

SPECIAL ISSUE
THE 198TH CONGREGATION 2017



LI KA SHING FACULTY OF MEDICINE
THE UNIVERSITY OF HONG KONG
香港大學李嘉誠醫學院

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CONGREGATION PROGRAMME

Hall 3DE, Hong Kong Convention and Exhibition Centre (HKCEC), Wan Chai, Hong Kong
December 17, 2017

BRASS PERFORMANCE: FANFARE FOR 130 YEARS OF MEDICINE IN HONG KONG

THE UNIVERSITY ANTHEM

PROCESSION IN

NATIONAL ANTHEM

DECLARATION OF THE OPENING OF THE CONGREGATION BY THE PRESIDENT AND VICE-CHANCELLOR

CONFERMENT OF HONORARY DEGREE

Doctor of Science honoris causa

SPEECH BY THE HONORARY GRADUATE AND GUEST OF HONOUR

STATE OF THE FACULTY ADDRESS BY THE DEAN OF MEDICINE

CONFERMENT OF DOCTOR'S DEGREES

Doctor of Science

Doctor of Medicine

Master of Surgery

Doctor of Philosophy

Doctor of Nursing

CONFERMENT OF MASTER'S AND BACHELOR'S DEGREES

Master of Philosophy

Master of Medical Sciences

Master of Nursing

Master of Research in Medicine

Master of Public Health

Master of Chinese Medicine in Acupuncture and Moxibustion

Master of Chinese Medicine

Master of Science in Chinese Medicines

Master of Psychological Medicine (Psychosis Studies)

Master of Clinical Pharmacy

Bachelor of Medicine and Bachelor of Surgery

Bachelor of Nursing

Bachelor of Chinese Medicine

Bachelor of Pharmacy

Bachelor of Biomedical Sciences

Bachelor of Science (Exercise & Health)

DECLARATION OF THE CLOSING OF THE CONGREGATION BY THE PRESIDENT AND VICE-CHANCELLOR

PROCESSION OUT

GROUP PHOTO SESSION

STATE OF THE FACULTY ADDRESS BY PROFESSOR GABRIEL M LEUNG

Dean of Medicine



Professor (Jennifer) Doudna, President, Provost, Vice Presidents, colleagues, graduands, parents, fellow alumni, distinguished guests, ladies and gentlemen,

One hundred and thirty years is a long time, especially in rapidly developing China that had experienced in that historical space dynastic rule, foreign occupation and concessions, republican revolution, civil war, foreign invasion, founding of the modern state, internal struggles, economic liberalisation, and more recently national rejuvenation and emerging geopolitical leadership. One constant, amongst few others, during the past century and some has been our school, variously called the Hong Kong College of Medicine for Chinese, Hong Kong College of Medicine, Faculty of Medicine of The University of Hong Kong, and since 2005 Li Ka Shing Faculty of Medicine. Not only were we by far the oldest local tertiary institution, we are the third school of western medicine established in the country (after Boji Medical College, forerunner of present-day Sun Yat-Sen University Zhongshan School of Medicine founded in 1866, and Peiyang (or Bei Yang) Medical College in Tianjin that was first inaugurated as the Viceroy's Hospital Medical School in 1881). We also boast an uninterrupted history since our founding.

Fast forward from 1887 to today, where are we? Notwithstanding

the many imperfections of ranking exercises, and at the risk of sounding unmannerly, I am pleased to report that we are ranked third in Asia by both QS and Times Higher Education, or 34th and 31st in the world respectively. Nationally, an affiliate of the Chinese Academy of Social Sciences recently ranked Queen Mary Hospital, our flagship teaching hospital for 80 years and counting, third in the country after the People's Liberation Army 301 Hospital and Peking Union Medical College Hospital, both in Beijing.

With our legacy and present achievements, where are we heading? The equivalent Latin expression *quo vadis* entitled the late Professor Sir David Todd's Halnan Lecture celebrating the inauguration of the Hong Kong Academy of Medicine complex almost two decades ago in 1998. Here and now, as we enter the first day of the fifth month in mourning Sir David's passing, I ask again the reflective question he then posed. In attempting an answer, I take the opportunity to summarise the work of the Deanery during the past five years while sketching a vision for the next decade.

Foremost, our priority has always been to plan for the future of our graduates, and by extension that of generations of patients here and everywhere. We set our sights not just on next year's rankings or the Research Assessment Exercise in 2020, rather we

take a long term view as the Norman Ko sculpture at the steps of the University's East Gate reminds us — 十年樹木 · 百年樹人 — that in education we must plan for the next century.

President Xi Jinping in a landmark address last August set out the country's vision in health and health care. The State Council followed with the publication of *Healthy China 2030*, a national blueprint of population health development. In parallel, China has recently embarked on the ambitious "Belt and Road" geopolitical initiative that will define the coming era of global development. Yesterday therefore we held a summit of global health leaders, many of whom have joined the platform procession this afternoon, to kickstart a dialogue on what all this may mean for health sciences education, research and innovation in biomedicine, the dissemination and application of cutting-edge technologies at the bedside and in patients' homes in this region where one-fifth of humanity lives and beyond. This will very much frame much of what we will do in future and provide the basis for a series of impactful multilateral collaborations.

As 《大學》 or *The Great Learning*, one of the Confucian classics from which the University took its motto, emphasises, to be truly effective on the national or global stage, one must first put affairs of self and at home in good order, that is 修身 · 齊家 . We have begun to mend and expand our home on Sassoon Road, extending to the clinical campus of the Hong Kong West Cluster jointly with the Hospital Authority, and across the border at our mainland base.

