



JS4460

BEng (Hons) in Biomedical Engineering

Offered by the newly established
Department of Biomedical Engineering
The Chinese University of Hong Kong

Explore

*Innovate,
Care*





What is Biomedical Engineering?

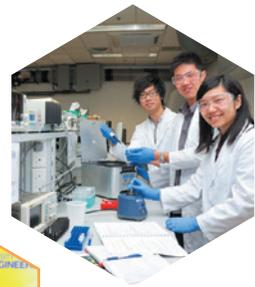
Biomedical Engineering (BME) is an interdisciplinary study in which engineering and technology are applied innovatively to solve human health problems.



What do we offer?

Our BME (Hons) programme is offered by the Faculty of Engineering in close collaboration with the Faculty of Medicine. We equip our students with:

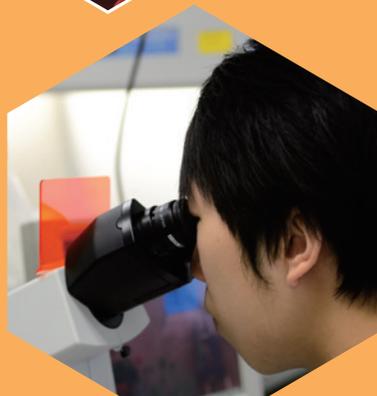
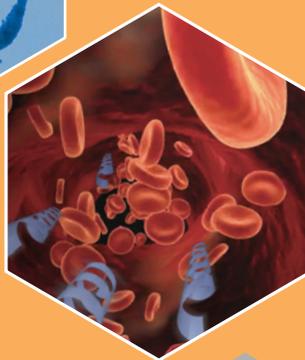
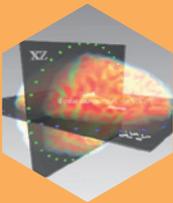
- a solid foundation in the underpinning sciences & mathematics,
- critical thinking & innovative problem-solving skills in interdisciplinary contexts,
- knowledge and competence in the design and development of medical devices,
- awareness of the emerging trends of healthcare & related industries, and
- passion & capacity for life-long learning.





Programme Highlights

- Supported by the CUHK Faculty of Engineering and Faculty of Medicine in teaching and research.
- Accredited by the Hong Kong Institution of Engineers (HKIE), ample opportunities for industrial and academic placements.
- Around 28% of our graduates pursue further studies in various engineering and medical disciplines (some all the way to PhD).
- The Prince of Wales Hospital is our teaching hospital, students will have opportunities to learn on-site how technology may enhance clinical services and patient benefits.
- CUHK will have our own private hospital in 2019-20.
- Students with outstanding academic records are eligible for potential enrollment in the CUHK MBChB program in an accelerated track.





Admission Criteria

For JUPAS students

We look for students who like science subjects, love to EXPLORE, INNOVATE and CARE, passionate for learning in breadth as well as in depth, ready to acquire new knowledge across disciplines, and eager to apply their learning to solve real-life problems in the medical and healthcare industries.

Students are expected to have completed at least two elective subjects plus the four core subjects. One of the electives should be Physics, Chemistry, Biology, Combined Science, or Mathematics Extended Module M1/M2. Priority score are computed based on the Best 5. A higher weighting of 1.5 will be given to English, Physics, Chemistry, Biology, Combined Science and one of the Mathematics subject (either the core Mathematics or the M1/ M2 Extended Module).

For non-JUPAS students

Local and non-local students with other qualifications can also apply through the non-JUPAS admission scheme. These qualifications include GCE, IB, SAT/AP and other overseas qualifications for university admission. Preferences are given to applicants with good grades in at least two of the following subjects - Physics, Chemistry, Biology, or Mathematics. More detailed information are available at <http://admission.cuhk.edu.hk/non-jupas-yr-1/requirements.html>.

A non-JUPAS applicant may apply for "Admission with Advanced Standing" if he/she meets specific requirements (including GCE-AL, IB-HL, etc.). For students admitted with Advanced Standing, the number of units for graduation may be reduced by up to 24. Applicants should indicate in the application form whether they would like to be considered for "Admission with Advanced Standing".

