Conferment of the Degree of Doctor of Science, *honoris causa*
A Citation

Professor Randy Wayne Schekman, BA, PhD
Nobel Laureate in Physiology or Medicine

The cells inside our bodies produce many different kinds of protein molecules. These molecules are created, stored and processed within a complex network of compartments in the same cell and then either used within the cell or else transported to different sites around the body, transmitting detailed signals or instructions to other cells to perform highly specific tasks. While being transported they are grouped together in tiny liquid-filled sac-like structures called vesicles. This vesicle transport system is very precise but it can also malfunction. When it does, such conditions as neurological diseases, diabetes and immunological disorders can arise. Therefore the study of this cellular transport system is of great importance in addressing such conditions. The system can be studied biochemically or genetically—or both. This is the story of someone who has been able patiently to unravel the functions of the 50 genes involved in the complex movement of vesicles within and between our cells.

As the Russian Revolution evolved many Jewish people migrated from the Soviet Union to Israel or the United States. Two brothers, Norman and Nathan, first went to Massachusetts, and then after going to fight with the British Foreign Legion in Palestine finally settled in Minnesota. Norman, a travelling salesman, married Rose, and they had three children. The middle one, Alfred, was born in 1927, and at the age of 20 he married the 18-year-old Esther. He became a mechanical engineer. Her parents were Romanian Jews who arrived in the United States in 1927, thus avoiding the Nazi Holocaust which followed not long after, but still struggling through the Depression. They too had settled in Minneapolis. In 1948 Alfred and Esther had a son called Ruvain in Hebrew, which became Randy in English; a daughter called Wendy; and in due course three more sons. When Randy was 10, the family moved to Southern California in the winter of 1959. He then discovered baseball, but perhaps more importantly for the world he had his first look through a toy microscope and saw how much life there was in one drop of pond scum. He also attended the school science fair and was captivated by the projects on display. He was determined to buy a proper microscope, but his mother kept borrowing his savings, so in frustration the boy rode his bicycle to the police station and reported her. The police didn't take this complaint too seriously, but at least it convinced his parents that he was serious, and a microscope was purchased the same day.

This interest in the microbial world was nurtured by friends and teachers through high school and into college. At UCLA, one of Randy's teachers was a Nobel Laureate in Chemistry. When another professor told him to read James Watson's new book on the molecular biology of the gene, his career as an experimental scientist and molecular biologist was almost determined. Short term placements followed at the

University of Edinburgh, in the laboratory of a prominent bacterial geneticist, and at the biological laboratories at Harvard. The young scientist was accepted for graduate school into the Stanford laboratory of the leading DNA enzymologist of his era, Arthur Kornberg.

But before he could take up this position, Schekman's career choice was further confirmed in a sad way, by a family tragedy. His sister Wendy was diagnosed with acute leukemia and passed away very rapidly. The immediate effect on her older brother was a decline in his grades; the long-term effect was a determination to fight disease. Then at Stanford he met his future wife Nancy and eventually graduated with the intellectual and technical skills as well as the emotional stability and determination that he would need to succeed.

A short post-doctoral placement at the University of California, San Diego was followed by a move in 1976 to the Department of Molecular and Cell Biology at the University of California, Berkeley, where Randy and Nancy have remained ever since, raising their two children. It was at Berkeley where Professor Schekman was to become one of the founding fathers of modern cell biology.

Before his pioneering work, the state-of-the-art technique in cell biology was electron microscopy. But the microscope, so beloved of the young Schekman, only gives a static picture of cellular structure. How does dynamic movement of materials such as proteins take place across these structures? How do the vesicles carry proteins through cell membranes? It proved difficult to study vesicles in ordinary mammal cells, so in what was at the time a controversial breakthrough Schekman and his team used baker's yeast cells in their experiments. They used chemicals to create random genetic mutations in the cells and were able to identify those mutations that damaged the cellular transport system. Over many years of research, drawing in this way on both biochemical and genetic approaches, they were eventually able to identify close to 50 genes that are essential for the vesicle traffic between and within cells.