In 2014, the School of Public Health's erstwhile disparately located offices reunited in the refurbished Patrick Manson Building (South Wing) at 7 Sassoon Road, in a fitting tribute to Sir



Patrick's memory as our founding dean and public health icon. The South Wing of the Patrick Manson complex has become an extension of the Madam SH Ho Residence for Medical Students, adding 124 places or 43% more capacity to the housing stock for students in their clinical years.

Across the road at 8 Sassoon Road, construction works are about to begin on the Laboratory Animal Unit capital works upgrade. When the project is completed by the end of 2020, it will provide an additional 730m² or one-third more net operating floor area for the only AAALAC¹-accredited facility in southern China.

Two major new buildings have recently been approved to be constructed on Tang Court at 21 Sassoon Road and on the old laundry site at 3 Sassoon Road, both hopefully to be completed by 2021. The former project will see the addition of 2,800m² of conference facilities and administrative offices consolidated in the new three-storey Annex. The winning design comes from Wong and Ouyang, whose principal is a distinguished Architecture alumnus previously responsible for the acclaimed Centennial Campus Project. As a consequence, the entire William Mong Block will be refurbished and reserved for student learning and amenities, housing amongst others the Bau Institute for Medical and Health Sciences Education and the Learning Commons @Medicine.

No. 3 Sassoon Road will provide a new permanent home for the School of Nursing as well as expanded quarters *pro tem* for the School of Chinese Medicine, together accounting for over 10,000m² of net floor area in the nine-storey building that will be connected by footbridges with Queen Mary Hospital across Pokfulam Road, student residences at 6 Sassoon Road and the Jockey Club Building for Interdisciplinary Research on 5 Sassoon Road.

We have invested and attracted external funding totalling some HKD1.5 billion for these Sassoon Road capital projects.

We have also been making parallel expansion plans at our teaching hospitals. Our pathology and microbiology departments are currently moving into newly refurbished laboratories, including a state-of-the-science biosafety level 3 facility, at the converted Block T of Queen Mary Hospital. Before these laboratory-based clinical departments find a purpose-built home in phase 2 of the Queen Mary redevelopment after 2024, the present premises provide over 2,100m² more operating space than the University Pathology Building which will be demolished to make way for phase 1 clinical expansion and re-provisioning.

Next, in tandem with the redevelopment of Grantham Hospital into Hong Kong's first academic cancer centre by 2024, we were awarded the University's largest single donation to date by the Hong Kong Jockey Club Charities Trust of HKD1.24 billion. Together with government's co-investment altogether totalling almost HKD3.8 billion, we will be building and fitting out a new translational research block of about 15,000m² at Grantham

¹ Association for Assessment and Accreditation of Laboratory Animal Care International

Hospital to bring –omics and cell-based technologies to bear on advancing the frontiers of cancer patient care.

Finally, at the HKU-Shenzhen Hospital, we will be constructing a research block of 27,000m² to accelerate our growth into a truly academic health science centre there.

On completion, these projects together will more than double the Faculty's net operating floor area for teaching and research, thereby restoring the per capita space norm for every student and researcher at the turn of the millennium.

In the coming decade, we will be relentless in further pursuing opportunities to continue the Sassoon Road medical campus transformation mega project, from Pokfulam Road at the top to Victoria Road at the bottom. We have already begun the second-phase master campus planning process with the vision to redevelop the current site of the Estates Building and its neighbouring reservoir to rehouse and consolidate the School of Public Health's laboratories, classrooms and offices under one roof. Across the road then, as a final step of the Sassoon Road transformation, the Patrick Manson site (including both the North and South wings) would become the new home of Pharmacy and Pharmacology, which by that time would hopefully have achieved "School" status. The School of Chinese Medicine would also be re-located to share this site with the pharmacists and pharmacologists.

While the built environment is a critical input for excellence, it must take second place in relation to our people strategy. I am again most pleased to report the brilliant successes our colleagues have enjoyed in the past year. There are simply too many to recount here and now although I would refer you to the printed proceedings for a complete listing.

We must not rest on our laurels, of course. Let me give an overview of how we continue to enhance human capital at the Faculty. By the numbers, since 2013, we have increased the size of our professoriate by 9%, the strength of our research staff

by 12% and the number of endowed professorships by 50%. Following the overarching strategy of differentiation in the professoriate categories of the University, we have ambitiously and aggressively recruited the most brilliant minds, from heads of schools and departments to world-leading researchers.

Like most of our national and international peers, many of their leaders are sitting behind me, the Faculty seeks to expand and improve our human capital stock of clinician-scientists. In parallel to intensifying recruitment externally, we are hopeful that the new Enrichment Year of our MBBS programme will inspire and initiate more students into joining our ilk. Recent support from the Li Shu Pui Medical Foundation, Croucher Foundation and the Health and Medical Research Fund Fellowship Scheme has lent a useful boost to recruiting junior clinical academics. Given the Chief Executive's espoused goal of turning Hong Kong into an innovation and technology hub, not least with a special emphasis on biomedicine, we look to the relevant bureaux for a renewed, era-defining push. This of course goes beyond financial support. Even more importantly, we need to align non-monetary incentives amongst the Hospital Authority as the exclusive employer of virtually all trainees, the Academy Colleges whose training guidelines have become progressively more systematised but perhaps inadvertently inflexible, and *mea culpa* the universities which are myopically obsessed with short-term results to satisfy the alphabet soup of RAE, QAC and UAA imposed by the University Grants Committee. The value placed on nurturing clinician-scientists must be genuinely reflected in a fundamental sea change in multi-institutional attitude that is followed through to action. This is a collective test of whether transformational leadership is matched by transactional leadership to bring about real change.

