

Message

Addresses given
at the Ceremony
for the Kavli IPMU
10th Anniversary

Makoto Gonokami

President of the University of Tokyo



Good afternoon, distinguished guests, Ladies and Gentlemen.

On behalf of the University of Tokyo, the host institute of the Kavli IPMU, I would like to say a few words.

First of all, I am very happy to attend this 10th anniversary celebration of the Kavli IPMU. I would like to thank everyone who have come to join us in these celebrations.

When IPMU was proposed as a WPI in 2006, I was in a special position to support President Komiyama and I learned about the plan from Professor Murayama. There were two major goals: One was to solve the mystery of the universe. The other was to introduce a truly international environment in our university. The proposal was very exciting, but, to be honest, I thought the goals were too ambitious.

I am a physicist too. So, I know it is almost impossible for basic research to produce major results according to a fixed plan in a limited period. I also thought that creating a truly international environment was not

easy.

In 2007, I was invited to be a member of IPMU's External Advisory Committee. And, in April 2015, I took office as President of the University of Tokyo. Through these years, I have watched IPMU become a truly international institute. I am very impressed by how the Kavli IPMU managed to achieve so much. It has recruited top-level scientists from around the world. Half of its members are international. And, thanks to the Kavli Foundation, it attracted a major international donation. It became the first Kavli institute in Japan.

As President, I would like to praise their effort to build a truly international research institute that is highly competitive in the world.

Now, it has achieved international recognition as a top-class research institute. In its 10 years of history, more than 60% of the papers published by Kavli IPMU researchers were based on international collaborations. Every year, more than 600 people apply for jobs at Kavli

IPMU, and about 500 international visitors come here. More than 40% of its past postdocs are on faculty positions in many institutes around the world. In terms of highly cited papers, it competes well with world leading institutes, such as the Institute for Advanced Study in Princeton. This shows how internationally competitive the Kavli IPMU has become.

Indeed, it has had a great impact on our University, in terms of not only academic activity, but also strengthening our research environment. We gave special treatment to the Kavli IPMU to encourage them to introduce system reforms to become more competitive. Many of the new systems that the Kavli IPMU introduced have now become a part of our University-wide systems.

I really appreciate Professor Murayama for his great effort in achieving all of this. When I met Professor Murayama in 2006, I was struck by his vision and his energy. He was very young. He was 42.

And he was different from other people. He had a charisma that made people take a second look. He attracted many young and excellent researchers. He was very persuasive. He was able to introduce new systems to make our University even stronger. People admired his public lectures very much. He brought in huge support from the public.

The Kavli IPMU truly made a difference, and I am convinced that it will continue to do so in the future. As President of the University, I will do everything I can to support the Kavli IPMU.

Last year, we were very pleased that the MEXT approved a five-year extension of the funding for the Kavli IPMU. Last month, we were also very excited to learn that MEXT accepted our new WPI proposal to launch the International Research Center for Neurointelligence (IRCN). IRCN sets an ambitious goal of understanding human intelligence. The team will include our world-leading researchers from medicine, biology and AI. Importantly, we also aim to

combine it with the humanities and social sciences, and this will make IRCN truly unique. IRCN will cover a broad range of academic disciplines. In the application process, I also gave a presentation at the panel hearing. I emphasized that the Kavli IPMU is a great success and we can use their knowhow to quickly establish the IRCN. And I felt that this was very persuasive. I hope that there will be active academic collaboration between the Kavli IPMU and IRCN. I also I hope that the two institutes will work closely together to drive the internationalization of the whole of the University of Tokyo.

The University of Tokyo's mission is to contribute to humanity by creating new value through excellent research and education. Basic science is the foundation of the value that we create. I am pleased that the Kavli IPMU has become a world-leading research institute.

We have many things to learn from its success. I believe that by using these experiences, we can further strengthen the research and

education of the University of Tokyo.

Thank you, and congratulations again on the 10th anniversary of the Kavli IPMU!

Masashi Takigawa

Director, Institute for Solid State Physics; representing the Kashiwa Campus



Professor Murayama, distinguished researchers of the Kavli Institute for the Physics and Mathematics of the Universe, ladies and gentlemen, on behalf of the Kashiwa campus of the University of Tokyo, I would like to express my hearty congratulations on the occasion of the 10th anniversary of the Kavli IPMU.