As a result of these discoveries, a biopharmaceutical company called Chiron was able to take genes from the virus hepatitis B and insert them into a yeast cell. The resulting cell produced the same proteins that appeared on the surface of the virus, but lacked the properties that make the virus dangerous. This became the basis for the world's most widely produced hepatitis B vaccine. Perhaps even more significantly, biotech engineers have been able to use yeast cells to manufacture one-third of the world's supply of recombinant human insulin. The Schekman lab is now also working on possible applications for Alzheimer's disease.

Randy Schekman is now an Investigator of the Howard Hughes Medical Institute as well as Professor of Molecular and Cell Biology at Berkeley. He has been a member of the National Academy of Science since 1992. Among many other prizes and awards, he won the Gairdner International Award in 1996 and the Albert Lasker Award for Basic Medical Research in 2002. In 2013, along with Professors Thomas C. Südhof and James E. Rothman,

he was awarded the Nobel Prize in Physiology or Medicine for his groundbreaking work on cell membrane vesicle trafficking.

Professor Schekman has also been an outstanding advocate for open science, as Editor-in-Chief of *eLife*, an open access e-journal, and as a critic of such high-profile publications as *Nature*, *Cell* and *Science*, which he says artificially restrict the number and type of articles published, and encourage research which is often just controversial or fashionable.

To end on a local note, Professor Schekman is Chairman of the Selection Committee for Hong Kong's Shaw Prize in Life Science and Medicine, and is a collaborator with CUHK's Area of Excellence Centre for Organelle Biogenesis and Function.

For his groundbreaking contributions to cell biology and thus to our understanding and treatment of disease, it gives me great pleasure, Mr Vice-Chancellor, to present to you Professor Randy Wayne Schekman, for the award of the degree of Doctor of Science, *honoris causa*.

This citation is written by Professor Simon Haines

Conferment of the Degree of Doctor of Social Science, *honoris causa*
A Citation

Professor Joseph Eugene Stiglitz, BA, PhD
Nobel Laureate in Economic Sciences

Many people have a social conscience. Their awareness of the inequalities within their society is often awakened when they are young, maybe by their own parents or by what they perceive outside the home. As they get older they may continue to speculate about the causes or solutions of these inequalities, but they usually don't try to do anything about them. A smaller number are more activist, through politics or advocacy of some kind, but often lack the intellectual framework. There are very few people who are capable, first, of developing exceptionally powerful and original intellectual theories of inequality; and then, secondly, turning these academic accounts into successful activism on the world stage.

Joseph Stiglitz was born and raised in the steel town of Gary, Indiana, near Chicago. His father was a strong civil rights advocate in later life, while his mother's family were New Deal Democrats and worshippers of President Roosevelt. Political issues were strongly debated in his home, while poverty, unemployment and social discrimination were facts of life in the wider community, and matters of concern in the public school he attended, where he was himself a top debater, though more interested in the ideas than the sport of debating itself.

He learned much more about the contest of ideas at Amherst, one of America's best liberal arts colleges. The Socratic teaching style and broad historical perspectives later helped him develop his thinking about globalization. But he also formed two enduring commitments: to economics, especially economic policy and the theory of markets; and to active politics, where through his presidency of the student council he promoted social change at a time when civil rights movements were galvanizing the country.

But it was at the Massachusetts Institute of Technology (MIT) that Joseph Stiglitz became a professional economist. He had four Nobel Laureates as professors, including Paul Samuelson, who was from the same home town as Stiglitz, and is said to have recommended him on one occasion as the best economist from Gary, Indiana. In political economy, MIT was somewhat closer to Cambridge, UK than to Chicago, with a more interventionist approach to policy, and Stiglitz and his fellow students became fascinated by growth theory. In 1965, he spent a year at Cambridge on a Fulbright fellowship where he found himself employing the tools that had been used to describe the dynamics of growth as a way of describing the dynamics of inequality. The standard model of a market economy where a perfectly competitive equilibrium with full employment will always tend to establish itself might seem plausible for those who grow up in affluent suburbs, but someone from Gary knew that such a model does not account for the observed reality

of persistent discrimination, nor explain why over time and through several generations unpredictable shocks repeatedly occur, with persistent adverse consequences, including unemployment. The causes and consequences of inequality had always been Stiglitz's deepest concern, but now he was developing a formidable mechanism through which to articulate that concern.