Once budding clinician-scientists are in post, like any good gardener the Faculty must nurture them and help them flourish. 十年樹木·百年樹人 – whereas the terms and conditions of service for clinical academics used to be superior to government doctors when I first joined the Faculty, the reverse had until recently been true. Remuneration is now on par although





medical benefits remain less favourable. The notional workload allocation of 55% clinical duty for clinician-scientists, as well as 10% teaching and research responsibility for Hospital Authority staff at the teaching hospitals must be universally respected and robustly enforced. Even for superstars, the day only spans 24 hours.

To support our academic colleagues, we have made a determined effort to bolster the administrative establishment. They have for far too long been an afterthought, although anyone who works in universities will tell you that they are actually the people who make the whole place tick. Of course, as a mostly publicly funded institution, we must be accountable for justifying this overdue expansion of our support infrastructure. Here the Executive Vice President's SMARTER@HKU programme provides a timely complement, identifying and implementing efficiency improvements to finance this and other initiatives.

On research and discovery, our philosophy has always been to provide the best hardware and software infrastructure, within a flexible and facilitative environment, to a community of the most brilliant minds then leave them to work their innovative magic. In particular the research deanery constantly reminds itself that the best laid plans rarely pan out and that scientific serendipity springs from curious and wandering minds. Managers of research must desist from actually managing research, rather positive non-interventionism must be our guide after having satisfied the most robust and stringent ethical and fiduciary oversight.

Therefore, we have focused on expanding core technology platforms particularly growing our –omics capabilities, small animal competencies and clinical trials facilities. To complement the investment in facilities and equipment, we continue to grow our core expertise in bioinformatics, biostatistics and clinical research methodologies. More recently, in tandem with the territory-wide shift towards a more entrepreneurial orientation in biomedical research, and inspired by the demonstrated success of Shenzhen in the digital economy as well as for startups generally, members of the Faculty have also engaged more deeply and frequently with industrial partners in co-developing devices, new vaccination strategies and the like.

Over the past decade and a half, the Faculty has matured from designating virtual research hubs and nurtured them into internationally recognised centres of excellence. The coming decade will hopefully see further consolidation in our lead in these areas of infection, cancer, biopharmaceuticals, stem cell and developmental biology, and global health. We also anticipate the emergence of newer fields that perhaps we cannot yet foresee. As such our research policy will always remain nimble and proactive in supporting nascent as well as established areas of enquiry.

One of the most exciting projects of our 130th anniversary is the MBBS 130 curriculum. The centrepiece is of course the Enrichment Year. Essentially it is our response, as a school practising undergraduate medical entry, to reap the benefits of a graduate entry system wherein incoming students would already have had a more broadly based and varied set of exposures at the tertiary level. At the same time it also lends the opportunity for aspiring students to pursue research, without the immediate time penalty associated with a more conventional MD-PhD track at enrolment. Furthermore, this Year is particularly important for the relatively much younger (compared to the case in North America and other graduate entrants in the UK and Australia) and really high-performing students in our context. The restrictive licensing regime in place since repatriation in 1997 has effectively made supply much less flexible thus wages disproportionately higher and therefore entry into the profession even more competitive, while at the same time all aspiring students converge on the two local schools. The Enrichment Year gives them the broadening worldview and an outlet for their tremendous energy to learn. It is a truly innovative experiment as I am unaware of another school that has tried such an approach. I hope to share our experience, that is failures as well as successes, more widely with colleagues around the world as we move forward, and in turn learn from our peers how to constantly improve our curricular offering.

I am also very proud of the success of our BBiomedSc programme, that has over the last five years become one of the most desired choices for high school leavers with entrance scores just shy of our flagship MBBS course. Of particular note, the exchange cum articulation with Edinburgh, Sydney and UC Berkeley in veterinary surgery, physiotherapy, radiography and public health have proved a major attraction. I thank their respective leaders for joining us in the platform party this afternoon.

To enhance pastoral care, together with the various student societies, we have jointly appointed two social workers to improve student wellbeing, to provide support and to intervene at the earliest signs of distress. There is to be a "China wall" in the work of these colleagues who are explicitly instructed not to divulge confidential information to the Faculty so as to create and maintain a safe environment for students to freely share their feelings and thoughts. We continue to look for a full-time clinical psychologist to join this team.

The impact of our human capital development work radiates

into the mainland, which has just launched the so-called “5+3+X” residency training reform initiative. Having presided over the Hong Kong Academy of Medicine since its founding by Sir David Todd a quarter of a century back, albeit on an *ad personam* basis by our professoriate colleagues, we have accrued much hard-earned experience to offer the rest of the country. To this end, I am pleased to report that HKU Health System with its four constituent teaching hospitals officially became a member of the Chinese Consortium of Elite Teaching Hospitals for Residency Education, leaders of each of the other eight academic health sciences centres are here with us in the procession. This marks a historical milestone of Hong Kong’s deep re-engagement with the mainland through our professional contribution. Not only can we share lessons we have learned through this process, we can also ensure that our own training scheme will be compatible as the country’s fledgling system matures. This could guarantee portability of our specialist qualifications nationwide that would extend beyond 2047. Just as Sir David had the foresight to build Hong Kong’s own specialist training regime to ready ourselves for 1997, we are now coming full circle to become nationally accredited as we approach 2047 when today’s graduands will be at their prime.

