Inaugural Address of the 16th President of KAIST

March 15, 2017

Distinguished guests, ladies and gentlemen, KAIST faculty, students, and staff members!

Thank you for celebrating my inauguration as the 16th president of KAIST today.

First of all, I would like to express my sincere gratitude to Chairman Jang-Moo Lee of the KAIST Board of Trustees and its members, to Minister Yanghee Choi of Science, ICT and Future Planning of Korea, and to other government officials for their support and timely approval of my appointment.

I am deeply indebted to several members of the Korean National Assembly, former Ministers of Science and Technology, presidents of academic and research institutions, industry representatives, and members of the science and technology community, who are also gracing this occasion with their presence.

Last but not least, I would like to express my particular thanks to my wife, my parents, and my family, who have always supported me with their prayers.

Honored guests,

KAIST was established in 1971 under the special mandate by the Korean government, known as "The Korea Advanced Institute of Science and Technology Act." It was the beginning of our nation's efforts for industrialization. KAIST was tasked with a mission to train highly advanced leaders in science and technology and conduct basic and applied research, both of which were desperately needed at that time in our nation's development.

KAIST has fulfilled this mission, faithfully and ceaselessly, thus far producing over 58,000 graduates including 11,700 doctoral degree holders. KAIST graduates, who are now working at universities, research institutes, businesses, and governmental agencies, have driven the progress of science and technology in Korea, and have played a pivotal role in the nation's industrialization and information revolution for the past half-century.

As you know, Korea currently stands at a critical juncture, destined either to solidify its place as an advanced nation based on its remarkable growth over the past 50 years, or be caught in a middle-income trap with a stagnant economy.

With the arrival of the Fourth Industrial Revolution in the 21st century, humanity will soon face a wave of revolutionary changes triggered by advances in science and technology. Over the next half century, we will experience a transformation with scientific progress comparable to that of the three industrial revolutions that took place over the past 250 years. A country that is willing to take on such a transformation and proactively respond to it is one that will become a global leader in this rapidly changing world.

We are living in an age of revolutionary change, and the future may seem daunting. However, all nations, including others with developed economies, will share the same starting point for the Fourth Industrial Revolution. Therefore, if Korea faces these challenges head on, we will find opportunities for a new leap forward.

As we face the new impending industrial revolution, KAIST now takes up a new mission: to educate the scientists of tomorrow and conduct research programs, through which it will continue to lead the future of science and technology at home and abroad. The upcoming technological revolution demands that we take on these new challenges, in which we will also find golden opportunities to prove our worth once again.

Therefore, we must set for ourselves a vision and establish innovative strategies for KAIST to complete this new mission. I urge our university members to join me in working towards making KAIST greater and stronger, to reach its next level of advancement. For this, we will need three baseline values: *vision*, *innovation*, and *passion*; let's call them "VIP." So long as KAIST takes root firmly on this VIP foundation, it will succeed in achieving this new goal.

Standing here today as the 16th president, I propose that KAIST become a "Global Value-Creative World-Leading University," by this I mean that KAIST should serve as a university that leads the world in generating globally-shared values in education, research, and public service. KAIST should push the envelope of science and technology and contribute to the progress of human civilization by creating world-class research and academic achievements, technological innovations, and economic impacts.

Specifically, I envision KAIST becoming a global hub for fostering knowledge-generation and convergence leaders who will work toward the advancement of humanity, and an epicenter for generating the new knowledge and technology needed for the growth of new businesses and industries during the upcoming industrial revolution.

To realize my vision, I will concentrate on innovations in five areas: 1) in education; 2) in research & development (R&D); 3) in technology commercialization; 4) in the globalization of KAIST; and 5) in future strategies for the university and our country.

The first is <u>educational innovation</u>.

Fostering scientific leaders in the era of the Fourth Industrial Revolution is a critical task that will define the future of our nation. I propose that we produce talented leaders equipped with abilities in convergence and collaboration as well as a strong ethical foundation.

In the future, we will need *convergence leaders* who can move across various academic disciplines with confidence and a challenging spirit; *collaborative leaders* capable of cooperating with people from a wide range of backgrounds in a hyper-connected society; and *leaders with high integrity* who will employ advancements in science and technology wisely.