For Mainland JEE applicants, please go to: <http://admission.cuhk.edu.hk/sc/mainland/requirements.html>

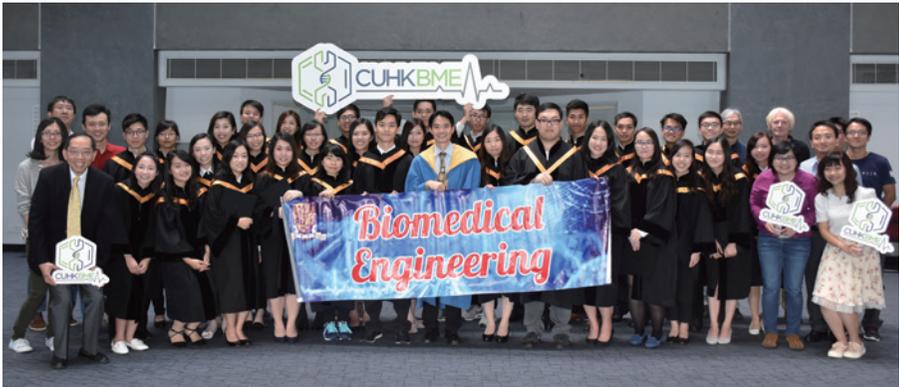


Scholarships

Ample scholarships are available through multiple sources – the Office of Admission and Financial Aids, Colleges, as well as Faculty of Engineering. At the same time, Department of Biomedical Engineering also provides scholarships and subsidies for students to encourage students to participate in international competitions and conferences.

BME Curriculum			
Lower Years	Engineering Foundation	Free Electives*, General Education & Languages	New courses to be introduced in 2019-20
	Biology / Chemistry / Physics, Engineering Design, Engineering Mathematics, Programming	Biomedical Sciences	
	BME Fundamentals	Business Administration	
	Anatomy and Physiology, Biomechanics, Cell and Molecular Biology, Circuits and Signals, Engineering Mathematics	Accounting Law	Big Data in HealthCare
Upper Years	Advanced Major Courses	Science	Data Analytics for Personalized Genomics and Precision Medicine
	Biomaterials and Tissue Engineering, Medical Instrumentation and Design, Global Medical Device Regulations	Arts Social Science	
	One-year Work Study Program (optional)	Physical Education	
	Electives for BME Streams	English	
	Graduation Project BME Electives	Technical Communications	

* Units for free electives can be used to fulfill the minor requirement.





Streams

Medical Instrumentation & Biosensors

TeleMedicine & Mobile Healthcare
Medical Robotics

Biofluids
BioMEMS

Neuroengineering
Bionanotechnology

- Recommended to minor in Electronic Engineering, Mechanical & Automation Engineering, OR Physics

Biomedical Imaging, Informatics & Modeling

Bioinformatics
Medical Imaging Applications

Biomedical Imaging
Sound and Light Waves in Medicine

Biomedical Modeling

- Recommended to minor in Computer Science, OR Electronic Engineering

Molecular, Cell & Tissue Engineering

Cell Biology
Musculoskeletal Tissue Engineering

Genetic Engineering
Biomolecular Engineering

Bionanotechnology
BioMEMS

- Recommended to minor in Biology, OR Biochemistry



BME + Business Administration Double-Degree Programme

The double degree option is designed to provide students with maximum flexibility to acquire a second degree by an additional year of study after their first degree. Biomedical engineering students can pursue a second bachelor's degree in the Faculty of Business Administration within a 5-year normative period of study if they fulfill certain requirements. For further information, please refer to the Faculty website at <http://www.erg.cuhk.edu.hk/erg/ergbba>.



BME Minor Programme

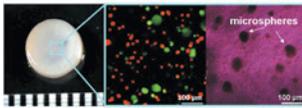
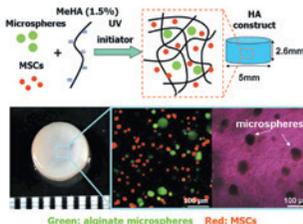
The BME minor programme is a good option for students with a science background to apply engineering tools on medical science and biology. For details, see the curriculum information in our website: <http://www.bme.cuhk.edu.hk>.