On the subject of deep engagement with the national health system, HKU-Shenzhen Hospital is our bridgehead. Let me take this occasion to congratulate it on the double happiness of having just been certified as the newest “3A” hospital in Guangdong province as well as designated an officially recognised residency training site by the national ministry. Accomplishing either feat would have been remarkable, let alone both within the short span of five years since commissioning. Its financial health has also improved to the extent that its operating budget, importantly inclusive of the HKU service contract, is now balanced.

I began my report by citing the first two elements of *The Great Learning*, which were 修身、齊家 (perfecting oneself and one’s family). Now I should like to end my presentation by recalling the remaining two elements of 治國、平天下 (leading the country and the world). I dare not suggest that we would really be first amongst equals with our national and

international peers. Suffice that HKU remains open to global interconnectedness, as a lynchpin in southern China and through the renewed Sea Silk Road to the rest of the world. We have done much to prepare ourselves. We boast four State Key Laboratories partnered with leading mainland institutions. We are also the Asian hub of Institute Pasteur with the HKU-Pasteur Pole and Karolinska Institutet’s first international foray with the Dr Li Dak Sum HKU-Karolinska Centre in Regenerative Medicine. Both the director and president of these respective esteemed institutions are also on stage. We are the exclusive clinical partner of Asia’s largest hospital group, Parkway Pantai, *viz* Gleneagles Hong Kong which began operations in March this year. At the global level, we host a WHO Reference Laboratory for Influenza and a WHO Collaborating Centre for Infectious Disease Epidemiology and Control. The list goes on.

In keeping with Hong Kong’s history, we are at our best when we are open, welcoming and collaborative with the world. Especially during the present inward-looking age of nationalistic isolationism and even tribalism, the Faculty of Medicine declares ourselves a global citizen, a friend to our profession worldwide and a voice for all humanity.

My first predecessor, Sir Patrick Manson in his remarks at the inauguration of the Hong Kong College of Medicine for Chinese on October 1, 1887 said:

...The old Greek cities used to boast of their great men, and claim them with jealous care. Let us hope that in the new and greater China of the future, when the learned dispute of their great men, not a few may be claimed for Hongkong and for the school to-day inaugurated...

I am content that we have done his words justice. And so today I say to you:

New cities along the Belt and Road will benefit from the wisdom, compassion and commitment of our graduates, from generation to generation. Let us pray that in the renewed globalism of tomorrow’s world, when the people consider leaders of clinical medicine to planetary health, more than a few may be claimed for Hong Kong and for the faculty today celebrated.





List of Individual Achievements 2016-7

Professional Recognition and Individual Honours/Awards

- Professor Malik Peiris (Public Health) was elected a foreign associate of the US National Academy of Sciences as well as made "Officier de la Légion d'honneur" by the French government.
- Professor Paul KH Tam (Surgery) was awarded the Denis Browne Gold Medal by the British Association of Paediatric Surgeons (BAPS).
- Professor Lau Chak-sing (Medicine) was elected President of the Hong Kong Academy of Medicine and made Honorary Fellows of the Academy of Medicine Singapore, American College of Physicians, College of Physicians Singapore and Royal College of Physicians of Thailand. He also won the APLAR (Asia Pacific League of Associations for Rheumatology) Center of Excellence for Research, Training and Education and Patient Care Award, as well as was conferred the Hang Seng-Regeneration Society "Outstanding Community Service Award".
- Dr Chan Wai-chi (Psychiatry) was elected President of the Chinese Dementia Research Association.
- Dr Cheung Chi-wai (Anaesthesiology) was elected President of the Hong Kong College of Anaesthesiologists.
- Professor Kenneth Cheung Man-chee (Orthopaedics and Traumatology) was elected President of The Scoliosis Research Society, being the first to assume the office from outside of North America in the Society's 51 years' history.
- Professor Lau Yu-lung (Paediatrics and Adolescent Medicine) was elected President of the Asia Pacific Society for Immunodeficiencies.
- Dr Yau Wai-pan (Orthopaedics and Traumatology) became President-Elect of the Hong Kong College of Orthopaedic Surgeons.
- Professor Anne Lee Wing-mui (Clinical Oncology) was elected to the Board of Directors of the Union of International Cancer Control (UICC) for 2016-2018.
- Professor Guan Yi and Professor Leo Poon (Public Health) were elected Fellows by distinction of the Faculty of Public Health of the UK Royal College of Physicians.
- Professor Jimmy Lai (Ophthalmology) was elected Fellow of the Academy of Medicine, Singapore, Fellow of the Academy of Asia-Pacific Professors of Ophthalmology and President of the College of Ophthalmologists of Hong Kong.
- Professor Law Wai-lun (Surgery) became Honorary Fellow of the American Society of Colon and Rectal Surgeons.
- Professors Hextan Ngan and William Yeung (Obstetrics and Gynaecology) were made Honorary Fellows of the Hong Kong College of Obstetricians and Gynaecologists.
- Dr Ho Pak-leung (Microbiology), Professor Paul KH Tam (Surgery) and Professor Sham Pak-chung (Centre for Genomic Sciences) were appointed Justices of the Peace.
- Professor Michael Irwin (Anaesthesiology) was made Mary Burnell Lecturer by the Australian and New Zealand College of Anaesthetists.
- The following colleagues won various awards from the Croucher Foundation:
 - Professor Anskar Leung Yu-hung (Medicine) – Croucher Senior Medical Research Fellowship 2017;
 - Professor Leo Poon Lit-man (Public Health) – Croucher Senior Research Fellowship 2017;
 - Dr Carmen Wong Chak-lui (Pathology) – Croucher Innovation Award 2017;
 - Dr Paul Lee Chi-ho (Medicine) – Croucher Foundation Fellowship 2017/8.
- Professor Chow Shew-ping (Orthopaedics and Traumatology) was awarded IFSSH (The International Federation of Societies for Surgery of the Hand) Pioneer of Hand Surgery.
- Professor Lo Chung-mau (Surgery) was awarded The International Transplantation Science Mentee-Mentor Award.
- Dr Alan Sihoe Dart-loon (Surgery) was awarded the European Society of Thoracic Surgeons (ESTS) Greek Pioneers' Prize and Intuitive Prize.
- Dr Chang Wing-chung (Psychiatry) received the IEPA (International Early Psychosis Association) Young Investigator Award and the 2016 NARSAD Young Investigator Award Grant by the Brain & Behavior Research Foundation.
- Dr Chen Jianping and Professor Shen Jiangang (Chinese Medicine) received a Science and Technology Award of Integrative Medicine (Third class) by the Ministry of Science and Technology of the People's Republic of China.
- Professors Shen Jiangang and Lao Lixing (Chinese Medicine) were given a Science and Technology Award of Shanghai City (First and Third class respectively) by the Shanghai Municipal People's Government.
- Dr Alex Ng Lap-ki (Ophthalmology) was recognised as a Distinguished Young Fellow by the Hong Kong Academy of Medicine and the College of Ophthalmologists of Hong Kong, and given the Young Ophthalmologist Award by the Asia-Pacific Academy of Ophthalmology and Singapore Society of Ophthalmology.

