assistant Professor, Department of Applied Life Sciences, Graduate School of Agriculture, Kyoto University</td>
</tr>
<tr>
<td>Shingo Ebata</td>
<td>Professor, Office of Strategic Management, Tokyo Institute of Technology</td>
</tr>
<tr>
<td>Sota Kimura</td>
<td>Professor, Faculty of Law, Tokyo Metropolitan University</td>
</tr>
<tr>
<td>Ryuma Shineha</td>
<td>Associate Professor, Research Center on Ethical, legal, and Social Issues, Osaka University</td>
</tr>
<tr>
<td>Hirofumi Shintaku</td>
<td>Professor, Institute for Life and Medical Sciences, Kyoto University</td>
</tr>
<tr>
<td>Kazuya Tanaka</td>
<td>Research Fellow, GRIPS Alliance, National Graduate Institute for Policy Studies</td>
</tr>
<tr>
<td>Saeko Terada</td>
<td>Assistant Professor, College of Arts and Sciences, Tamagawa University</td>
</tr>
<tr>
<td>Tomoya Hanibuchi</td>
<td>Associate Professor, Graduate School of Letters, Kyoto University</td>
</tr>
</tbody>
</table>
Sachiko Hirata-Mogi (Designated Associate Member)

The following staff members provided administrative support in the preparation of this advisory opinion.

SCJ Secretariat
Noriyoshi Masuko, Director, Division for Scientific Affairs I
Hiroshi Yamada, Deputy Director, Division for Scientific Affairs I
Kouki Takeda, Official, Division for Scientific Affairs I
Executive Summary

1 Rationale for this Statement
The innovation landscape in Japan is reaching a critical juncture as its global prominence in science and related fields declines. For a nation with limited resources, sustained innovation is crucial to fostering new values and ensuring a prosperous future, both materially and culturally. Young Academy of Japan, which belongs to Science Council of Japan, is a unique body composed of researchers under the age of 45 who conduct cutting-edge research in diverse fields spanning humanities, social sciences, and natural sciences. Young Academy of Japan is poised to conduct innovation over the next two decades from an academic perspective. Thus, Young Academy of Japan has assessed the barriers to innovations holistically and considered possible remedies. Based on these interdisciplinary deliberations, we have identified ten issues and formulated recommendations for solving them.

2 Current Status and Challenges
To promote innovation over the next 20 years from scientific and academic perspectives, it is essential to bridge the gap between academic disciplines, strengthen collaboration with local stakeholders, and enhance international collaboration. All of them are based on a foundation built on accumulating knowledge and technology in basic and traditional fields. Despite these goals, the foundation that supports innovation is eroding due to intense competition for research funding and positions, an overreliance on quantitative metrics that are ill-suited to exploring research such as interdisciplinary and regional collaborative studies, diminished stable funding such as basic expenses, insufficient technical professionals and administrative staff, and a deteriorating research environment due to overwhelming workloads. This not only depletes the time and mental bandwidth needed to address the academic issues, but has also curtailed research on important academic issues, regional challenges, and international collaborations. In addition, these are driving an exodus of talent and reducing the number of graduate students. To be truly innovative, there is an urgent need to support a diverse cohort of graduate students - the future torchbearers of innovation - and to create career paths that enable researchers to work across fields and sectors. The academic sector needs to critically assess its current state and implement profound improvements to its research environment. Swift action on these fronts will catalyze interdisciplinary studies, international collaboration, and regional collaboration, paving the way for innovative leaps in the next two decades (Figure 1).

Figure 1 Five areas that need to be addressed to foster innovation

3 Content of the Advisory Opinion
The following are ten pressing issues that must be addressed immediately to foster innovations by envisioning academia and society in the coming 20 years (Figure 2).

(1) Cultivating fundamental and traditional knowledge and technology
Cultivation and accumulation of knowledge and technology in fundamental fields is the fertile
ground for innovations.

(2) Strengthening evaluation and support for interdisciplinary research and regional collaboration with local stakeholders

A system for evaluating academic ventures aimed at interdisciplinary research and solving regional challenges needs staffing and budgeting.

(3) Enhancing core facilities with Ph.D. holders

Strengthening core facilities with skilled technical personnel with doctoral degrees is needed to promote innovations and expand career paths of Ph.D. holders.

(4) Cultivating a cross-sector collaborative ecosystem

A system to let academia, industry, government, and local stakeholders collaborate to address interdisciplinary challenges is needed.

(5) Enhancing foundational funding and research support personnel

We see a paradoxical situation where competitive funds are underutilized due to a lack of foundational expenses and human resources.

(6) Establishing career paths in science diplomacy

Cultivating individuals capable of spearheading science and technology diplomacy and developing their career trajectories are important.

(7) Overcoming the "zero-failure" bureaucratic mind in science management

To truly drive innovation, it is imperative to move beyond the bureaucratic mindset. It is necessary to understand and accept inherent risks of pioneering work.

(8) Reducing the burden of education on households

To stem the decline in the number of graduate students, it is essential to substantially reduce the financial burden of education on families.

(9) Breaking free from the "activity traps" of academia

It is essential to change the culture that appreciates the relentless effort and refine its operations to ensure alignment with its core objectives.

(10) Promoting inter-sectoral career paths for Ph.D. holders

It is imperative to promote the integration of specialized expertise across sectors, increase job mobility, and promote job-based employment.

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Figure 2 Ten Recommendations for Science and Society in 2040