Areas of Research

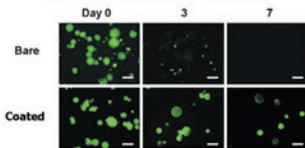


Biomaterials and Regenerative Medicine

Biomaterials scaffolds, stem cell technology, microenvironmental cues in stem cell differentiation, biophysical stimulation and mechanobiology

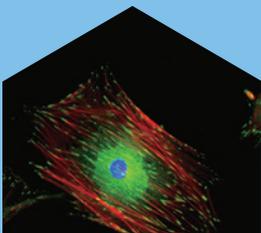
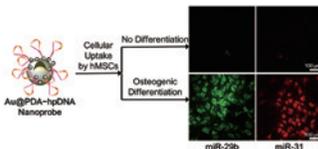
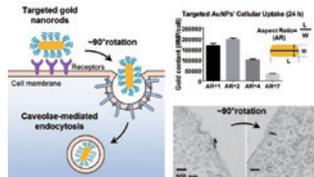


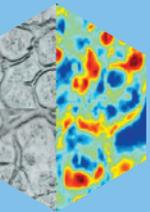
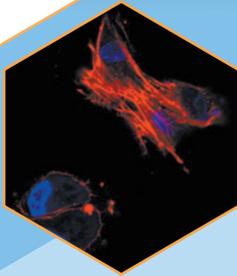
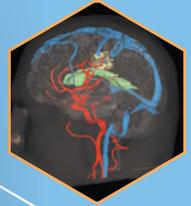
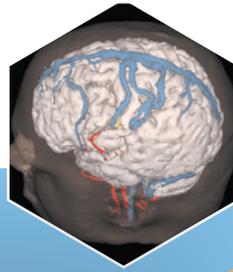
Green: alginate microspheres Red: MSCs



Biomolecular Engineering and Nanomedicine

Lab-on-a-chip biosensors, point-of-care devices, microfluidic manipulation and detection of biomolecules, bionanotechnology and delivery of diagnostic and therapeutic molecules



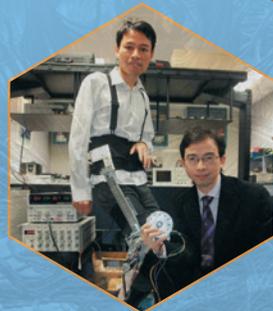


Medical Imaging and Informatics

Computer-aided diagnosis, functional magnetic resonance imaging, terahertz imaging and spectroscopy, biomedical optics, bioinformatics, health informatics, telemedicine

Medical Instrumentation and Biosensors

Wearable sensors and mobile health, home healthcare technology, surgical robotics, wireless capsule endoscopy, wearable robotics for rehabilitation





Hospital Training

Students are required to participate in a two-week summer training in the Prince of Wales Hospital. During the training, students can experience the daily operation, information flow and logistics in the running of a hospital. They will also learn about the fundamentals and the clinical use of medical instruments. The summer training provides a valuable chance for students to relate theory and engineering knowledge to practice in a real-world setting.



Students' Sharing

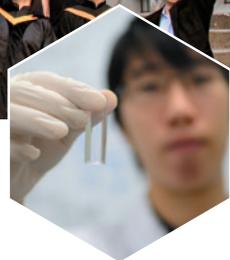
Cola HO (Class of 2014):

It was surely an unforgettable experience which urges me to think about the contributions of biomedical engineers to those who desperately need help.

Nico CHEN (Class of 2017):

The training was eye-opening and exposed us to multitudinous hospital equipment and facilities, granting us a real-time perception of the state-of-the-art technologies adopted by hospital personnel. We were invited to observe the machinery operation on patients with their consent, polishing our viewpoint on our role as biomedical engineers of the next generation.



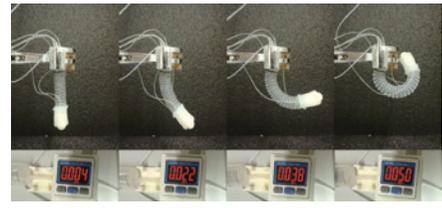
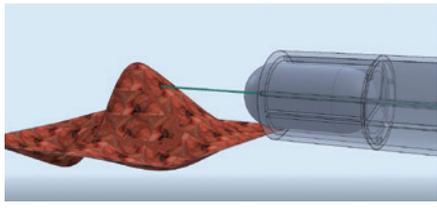
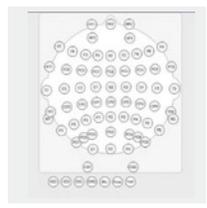
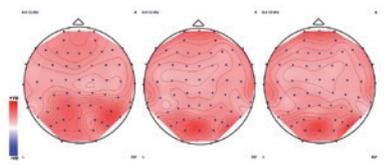