Major Research Support

- The Hong Kong Jockey Club Charities Trust awarded HKD128M to the School of Public Health for the Jockey Club SMART Fami-Link Project, in collaboration with 12 NGOs in Hong Kong.
- Professor Maria Lung Li (Clinical Oncology) won a UGC Theme-based Research Scheme project "Translational Studies for Elucidating the Tumor Heterogeneity and Molecular Evolution in Metastatic Gastrointestinal Tract Cancers for Personalized Medicine" (HKD33.333M).
- Professor Mary Ip Sau-man (Medicine), Dr Christopher Hui (HKU-Shenzhen Hospital) et al. obtained a tri-partite (ICL and NHLL, UK – HKU – HKUSZH) project grant of RMB18M from the Shenzhen Government for an Integrated Airways Disease Programme based at HKU-Shenzhen Hospital.
- The Department of Medicine received a HKD20M research donation from Mr Hui Ming of Koon Wah Mirror Group and his family for research projects on the advancement of clinical diseases and health management.
- Professor Kenneth Cheung Man-chee, Dr Wong Tak-man and their team (Orthopaedics and Traumatology) were granted by "Sanming Project of Medicine in Shenzhen" on the development of spine surgery at The University of Hong Kong-Shenzhen Hospital (RMB15M).



SPEECH BY PROFESSOR JENNIFER A DOUDNA

Honorary Graduate and Guest of Honour



Professor Jennifer A Doudna is a Professor of Molecular and Cell Biology and Chemistry at the University of California, Berkeley, where she holds the Li Ka Shing Chancellor's Chair in Biomedical and Health Sciences, and is an Investigator at the Howard Hughes Medical Institute. She holds a Bachelor of Arts degree in Chemistry from Pomona College and a PhD from Harvard University.

Professor Doudna has been a leading figure in what is often referred to as the "CRISPR Revolution" and she is renowned for pioneering a simple way of editing the DNA of any organism using an RNA-guided protein found in bacteria.

Professor Doudna is a member of the National Academy of Sciences, the National Academy of Medicine, the National Academy of Inventors and the American Academy of Arts and Sciences. She is also a Foreign Member of the Royal Society, and has received many other honours including the Breakthrough Prize in Life Sciences, the Heineken Prize, the BBVA Foundation Frontiers of Knowledge Award and the Japan Prize.

The University of Hong Kong (HKU) conferred an honorary degree on Professor Jennifer Doudna at the Li Ka Shing Faculty of Medicine session of the 198th Congregation held on December 17, 2017.

Professor Michael Wilkinson, the Public Orator of the University, wrote and delivered the citation for Professor Doudna, and Professor Doudna delivered an acceptance speech to the HKU Medicine graduates of the Class of 2017.

The following is the citation by Professor Wilkinson, followed by the acceptance speech of Professor Doudna.

Mr President:

Dr Jennifer Doudna is a world-renowned scientist whose cutting edge research has led her to the discovery of "CRISPR", an important tool which allows for and facilitates the "cutting and pasting" of genes. Her remarkable discovery has revolutionized and simplified gene editing. Jennifer is presently Professor of Biochemistry and Molecular Biology at Berkeley, California and holds the Li Ka Shing Chancellor's Professorship in Biomedical and Health Sciences.