That being said, I suggest we complement our educational curriculum. Courses in basic science (physics, mathematics, chemistry, and biology) and engineering (computer coding, statistics, automatic control, and engineering design) should be deepened. Traditionally, science and engineering education has tended to train more left-brain thinking, and to supplement this, we will offer courses to encourage the full development of our brain capacity. More courses in humanities (comparative history, Eastern and Western philosophies, and art history) and social sciences will become mandatory. This balanced approach will allow students to pursue their interests in more areas of study, to readily understand rapidly changing trends in science and technology, and to develop a high level of creativity.

KAIST will strengthen team-based learning and group research activities to improve our students' capacities for collaborative work. A newly created organization, the "KAIST Global Leadership Center," will support students to help develop the qualities required for collaboration and global leadership such as high-mindedness, justice, courage, optimism, tenacity, and a sense of noblesse oblige.

Along with these innovations, we will adopt the **"Non-Departmental Education System"** in which students are not required to choose majors or departments during all four years of their undergraduate studies. This will operate in conjunction with our existing department system.

Second, we will implement innovation in research.

Korea's research and development (R&D) efforts so far have largely been reactive in nature. We need to change this. We should lead R&D efforts, locally and globally, by pushing the envelope to conduct the world's first, best, and only research. In return, we will be able to produce "U-shaped research outcomes" which will create new knowledge and economic benefits.

Considering the acceleration of convergence studies in the 21st century, a single professor's specialty in one particular field is not sufficient to lead world-class research. The innovative and disruptive technologies that will dominate the fast approaching Fourth Industrial Revolution will be produced through the convergence and collaboration of the Internet of Things (IoT), artificial intelligence, big data, cyber-physical systems (CPS), nanotechnology, and biotechnology.

KAIST will establish the **"Convergence Research Matrix System (CRMS)"** to foster strategic research groups for interdisciplinary and convergence collaboration across a wide range of divisions and departments within the university. Based on the CRMS, we will identify future-oriented, convergence-research areas that are both new and emerging, which in turn will promote national growth and global competitiveness. Professors and students from a variety of different academic backgrounds will work together under this system. I am setting a goal of conducting at least ten flagship convergence-research projects for KAIST to truly claim its reputation as a world-leading research university.

Meanwhile, let me talk about the reality of research labs in Korean universities. Many university labs shut down immediately after the professor in charge retires. As a consequence, the labs lose the benefit of their academic achievements and the institutional memories of those professors attained over thirty-something years. This is a tremendous loss for the university and for our country. This practice prevents the accumulation of knowledge across generations of researchers, and seriously hurts the strength of our basic science. You know that basic science takes several decades for a return on investment.

To combat this issue, I plan to introduce the **"Collaborative Research Lab"** system to better retain our academic successes without interruption, and to improve the continuity of research. Professors both in similar fields and of different ages will work jointly in these collaborative labs. Researchers from our neighbor, Japan, have won 22 Nobel Prizes, mostly in basic science, and it is precisely because of their collaborative lab system, similar to my proposal, that they enjoy these successes.

In order for KAIST to serve as the *birthplace of new discoveries and inventions*, we will connect different generations of researchers. We will strive to organize teams of professors in diverse age groups to work together in mutually complementary fields. We will also allow professors who have achieved globally renowned research outcomes to recommend, before they retire, a next-generation professor to continue their lab projects.

Third, innovation is required for technological commercialization.

Until the mid-19th century, universities only tried to educate. The introduction of graduate courses in the early 20th century brought about the first university reform with the addition of a research function. Under the current second university reform, leading universities in the 21st century now serve not only as cradles of new knowledge, but also as hubs for research, development, and business (R&DB) to create value-added knowledge.

Universities should go beyond publishing papers and applying for patents based on research outcomes. Instead, they should promote a virtuous cycle in research by translating commercially viable outcomes into the creation of venture startups through technology transfer and commercialization. As a result, this will lead to additional investments in research.

Consider the example of Stanford University in the United States. It established a good practice for technology commercialization: Stanford graduates have founded nearly 40,000 businesses, and those businesses represent a combined annual revenue of 2.7 trillion dollars, a remarkable economic value corresponding to twice Korea's Gross Domestic Product.