The Kashiwa campus is one of the three main campuses of the University of Tokyo and is the youngest one, which started in 2000. Since then, cutting edge research in various fields of science has been actively pursued by several research institutes, as well as the Graduate School of Frontier Sciences. Therefore, all of us were very excited ten years ago when IPMU was born in Kashiwa as a World Premier International Research Center designated by the Japanese government. It is needless to say that outstanding research of IPMU based on the unique integration of Physics, Mathematics and Astronomy to solve fundamental problems of the universe has enormously enhanced

the scientific diversity and reputation of the University and the Kashiwa Campus. In addition, I would like to emphasize that the researchers of IPMU from all over the world brought international atmosphere and cultural diversity to the campus. A large fraction of the researchers of IPMU including external visitors are from outside Japan. I appreciate that their presence and interaction with people of the campus has provided rich and stimulating environment.

Let me also mention that our institute ISSP, the Institute for Solid State Physics located next to the IPMU building, has been enjoying very fruitful interaction with IPMU. The target of our research, which includes various novel materials often with structures of nano-meter scale, is very different from the universe, the target of particle and astrophysics. Nevertheless, both fields are based on common principles of physics and it often happens that an idea developed in one field turns out to be very useful in the other field. In fact, IPMU and ISSP have hosted

several workshops jointly in the past and we saw some excellent papers came out from cross-disciplinary collaboration between IPMU and ISSP. Such kind of collaboration is truly fruitful and I hope it will be stronger and more extensive in future.

Once again, I would express my sincere congratulations for the remarkable scientific achievements of IPMU in the last decade and wish all the members of IPMU an even more successful future. Thank you very much for your attention.

Shing-Tung Yau

Professor, Harvard University



Good afternoon, leaders of the University and the Government, ladies and gentlemen, it's a great honor for me to be invited to give a short speech in celebration of the 10th anniversary of the Kavli IPMU Center. The opening of this remarkable center has afforded Japan a strong leadership position in mathematics and physics, both in Asia and throughout the world. Historically, Japanese mathematicians and physicists have played fundamental roles in creating new ideas and solving important problems in both subjects. In fact, starting from the great achievement of Professor Takaaki and Yukawa, about 100 years ago, we have seen many Japanese scholars who have opened up important research areas that have remained influential up to modern times.

To name a few such achievements, let me cite some that I am familiar with. Professor Ito, who was in the University of Tokyo, conceived of stochastic differential equations that are being used in all areas in applied mathematics and physics.

Kodaira and Hironaka created a substantial part of modern algebraic and complex geometry that has been vital to modern geometry and its interactions with physics. Sato and his students created a whole new field of hyperfunctions in micro-local analysis that has led to spectacular applications in statistical physics and many fields in mathematics.

These are all grandmasters whose names will be remembered in the history of mathematics, following the tradition of Gauss, Riemann, Poincaré and Hodge and many others. And these Japanese leaders, in turn, are now being followed by new generation of younger scholars, many of whom are presently at this center. In the last 50 years, we have witnessed tremendously important interactions between mathematics and physics, which has contributed greatly to our understanding of the laws of the universe. The leaders of this center have helped to create many important branches of this part of modern science. A number of them have made critical contributions to

my own area of research including Professor Saito and Professor Ooguri whose tremendous originality has continued to impress us over the past 30 or so years.

Now, in the 21st century, many areas of science will need ideas from other fields, requiring interactions of a deep fundamental nature. This endeavor calls for scholars of many different countries to come together. The Kavli IPMU Center has been, and will remain, a place where this coming together of scientists and disciplines can magically occur.

I congratulate the Japanese Government for providing such strong support for this center, and the success of the center should encourage further support from the government and the private sector. There certainly should be strong support from Chinese and American quarters as well, in appreciation of the expansion of the knowledge that has come from this great center of contemporary thought. If I personally can be of any help, I will do it. Thank you very much.

Message

David J. Gross

Professor, University of California, Santa Barbara



It is a great pleasure to be back here after 10 years, since the inauguration of this institute 10 years ago. It seems like yesterday. It is amazing how much has been achieved in such a short period of time. In the beginning, this was the Institute for the Physics and Mathematics of the Universe, and shortly after, it became the Kavli Institute for the Physics and Mathematics of the Universe, and in ten years, so much has been accomplished.