Jennifer was born in Washington DC but, when she was 7 years of age, her parents moved to Hawaii where her father taught American literature at the University of Hawaii. Growing up in such a beautiful environment with its rain forests and exotic plants and animals, she soon acquired a burning sense of

curiosity about how nature works and wanted to understand nature's underlying biological mechanisms. Her father had a passionate interest in reading about scientific developments and, when Jennifer reached the sixth form at school, her father gave her a copy of *The Double Helix* by James Watson of DNA fame. This further enthused her to pursue a career in science and she was admitted to Pomona College in California to study biochemistry. Having graduated with flying colours in 1985, she attended Harvard Medical School for her doctoral study, her PhD focusing on engineering a self-replicating catalytic RNA.

After Harvard her career led her to Yale in 1994 and then to the University of Berkeley, California in 2002. Her work focused mainly on large RNA structures and strove towards a mechanistic understanding of biological processes involving RNA. A couple of years later, however, in 2005 a particularly fortuitous event occurred. Jennifer was approached by Jillian Banfield, an environmental researcher at Berkeley, who had been sequencing the DNA of unusual microbes that lived in a highly acidic abandoned mine. In the genomes of many of these microbes were unusual repeating sequences called "clustered regularly interspaced short palindromic repeats" or the acronym "CRISPR" for short! No one was very sure what these clusters did, but it appeared that they served as part of the bacterial immune system. Still puzzling over this question another fortuitous event occurred in Jennifer's life when, in 2011, she met Emmanuelle Charpentier, a French microbiologist, at a conference in Puerto Rico. Emmanuelle was also studying the *Streptococcus* bacteria "CRISPR", which she also believed to be an immune system, and the two experts with complementary disciplines soon became friends and collaborators. This collaboration bore enormous fruit and the duo was soon to make a spectacular discovery that would reduce the time and effort required to edit genomic DNA. They discovered that a protein named Cas9 found in the "CRISPR" immune system operated like a pair of scissors to slice up the DNA of viruses. Very soon afterwards, in a second "eureka" moment, the scientists realized that this cellular defence system CRISPR-Cas9 could be used, not just to kill attacking viruses, but to edit genomes. Pieces of DNA could be deleted or added just like a film editor might cut and splice frames of a film or a computer user might cut and paste by way of editing a document! And what is more, this cutting is effected with exceptional precision.

This amazing discovery has been described as "one of the most significant discoveries in the history of biology". In quick succession researchers found that the technique could be applied to mammalian cells, mice, plants and in early 2014, monkeys!

The pioneering work of Jennifer and Emmanuelle has since been further developed by many research groups for application to the treatment of diseases ranging from Sickle Cell Anemia, Cystic Fibrosis, Diabetes, Huntington's Disease, AIDS and HIV.

Naturally and deservedly, Jennifer's pioneering work has gained global recognition and many awards followed. Amongst others, she has been the recipient of the Breakthrough Prize in Life Sciences (2014), Gruber Prize in Genetics (2015), the Canada Gairdner International Award (2016), the Tang Prize in Taiwan (2016) and the Japan Prize (2017). She has also been recognised outside the scientific community by being named as one of the TIME 100 most influential people in 2015 (with Emmanuelle) and listed as a runner-up for TIME's Person of the Year in 2016.

But all has not been entirely rosy. Two rival laboratories at Harvard and the Broad Institute were carrying out similar research and the Broad Institute claimed patent rights over the discovery. Legal battles still rage over the determination of this issue.

Jennifer's work has also given rise to important ethical issues. As she herself has readily recognized, the "CRISPR" technique is readily amenable to abuse since it can be applied to modify human cells. Although this is forbidden in many countries including the USA, it is lawful in others including, I am led to understand, Hong Kong. The ethical argument is not easy to resolve. On the one hand, if properly used, the technique can be applied to edit embryonic genes to remove genetic defects. This would surely be good and desirable. The genes of babies who are genetically likely to develop life threatening or life impairing diseases could be modified to avoid such diseases. On the other hand, such a procedure is readily amenable to abuse. If legalized, it could lead to the spectre of "designer babies", babies designed to meet the desired specifications of their parents: indeed what we might designate as "CRISPR" babies. This is scary and seems to run into the sphere of science fiction!

How does one summarise such an illustrious career - which I should add, is far from over. It must be remembered that Jennifer's "CRISPR" work is but one accomplishment in her stellar career. She produced a great deal of useful research on the structure of RNA before chance diverted her along the road of creating a tool for editing human genes. There is no doubt that her pioneering research, which has led to the CRISPR-Cas9 genome editing tool, has revolutionised the fields of genetics, molecular biology and medicine.

I asked Jennifer what was the main purpose of and driving force behind her professional life and she modestly replied that it is to understand the chemistry of living systems and use those insights to advance human health.

Jennifer can be rightly proud of what she has achieved and her insights have undoubtedly proved of immense significance to advancing human health.

Mr President:

It is my honour and privilege to present to you Dr Jennifer Doudna for the award of Doctor of Science *honoris causa*.



President Mathieson, graduating students, families, friends and honoured guests:

It is a great honour to accept this honorary degree and to celebrate the achievements of this year's graduates here at The University of Hong Kong.

My own professional journey had its origins on the island of Hawaii, where I grew up in a small town, attended public schools and struggled to feel relevant in a world I imagined was passing me by. I loved math and science but this did not endear me to peers, who were less than complimentary of my geeky interests and passion for things like cryptograms, tiny sea urchins and hikes in the rainforest with my dad.

