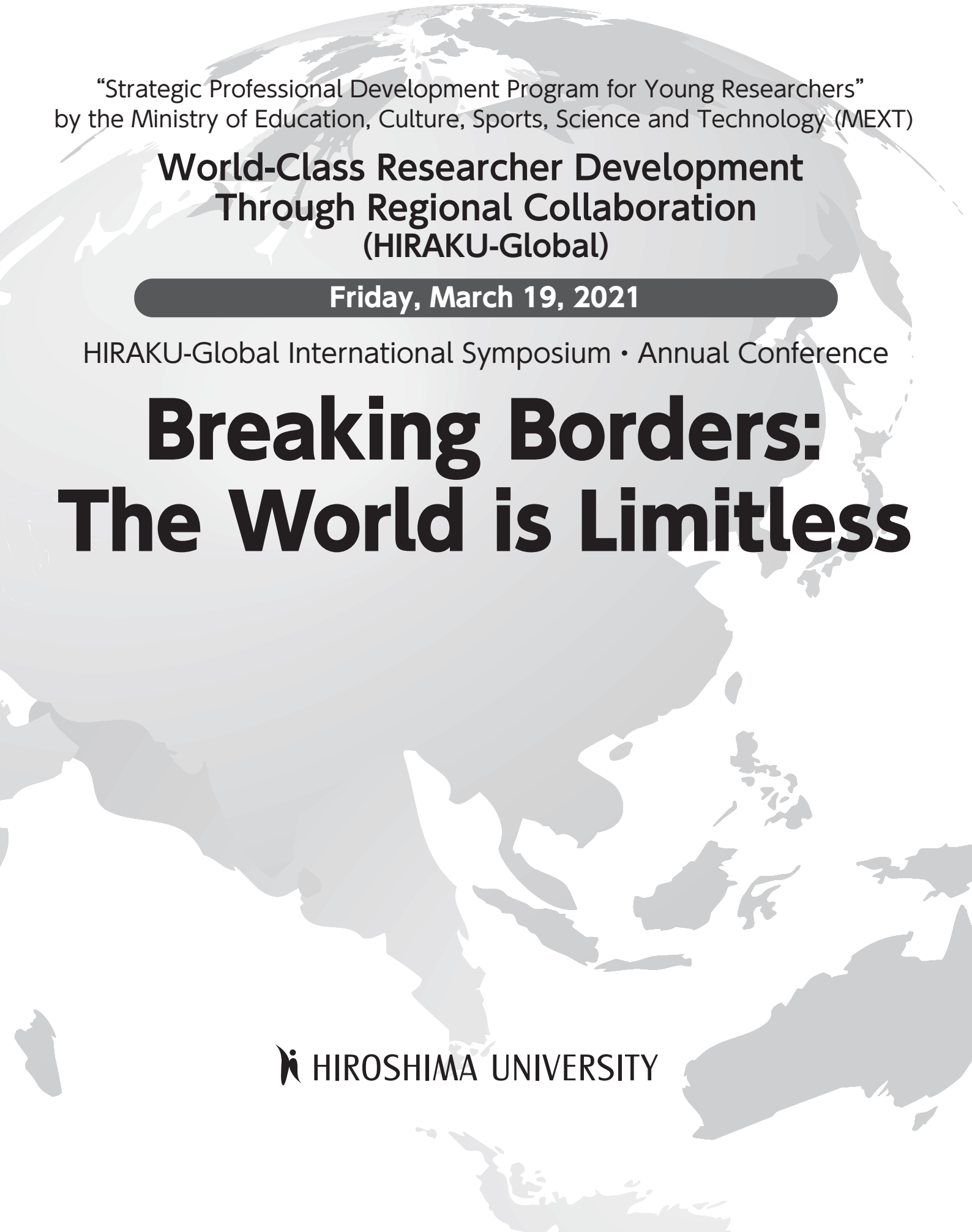


"Strategic Professional Development Program for Young Researchers"
by the Ministry of Education, Culture, Sports, Science and Technology (MEXT)

World-Class Researcher Development Through Regional Collaboration (HIRAKU-Global)

Friday, March 19, 2021

HIRAKU-Global International Symposium・Annual Conference

Breaking Borders: The World is Limitless

HIROSHIMA UNIVERSITY

Breaking Borders: The World is Limitless

Friday, March 19, 2021 Online (via Zoom)

MC: Jorge N. TENDEIRO, Ph.D.
Program Manager of the HIRAKU-Global Program

HIRAKU-Global Advisory Board Members

Robert W. MAHLEY, M.D., Ph.D.

President Emeritus and Founder, Gladstone Institutes, USA

As the founder of one of the world's leading research institutions (Gladstone Institutes), which has consistently been selected in the top 3 of the "Best Places to Work Postdocs" in surveys of universities, medical schools, and research institutes conducted by *The Scientist* magazine, he will share with us his secrets to becoming a successful, world-class researcher.

Alastair G. McEWAN, Ph.D.

Pro-Vice-Chancellor (Research Training),
The University of Queensland, Australia

As Pro-Vice-Chancellor and Dean of the Graduate School at the University of Queensland, in addition to being Convenor of the Australian Council of Graduate Research Executive Committee, he is leading change in practice in graduate researcher development across Australia. Given this background, he will outline the researcher development programs in place throughout Australia.

Jeremy P. BRADSHAW, DPhil

Pro-Vice-Chancellor (International & Doctoral),University of Bath, UK

As Pro-Vice-Chancellor at the University of Bath, he leads the international development of the institution and enhances its reputation for excellent doctoral provision. He is also a key figure within many European university alliances and is an expert higher education quality reviewer. Given this expertise, he will provide details regarding Europe's leading researcher development programs.

Yuko HARAYAMA, Ph.D.

Executive Director, RIKEN

Having contributed to the promotion of science and technology in Japan and overseas for many years as the Executive Member of the Council for Science, Technology and Innovation, Cabinet Office of Japan, after serving as Deputy Director of the Directorate for Science, Technology and Innovation at OECD, she has firsthand experience of the challenges the next generation of world-class researchers will face.

Takashi TODA, Ph.D.

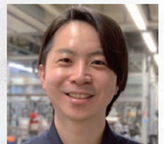
Specially Appointed Professor, Hiroshima University

As a Japanese researcher who excelled in an international setting by leading the Laboratory of Cell Regulation as a Senior Principal Investigator at the Francis Crick Institute (formerly Cancer Research UK's London Research Institute) for over 20 years, he is well-positioned to advise the next generation of world-class researchers on what it takes to excel on the world stage.

