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The Public University in the 21st Century

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I am greatly honored to receive this very highest recognition from Tsinghua University, one of China's finest universities. The awarding of an honorary degree from your esteemed institution honors both me and the great university which I represent, the University of California, Berkeley.

Our two institutions, Tsinghua and Berkeley, share many traits and aspirations. Both are preeminent public universities, in China and in the US respectively, that play an important role in the social and economic development of our respective countries. We share a mission to educate the brightest students and to contribute through research, scholarship and innovation to the continuing development and betterment of our country and the world.

I would like to talk to you today about the public university in the 21st century. Public universities in America were created in the 19th century by the granting of land through a public trust under our great American President, Abraham Lincoln, who called them the "people's colleges." Public universities have at the core of their mission fulfillment of the public trust, providing current and future generations with excellent educational opportunities, cultivating the abilities of students from all walks of life, and producing knowledge with global import in improving human lives. Public universities are a key vehicle for realizing society's potential for opportunity, social justice and prosperity. They extend the public good for the benefit of all people.

California is broadly recognized as having one of the world's best public university systems. The University of California, Berkeley is fully competitive with the great U.S. private universities such as Harvard, MIT, Princeton, Stanford and Yale. As a public university, we serve a very different mission and our responsibilities are more complex than those of our elite private peers. I can tell you this from deep personal experience, having completed my doctoral studies at Yale, served briefly on the faculty there and later spending 25 years at MIT as professor, chair of physics and Dean of Science. Indeed, I am honored to be in the company of MIT President and distinguished neurobiologist Susan Hockfield, who also was recently awarded an honorary doctorate from Tsinghua. I also have been privileged to serve as the leader of two large public

universities, first as President of the University of Toronto, Canada's largest and most distinguished research and teaching university, and currently as Chancellor of UC Berkeley, widely regarded to be among the world's premier institutions of higher learning.

Like your own President Gu Binglin, whom I had the great pleasure of meeting when he visited UC Berkeley in 2005, I too am a physicist and indeed, my area of research also concerned with the properties of complex materials, specifically with the phases and phase transition behavior of novel states of matter. Like President Gu Binglin, who is an academician in China's most distinguished Academy of Science, I too am fortunate to be a member of our National Academy of Sciences and other major scientific academies in the United States, as well as in Canada and in Britain. I have been intimately involved over the last four decades in the unprecedented revolution in research in the United States in industry, the national laboratories, and most especially, universities. I mention this because I firmly believe in leadership by example. Great universities must be led by engaged scholars, like your President Gu Binglin, who themselves capture the vision and exemplify the goals and aspirations of our faculty and students in pursuing the frontiers of knowledge.

Turning then to the role of the public university in the 21st century, first, I would like to describe to you how public higher education is structured in California and Berkeley's mandate for higher education within the State of California. I will suggest to you that China may be best served by modeling after California's great public university system. Second, in the 21st century, preeminent universities also must become leaders in the global arena. As part of our public mission, we at Berkeley are engaged in a number of important initiatives that focus the considerable talent and research efforts of our faculty and students on addressing major world challenges for the betterment of all people. I would like to describe some of these initiatives for you and suggest how we would welcome partnering with China and build upon our close relationship and strengthen our bonds with great Chinese universities such as Tsinghua.

California has a three-tiered system of public education formed under a master plan for higher education. The top tier is the University of California which is comprised of ten campuses that serve over 209,000 students, the oldest being Berkeley which was founded in 1868. The University of California's mandate is to draw its students from the top 12.5% of California's high school graduates and to foster world-class education and research opportunities for the benefit of the citizens of the State of California. There is a second tier of State Universities, with 23 campuses, that educate some further 417,000 students drawn from the top 30% of California high school graduates. The State Universities also do research, primarily of a more applied nature. The normal undergraduate program at the University of California and at the state universities is four years. The third and lowest tier consists of two-year training colleges for students. Students can move between levels if they meet the necessary qualifications and many do. Indeed, more than one-quarter of our UC Berkeley graduates are transfers from the two-year community colleges.

Berkeley is widely regarded as the flagship campus of the system. It plays a special role in higher education both within California and in the United States as a whole, as an institution whose three responsibilities are teaching, research and public service. Berkeley has for many decades excelled at all three mandates. Today Berkeley serves some 24,000 undergraduate students, 90% of whom by agreement with the State of California must come from within the state. It also has some 10,000 graduate students who are recruited internationally. It receives some 2500 post-doctoral fellows and visiting scholars each year from around the world.

Like Tsinghua, the majority of Berkeley's undergraduate students are among the brightest high school graduates in the state and in the country. Admission to the university is on the basis of merit, with merit being judged on a comprehensive basis, not just by test scores alone. Our students are taught by some of the world's finest faculty including our Nobel Prize winners and our young faculty chosen because of their potential to make discoveries that will change the paradigm in their fields.