As I was reflecting on my journey to where I am today, three things stood out from my experiences.

The first is that mentors matter. I remember the time in college when I had done poorly on a chemistry exam after studying very hard for it, and I was discouraged. After having been so excited to study chemistry and apply that knowledge to biology, I found myself struggling to make the connection between balancing equations or calculating molarity and understanding the function of biological molecules. Meanwhile I was enjoying my French language and history classes, and I went to see my French teacher to ask about switching my major. "What's

your current major?" she asked. "Chemistry", I replied. Without skipping a beat, she said "Oh, you should stick with Chemistry!" And she explained that although she loved teaching, she thought Chemistry offered many more career options. I credit her steady guidance, in part, for giving me the encouragement I needed to stay the course, continue through general chemistry and on to organic, analytical and eventually biochemistry classes that I found both challenging and fascinating.

When at last I stood on the stage receiving my diploma in biochemistry in 1985, the path ahead looked long and open, filled with opportunities but also risks. Could I really become a professional scientist? The question was both exhilarating and terrifying to me. I went off to graduate school not quite sure how I would fare, but nonetheless full of anticipation. Over the next few years I worked on my graduate degree in Boston and then took on a post-doctoral position in Boulder Colorado to gain additional research experience before deciding on a career path. Along the way my dad was an unwavering supporter of my research adventures. Each time we got together, which was not that often given the distance between Hawaii and Boston or Boulder, the visit went the same way: Dad would sit down at the dinner table on our first evening together and ask "So, what's happening in the lab?" And he would really want to know! This would begin a detailed discussion and debate about experiments I was doing and why I was doing them. I told Dad I was trying to understand how the molecules encoding

the chemical information needed for life came into existence, sparking many debates about the origins of the universe and how life as we know it might have evolved. Dad turned me on to books like Dawkins' *The Selfish Gene* and Harold Morowitz's *Mayonnaise and the Origin of Life*, and we would dissect the author's thesis and arguments – and writing style! He was an English professor, after all! Those years went by all too quickly, but Dad's intellectual support was key as I was completing my early training and struggling through various disappointments: experiments not panning out, my first scientific manuscript getting rejected for publication and various personal setbacks... Dad was always there for me.

The second thing I've learned since graduation is that life takes unexpected turns. And one can respond by resisting those turns, or meeting them head on. As a kid I spent a lot of time in the ocean and had many experiences with unexpected surf – turning around to find a big set of waves about to break over me, or a surprisingly strong current pulling me away from shore. And experience taught me that resisting these waves or currents resulted invariably in getting a face full of sand or getting pulled far from my starting point on the beach. Now as an adult, these experiences are somehow always in my psyche, reminding me of the analogies to life's experiences. I found a powerful description of this C.S. Lewis' *Perelandra*, in which swimmers in a vast ocean are facing rogue waves, and realizing that they must swim to meet them – a powerful analogy for me. I still have dreams in which I am in shallow water and facing huge powerful waves, or trying to surf waves that are many stories high... and I have come to see these dreams as reflecting my experiences with challenges in life and how one can either be crushed by those challenges, or can grab a surfboard and start paddling... When I was working daily in the lab, failures were frequent and I had to find ways of maintaining inspiration and



enough optimism to carry on with my work. One source was gardening: I loved (and still love!) the immediate gratification one gets from planting flowers in a bed or raking up fallen leaves – something counteracting the delayed gratification of experimental science! I also found inspiration from the experiences of famous scientists and inventors from earlier times – for a long time I had a Thomas Edison quote above my bench in the lab: "I have not failed. I just found 10,000 ways that won't work!"

The third thing I've taken to heart since graduation day in 1985 is that the journey is ours to make, but it is not made in isolation. Family, friends, colleagues, students, classmates – many people offer support along the way that is crucial to staying the course. I've really appreciated my colleagues here at UC Berkeley – some of the best friends as well as accomplished scholars and educators once could hope to work with! And I'm continually inspired by my students at my home institution, UC Berkeley. One of my favourite stories is about a student who took my molecular biology class and asked to work in my lab. Older than most sophomores, she told me she was the first in her family to go to college, and that she had actually thought she would become a cosmetician. But while in cosmetology school she realized she was fascinated by the chemistry of hair dyes and nail polish, and after taking some chemistry classes at community college she transferred to UC Berkeley where she majored in Chemistry. Two years later she graduated summa cum laude, and is now completing an MD/PhD programme with a focus on paediatrics.

So as you embark on your journey forward from today, I encourage you to seek out mentors for the next steps along your path. Embrace the twists and turns in the path. And spend time with family and friends to keep perspective on the road ahead.

Students, I salute your accomplishments and share in the joy of your achievements!

And to The University of Hong Kong, thank you again for this honorary degree, I am deeply honoured to receive it.



THE FIRST GRADUATION CEREMONY



Dr Sun Yat-sen visited the University on February 20, 1923 and gave a speech at the Great Hall (Loke Yew Hall). Photo courtesy of the University Archive, The University of Hong Kong

When the Hong Kong College of Medicine for Chinese, the predecessor of HKU's Medical Faculty, held its first graduation ceremony in the City Hall on July 23, 1892, it was a triumph for its founders. In the first five years of its existence, the College had encountered a number of challenges and teething problems, but by 1892 it was sufficiently ensconced for the Governor Sir William Robinson to oversee the ceremony where colonial officers and community leaders joined College staff and students to commend Sun Yat-sen and Kong Ying-wah in being the College's first graduates.