HIRAKU-Global Faculty Members (1st Cohort)

Dr. Eiji HASE
Tokushima University
(Optical Measurement)

Dr. Hiroyuki IMAI
Yamaguchi University
(Veterinary Medicine)

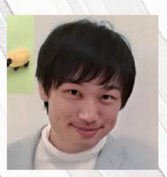


Dr. Keiichi IMATO
Hiroshima University
(Polymer Chemistry)

Dr. Hanae INAMI
Hiroshima University
(Astronomy)

Dr. Hiroshi SAKAI
Ehime University
(Sports Science)

Dr. Naoki TANIMINE
Hiroshima University
(Gastroenterology [Surgery])



Dr. Tomotaka UMEMURA
Hiroshima University
(Psychology)

地方協奏による世界トップクラスの研究者育成
HIRAKU GLOBAL
Home for Innovative Researchers and Academic Knowledge Users Driving Global Impact

For more information about the event,
please scan or click the following QR code.

国境を超えろ。活躍の舞台は、世界だ。

2021年3月19日(金) Zoomによるオンライン開催

司会:Prof. Jorge N. TENDEIRO HIRAKU-Global プログラムマネージャー

アドバイザリーボードメンバー

Prof. Robert W. MAHLEY

米国グラッドストーン研究所 創設者・名誉所長

Best Places to Work Postdocs ベスト3に4年連続で選ばれている世界屈指の研究機関を創設、牽引してきた氏が、研究者としての成功の秘訣を説く。2012年ノーベル生理学・医学賞受賞者の山中伸弥氏の恩師であり、モットーであるVW(Vision and Hard Work) はマーレー氏の教えであることは有名。

Prof. Alastair G. McEWAN

豪州クイーンズランド大学副総長(研究養成担当)

豪州クイーンズランド大学において研究養成担当副総長および大学院総長として、そして豪州大学院研究評議会実行委員長として、豪州全域にわたる博士研究者養成の変革を先導している氏が、豪州の先端事例を説く。

Prof. Jeremy P. BRADSHAW

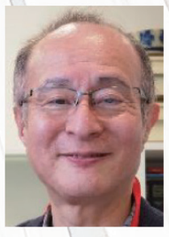
英国バーズ大学副学長(国際&博士担当)

英国バース大学副学長として国際展開や優秀な博士人材輩出に向けて組織を牽引する傍ら、数多くの欧州大学連盟での要職に加え、国内外の教育質保証機構において評価委員を務める氏が、博士課程教育の専門家として、欧州の先端事例を説く。

原山 優子

理化学研究所理事
前 総合科学技術・イノベーション会議 常勤議員

経済協力開発機構(OECD)科学技術産業局次長職を経て、総合科学技術・イノベーション会議常勤議員職を務め、長年にわたり国内外の科学技術振興に貢献してきた氏が、世界を目指す次世代の研究者たちの直面する課題にともに向き合う。



登田 隆

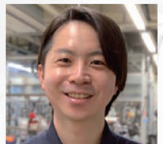
広島大学学術院 特任教授

英国フランシス・クリック研究所(旧英国癌研究所)にて上席主任研究員として、21年間(1995-2015)細胞制御研究室を統括してきた氏が、国際的に第一線で活躍する日本人研究者を代表して次世代の研究者たちに助言する。

第一期 HIRAKU-Global 教員

長谷 栄治
徳島大学
(光計測)

今井 啓之
山口大学
(獣医学)



今任 景一
広島大学
(高分子化学)

稲見 華恵
広島大学
(天文学)

酒井 大史
愛媛大学
(スポーツ科学)

谷峰 直樹
広島大学
(消化器外科)

梅村 比丘
広島大学
(心理学)

地方協奏による世界トップクラスの研究者育成
HIRAKU GLOBAL
Home for Innovative Researchers and Academic Knowledge Users Driving Global Impact

イベント情報は右のQRコードよりご確認いただけます。

Contents

Session 1

Visionary Empowerment Lecture

Guiding Young Scientists: Suggested Secrets of Success

Robert W. MAHLEY, M.D., Ph.D.
President Emeritus and Founder, Gladstone Institutes, USA

Profile ●Robert W. MAHLEY, M.D., Ph.D.

Professor Mahley is the founder of Gladstone Institutes in San Francisco, US. He now serves as President Emeritus and Senior Investigator at Gladstone. He is also a Professor of Pathology at the University of California, San Francisco. Since his days as the Inaugural President and now as President Emeritus of Gladstone, he has guided young scientists to success for over four decades.

Summary

■Advice to young scientists and suggested secrets of success

The concept of "VW" embodies the secrets of success. The "V" stands for vision. One of the secrets of success is to have a vision of what you want in your career. A vision is anticipating what you might be IF you stretch. In addition to being bold and risky, a vision recognizes the importance of contributing to society.

The "W" stands for work, hard work. It means never leaving until tomorrow what you can do today. As the saying goes, "You miss 100% of shots that you don't take."

Envision your career and then work hard to achieve your vision!

Professor Shinya Yamanaka belonged to Gladstone Institutes when he was a postdoc. He attributes his success to "VW". He didn't have any problem with hard work. However, his initial goal was to attain research achievements. When he told me this, as he recalls, I said to him, "That's not a vision. That's simply a way to achieve your vision." Dr. Yamanaka then came to recognize that his vision was to help patients, or to develop new cures for patients suffering from intractable diseases and injuries. That vision of his evolved to include using iPSCs.

My vision is to contribute to preventing coronary heart disease and high cholesterol levels. This vision grew out of the fact that my father died at the age of 37 from a massive heart attack. I have studied a cholesterol-transporting protein—apoE—for 50 years. This vision has expanded to contributing to the prevention of Alzheimer's disease. I have been working for many years on ways to prevent the detrimental effects of apoE4, the major genetic risk factor for Alzheimer's disease, on neurons. I don't know whether I will succeed in this, but I do know I will strive valiantly and take on challenges boldly to that end.

However, even if you create a bold vision and work hard, everything will not always work perfectly so that you win a Nobel Prize. Every scientist faces roadblocks along the way.