In comparison, the revenue of technology transfers made by Korean universities accounts for only 0.92 percent of the research funds invested, which is only about 27 percent of that of their US counterparts. In the meantime, the number of technological startups in each public institution in Korea is only 0.6, which represents 16 percent of the level in the US. Considering that 61 percent of Korea's doctoral degree holders work at universities here in Korea, universities must strengthen their R&DB efforts, not only to expand their financing

possibilities, but also to enhance their national competitiveness.

KAIST can become a role model in this area. With promising ideas and technologies worth commercializing, **it can build a resilient R&DB environment**. We will reinforce our entrepreneurship education and actively recruit outstanding talents from the industry and business sectors as well as successful entrepreneurs for our adjunct professor positions. In this way, we can offer practical knowledge and research opportunities for real-world problems to our students and support the cultivation of **social entrepreneurship** that will return corporate profits to society.

In addition, we are preparing a new university-industry cooperation model. In order to utilize KAIST's intellectual properties to the fullest extent possible and optimize their economic profits, we will **sponsor the creation of "Technology In-kind Investment Companies."** This is how it will work: A public institution such as KAIST develops a technology and establishes a company based on the commercialization of its technology. The value of the technology is appraised, and more than 20 percent of the total amount of the capital is invested into the company as an in-kind contribution. Venture capitalists will provide the rest of the capital and control the management of the company. This, I believe, is an ideal arrangement for startups based on partnerships between universities and industry.

KAIST campuses in Daejeon are located within the Daedeok Innopolis that houses thousands of research institutes, government agencies, and ventures. The Innopolis is subject to the governance of special laws, and if a technology commercialization company is established therein, it enjoys many benefits including corporate tax cuts from the Korean government. This will surely increase the success rate of technology entrepreneurship compared to startup efforts led solely by professors.

Fourth, we must focus on <u>innovations in globalization</u>.

KAIST and other Korean universities tend to suffer in global college evaluations, despite their remarkable education and research performances. I see their relatively poor standings in the globalization index as the main culprit.

KAIST will continue to take initiatives to globalize its campus, its members, and promote itself abroad. As you know, a good command of English is a *must* in higher education and international business. International faculty and students should not feel frustrated while working and living on campus because they cannot communicate their ideas and feelings fluently. I will implement more programs for students and staff members to improve their communication skills in English. There will be an **"English-Only Zone"** throughout the campus where our university members must use English. As a whole, these efforts will help our campus become more globalized and diverse.

However, our international students and faculty members can also become "more global" through their efforts to assimilate into Korean culture. We will provide them with increased opportunities to learn the Korean language, the first and most important step toward "getting to know Korea." With the ultimate goal of making the campus bilingual in Korean

and English, I hope someday our international students can conduct their oral defenses for their doctoral dissertations entirely in Korean.

Furthermore, I will increase the hiring of international faculty to 15 percent from the current level of 9 percent, and double the ratio of international students from the present 5 percent under my leadership. Above all, KAIST will keep recruiting talented students from less developed and developing nations who are recommended by academic societies and Korean embassies. These graduates will become our invaluable assets, and will one day serve as "goodwill ambassadors" for KAIST and Korea.

Lastly, we will innovate with future strategies.

Developing detailed future strategies was less important over the past half-century when Korea was busy chasing after other developed countries, but they have grown in significance as Korea now leads in many areas in science and technology. Given the speed of science and technology development, the impact of this transformation, which has affected all aspects of our lives, is expected to be remarkable in the era of the Fourth Industrial Revolution.

In this age of uncertainty created by such a great transformation, the US futurist Thomas Frey once said: "The future is not shaped by the present, but rather the present is shaped by the vision for the future." I believe organizations and nations that fail to set a vision for the future and swiftly innovate in response to the changing times will be left behind, or disappear into history.

With an acute sense of urgency, KAIST should also design how to select its course of action to stay strong and relevant during this transformative period. So, I ask the members of KAIST to join me in formulating **"Vision 2031 for Long-Term Plans"** that will lay out a roadmap for KAIST's development towards its 60th anniversary.

KAIST will play a fundamental role in shaping national policies and strategies for science and technology by **operating "think tank groups"** that consist of professors with policy insights and ideas from varying disciplines, most notably from our two graduate schools for future strategy and science and technology policy. These think tanks will design detailed development plans for KAIST, in addition to formulating and helping the nation implement long-range development strategies for the advancement of science and technology.