After a year back at MIT he moved to Yale and began his work on the economics of uncertainty, which in turn led to thinking about the economics of information: especially of imperfect information, in which asymmetry or inequality of information in the structures of a market economy limits and distorts those supposedly rational choices made by firms or individuals, and often leads to monopolistic competition and persistent unemployment.

As these powerful ideas developed through the 70s, 80s and 90s Stiglitz held professorial positions at Yale, Stanford, Oxford and Princeton Universities. In 1979 he had won the John Bates Clark Award given by the American Economic Association to the economist under 40 who has made the most significant contribution to the field. He has been University Professor of Economics at Columbia since 2000. But even such a distinguished academic career could not satisfy the political side of his ambitions. In 1993 he moved to Washington to join the Clinton Administration, eventually becoming Chairman of the Council of Economic Advisers and a member of the cabinet. He also served on the International Panel for Climate Change, a lead author in their work identifying the economic impacts of climate change. In the Clinton Administration, he was involved in every aspect of policy that touched on economics—which is almost every aspect, from drafting new toxic waste legislation to formulating trade and security policies. Most importantly, he played a leading role in developing the new economic philosophy known as the 'third way', recognising that governments had an important but limited role to play in correcting the limitations of markets.

Then in 1997 Professor Stiglitz was appointed Chief Economist and Senior Vice President at the World Bank. Here his fascination with the interface between intellectual frameworks and the practical aspects of poverty elimination could finally be played out on a world stage, including in his disagreements with the models, policies and practices of the Bank's sister institution, the International Monetary Fund, in Africa, during the Asian financial crisis, and as the former centrally-planned economies made the transition to market economies.

After three years at the Bank Professor Stiglitz returned to academia, but that long period of policy and practical experience left him even better equipped to continue his work in changing attitudes towards international development and inequality more widely. His ability to do this was enhanced by the award in 2001, along with A. Michael Spence and George A. Akerlof, of the Nobel Memorial Prize in Economic Sciences, for his analyses of markets with asymmetric information. Professor Stiglitz was already (and has since been) the recipient of many academic awards and prizes, and he is a fellow of many top level learned societies; but the Nobel Prize meant that intellectual recognition at the highest level could now work hand in hand with his top-level practical experience in achieving

social change. Under his influence such concepts as adverse selection and moral hazard have become standard tools of policy analysts as well as theorists. He has made major contributions to development economics and trade theory, macroeconomics and monetary theory, industrial and rural organization theory, welfare economics and wealth distribution. In the last 15 years his many prize-winning books written for general audiences have become worldwide best sellers. His 2002 book *Globalization and its Discontents* has been translated into 35 languages, while *The Three Trillion Dollar War* from 2008 reshaped debate on the costs of such conflicts as the one in Iraq. Stiglitz is Co-Chair of the Organization for Economic Co-operation and Development (OECD)'s High-Level Expert Group on the Measurement of Economic Performance and Social Progress. And as if one Nobel weren't enough, the 1995 Report of the Intergovernmental Panel on Climate Change, of which he was a lead author, shared the 2007 Nobel Peace Prize. In 2011 *Time* magazine named Stiglitz one of the world's 100 most influential people. There are indeed very few who have combined such a level of intellectual distinction with such a high degree of policy influence.

For his unique and remarkable contributions to economic theory and to social change on a world scale, it gives me great pleasure, Mr Vice-Chancellor, to present to you Professor Joseph Eugene Stiglitz, for the award of the degree of Doctor of Social Science, *honoris causa*.

This citation is written by Professor Simon Haines