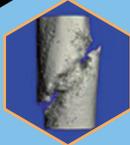
Graduation Project

Graduation projects are offered from both Faculty of Engineering and Faculty of Medicine. Recent project topics include:

Medical Instrumentation & Biosensors

- EEG brainwave system to analyze the effects of background music on college students
Supervised by Biomedical Engineering Programme, Year 2015-16
- Biomimetic soft crawling robot for GI tract inspection
Supervised by Department of Surgery, Year 2016-17





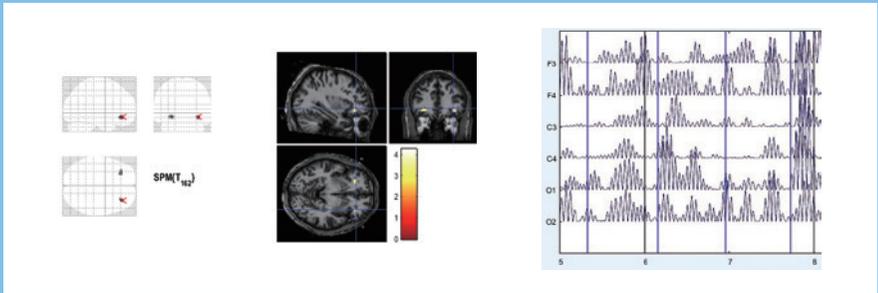
Biomedical Imaging, Informatics & Modeling



- Application of contrast agent to enhance the quality of computed tomography [CT] imaging for evaluating fracture healing
Supervised by Department of Orthopaedics and Traumatology, Year 2015-16

- Fusion of EEG and fMRI

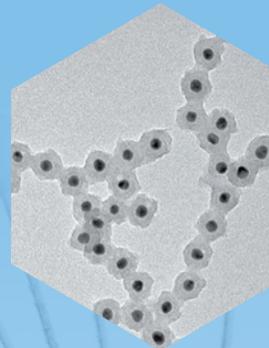
Supervised by Department of Medicine & Therapeutics, Year 2015-16



Molecular, Cell & Tissue Engineering



- Bioink Development for Organ Printing
Supervised by School of Biomedical Sciences, Year 2016-17



- Development of bionanomaterials for neuron targeting
Supervised by Biomedical Engineering Programme, Year 2016-17

Experiential Learning

Based on interests, students are encouraged and supported to participate in various experiential learning activities, such as academic exchanges, community services, early research exposures, international design competitions, study field trips, summer internships, work-study, etc. Examples are provided below.

Design Competitions

- iGEM, International Genetically Engineered Machine Competition at the Massachusetts Institute of Technology (MIT)
- Engineering Medical Innovation Global Competition in Taipei
- Hong Kong University Student Innovation and Entrepreneurship Competition

Local Summer Industrial Internships

- Academy of Science Shenzhen Institute of Advanced Technology
- Philips Electronics Hong Kong Ltd., etc.
- Hospitals such as the Hong Kong Adventist Hospital and Prince of Wales Hospital
- Hong Kong Government Electrical and Mechanical Services Department
- Hong Kong Productivity Council

Overseas Summer Research Internships

- Columbia University, USA
- Imperial College, UK
- Korea Institute of Science & Technology, Korea
- National University of Singapore, Singapore
- Northwestern University, USA
- University of California at Irvine, USA
- University of Toronto, Canada



Students' Sharing

Summer Overseas Research Internship at Musculoskeletal Research Center (MSRC), Department of Bioengineering, University of Pittsburgh
Bonnie LEUNG (Class of 2013)



I was so glad to be given an opportunity to gain research experience at the Musculoskeletal Research Center (MSRC). I learnt not only research skills, but also cooperation that a good researcher requires. During the summer internship, my project was to perform computational and in vitro tests on a magnesium-based suture anchor. My training as a problem solver at the MSRC provided me with a chance to further sharpen my analytical skills. Throughout my short stay at MSRC, I experienced what research is and learned what to do whenever I encounter setbacks in the research process.