I have advised many institutes of this type that do fundamental science, mostly physics, around the world: in Brazil, in China, in Europe, and in the United States. I often try to summarize the advice that I give them by saying that there are only three guidelines to creating a great institute: excellence, excellence and excellence. IPMU followed that advice. IPMU has an excellent plan, it has excellent people, and it has excellent leadership. At IPMU, they have created a uniquely broad combination of people and institutions, including many of the leading scientists in Japan and from abroad, who probe the secrets of the universe using the language of science (mathematics), centered around the queen of science (physics), and with the oldest science of all (astronomy), or, as it is now known, as astrophysics and cosmology.

As the ex-director of a somewhat similar institute of fundamental science, the KITP, which almost 15 years ago became the first Kavli institute, I was very interested in the establishment of this new institute. Although supportive, and doing whatever I could to help, I was somewhat skeptical. Can they carry it off? Having given advice to many places throughout the world, I was aware that not all of them have succeeded. It is not easy to create a new institute. It is not easy to attract excellent people from around the world to come to a new institute. It is not easy to get the funding to make long-term investments, and to survive. I was also curious as to what they would do. Would they just copy what has been done in other places, or would they come up with some new ideas? I must say that I have been impressed, beyond my expectations, with the results that have been achieved.

I am especially impressed with many of the very new and innovative initiatives undertaken under the dynamic and creative leadership of the founding director of the IPMU, Hitoshi Murayama, and his colleagues. These include building a vibrant research staff of nearly 200 people, of which, I gather, at least 30% are from outside Japan. This would be unusual in any country, and is especially unusual in Japan.

They have made English the institute's official language, and thereby created a truly international institute, in a way that I think is clearly a breakthrough in Japan. Most importantly, they are pursuing scientific breakthroughs with this very broad and dynamic fusion of different scientific disciplines, and also by motivating people, by creating new interactions and joint research programs, and by seizing upon opportunities wherever they can. As an ex-director, these achievements impressed me greatly.

In my field of fundamental physics, I can certainly attest that, in this very short period of ten years, IPMU has become one of the top research institutes in the world and is widely known as such.

So, in conclusion, I congratulate the government of Japan, the WPI initiative (which I think was a brilliant idea), the Ministry of Education MEXT, Tokyo University, the Kavli Foundation, and, most of all, the leadership, the staff, and the scientists at IPMU who have created so much, in such a short time, with enthusiasm and dedication. I have no doubt that IPMU is here to stay, and will continue to develop and flourish and contribute to Japan and to science. I hope to be here for the 20th anniversary. Thank you.

Yasunao Seki

Director-General, Research Promotion Bureau of Ministry of Education, Culture, Sports, Science and Technology



Ladies and gentlemen, on behalf of Ministry of Education, Culture, Sports, Science and Technology, I would like to extend my sincere congratulations to the researchers and staff of Kavli IPMU for the institution's 10th Anniversary. It is my pleasure to offer a few words on the occasion of the 10th Anniversary Ceremony.

The WPI program aims to enhance the level of science and technology in Japan and to continuously trigger innovation that serves as an engine of the future growth, by establishing world-class basic research centers which attract top-notch researchers from all over the world and form the "pivotal hubs for global brain circulation".

Founded in 2007, in the same year as the WPI program was launched, the Kavli IPMU of the University of Tokyo constantly has achieved the outstanding research results through the interdisciplinary approach between mathematics, physics and astronomy while playing a major role as a 'world premiere' research center

in the global sphere of research. It has also greatly contributed to the success of the WPI program as a leading model of the WPI center.

I believe it is due to the considerable effort devoted by Director Murayama, all researchers and staff of the Kavli IPMU for conducting vigorous research and developing the first-rate research environment for such a long period of 10 years.

In addition, I think it was only possible with the cooperation from many, such as a substantial support provided by the host institution, the University of Tokyo, and the generous supports offered by the stakeholders including the Kavli Foundation.

I would like to express my respect to all of you for your great efforts up until now.

Following the past 10 years, the Ministry of Education, Culture, Sports, Science and Technology will work hard to ensure that Kavli IPMU will continue carrying out excellent research activities and accelerate its further development to be held in

high esteem globally.

In closing, I wish you all the best for your future endeavors. Thank you.

Hiroyasu Akiyama

Mayor of Kashiwa City



I would like to offer my congratulations to the Kavli Institute for the Physics and Mathematics of the Universe as they celebrate their 10-years anniversary.