●Case of Professor Shinya Yamanaka

During his enrollment at Gladstone in the mid-1990s, Dr. Yamanaka studied a factor that was supposed to lower cholesterol levels. In that process, he expressed this factor in the livers of transgenic mice. However, the factor didn't work as he had planned, and the mice developed hepatocellular carcinoma. That might have seemed to be a failed research project, but in fact it led him to study embryonic stem cells—cell proliferation and differentiation. He returned to Japan to begin his independent research. He tested factor after factor to create what he hoped would be a way to generate what eventually became iPSCs. In that process, most combinations failed, leading him to face roadblock after roadblock.

We scientists all face roadblocks of some kind, but they give us a chance to demonstrate just how badly we want to accomplish our vision. They really determine how committed we are to our vision. The secret of young scientists' success revealed by this example is whether they have the perseverance to keep pushing forward in the face of difficulties.

●Case of Dr. Akira Endo

Another example I now want to offer is how Dr. Akira Endo overcame numerous roadblocks to develop the statin class of drugs, which has undoubtedly saved millions and millions of lives from heart attacks. He became fascinated by mushrooms and molds and was inspired by the story of Alexander Fleming and the discovery of penicillin from a blue-green mold. Dr. Endo envisioned that extracts from fungi could be modulators of various enzymes. He became interested in cholesterol biosynthesis, and his interest in that process was heightened while he was at the Albert Einstein College of Medicine. He observed rampant coronary heart disease (CHD) in the US, which was exacerbated by the American diet and was associated with high blood cholesterol levels. In 1968, he joined the Fermentation Research Laboratories of Sankyo Co., Ltd. back in Japan. He speculated that fungi would produce molecules that inhibit HMG-CoA reductase, which would decrease cholesterol. In the early 1970s, Dr. Endo examined broths from thousands of fungal cultures and identified the first inhibitor. However, his compound killed the rats in his experiment. That was his first roadblock. Nevertheless, his vision was expanded, and he never became deterred from his research. He eventually discovered a better molecule, called "compactin", isolated from rice mold in Kyoto. He then encountered his second roadblock. When the molecule was given to rats, it had no effect on their cholesterol levels. Although it is now known that normal rats simply did not respond, that was a big setback at the time. Sankyo was dismayed, but Dr. Endo did not give up. He found a clue in research on egg-laying hens conducted by his friend in the lab next door. Eggs are high in cholesterol, and hens have high blood cholesterol levels. When hens were treated with compactin, their cholesterol levels decreased by 50%. Compactin was then found to also work in dogs and monkeys. He then encountered a third roadblock. When he gave compactin to rats, their livers filled with microcrystals, causing them to suffer from hepatotoxicosis. He nevertheless pushed ahead, and his vision advanced.

In 1978, it was proven that compactin inhibits HMG-CoA reductase in human fibroblasts. At Osaka University Hospital, compactin was actually administered to familial hypercholesterolemia patients. The result was a 30% decrease in plasma cholesterol in those patients. Merck was impressed and began its own program. The company identified a molecule that resembled compactin, called "lovastatin". However, in response to a rumor that compactin caused lymphomas in dogs, Sankyo stopped the program, and Merck put its program on hold. This was the fourth roadblock Dr. Endo faced. Nevertheless, he continued to push forward because there were too many positive results for him to give up on the vision of finding a molecule that could treat high cholesterol levels in CHD patients. The rumor about the lymphoma was not based on a valid observation, and no official disclosure was made concerning it. Studies repeated by Dr. Goldstein and Dr. Brown demonstrated that compactin was safe when given to dogs. In fact, when compactin was administered to patients with severe hypercholesterolemia, it produced very few side effects and dramatically lowered LDL cholesterol in those patients. In 1984, Merck conducted a major examination of the risk that lovastatin would cause tumors, and demonstrated that there was no concern of the development of tumors, and that the treatment was well tolerated. In 1987, the US Food and Drug Administration (FDA) approved the administration of lovastatin to patients. This was the first statin-class drug to be launched on the market. Dr. Endo thus maintained his vision, battling through the four roadblocks that could have killed the development of these life-saving drugs. The end result is a miracle drug that has impacted millions of patients around the world and prevented early deaths from CHD.

I have tried to share with you what I have learned over the years as possible secrets to success. In conclusion, let me repeat.

Remember VW: a vision and hard work. Establish a bold and risky vision that anticipates what might be IF you stretch and are willing to work hard to achieve that vision. You will inevitably face roadblocks. Be willing to push forward—demonstrate how badly you want to accomplish your vision and how committed you are.

Session 2

Professional Empowerment Lecture

Early Career Researcher Development in Australia

Alastair G. McEWAN, Ph.D.
Pro-Vice-Chancellor (Research Training), University of Queensland, Australia

Profile ●Alastair G. McEWAN, Ph.D.

Professor McEwan is the Pro-Vice-Chancellor (Research Training) at the University of Queensland (UQ), Australia. He is also the Convener of the Australian Council of Graduate Research. With a Ph.D. in Biochemistry, he has served as a Professor of Microbiology at UQ since 2003. In addition to being a well-experienced scientist, he has experience of serving as Dean of the UQ Graduate School.

Summary

■Early career researcher development in Australia

As a premise, in Australia, early career researchers (ECRs) are defined as researchers who completed their Ph.D. less than eight years ago. In our system, all post-Ph.D. staff are classified as "Academic Staff" of one of two categories: Teaching & Research Staff (faculty) or Research-focused Staff (postdocs and research fellows). Many of the latter would like to move to Teaching & Research Staff because, usually, only Teaching & Research Staff can be tenured. The appointment of tenured academic staff is a major investment by a university, and I think we should help develop the faculty for their success as academics. One route we use to transition postdocs and research fellows into faculty positions is to engage them in teaching activities at an early stage to enhance their own career pathways. UQ has the Amplify Fellowships Program, which leads research fellows to fixed-term contracts and eventually to faculty positions. At an early stage, we try to transition them into faculty positions if their performance is sufficient.

■Supporting female researchers

We have two programs to support female researchers:

- UQ Amplify Wo[men]'s Academic Research Equity (AWARE) Program
- Queensland State Government Women's Research Assistance Program (WRAP)

These programs support female scientists when they are on maternity leave or cannot work full-time due to the need to look after their children or other circumstances. Having flexibility is quite important for female researchers, and is one of the ways in which we can help them succeed.

■Supporting ECRs

It can be said that the key to success in developing ECRs as future world-class leaders is providing various researcher development programs, enabling them to obtain support from supervisors and mentors, and listening to the ECR community. UQ has very strong early- and mid-career researcher communities of various sizes, ranging from University-wide integrated communities to faculty- or department-specific communities. They bring together various proposals and requests to develop a roadmap.