International Genetically Engineered Machine Competition (iGEM)
Winnie SO (Class of 2013)

Joining iGEM is an amazing adventure in my university life. This competition is launched by the Massachusetts Institute of Technology (MIT) and requires teams to show their knowledge in biotechnology, innovation, teamwork and public outreach.

For half a year, students from both Life Science and Engineering cooperate with each other to finish a synthetic biology research project. It is my great pleasure to be one of the teammates of iGEM CUHK 2011. Several teammates and I also feel delighted to conduct further research on ChloriColight – development of a microbial desalination power plant in the Biomedical Engineering Laboratory after the competition. This iGEM experience has broadened my horizons and enriched my study life in CUHK.



Global Educational Exchange Program (GLOBEX)
at Peking University
Po Wen LO (Class of 2015)

GLOBEX constitutes an initiative for international and educational exchange between the College of Engineering at Peking University and engineering schools all around the world. Studying at Peking University with foreigners gave me countless opportunities. The course on Nanomaterials and Nanotechnology was in some way difficult for a freshman but I really enjoyed knowing things at the nanometer length scale and their special properties and applications.

The course on Orthopedic Biomechanics was really full of fun. I learned a lot of new and in-depth knowledge about mechanics and anatomy of bone during such days. I feel really grateful to join the Global Educational Exchange Program. Not only did I learn a lot of new knowledge, but I also made a lot of foreign friends.



Overseas Exchange

University provides overseas exchange opportunities to students to immerse in multi-cultural settings and to enrich their study life and personal experience. Many undergraduate students in Biomedical Engineering participate in overseas exchange programmes around the world. Recent examples include:

- Ewha Womans University, Korea
- Karlsruhe Institute of Technology, Germany
- KTH Royal Institute of Technology, Sweden
- Nanyang Technological University, Singapore
- National University of Singapore, Singapore
- Pompeu Fabra University, Spain
- San Diego State University, USA
- State University of New York at Stony Brook, USA
- University College London, UK
- University of Illinois at Urbana-Champaign, USA
- University of Ottawa, Canada
- University of Tennessee, USA
- University of Western Australia, Australia



Work-Study Programme

Students can choose to participate in “Work-Study Programme” upon completion of the third year of their major study. The Programme provides students an opportunity to apply engineering principles and methods from their studies to an authentic working environment. Students will continue their final year of study on campus afterwards. Partners include Hospital Authority, private hospitals, companies from the biomedical engineering industries. Recent examples include:

- Asia Satellite Telecommunications Co. Ltd
- ASM Technology Hong Kong Ltd.
- Automatic Manufacturing Ltd.
- Electrical and Mechanical Services Department, HKSAR Government
- Hong Kong Productivity Council
- The Hongkong and Shanghai Banking Corp. Ltd. (HSBC)
- ITE Smartcard Solutions Ltd.
- Medisen Ltd.
- Ove Arup & Partners Hong Kong Ltd.
- Paul C. Lauterbur Research Centre





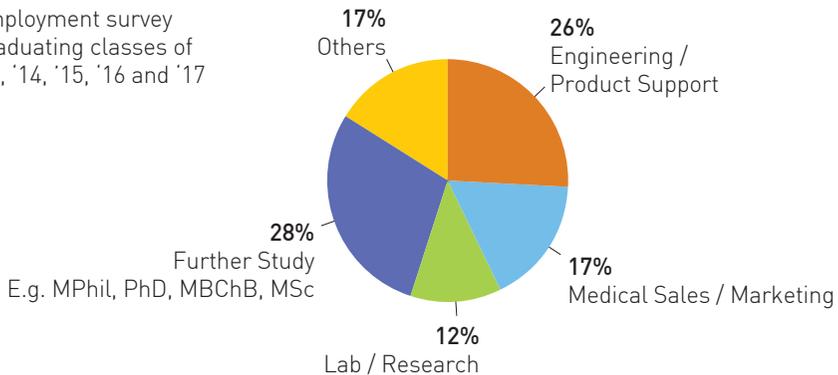
Career Opportunities

According to a long-range forecast of the U.S. Bureau of Labor, employment of biomedical engineers is expected to grow much faster than the average for all occupations. The aging population and the focus on health issues will increase the demand for better medical devices and equipment. The development of biomedical engineering is therefore a worldwide trend. Our graduates are pursuing the following career paths.