The most important feature of the Kavli IPMU is that physicists, mathematicians, and astronomers can work together on their research in the same place. Because of this very unique effort, the Kavli IPMU has earned a high reputation worldwide. In addition to being a source of pride among our residents for being based here in Kashiwanoha, the accomplishments from the research have received great acknowledgement, and been granted an extension for their activities as a World Premier International Research Center Initiative (WPI) with the Ministry of Education, Culture, Sports, Science and Technology (MEXT). Dr. Hitoshi Murayama, the director of the Kavli Institute for the Physics and Mathematics of the Universe, the researchers and staff, as well as everyone with the University of Tokyo, all deserve our deepest respect for their extraordinary work and the results of their endeavors.

Our city is located about 30 kilometers from the heart of the Tokyo Metropolitan Area, and has a population of about 420,000 people. Kashiwa is a key area for transportation, with two

national highways and expressways, and three major railways JR Joban Line, Tobu Urban Park Line, and the Tsukuba Express Line all providing access. This area is blessed with an abundance of nature, and has been developed as a bedroom community to the metropolitan area. Among the highlights of our city are the downtown area around Kashiwa Station, with commercial shops including major department stores, and the large commercial activity base that draws in the younger generation. There is also a rich natural water area around Tega Lake, and a thriving urban agriculture community has been developed, which produces an abundance of fruits and vegetables.

The development of the Kashiwanoha area where the Kavli Institute for the Physics and Mathematics of the Universe is located, began in 2005 with the opening of the Tsukuba Express railway. In just 12 years, the area has seen an incredible amount of development, not only with commercial establishments, hospitals, and large condominium complexes, but also as a new city center which has accumulated a number of scientific research institutes including the University of Tokyo and Chiba University.

The Kashiwanoha Campus Area in particular is moving towards the

creation of an international scientific city. The development of the area places a great importance on scientific research resources and activities, and internationalization. The community-building centers on the Kashiwanoha International Campus Town Initiative, which comprises six participants, Chiba Prefecture, Kashiwa City, the University of Tokyo, Chiba University, Mitsui Fudosan Co. Ltd., and the Independent Administrative Institution, the Urban Renaissance Agency (UR). Based on the principle of our Initiative, "harmony between university and town," we hope to realize the Initiative's three pillars of an Environmental-Symbiotic City, City of Health and Longevity, and City of New Industry Creation, through public, private, and academic partnerships. In particular, we hope to promote advanced city planning utilizing the state of the art knowledge from the University of Tokyo.

The Kavli Institute for the Physics and Mathematics of the Universe continues to develop as a pioneer, clearing a path through the field of space research. I would like to offer my congratulations, and I hope that, with the cooperation between the University of Tokyo and Kashiwa City, the Kashiwanoha Campus area continues to develop even more as a "pillar of knowledge on which the world can depend."

Akira Ukawa

Deputy Director, RIKEN Advanced Institute for Computational Science; WPI Program Director



Ladies and gentlemen, distinguished guests, Professor Murayama and all members of Kavli IPMU.

It is my great pleasure to be here as Director of the WPI Program, and present a few words on the occasion of the 10th Anniversary Symposium of Kavli IPMU.

The WPI Program was launched 10 years ago in 2007. The Program aims to create research centers in Japan that are internationally opened and globally visible. It was strongly felt at the time that, science in Japan, though already having had distinguished history, was still suffering from borders and barriers hindering progress.

Accordingly, four missions were set up for the research centers of the WPI Program. First, of course, is that Top Level Science should be conducted. This does not simply mean progress in already existing disciplines but, more importantly, breaking the barriers and borders of disciplines and scientific communities. Hence the second mission of Fusion Research. The third is Globalization going beyond national borders, and the fourth is the Reform of the traditional Japanese research system which is full of borders and barriers.

In the course of 10 years since the start of the Program, 9 WPI centers have been established. These 9 centers cover the frontiers of science ranging from the Origin of the Universe/Earth/Life to Materials/Energy and Life Sciences.

Kavli IMPU is one of the first 5 centers launched in 2007. It aims to study the crucial questions of our Universe by physics and mathematics, and by theory, experiment, and observation.

I am happy to say that the first decade of Kavli IPMU has been an impressive success in each of the four missions of the WPI Program. The top level of science, and success in the fusion of physics and mathematics, is apparent if one only looks at the scientific program of the 10th Anniversary Symposium and appreciates the speakers and their expertises. Physics and mathematics have long been the areas where the activities have transcended national borders and continents. Even so, the success of Kavli IPMU to establish a truly international research hub in Japan, far away from both American and European continents, is a remarkable feat. Finally, by endeavoring to establish a

research environment that conforms to the international standard. Kavli IPMU has led the system reform of University of Tokyo.