■Researcher development programs

I don't think Australia has as advanced researcher development programs as the UK, but I would like to introduce the researcher development programs in my country. The University of New South Wales has an "Extend" program as a researcher development initiative. The program visualizes the capabilities that researchers should develop to succeed and the activities that they should engage in for that purpose, including supervising research, engagement and knowledge exchange, publishing and profile building, funding and projects, leading and working with others, and learning and teaching. ECRs incorporate the capabilities they want to develop or the activities they want to conduct from among the above into their own individual development plan (IDP). They then discuss the plan with their supervisor.

It is also very important that a university's common facilities (including libraries and research offices) and each faculty or department share various tasks necessary for ECR development, and partner with each other.

UQ also offers a huge number of programs and opportunities to ECRs. It is essential to visualize the linkage between each of those opportunities and its effects in developing each ECR in an organized manner, and to incorporate the results into each ECR's IDP. UQ has also clarified such linkage while consulting examples from the University of New South Wales and the University of Edinburgh.

■Support and structures to support ECRs

One of the most important factors for ECR development is commitment from supervisors to researcher development. In researcher development, nothing is more important than mentoring and support. As suggested in Dr. Mahley's lecture, it is crucial to show a vision and include the actions to realize that vision in each young scientist's IDP. It is also important that annual reviews are more than just measurements of research outputs. They should be measurements of career outcomes in light of the IDP. In addition, supervisors need training to develop as Ph.D. advisors and research supervisors. Based on this, as a new initiative, UQ has recently added to its domains of performance appraisal for academic staff, which already include Teaching, Research, and Citizenship & Service, a new domain of Supervision and Researcher Development. Supervisors (senior faculty) will be asked about their performance in developing Ph.D. students and ECRs. The following five items are expected in the domain of Supervision and Researcher Development:

The first is supervision outcomes. Possible standards for performance appraisal are, for example, whether Ph.D. students have completed their Ph.D. and whether ECRs have been tenured. However, such career progression of ECRs and Ph.D. students is facilitated through structured performance and development discussions. I think it is really important to help young researchers in terms of their vision, and lead them to the action they need to take for their career progression.

The second is responsible conduct in research. Full consideration of research ethics and authorship is naturally important.

The third is capability and skills development. I think supervisors should be interested in what capabilities and skills individual young researchers should develop, and support them. For the development of teaching skills and capabilities and supervisory capabilities in particular, supervisors should advice ECRs based on their own teaching and supervising experience. Support from supervisors for ECRs in learning to teach and supervise Ph.D. students and other students is very important.

The fourth is engagement, or supporting ECRs in networking to enable them to achieve their visions. Senior researchers should provide ECRs with opportunities to become involved in discipline-based societies/professional associations and international connections. They should also offer ECRs opportunities to develop their own knowledge exchange capabilities through discussions with external stakeholders, including industry, government, and external funders. Small things will make a difference in developing engagement opportunities for ECRs.

The last one is leadership, which is also important for senior staff in undertaking relevant training and development opportunities to enhance personal effectiveness as a supervisor, and developing/implementing an initiative to improve the supervision and/or experience of (groups of) ECRs.

■Future of researchers

It is important for researchers to not only lead their disciplines but also work with teams. This skill can be learned on the job and through discussions and coaching.

In addition, importance has recently been placed on mission-oriented research in Japan, the UK, and the US. This also requires not only individual visions but also teamwork.

Finally, I believe greater emphasis will be placed on the quality of output, rather than volume, in the future.

Early Career Researcher Development in Europe

Jeremy P. BRADSHAW, DPhil
Pro-Vice-Chancellor (International & Doctoral), University of Bath, UK

Profile ●Jeremy P. BRADSHAW, DPhil

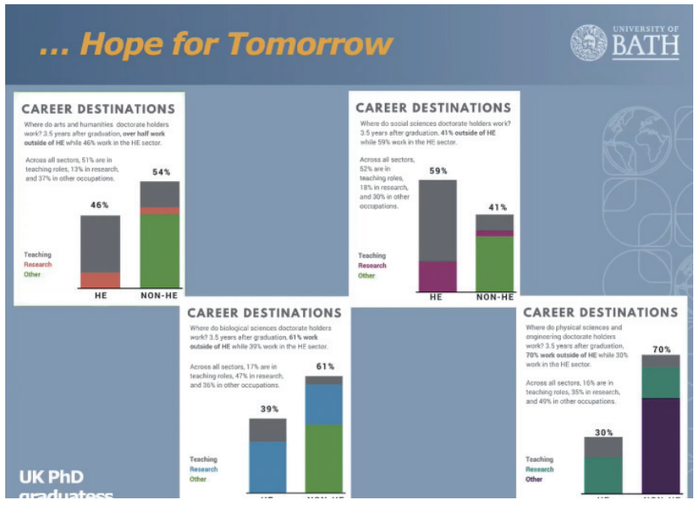
Professor Bradshaw is the Pro-Vice-Chancellor of the University of Bath. During the 33 years from 1985, when he joined the University of Edinburgh as a postdoc, to 2018, when he moved to the University of Bath, he assumed various important posts. His last post at the University of Edinburgh was Assistant Principal (Researcher Development). He also served as an Executive Member of the UK Council for Graduate Education. He has led doctoral education by participating on behalf of his university in various university alliances, including in the League of European Research Universities, the Coimbra Group, and Universitas 21. Currently, he is serving as Chair for the UK's national Three Minute Thesis (3MT) competition.

Summary

■Habilitation as a qualification to be a professor

About 300 years ago, German universities became increasingly concerned about the large gap between attaining a doctorate and becoming a successful professor. Therefore, they adopted and adapted a degree invented in 1652, a century earlier, to create a "super doctorate" degree. This was "habilitation", as adopted in academia. Habilitation is still used by universities in many European countries, excluding the UK, as a gateway to tenured faculty posts. Habilitation involves writing a second thesis without a supervisor, unlike the doctoral thesis. Habilitation as a gateway helps clearly show young researchers the steps they should take to become tenured. It also helps ensure objective assessment of the end of becoming a professor.

