Honorary Doctor of Science
Professor Herbert GLEITER

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Mr Pro-Chancellor:

Professor Herbert Gleiter, a distinguished researcher in physics, is currently the Senior Member and Institute Professor of the Institute of Nanotechnology of Karlsruhe Institute of Technology in Germany and the Zijin Chair Professor and Director of the Herbert Gleiter Institute of Nanoscience at Nanjing University of Science and Technology. Over the last 30 years his ground-breaking work in nanoscience and nanotechnology has opened the way to new kinds of materials. His work will have long-lasting repercussions not only for scientific enquiries but also for the way we live in the future. His publications have been cited 23,000 times, a testament to his far-reaching influence in the study of nanomaterials.

Since receiving his PhD from the University of Stuttgart in Germany in 1966, Professor Gleiter has taught at the most prestigious universities over the world. His scientific work earns him affiliations around the world with research institutes that focus on cutting-edge scientific research, a few of which he has either founded or directed. Throughout his career, he has garnered more than 40 prizes and awards, including the Leibniz Prize, the Max Planck Research Award, the Acta Materialia Gold Medal of the Federation of European Material Societies, the Edward DeMille Campbell Award, the 2008 Staudinger-Durrer Award of the Swiss Federal Institute of Technology, the Blaise Pascal Medal of the European Academy of Sciences and the Cothenius Medal of the German National Academy of Sciences Leopoldina. He has received honorary doctorates and professorships from the best institutions in the world, and he has been elected as a fellow, member or honorary member in many professional bodies and national academies, such as the German National Academy of Sciences, the US Academy of Engineering as well as the American Academy of Arts and Sciences, several National Academies of India, four European Academies of Sciences/Engineering, the Japanese Society for the Promotion of Science, the Materials Research Society of the United States, and of India, the American Nano Society, as well as the German Materials Society. In addition, Professor Gleiter's influences go

beyond the scientific field. In several official functions Professor Gleiter played a key role in helping to shape Germany's policies in the development of science and technology.

Professor Gleiter remembers fondly the time he spent at Harvard University, the Massachusetts Institute of Technology and Bell Laboratories in the late 1960s, the early 1970s and in the 1980s. These experiences gave him the freedom, in his words, to "get off the beaten track" in developing his new ideas. On the basis of the work that he did in these places and during his first professorships in Germany, Professor Gleiter pioneered in the late 1970s a new class of materials that are called today nano-crystalline materials. Nano-crystalline materials were structurally different from all of the materials that existed at that time and had been used to produce tools throughout human history, ranging from quartz and granite in the Stone Age to more recent materials such as semiconductors and steels. The new type of atomic structures of nanocrystalline materials resulted in new and technologically attractive properties. When this idea was confirmed by other groups, it was the start of a rapidly growing number of subsequent studies on nanomaterials world-wide. In 1989, Professor Gleiter introduced a second concept in materials science by initiating the development of a new kind of non-crystalline solids, called today nano-glasses with new properties that differ frequently in spectacular ways from the properties of today's glasses. The new properties of nanoglass lend themselves to a range of novel applications that open the way to new technologies that cannot be realised with the materials we have today. In fact, observers foresee the arrival of a "Glass Age" in the future based on the technological utilisation of the new properties of nano-glasses similar to the changes to human civilisation caused by the utilisation of bronze or iron during the Bronze Age or the Iron Age. Already, the economic implications of the everyday application of nanomaterials are astounding. According to a study published by the German government, the annual value of the products based on nanomaterials is over US$2 billion and has grown at a rate of 15 to 20% per year in the past.

Moreover, the methods that Professor Gleiter has developed in nanotechnology are found to be significant in the other areas of scientific enquiry. For example, scientists cooperating with Professor Gleiter now recognise that nanoscience and nanotechnology can provide tools for performing new kinds of studies in probing the applicability limits of quantum physics to systems of macroscopic size. The results of these studies are of basic significance for our understanding of nature and may—

in the long run — result in new applications somewhat similar to the application of nuclear magnetic resonance in medicine or the decay of radioactive isotopes for dating archaeological artifacts.

In 2004, Professor Gleiter was named the Kuang-pui Chair Professor at Zhejiang University. In 2012, Nanjing University of Science and Technology established the Herbert Gleiter Institute of Nanoscience and named Professor Gleiter its Chair Professor and Director following an evaluation conducted by the Chinese Academy of Sciences that identified nano-crystalline materials and nanoglass as the most promising developments in the area of modern materials.

Professor Gleiter's collaboration with Chinese scientists harks back to an earlier period, however. For more than 30 years, Professor Gleiter has amassed around him an international group of scientists, a large number of whom are elite Chinese researchers. Nevertheless, the Herbert Gleiter Institute of Nanoscience represents a new phase in his involvement with scientific circles in China. The Institute is run on the model of the Max Planck Institutes in Germany, which are considered to be some of the most outstanding research organisations in the world. The scientists at the Herbert Gleiter Institute are offered the opportunity of spending several months at either the Institute of Nanotechnology at Karlsruhe or the Center for Nanotechnology at the University of Muenster where they get involved in research and teaching methods that will help them to initiate and conduct research groups in Nanjing on their own.

Despite his prominence in the scientific world, Professor Gleiter encountered his share of detractors in his early career. His ideas were initially held up for ridicule, and his work was dismissed as a waste of time. Yet Professor Gleiter continued to work with conviction, silently and patiently. Time has proven him right. Many of Professor Gleiter's students are now distinguished scientists in their own right, and they look upon him as a source of encouragement, one who thrives in the face of the stiffest opposition.

During his leisure, Professor Gleiter is an enthusiast in outdoor life, braving the frigid waves of the Antarctic waters, traversing the uninhabited Sahara, and otherwise taking on white water canoeing and hiking trips that test the limit of human endurance. Professor Gleiter is truly a man of all seasons, and remains an inspiration in science and other intrepid adventures.

Mr Pro-Chancellor, Professor Gleiter's research in material sciences has altered the way we look at our world and live our lives. His impact is felt not only in the scientific but in the economic and political worlds, too. We can foresee that even greater changes are yet to come. The new modus operandi that his collaborations with scientific circles in China have introduced will have far-reaching implications. They will certainly strengthen the international competitiveness of Chinese scientists.

And so it is with great honour that I present Professor Gleiter for the conferment of an Honorary Doctorate in Science.