A distinct feature of Berkeley is that in this meritocracy, some one-third of our undergraduate students come from very poor families, are the first in their families to go to college and are helped by scholarships and government grants. This is a significantly larger number of such students than educated in the elite private universities. These students receive an excellent education as evidenced by the fact that more of our students go on to receive Ph.D.s than those from any other university in the United States. In educating a large number of people very well, we have a much greater societal impact as a public university.

Internationally, Berkeley is best known for its graduate programs which are the highest ranked in the nation. At the graduate level, we compete for the best students from around the world, including many who come from China.

There is concern by many in the United States about China's growing competitiveness in science and technology. This may be true, if viewed exclusively from the perspective of the elite private universities in the Northeast of the United States that have in recent times produced far too few graduates pursuing hard-core technical professions. The situation is quite different in California where UC Berkeley, along with other world-leading universities in the Bay Area, has in good part driven U.S. global competitiveness in the biotechnology, electronic and information industries through its basic research. As a public university, we tap into a large partly-unrealized talent pool of students of strong character who value education and approach it with a passion, an almost patriotic fervor to succeed. In this respect, our students may be more like those at Tsinghua than like students at U.S. private universities.

Public universities serve as incubators of the next generation of innovators. The innovation that spawned the Internet and biotech revolutions is linked to our public mission of preparing students for the opportunity to improve their own lives in a

changing global economy. Your own President Gu Binglin has expressed the need for Tsinghua to adopt the most advanced educational ideas and experience from other universities to develop Tsinghua into a world-class university and contribute to the development of China and the world. I would suggest that China, as it aspires to build its universities to world class status, would be best served by modeling after the great U.S. public universities.

Let me now turn to the second point which I wanted to take up, namely, the role that great public institutions in the 21st century can play in addressing some of humankind's great global challenges. Focusing our efforts solely on the technological hard-core is not sufficient to address the world's biggest and most difficult challenges, ones we must progressively solve to improve human life. These challenges are faced only by putting them into social, economic and humanistic context. This is what great universities must do in the 21st century.

A specific feature of Berkeley is an unusual combination of breadth and depth. We have over 130 departments with more distinguished research programs than any other U.S. university. This combination provides special opportunities for meeting new challenges of the 21st century, many of which are intrinsically multi-disciplinary by nature. Indeed, I believe that in the 21st century the faculty who have the greatest impact will be very often those who are able to move effortlessly across traditional disciplinary boundaries. Our reputation for cutting-edge research has drawn to Berkeley some of the world's most prestigious, innovative faculty. The faculty and the outstanding students that are attracted by the vitality of Berkeley's research are uniquely prepared to create new knowledge that helps to make the world a better place.

At Berkeley, we are engaged in several multi-disciplinary initiatives aimed at seeking solutions to profound global challenges. Let me briefly describe four of them to you.

One of the greatest of these is solving the problem of global climate change that threatens our world. Energy research is critical to solving this problem. Developing new sources of affordable, carbon-neutral energy is one of the most pressing scientific and technical challenges of the 21st century. We have ongoing world-class basic research on campus and at the Lawrence Berkeley National Laboratory which adjoins our campus, with expertise in the physical sciences, engineering, biology, information technology, earth sciences and systems engineering. Through a project called Helios, headed by lab director and Nobel Prize Laureate Steven Chu, we are exploring various technologies – wind, solar, nano-technology and others. We also have faculty who can address the broader economic, ethical, societal, legal and policy implications of new forms of energy.

Some of you may be aware that Berkeley recently won a $500 million competition for a partnership with BP for the next ten years for research on biofuels. We are creating an Energy Biosciences Institute that will bring together the most talented people in the world to address one of the most difficult problems of our time: solving the

global energy crisis through technologies that avoid damage to our environment from carbon emissions. The California state government has also committed $70 million for new facilities to support our energy research. California is already the national leader in energy policy and conservation. California will now lead in research on clean sustainable alternative energies. Addressing the major problems facing our society is our public mission. This energy research effort will continue our legacy of excellence in research, teaching and innovation in service to our state, our nation and the world.

One of our great leaders in this effort, Dean of Engineering, Professor Rich Newton, was a great friend of Tsinghua. Before he died, tragically of pancreatic cancer in January of this year, he was working with colleagues from Tsinghua on a joint institute on energy. We are hopeful that we will find ways to continue his efforts.

Berkeley is also a major participant in CITRIS, the Center for Information Technology Research in the Interest of Society and in the California Institute for Quantitative Biomedical Research known as QB3. These are two formidable efforts of collaborative research that harness the strengths of the entire University of California system to sponsor research to create solutions to grand-challenge social and commercial problems and to advance diagnosis and treatment of disease, for the benefit of developing economies as well as affluent nations. One example of CITRIS research is Technology and Infrastructure for Emerging Regions, which involves researchers in engineering, science, social science and other disciplines, looking to technologies that can play a large role in addressing the challenges of emerging economies in an effort to bring information technology to large populations in developing countries. Such work involves addressing key challenges in cost, deployment, power consumption, and support for semi-literate and illiterate users. For example, one problem being studied is how to make computers that are more tolerant to bad power and how to design smarter and more resilient control systems for batteries and solar panels. This focus is exemplary of our mission as a public university.