Needless to say, the strong leadership of Hitoshi Murayama, many top level scientists who gathered at Kavli IPMU, and the strong support of University of Tokyo, have been instrumental in bringing out this success. I would like to express the highest appreciation for their effort.

Now, Kavli IPMU has entered into the second decade of its activity. It is my sincere hope that Kavli IPMU continues to develop further by making further challenges in the quest toward the origin of our Universe.

Let me end by saying that, just as Kavli IMPU, the WPI Program is also developing. This year, two new WPI Centers have been selected to start their activity.

These are International Research Center for Neurointelligence of the University of Tokyo, and Nano Life Science Institute of Kanazawa University. It is my sincere wish that Kavli IPMU continues to be the model for WPI research centers in the years to come. Thank you very much.

Steven Kahn

Professor, Stanford University; Chair of the External Advisory Committee for Kavli IPMU



Thank you very much for the invitation to be part of this extremely distinguished panel congratulating KIPMU on the first 10 years of its existence. Most of those of us who have been on the External Advisory Committee for this institution have been with it for a number of years, almost from the beginning. We have witnessed the construction of this building, the award from the Kavli Foundation—the first major private funding of an academic institution in Japan, the creation of UTIAS, the conferral of World Premier Status, and, of course, the renewal of funding for KIPMU programs over many years.

We have also witnessed the growth and evolution of Hitoshi Murayama from a brilliant young particle physics theorist to a brilliant academic administrator, political strategist, leader of large experimental collaborations, expositor extraordinaire to the general public about fundamental science, and, more recently, “ambassador” to the United Nations on behalf of science

and extraterrestrial intelligence.* We have also seen a large number of outstanding young physicists, astronomers, and mathematicians come through KIPMU, and we have followed their remarkable achievements as they have distributed themselves over a number of distinguished sister institutions around the world.

The uniqueness of KIPMU is its breadth. In our last report, we pointed out that there is no other institution like this in the world, which combines pure mathematics with theoretical physics, experimental physics and observational astronomy. It is that combination that has made it particularly interesting to serve on this Committee. During our annual visits, we have benefitted from hearing in-depth presentations of the significance of new results from both the scientists and mathematicians here at KIPMU, and from our colleagues among the Committee members. For me personally, that has been one of the most rewarding elements of being part of this.

As we have all seen, it has been an absolutely remarkable decade for this field. We witnessed the discovery of the Higgs boson, the increasing confirmation of the Concordance Model of Cosmology that includes the mysteries of dark energy, dark matter, and inflation. The unbelievable success of the Standard Model of Particle Physics in explaining a large number of interactions at the B-factory at KEK, as well as at SLAC, and more recently, the first detection of gravitational waves from colliding black holes and colliding neutron stars. This has been a tremendously fun time to be in this field and to witness such a remarkable institution move forward from its inception. Therefore, on behalf of the External Advisory Committee, let me congratulate again the leadership and all those involved with KIPMU. Thank you.

* See, *Kavli IPMU News No. 28*, pp. 4-6 and p. 33, as well as its cover.

Robert W. Conn

President and CEO, The Kavli Foundation



I'd like to begin by thanking President Gonokami, Mayor Akiyama, the various members of the government ministry MEXT – particularly Dr. Seki and Dr. Ukawa—and the distinguished people here today. As importantly, I'd like to express thanks and congratulate the Japanese government for its conception of the absolutely unique idea of the World Premier International Research Center Initiative, known as WPI. We have many science institutes in the United States funded by our government agency, the National Science Foundation. But the notion of establishing top-tiered research institutes that bring researchers from around the world, use English as the lingua franca of communication among the scientists in the institutes, and doing this in Japan ... well, this is very distinctive and special.

You – the Japanese Government and people—have been innovative and imaginative, and you have put something together of very large scale. When I look at what you are attempting to achieve by way of

globalized scientific activity—both projecting science out of Japan, as well as bringing scientists and science to Japan—this is a remarkable thing, and not something I've seen anywhere else in the world. So, for all of this, I congratulate the Japanese government, the University of Tokyo and its people, Hitoshi Murayama, the director of the Kavli IPMU, the Institute's leadership team, and all the members of the Kavli IPMU.

The Kavli Foundation became very aware of IPMU when we began thinking about our next generation of Kavli Institutes. As David Gross pointed out, the Kavli Institute for Theoretical Physics at UC Santa Barbara, where he served as director for many years, was announced as KITP in 2002, and it became the first Kavli institute. Over the next seven years, The Kavli Foundation established and funded 14 more Kavli Institutes.