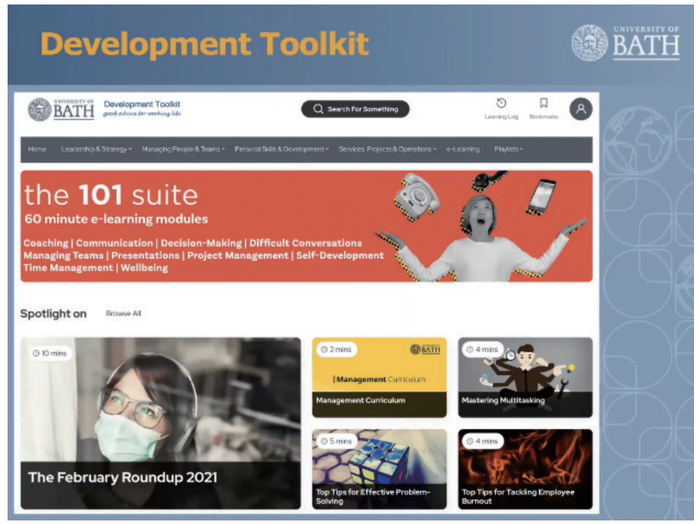
As shown by the results of a survey conducted by Vitae in the UK (see the figures down below), there are now only a minority of Ph.D. graduates who stay on in academia in the UK. Among Ph.D. graduates, only social scientist doctorate holders who stay on in academia constitute a majority, and most of them teach at higher education institutions, with a low percentage actually conducting research. This phenomenon is recognized by many organizations. Of them, the UK Council for Graduate Education, issued the Oxford Statement 2015, which not only admitted that many Ph.D. graduates had entered careers outside of higher education but also acknowledged that a Ph.D. is excellent training for a wide range of careers.



■Researcher Development Framework (RDF)

The Researcher Development Framework (RDF), produced by Vitae mentioned above, is well known around the world and is widely adopted in the UK. The RDF describes the attributes of anyone conducting research in a higher education institution, and charts the paths of development of these attributes. It identifies the attributes of good researchers at different stages of their development. The RDF contains other activities related to research that may or may not be undertaken by individual researchers. It is also deliberately designed to simply provide information at different levels for reference, and avoid any link to performance appraisal or academic promotion procedures. The RDF is made up of four domains: Domain A for knowledge and intellectual abilities necessary for research; Domain B for personal effectiveness; Domain C for research governance and organization; and Domain D for engagement, influence and impact. The four domains are divided into 12 subdomains, which include a total of 63 items, for each of which there are five development phases. These phases are not explicitly linked to any particular career stage. This recognizes that we all develop skills and experiences in each subdomain at a different rate. Anyone may be more advanced in some subdomains than others, and this may change throughout their career.

As shown in the figure below, a web page of the University of Bath describes training and development opportunities for faculty members. Each of these opportunities is explicitly linked to the RDF. The same would be true of the majority of UK universities.



■Examples of tenure-track programs

Five years ago, the University of Edinburgh launched a five-year tenure track fellowship program called the "Chancellor's Fellowship" for talented ECRs. Every year, a new cohort of fellows start. They receive financial support and generous startup costs, in addition to their salary. They also receive training and mentoring to develop their research, and even receive funding to hire Ph.D. students as research assistants as needed. The expectation is that, within five years, they will have established themselves with a portfolio of research plans and publications and become permanent tenured academic staff.

Several other European universities have similar programs. Examples:

- University of Freiburg: https://www.tenuretrack.de/en/funded-universities/university-of-freiburg
- University of Copenhagen: https://employment.ku.dk/tenure-track/tenure-track-at-ucph/

Session 3

Visionary Pitch and Panel Talk

HIRAKU-Global

3 Minute Visionary Pitch by the HIRAKU-Global Faculty Members (1st Cohort)

Summary

HASE Eiji, Ph.D.

Designated Assistant Professor, Institute of Post-LED Photonics, Tokushima University

Outline of research

I am conducting research to develop optical measurement instruments. I specialize in biomedical optics. Optical microscopes and confocal lasers can be used for the observation of skin aging and cell visualization. I am currently spending a lot of time developing such equipment.

Vision and aspiration

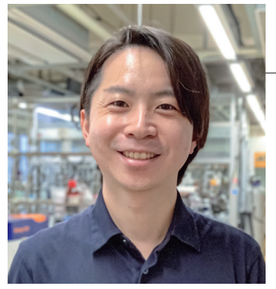
I hope to establish originality as a researcher. As the action necessary to realize this vision, I should expand my research field to the area of practical application. However, this symposium has taught me that this does not amount to a “vision”, so I will reconsider my vision.

IMAI Hiroyuki, D.V.M., Ph.D.

Assistant Professor, Joint Faculty of Veterinary Medicine, Yamaguchi University

Outline of research

I am conducting research on polyploid mammals in the field of veterinary medicine. My research also covers biology, evolution, stem cells and reproduction. I believe that another genome duplication event will be needed for the further evolution of mammals. A diploid embryo, which has two sets of chromosomes, can survive until adulthood. However, a tetraploid embryo with four sets of chromosomes unfortunately cannot grow up due to abnormalities that occur in the developmental process, and it dies in the early stage of pregnancy. The cause of abnormalities in polyploid embryos is yet unknown. Research on these topics is likely to be applied to livestock genetics in the near future and may be applied to the prediction of the evolution of mammals, including humankind, in the long term. I believe this research will be able to help in the treatment of diseases, including cancer, as well as wounds and disorders caused by aging.



IMATO Keiichi, Ph.D.

Assistant Professor, Graduate School of Advanced Science and Engineering, Hiroshima University

Outline of research

I specialize in chemistry, and more specifically, polymer chemistry. I am currently conducting research on smart materials that show unique properties in response to external stimuli, such as certain levels of temperature, light, electricity, hydrogen-ion concentration, chemicals and force. My current target is to develop soft actuators (artificial muscles). To achieve this target, I am now designing and developing necessary molecules and materials.

I believe that one of the challenges we must solve in this field is amplifying molecular motion to achieve macroscopic functions, so now I am tackling this challenge. In the future, my study will help realize actuators for soft robots, on-demand adhesion, improvement of reliability, and organism-like materials.

Goal and challenges to be solved

To become a top-class researcher in this field, I hope to submit papers to general science or chemistry journals with high impact factors, and acquire a large research grant. I would like to seek advice on what I should do to collaborate with scientists in different fields from Japan and abroad, and to conduct joint research with overseas young scientists and excellent talent in the same field as mine.

INAMI Hanae, Ph.D.

Assistant Professor, Hiroshima Astrophysical Science Center, Hiroshima University

Outline of research

My goal is to understand cosmic history. I am currently implementing a project to reveal the details of the vast universe and the evolution of the universe. Infrared light allows us to see hidden energy sources in galaxies, such as black holes. What you see in visible light is not the entire universe but only an aspect of it. Infrared galaxies show us the past of the universe.