In the health sciences, some of the most exciting new breakthroughs are occurring at the interfaces between different disciplines. One of these is in the area of stem cell research. At Berkeley we have launched the Center for Stem Cell Research bringing together faculty from the fields of molecular and cell biology, genetics, genomics, bioengineering, neuroscience and ethics. The State of California has approved an investment of $3 billion in this research. We have also secured support from private philanthropists including a $40 million gift from Hong-Kong philanthropist Li Ka Shing, who is also a great contributor to Tsinghua. Although Berkeley does not have a medical school, it is a world-leader in the biological sciences that are the fundamental underpinning for stem cell research and will be a major participant in discoveries that hold the potential for finding therapeutic treatments or cures for diseases ranging from diabetes, Parkinson's disease, Alzheimer's disease, to certain forms of cancer. The inclusion of ethics in the Center for Stem Cell Research will ensure that this research is available to help all mankind, not only the affluent nations. A precedent has already been

set at Berkeley for developing protocols that make medicines that are the product of our research available at cost to the poorest nations.

A fourth initiative I would like to describe is our Center for Developing Economies whose goal is to create strategies for the alleviation of global poverty. Through the Center we are training the next generation of leaders to be dedicated to this goal. By generating economic development and new technological innovations – ranging from entrepreneurship programs to improved health delivery – we can hope to benefit millions of lives. The Center will draw on our immense research expertise and also will engage our students in transformative service programs. With a focus on developing innovative projects in specific countries, Berkeley students will explore the tremendous potential and challenges created by international aid. The first of these projects, to begin this summer is an initiative on safe water and sanitation in Mexico. Through the work of the Center, we will be taking the expertise of our faculty in a wide range of disciplines including human rights, affordable technology, agriculture, health delivery and economic development, out of the lab and transforming it into real-world applications. This is a unique leadership role that we are playing as a public university in the 21st century, building upon our tradition of activism and public service. We would welcome a partnership with China in this noble endeavor.

The Center for Developing Economies was initiated through a $10 million gift from alumnus Richard C. Blum and a promise to provide $5 million to match other donors. Although public universities are primarily funded through government support, I mention this as an example to show that substantial other support can be secured for public universities that have the excellence and visionary initiatives that can excite the imagination of potential benefactors. I believe that this type of public/private model is one that will expand in the 21st century and is one that China's universities may want to consider in future.

In the above, I have focused on multidisciplinary programs with very direct societal impact. Of course, we must always remember that the modern teaching and research university represents the only place where fundamental knowledge can be pursued for its own sake. It is such undirected basic research which generates breakthroughs which are revolutionary rather than evolutionary. This research and scholarship must span all fields from the humanities to the social sciences to mathematics and the physical and life sciences. At Berkeley, we take the same pride in our great scholars in art history, medieval studies and the classics as we do in our Nobel Prize winners in physics, chemistry and economics. One of our classicists is studying the Archaic period of ancient Greece trying to understand the major transformations from the world of Homer (8th c. BCE) to the fully formed democratic city-state of the 5th and 4th centuries (BCE). Another studies how Buddhism evolved from being an ascetic religion of renunciation to becoming a domesticated and cohesive social force. A third is a world-class bassoonist performing at night and, during the day, a scholar seeking new ways of understanding how music was performed and heard in the past. It might interest you to know that we have scholars in our East Asian Languages and Cultures Department

studying classical poetry and poetics from the third to eleventh centuries through Chinese literature of the seventeenth through nineteenth centuries to modern and vernacular Chinese literature and popular culture including music, sonic culture and media technology. These are all "typical" Berkeley faculty.

Before closing, let me turn briefly to our relationship with Tsinghua. Berkeley was the earliest institution to enter into a formal collaborative relationship with Tsinghua after the opening-up policy of China in 1978. A collaboration agreement was signed by then Chancellor Albert Bowker and President Lui Da and has since been renewed several times. Chancellor Emeritus Bowker is still living although I regret to say that he is now in failing health. Over the past 27 years, more than fifty Tsinghua faculty members have received degrees from or been visiting scholars at Berkeley. We have many joint programs, including the Inter-University Program for Chinese Language Studies at Tsinghua University. We welcome further cooperation between our two universities.

There is much opportunity as we look to the great challenges of the 21st century. The public structure of a university such as Berkeley, which I described to you in the first part of my address, is both cause and result of its ability to undertake complex multidisciplinary initiatives addressing great global challenges. The underlying structure and particular programs change depending upon needs, but are always pointed towards large problems of society and are interdependent. I am confident that world-class public universities in China as well as in the United States will be among the great leaders of higher education in the 21st century.

Thank you.