To promote these five types of innovation with all members of KAIST, I promise to work with the **"Three Cs" (3Cs) of leadership**. First, I will not hesitate to pursue *change*; I will actively *communicate* with university members; and I intend to express my *care* for all KAIST members by listening to *every voice.*

Respected faculty and staff members,

Thanks to your dedication and passion, KAIST has matured into a world-class university while positioning itself as the most renowned science and technology university in Korea. This was indeed a great feat from our humble start 46 years ago. However, to make KAIST a member

of the exclusive group of elite universities, put your *heart and soul* into your work. By committing your heart and soul to education, research, and administration, we can join the ranks of the best global universities. I am not telling you to exhaust yourselves; instead, stay focused and motivated. As president, I promise to do the same.

Let me also take this opportunity to ask our faculty and staff members one more thing. Just as KAIST removed its surrounding walls to invite more interactions with neighboring institutions and communities, seek active collaboration with other organizations with an open mind. That said, I urge you to interact more with the Korea Institute for Advanced Study, the National NanoFab Center, and the Korea Science Academy of KAIST, all of which are affiliated with us. They are indeed our family members, and I would like you to cherish our special bond with them.

In addition, it is important to maintain strong partnerships with other relatively young advanced institutes, such as the Daegu Gyeongbuk Institute of Science and Technology (DGIST), the Gwangju Institute of Science and Technology (GIST), and the Ulsan National Institute of Science and Technology (UNIST). As the first and oldest advanced institute of science and technology in Korea, KAIST should share its experiences with them and help their growth. The arrow of competition, though sharp, should not face inward but outward toward the global stage. KAIST should reinforce its global competiveness by collaborating with and setting an example for other universities in Korea.

Numerous government-funded public research institutes encompass the KAIST campuses, and we risk losing invaluable resources if we do not capitalize on this unique relationship with them. I believe the innovations earned from our collaboration with these research institutes are a significant strategy to upgrade Korea's competiveness in science and technology to the next level. I see many presidents of these institutes present here today, and taking this opportunity, I urge you to join in my endeavors for wider collaborations with KAIST, thereby creating mutual benefits for our institutions.

University-industry cooperation is increasingly considered a key driving force for innovation processes. Closely working with industry, KAIST will continue to provide the talented graduates and breakthrough technologies needed by businesses and industries. Let us redouble our efforts to have KAIST serve as a source of inspiration for university-industry collaboration.

Universities fuel the innovations of local businesses and industries. It is extremely hard to find innovative cities around the world that do not host global universities. For example, the City of Boston in the US has the Massachusetts Institute of Technology. Stanford University lies just outside San Francisco, and ETH Zurich is in the City of Zurich in Switzerland. Likewise, the City of Daejeon benefits from the existence of KAIST to enhance the city's global competitiveness. Therefore, I ask the people of Daejeon and our local politicians for their unwavering support for KAIST, and in return, KAIST can jumpstart locally led innovations.

***To our proud students at KAIST*,**

You are the future of Korea. So, please, dream big for yourselves and for the future. Forty years ago when I was a graduate student at KAIST, Korea barely registered on the global map, with a per capita income around 1,000 USD per year. Korea, then, was so poor and weak, it was hard to imagine how it was possible to aspire to something as big as becoming a world leader.

Now the Korea you live in represents the world's tenth largest economy, enjoying material progress and sophisticated science and technology. Given the strides Korea has already made, look for ways to help the world and all of humanity. Dare to make history in the advancement of science and technology. Don't be afraid to envision making significant contributions for developing human society and civilization through your discoveries and inventions. But of course, you will need more than a single night's sleep to find your dream. You may have to strive for some time to realize your dreams, and most of all, to immerse yourself in your current studies to become the person you aspire to be.

Distinguished guests,

A mere fifty years ago, KAIST was a beacon of hope to the Korean people when the nation was about to enter a stage of industrialization. Korea now faces intensifying anxiety over an uncertain future, and we are witnessing some fellow Koreans lose hope. At this important juncture, KAIST must remain a beacon illuminating Korea's future once again by fulfilling its new mission at this beginning stage of the Fourth Industrial Revolution.

As I stand in the vanguard, and hold this beacon alight, I pledge to do my utmost to serve KAIST and its members.

I sincerely ask for your support and cooperation.

Once again, I would like to extend my heartfelt appreciation to each one of you for kindly setting aside some time out for busy schedules to grace me with your presence.

Thank you and God speed!