Challenges to be solved and thoughts

In recent years, I have faced the challenge of securing sufficient time to conduct research and obtaining research grants, and attracting graduate students and postdocs to my team. In addition, there is the issue of possible gender bias. I believe that, in the field of astronomy, my current research will have a particularly strong impact on science in general and society. I also believe that astronomy has the potential to serve as an ideal gateway to science, technology, engineering and mathematics (STEM) education.

SAKAI Hiroshi, D.V.M., Ph.D.

Assistant Professor, Proteo-Science Center, Ehime University

Outline of research

I am currently researching human skeletal muscles and examining the mechanism for androgen, a male hormone, in causing the enlargement or hypertrophy of skeletal muscles. I aim to conduct joint research with others, expecting that such collaboration will enable me to develop novel ideas and learn new technologies. I also believe that such collaboration will provide me with the opportunity to obtain a research grant.

Future vision

I hope to use the results of my current research to propose new solutions or treatments, not only for those who want to increase their muscle size but also for those who have suffered a decrease in muscle mass, such as through sarcopenia, and the elderly who have weakened muscles. I expect this research will help increase public understanding of muscle systems and lead to the development of new treatments.

TANIMINE Naoki, M.D., Ph.D.

Assistant Professor, Hiroshima University Hospital,
Hiroshima University

Outline of research

I am conducting research on organ transplantation, tumor immunity, and transplantation immunity. Transplantation therapy has advanced together with the control of rejection. Immunosuppressive drugs have contributed to dramatic improvement in the outcomes of transplantation over these 20 years. However, transplantation sometimes results in uncontrollable rejection and causes the recipients to suffer burdens of lifelong medication and side effects. An expected solution to that is transplantation tolerance, whereby transplants can be maintained without any immunological reaction after transplantation.

Challenges to be solved

No method of inducing and maintaining transplantation tolerance has been established yet or even characterized well clinically. I am conducting clinical studies and basic experiments in this field. Since this field requires a team effort, I am tackling the challenges of improving my team-building and managing skills and leadership. I will characterize clinical tolerance and develop therapy for inducing and maintaining transplantation tolerance.

UMEMURA Tomotaka, Ph.D.

Associate Professor, Graduate School of Humanities and Social Sciences, Hiroshima University

Outline of research

As a psychologist, I am researching attachment and implementing the Hiroshima Attachment Research Project (HARP). What is attachment? Suppose a baby is crying in front of a door. It is crying because its mother closed the door and disappeared, leaving the baby alone there. Generally, the baby is likely to stop crying after the mother returns from behind the door and hugs the baby. In another case, however, even if the mother returns, the baby may not approach her or look at her. That case suggests that the baby may have experienced physical abuse or neglect. I am trying to understand how we can treat such people, including babies.

Goal

I am currently collaborating internationally with American, European and Asian colleagues. At Hiroshima University, I'm trying to share my experience in international collaboration and English publication with students. I hope to further promote my research project in interdisciplinary collaboration with scientists in various fields, including cultural anthropologists, and international collaboration.

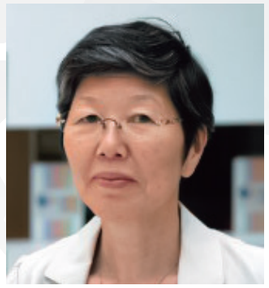
HIRAKU-Global

Panel Talk ❶

Problem Statement and Advice for World-Class Researcher Development

Breaking Borders

HARAYAMA Yuko, Ph.D.
Executive Director, RIKEN



Summary

We must empower ECRs beyond various borders, including national, institutional and disciplinary borders, as well as borders between different ways of thinking and norms. For example, we must not only coach them in technical aspects and skills, but also invite them to fully mobilize their potential, to take up the challenge of undertaking an endless journey to discover the unknown and break through existing borders.

Developing leadership in cooperation with others

That means that ECRs should interact with others, including not only other researchers but also various professional support staff members, intermediaries, and communities. They should also exercise leadership while working with others. I hope that, by doing so, they will find a way to become a researcher, act globally, and act responsibly.

Both ECRs and their mentors should be innovative

As a mentor, I am supposed to coach and help ECRs, but I would say that we as mentors have a lot to learn in interacting with our candidates. Any support should not be one-way but mutual. We can interact with the HIRAKU-Global Faculty Members not only to change them but also to change ourselves as mentors, including myself. So I hope the HIRAKU-Global Faculty Members will take the lead in engaging in discussion and working together towards shaping a better research community. I also trust that they will not only have an impact on other researchers in their fields, but also serve society in a wider range of aspects to create a sustainable world.

Advice to Young Scientists

TODA Takashi, Ph.D.
Specially Appointed Professor, Hiroshima University

Summary

I will give some advice to young scientists based on my experiences.

(1) Have mentors and supporters

Mentors could be your Ph.D. supervisors, superiors or bosses, or senior researchers in your field. So find mentors whom you can respect. They will assess you while you are not aware, and will support you when necessary. I myself used to receive good advice and great support from two mentors, who have been particularly influential in my life.

(2) Establish keywords

Select keywords about yourself and your research. Your keywords should clearly encapsulate what you are and what you are doing so that your colleagues will remember and recognize not only your name but also more about you. When you choose such keywords, it is important to choose words that can create a big but simple picture of yourself. Those keywords will serve as a message that will enable others to recognize you and will help you develop your future career.

(3) Set specific goals

I would use the word “goal” rather than “vision”. The two words overlap but are slightly different. You may set a goal of publishing a paper or papers in a top journal during your lifetime. If possible, write original and review papers, or desirably books. It is vital to publish such works. Then get promoted to a PI and run your own laboratory. Such a promotion is unfortunately beyond what you can achieve on your own right now, but be patient. I’m saying this because, crucially, positions make people. If you are promoted, it will change you because it will serve as positive feedback.

(4) English is important

If you are to work internationally, English proficiency in speaking, listening and writing is always important. English proficiency is not just inborn talent but something you can improve as you gain more experience. Many Japanese have an inferiority complex about their English proficiency, but it’s a skill everyone can master through continuous learning.

(5) Consult with people close to you

Consult with your partner, family members, friends, research colleagues, or other people close to you. Their consent and encouragement will empower you to take a step forward. However, when you make a decision, trust your own instincts. Move swiftly when you think an opportunity is coming your way.