During the Great Recession that began in 2008 and extended well into 2010, we stopped our large programs and began thinking about what we would do next

once things recovered. And when that opportunity arrived, we began to look at where in the world the best work is being done in the science fields that we provide support. At The Kavli Foundation, we support basic research in four areas: astrophysics and cosmology, nanoscience, neuroscience, and theoretical physics. We do so by providing funding whose use is unconstrained. So, when we looked around the globe at what was being achieved, one place that stood out was here, at the University of Tokyo, and what you were attempting to do with the IPMU.

Today, we are celebrating the 10th anniversary of the IPMU, and the 5th anniversary of the Kavli IPMU. With that in mind, I want to point out the portrait of Fred Kavli on the back wall of this room. There are only five of these portraits, each distinct. There's another at the Norwegian Academy of Science and Letters in Oslo, Norway, the country where Fred Kavli was born. A third portrait hangs outside the Fred Kavli Auditorium at the U.S. National Academy of

Message



Figure 1: Celebrating the establishment of Kavli IPMU. Kavli IPMU Director Hitoshi Murayama and Fred Kavli in 2012.



Figure 2: Left to right: Robert W. Conn, President and CEO, The Kavli Foundation, Hitoshi Murayama, Fred Kavli, and Japanese PM Yoshihiko Noda. (2012).

Sciences in Washington, D.C. There's a fourth hanging at the Kavli Royal Society International Centre in the U.K., and the Foundation has the fifth and last portrait. So it is wonderful to see Fred's portrait here, especially in this room and during this very special celebration.

Fred Kavli was an extraordinary person with an extraordinary vision. He liked to say he was a physicist by training, and he was; but he was also an engineer, and a very inventive one at that. He was also a remarkable businessman and entrepreneur who created a great fortune.

When he thought about what to do with his wealth, Fred Kavli decided to give it all back in support of basic science. People like David Gross, here today, and many others had a large influence on Fred as he thought about what to do. In 2000, he began the Foundation with \$100–150 million. That is a lot of money but modest by philanthropic standards in the United States. Now, that sum is more than \$600 million, no longer modest by any standard, and all of it is from Fred Kavli. He

gave it all The Kavli Foundation for support of basic science.

The establishment of the Kavli IPMU was one of the two last great events of Fred Kavli's life. When you look at the picture of Fred and Hitoshi (Figure 1), taken at the ceremony when the Kavli IPMU was announced in May 2012, you see in his face the enthusiasm he had for doing something in Japan that was going to be truly transformative from a scientific point of view. In this picture, he's holding a gift commemorating that moment, and you can see that he cares enormously, just as we at The Kavli Foundation care enormously, about your success in pursuit of great questions in science. During our visit then, we could tell that great science was happening and Fred is expressing that joy.

I remarked earlier about what I consider to be this extraordinarily innovative and imaginative approach of the WPI program that you have undertaken here in Japan. We don't get to visit the prime minister or president of most countries, but

when we came for the inauguration five years ago of the Kavli IPMU, we were graced by the willingness of the Prime Minister of Japan to visit with us, and he did. We had that visit in his office. It was Prime Minister Noda at the time.

You can see here the four of us with a rather special wine glass (Figure 2). The glass is a beautiful piece of art, with the blue bowl of the glass celebrating cosmology and the universe's evolution from the big bang until now. In this picture, we're enjoying a laugh together after the Prime Minister asked, "What's this glass about?", and Hitoshi helped him out with the explanation. But more importantly, the presence of the Prime Minister was an expression by the leader of the government and people of Japan that science is important, and we were very appreciative that he met with us.

The celebration then, with people coming from around the world, just as the celebration today, reflects the character of what you have established here. In the United States, we have had many people come

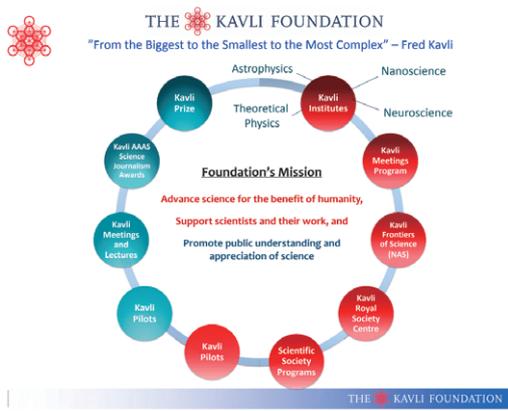


Figure 3: The Kavli Foundation community of programs and initiatives.