Tellingly, Sun and Kong were the only two of their original class of 13 students to pass all professional examinations, and Sun was the most outstanding of them, earning the highest marks in medicine, obstetrics and public health. The young College continued to face many difficulties, which were addressed in a remarkable speech at the ceremony by Dean James Cantlie, which he delivered after the Secretary of the College, Dr J. C. Thomson, had announced the academic results and Sir William presented the awards. Dean Cantlie commented that

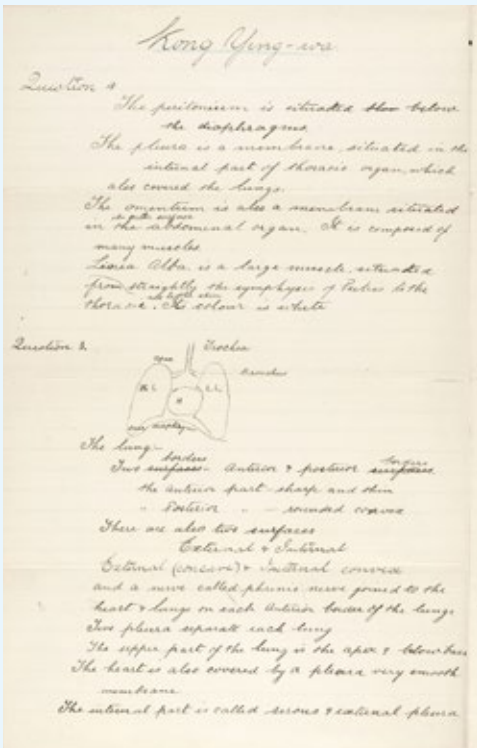


Located on Hollywood Road, the Alice Memorial Hospital was the first teaching and training base for students of the College in the late 19th century.

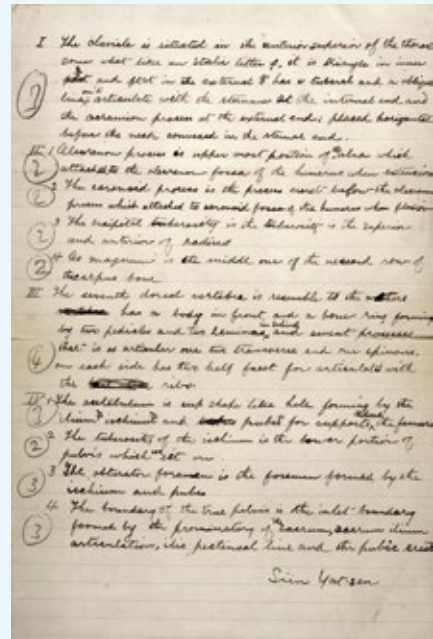
steadiness of purpose was the most constant characteristic of Chinese people and this would provide the Hong Kong College of Medicine with a solid foundation for making significant contributions to the community and realising its ambitions to advance the well-being of China. Sir William also addressed the gathering and spoke of his hopes for improving the Government's financial situation and supporting the College in future.

At the end of the ceremony, the designated third dean, Professor FW Clark and Chief Judge J.J. Francis expressed thanks for the efforts of all involved. The celebrations then got underway with a private dinner hosted by Dean Cantlie at the renowned Mount Austin Hotel on the Peak for his two graduates and his important friends, including Sir William, Colonial Secretary J. Stewart Lockhart and Major-General Digby Barker. As the dinner came to an end, the guests broke into a rendition of "Auld Lang Syne", celebrating the friendships that would endure well beyond the College years and the party.

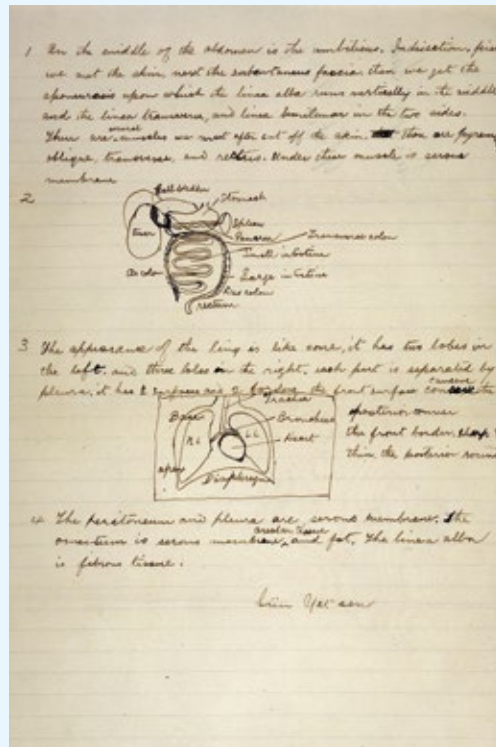
However, there was one dark cloud over the event: the Licentiates were not looking at the brightest of prospects. They were not legally permitted to practice in colonial Hong Kong (local graduates would not earn this right until The University of Hong Kong was founded in 1912), despite being granted a diploma in medicine there. Dr Sun would earn renown as a politician and the founder of the Republic of China in 1912, whereas Dr Kong would serve as a doctor in Sandakan, Malaysia for more than 40 years.



Examination paper of Dr Kong Ying-wah



▲ Examination paper of Dr Sun Yat-sen







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the Congregation,
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*Congratulations
to the
Class of 2017!*



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