HIRAKU-Global

Panel Talk ❷

Challenges faced by early career researchers in a global world, and some proposed solutions

HIRAKU-Global Faculty Members (1st Cohort) and the Advisory Board Members

Moderator: Jorge N. TENDEIRO, Ph.D. (HIRAKU-Global Program Manager)

▶Prof. Tendeiro

For the panel talk, I will select some topics to launch the discussion. Our seven HIRAKU-Global Faculty Members and five Advisory Board members will have opportunities to share their perspective or give feedback on the topics. Also, the audience can feel free to post remarks or questions using the Q&A function on Zoom. We will try to take up audience feedback, if possible. The first topic is how to start networking. How can young researchers who have started their research in Japan network with successful researchers abroad? How can they have the first contact with such people abroad? I would like one Advisory Board member to start elaborating this topic. Afterward, I would like a HIRAKU-Global Faculty Member to give any follow-up remarks. Professor Mahley, what would you suggest to young researchers?

▶Prof. Mahley

It's always good to participate in programs of international meetings so that you have something to talk about. I think the most important thing on this topic is to be bold. Approach the people you want to influence in your particular area. That is because they will promote you internationally. At a meeting, find the people you want to come to your poster or oral presentation and invite them. Be bold. I think the most effective way to approach senior researchers is asking them questions about their research, rather than talking about yourself. Show your interest in their research. After that, you will have an opportunity to talk about yourself. I think this is the most important thing.

▶Prof. Tendeiro

Professor Mahley has given us some very practical advice. Young researchers, do you have any questions?

▶Dr. Inami

Thank you for your very valuable advice. I believe we have been doing that, but it has recently been becoming harder to engage with people online. In the astronomy field, even before the pandemic, we were talking about offsetting carbon, so many meetings, both international and domestic, were held online. I think that, from now on, most meetings will be held online. I'm trying to keep in touch with some people using chat tools and other online technologies, but it's still sometimes very difficult to make meaningful contact with someone without meeting in person.

▶Prof. Mahley

That's right. We are now in a very difficult situation. Zoom and chat tools have helped us manage to keep things moving forward, however. I hope that the pandemic is over soon, which will give you much more opportunities. However, I think it's not easy to broaden your network only online.

▶Dr. Inami

I predict that, at least in the astronomy field, all meetings will be held online for the purpose of carbon offsetting, even in the post-COVID-19 era. Although online technologies are developing, we face the challenge of considering how we can change our behavior against the backdrop of the likely monopoly of online communication in human networking.

▶Prof. Mahley

That's an excellent question. There's no answer to that yet. We all have to consider it together.

▶Prof. Bradshaw

I think we will continue to use Zoom and other tools even after the pandemic is over. However, I don't think this means the end of scientific meetings or the abolition of on-site events. Both young and senior researchers actually want to meet each other in person, so non-virtual international meetings will continue to be held.

▶Prof. McEwan

Let's think of this as an opportunity. I suppose some people cannot be positive online or cannot be themselves in an online chat. However, even if you start with a small question, you may end up coming up with a better question. Therefore, don't be afraid to speak to other people to make them more aware of your name. This is important advice I received when I was doing my Ph.D. As Professor Mahley says, be bold and don't be afraid to talk, and take advantage of the online circumstances without fear of talking to others. Various online academic meetings and programs have evolved. There has been an increase in opportunities for young researchers to organize their own

groups, take part in the organization process, and have their ideas incorporated in specific programs or structures. Follow such opportunities and participate in some of them to become a little bit more creative. At a conference I recently organized, a researcher new to that field contacted me directly to ask whether she could become a member of the network. I welcomed her, of course. I think we'll have opportunities for face-to-face meetings again some day. I think it would be good for young researchers to not only approach senior researchers but also form a group with each other for mutual support. Although young researchers are scattered around the world, some of them seem to have taken opportunities to engage in joint research with other young researchers in the same field, by networking and supporting each other in research and other areas. In this way, I believe there are opportunities to survive this online era on several levels.

Dr. Tanimine

Do you believe it's good to have close discussions with your competitors when they are doing excellent work?

Prof. Mahley

If you come across anyone conducting similar research to yours, engage with them. They will be your best contact. They may have more abundant resources or broader ideas than you. So it's important for you to let your competitors know about you. Let me repeat, "Be bold".

Prof. Tendeiro

The next topic is how to control our expectations. What should we do if we can't do something as we intended? Dr. Harayama, what do you think?

Dr. Harayama

It's natural that unexpected things will happen. In my experience, failure to make progress toward a goal means discovering new things. Therefore, carefully observe phenomena that conflict with your expectations. You will probably have to modify your initial hypothesis. Think flexibly without sticking rigidly to your initial idea, and take up the things that you find exciting. This will enable you to acquire something new. Also, talk to other people. I believe they will be your source of inspiration. Talking to people outside your field will particularly help you break your boundaries and listen to others with an open mind. That may enable you to come up with new ideas and take a step forward.

Prof. Toda

The point is that you don't have to be disappointed. Even if you fail to gain the results you expected, take all results with a positive frame of mind. As Dr. Harayama just said, it is also important to talk to your friends and colleagues and receive encouragement from them.

Prof. McEwan

I would add a quote from Pasteur: "Chance favors the prepared mind". It is also important to think promptly. Always be prepared for various ways of thinking about what skills you have and what direction you want to take. As Dr. Harayama said, even if you find an opportunity during your observation, it won't be like a straight line. I believe it is also vital for you to have many backup plans for various opportunities, that is, a portfolio capacity.

Prof. Tendeiro

The next topic is working in a research team. When young researchers work under senior superiors or guides, they may sometimes be hindered from becoming independent or achieving growth. That may happen when young researchers are striving to become independent while working under the wing of their academic supervisors. Under such circumstances, how should young researchers respond in order to achieve growth? Professor Bradshaw, what strategy would you suggest?

Prof. Bradshaw

A possible strategy would be to hold regular meetings in your research group to discuss the progress of your research. This would provide young researchers with a good opportunity to present their ideas and make corrections to their research. It would enable them to contribute to the direction of their research. I think, in this topic, there is a very important message for all established researchers, such as members of the Advisory Board: We need to respect the opinions of young researchers and give them the freedom to develop as independent researchers.