Figure 4. Fred Kavli, founder of The Kavli Foundation (1927-2013).

from Europe and Asia, including from Japan, to contribute to our science. This is now what you're doing. And just as it was very successful for us, I think it's going to be extraordinarily successful for you.

Let me say a few words about The Kavli Foundation and its work. As you know, our mission is to support basic science for the benefit of humanity. It's a core belief, you might say, that if you do the basic research, the results will contribute to humanity in ways that are unpredictable but certain to happen. I feel deeply confident in this statement. Why? Well, if you ask why over the past century-and-a-half the average life expectancy of people has increased from 45 to 85 years in so many countries, you can trace that fact to just two things. One is achievements in engineering that have led to cleaner air, cleaner water, and addressed the sources of disease such as sanitation. Pasteur understood all that. The second is the contributions of basic science. These two developments have changed life around the world in ways never seen in human history. It has made

life extraordinarily different, and here in Japan, where you have one of longest average life spans in the world, it's because of science. That's the simplest measure, life expectancy, of why supporting science is so important - it benefits everyone.

The program areas we support at a Foundation are shown in the graphic that is Figure 3. The red circles represent our programs supporting basic science and accounts for more than two-thirds of everything we spend. By the way, the Kavli Institutes receive the bulk of this support.

But we also care enormously about public understanding and public appreciation of science. Why? We in science want to do lots of things and to do our work, we need governments to invest generously in research. Governments, lest we forget, spend the people's money. It follows that people—citizens—need to understand how basic research benefits humanity, why scientists work the way we do, and why it can take a long time to make from breakthrough discoveries to extraordinary benefits to society. This

is the reason there are three Nobel prizes that were awarded across a span of more than 60 years, each associated with the basic scientific discoveries, that underlie the MRI's everyone gets these days. Not one, not two, but three different Nobel prizes underpin the science of an MRI, the most widely used diagnostic today in medicine. The green circles in Figure 3 are the programs we support in this important area.

The year 2012 was the last year that Fred Kavli lived life to its fullest. In that year, as I said earlier, he came to Japan to celebrate the inauguration of your Kavli Institute—the Kavli IPMU. That September, he traveled to Oslo for the 2012 Kavli Prizes. Later that year, he became gravely ill and in 2013 he passed away at the age of 86, having lived a long and fruitful life.

So, on his behalf, and on behalf of The Kavli Foundation, we wish you a future full of creative activity and discoveries, a future that will advance science for the benefit of us all.

Thank you very much.

Mikhail Kapranov

Principal Investigator, Kavli IPMU



Thank you very much. It's a great honor to be able to say a few words on this occasion, the 10th anniversary of Kavli IPMU. I am a relative newcomer to the institute being here for three years. I moved from Yale University. And the reason I moved was because I was attracted by the spirit of interaction and collaboration which I haven't seen elsewhere. What I was used to see is that different departments are situated in different places and often in different buildings and every interaction is so rare and precious. Before Yale, I was in Toronto and one of our great achievements was to have a joint position in physics and mathematics, which was very luckily occupied by Kentaro Hori who is here now.

So then when I went to Yale, the next thing I know is that Kentaro is at IPMU. So they should be doing something right. And when I visited IPMU, I realized that it's not just one position, the entire institute is like this. And all the seminars are joint by definition. So it's a completely different type of

environment, completely different type of interaction. So being here is an incredibly inspiring experience because, in this very specialized age, you see the place of what you are doing in the larger scheme of scientific endeavor, you hook up to the power of the fundamental science. And this has been an incredible experience.

So glimpsing into the future, I can see even more intense interaction and collaboration with people who have been here for some time and who are just joining the IPMU. And I am very proud and happy to be a part of the IPMU team and I think it's only appropriate to finish by thanking once again all the people and organizations that made this environment possible. Thank you very much.

Tom Melia

Project Assistant Professor, Kavli IPMU



Good afternoon. Well, I have the honor of being a newly appointed assistant professor in theoretical physics here at Kavli IPMU and what I wanted to do with you is to share a few of the reasons why it is that I wanted to come here and what excites me about my future. In fact, I am going to give you four reasons because, in my head, I associate each one of them with one of the letters IPMU.

So “I” stands for international. My research is in particle physics, and by its very nature is international. So the focus here on fostering international collaboration is very important to me. “P” stands for “part of something”. I was drawn by the idea of becoming a part of what is a very ambitious and somewhat scarily successful project and group of people, and I am excited about bringing my own contributions to team IPMU. “M” stands for multidisciplinary. In the past I have worked with experimental physicists, mathematicians and I have even worked with chemists and so I know how good multidisciplinary

research can be. And so naturally, I am very excited about what the future holds for me between the four walls of this beautifully designed building: walls without borders. And finally “U” stands for “unusually happy”. One observation I have made in the month since I came here is that people just seem to be *unusually happy*. At first I put this down to the daily cake and tea that we are provided with, but actually I think there is a little more to it than meets the eye, and I am looking forward to finding out exactly what that is. Thank you.

Message

Hitoshi Murayama

Director of the Kavli IPMU



Distinguished guests, friends, colleagues, ladies and gentlemen, thank you so much for the nice words given to us from distinguished speakers today and all of you being present at this ceremony which means so much to all of us.

Well, I was very impressed by this new interpretation of the name IPMU. I really like that. I always used to joke that IPMU stands for Informal Physicists and Mathematicians' Utopia but "unusually happy" is better than utopia, so I really like that.

So, what a difference 10 years can make. You have seen the video. My hair used to be black, no longer. My belly used to be flat, no longer. This building didn't exist back then but now we have this magnificent building for physicists, mathematicians, and astronomers to interact with. And there were no scientists on site 10 years ago. Now, they are two hundred of them right here in this building today. What a difference 10 years can make.

When we started, I didn't

really believe that a world class international research center can be brought up from scratch. According to all the talks I listened today, apparently we made it, that's fantastic.

Ten years ago, all the efforts we had to make to create this institute required new ideas and new systems, and President Gonokami emphasized this aspect. And I was kind of skeptical that all of these new ideas would stick with the university because they were so unusual and foreign compared to the traditional system of the university. But instead of alienating us, University of Tokyo embraced Kavli IPMU, which is remarkable in my mind, and I really appreciate all the effort done by the president, previous presidents, Professor Takigawa heading this campus as well. So this was a big change in the way the university operates, and according to Professor Ukawa program director, what we have done here apparently also changed the Japanese academia as a whole which is amazing, and

something we had not anticipated 10 years ago.

Also 10 years ago, we didn't think that this institute would continue to exist. The funding was guaranteed only for 10 years. I was very worried, 10 years later I will be standing here alone, empty, but now we see these many people celebrating this occasion which shows strong support from MEXT, president of the university, administration and Kavli Foundation, which also provided us very important resources to keep creating exciting research as well. So, this three-way support is really new in a Japanese system, if I understand correctly, and that enabled us to continue to exist and thrive beyond the initial 10 years. What a difference 10 years can make.

But we have to look beyond that. I specifically asked Mikhail Kapranov and Tom Melia to give a brief speech today because that's the future of this institute. At the onset, at the time of the launch, a lot of great scientists joined this effort believing in the future but also somewhat on

a risky path. They didn't know quite what they were getting into but they were happy with this idea to create a new type of institute combining physics, mathematics, astronomy and many of them have left the institute since then and are doing great work elsewhere. But looking at Mikhail Kapranov and Tom Melia, they came here knowing what kind of institute this is. They already knew what was going on here and they appreciated that. They liked that. That's why they came here. So, this is a new phase for the institute.

Ten years is a long time. It's been a long time for me. But looking at the history of humanity, looking at 13.8 billion years of life of the universe, it's such a blip of a moment and even just focusing on the history of science since Galileo and so on, you see the inscription of Galileo's word on this pillar right here, 'Universo scritto in lingua matematica', Universe Is Written in the Language of Mathematics. In 400 years, 10 years is such a short period of time.

We are a startup company. We

are like the beginning of Apple or Uber, the startup companies. We have a long way to go. So, 10 years is actually a very short period of time and there will be the next decade and the decade after and I really appreciate the long-term support from the Japanese government, University, and Kavli Foundation to at least think ahead about what may be happening in decades from now and that happens thanks to all of you here today.

All the support we get within the university, outside the university, from Japan and from the whole planet, maybe from extraterrestrial life as well and all the scientists, who created amazing research here at this institute and all the dedicated staff that supported the work by scientists, and as you saw in the video, they also led the system reform of the university.

This is a very unique combination. If we are missing any of them, we wouldn't be here today and that's the difference 10 years have made for this institute. Thank you so much

for being here and I truly appreciate your support and presence today and thank you very much again.