Prof. Mahley

When the time approaches for young researchers to leave their lab to pursue their research independently, it is also important for them to talk with their supervisors about what they can take out of the lab with them. Good supervisors will respond positively to this topic. There is usually a lot still to continue to explore, other than the challenges the supervisors themselves are tackling. In my lab, young researchers talk frankly with principal investigators (PIs) about what they can take out with them and their research plans. For example, they may say, "I will leave this lab in about a year to start my own lab. I would like to take out this mouse model that I started developing with you, and do XYZ research". Usually, it's not difficult to have such a discussion.

Prof. Tendeiro

I see. That's a good example. For example, some supervisors may not be very open to others. An online attendee asks a related question. "When you faced difficulties communicating with other team members, how did you improve the situation or solve the difficulties?"

Prof. Toda

I think there are many kinds of problems and difficulties, including purely scientific ones and those concerning human relationships. If your problem or difficulty is about science, I recommend that you be honest and open. I believe it is important to avoid just feeling hostile to your colleagues. In addition, I would recommend that you share your problems with other team members through discussions with them, instead of trying to solve those problems by yourself.

Dr. Inami

I may be overcomplicating the question. But there is another problem, in that if you want a job transfer, all you can rely on is a letter of recommendation. That will create a bottleneck if you don't have a very good relationship with your boss. A possible breakthrough would be to conduct major joint research. I used that method once to escape from a difficult situation I faced. Now I'm conducting joint research with researchers from various continents, outside of Africa, and I can ask colleagues at other labs abroad to write me a letter of recommendation even if they are not my immediate boss. I would return to the first topic to suggest that networking may help solve such problems.

Prof. McEwan

I think it comes back to the question of how you can negotiate with senior researchers in a large group. In my biochemistry field, at the lab of Professor Nishino, a distinguished Japanese professor, senior staff give presentations at most academic meetings, including major ones. Having discussions about opportunities to present on behalf of the lab, many senior staff are very reasonable about that. Have the courage to talk to senior researchers. They will never refuse to talk to you. Some of them may not have thought much about your topic and you may cause them to think about it for the first time. It is important to create such a culture of communication. Many researchers sincerely want to offer a favorable environment to younger researchers. Moreover, young and middle-aged researchers can play a role in creating such a culture by forming a group for themselves and voicing their requests not as individuals but as a group. Once young researchers' voices reach the administrative section, the staff will consult senior researchers, informing them about the requests. In this way, it is possible to act collectively and share your opinions and ideas with senior researchers to change the situation. In summary, you can act on two levels: talk with senior researchers on a personal level and voice your requests to other researchers on a group level. You may not be able to change the situation immediately, but you will be able to bring about gradual changes.

Prof. Mahley

It's important to have mentors. They can help young researchers immensely. They allow you to test your own ideas to solve problems. They can play the role of persons somewhat unrelated to you, organizing your ideas and checking whether your problems are really "problems" or whether there are any other solutions. PIs often serve as mentors to young researchers. Have various kinds of mentors, including scientific mentors who assist you in your research and mentors for your life (who may not even be researchers), and learn from them about how to manage your time, what kind of life you should lead, and how to manage your money. You should also have role-model mentors. Learn how to think and act from them. Have a lot of mentors and consult them. You may start with a PI near you. But I don't mean to threaten you by saying their help may not be enough. Many PIs are rational in their thinking. For senior researchers, young researchers are like their own children, so they want young researchers to succeed, of course.

Prof. Tendeiro

It is important for young researchers to have the courage to come forward and seek help from mentors in solving problems. The next topic is how to acquire leadership skills while, at the same time, working in a team of researchers from diverse backgrounds. Leadership is an important skill that most researcher training programs focus on. For example, it may sometimes be difficult to stand out as a leader while collaborating as a team member. What kind of experience is necessary to become a leader?

Prof. Toda

I would recommend young researchers have a try at something according to their immediate circumstances, and never give up on continuing their research.

Prof. Bradshaw

I think the answer will depend on the definition of leadership. Leadership may mean the ability to serve as the representative of a lab and instruct its members. Advising group members, having discussions with them, and helping them are probably included in the first kind of leadership. Good leaders should respect their team members, and, just as they would with their own children, help them do their best. Needless to say, these can be done in a team of researchers from diverse backgrounds. It is essential to pay attention to what the other members are doing, be aware of what they need and what problems they face, and help them.

Dr. Harayama

A leader must enable people with diverse characteristics to work together in a team and lead them in the right direction. Therefore, it is crucial for the leader to listen carefully to all team members to identify their needs and engage with the team. Having openminded discussions with all people and engaging with them will eventually enable you to lead something. The point is whether you can work with other people even if you are not officially titled a "leader".

Prof. McEwan

A good leader is someone who can understand the strengths of each team member and leverage them. A team may have various members, such as one who has a vision but is not good at management, and one who is good at implementing projects. I mean that the leader should be able to make optimal use of the strengths of each member for the sake of the team. Needless to say, you should understand yourself well, further boost your strengths, and address your weaknesses. I believe a good understanding of both the strengths of diverse team members and your own strengths will enable you to demonstrate leadership.

Prof. Tendeiro

I would like to ask the HIRAKU-Global Faculty Members how they assess the level of contribution of their research to society. To what extent is contributing to society related to your setting of research or career goals? Because public funds are invested in your research, it is meaningful to give back to society through social contribution. To what extent does social contribution affect your career planning?

Dr. Umemura

As I'm overly busy working to get published or pursuing other purposes, I sometimes lose sight of the reason why I'm doing my research. I hope to contribute to society, of course. Therefore, I sometimes pause to reconsider how I am allocating my time to various parts of the research and the direction it is taking.

Prof. Tendeiro

Do you believe you should consider to what degree your research contributes to society? Or do you believe you should only concentrate on your own research, which will consequently lead to contribution to society?

Prof. Toda

It is certainly important for us in our 60s to consider what impact our research will have on society. However, the HIRAKU-Global Faculty Members are still in the process of self-development, so I think they are still pursuing their own interest, rather than social contribution. Any initial-stage vision that is not directly linked to society like a medical vision, originates from scientific interest. It would be very commendable to make social contribution through such a vision at any stage. However, in their current situation, no one can say to what degree young researchers should consider their contribution to society.

Prof. McEwan

It is important that young researchers begin by concentrating on what they are good at to increase their capabilities. Give young researchers a little more time. If they tackle challenging tasks in the process of maturing their research, that will lead to their contribution to society. Pressure to contribute to society in the early stage of their research may adversely decrease their productivity.

Prof. Tendeiro

Thank you very much for joining us today. That concludes session 3 of this event.