- Medical device distribution and technical sale
- Medical device manufacturing
- Consulting services for medical device industry
- Research and development
- Further studies both local and overseas. Most of them go deeper in a specific biomedical engineering area or other related areas in engineering or science. Some go for other complementary study, including business administration, medicine, and law.
- Our graduates are also sought by non-BME related companies, likely due to their interdisciplinary preparation and generic competence.

Employers include: AB Sciex, ArjoHuntleigh, ASM Pacific Technology, Electrical and Mechanical Services Department of HKSAR Government, Healthlink Holdings Limited, Hong Kong Adventist Hospital, Hong Kong Aircraft Engineering Company Ltd. (HAECO), Hong Kong Applied Science and Technology Research Institute (ASTRI), Hong Kong Productivity Council, Hong Kong and Shanghai Banking Corp. Ltd. (HSBC), Innotronik Hong Kong Ltd, Johnson & Johnson, Medisen (Sengital), Medtronic, Philips, Siemens (Healthcare sector), Transmedic, Ultronics Enterprise Limited

Employment survey
Graduating classes of
'13, '14, '15, '16 and '17



Franklin AU
(2018 BEng (Biomedical Engineering) graduate)
Student, MPhil in Imaging and Interventional Radiology,
CUHK



I am honored to be part of the family of CUHK BME. As an inter-disciplinary subject, BME offers us an excellent learning platform and abounding scientific research opportunities. Not only do we benefit from receiving forefront knowledge about the world of engineering and medicine, our horizon on cutting-edge biomedical technology also gets expanded.

My BME undergraduate experience has opened the doors for advancing my studies in medicine. As a Biomedical Engineer, I found myself well-prepared in a variety of medicine-related specialties including Interventional Radiology and Imaging - a topic which I have chosen for my further study.

Passionate professors in CUHK BME have inspired and nurtured my creativity for medical devices and related technologies. With their open assistance, I recently invented my first medical device for stroke rehabilitation. The device also helped me win the Golden Technopreneur Award 2017 organised by Hong Kong Science & Technology Park Corporation (HKSTPC).

The revolution is now upon us. "Explore, Innovate and Care" - the Motto of CUHK Biomedical Engineering - is the promise for this fast-changing industry. I feel grateful that Biomedical Engineering of CUHK has prepared me to become a highly-qualified professional in this booming sector. I look forward to contributing to this challenging industry in the future.



Jason LAU
(2014 BEng (Biomedical Engineering) graduate)
Biomedical Equipment Technician,
Hong Kong Adventist Hospital

My job is to maintain the medical devices in the hospital. Specifically, I am required to fully understand the operating principles of these biomedical equipment items so that I can trouble-shoot any on-site technical issues independently. From my undergraduate studies in biomedical engineering at CUHK, I have well understood the principles of different medical devices such as MRI, CT scanner, pulse oximeter, and infusion pump.

As a technician, I am also responsible on procurement, sorting out the merits of medical devices from different brands to determine the best suited ones use in the hospital. As I learned about the regulations of medical devices at CUHK, I was well equipped for the task of procurement before I officially started my current position at the hospital.

Tracy WONG
(2014 BEng (Biomedical Engineering) graduate)
Student, Bachelor of Medicine and Bachelor of Surgery
(MBChB), CUHK



Being a final year medical student, the memories of studying in Biomedical Engineering is still fresh in my mind. Medicine and Biomedical Engineering are very different yet closely related disciplines where Biomedical Engineering does play a significant role in medical research. I am grateful to have been awarded the 2017 Innovation and Technology Scholarship Award, which provided me invaluable opportunities for participating in research and clinical attachments. In 2017, I took part in a one-month research attachment, under the supervision of Prof. Yang Guang Zhong, at Hamlyn Center of Imperial College London in UK. In the same year, I also participated in a six-week pediatrics research and clinical attachment, under the supervision of Prof. Rosemary Horne, in Monash Children Hospital in Australia. During those attachments, I was able make full use of the skills acquired in Biomedical Engineering for solving medical research problems.

In the future, I wish to be a clinician engineer. I hope to be an effective communicator between doctors and engineers, while integrating knowledge of the two disciplines to develop products or systems which would benefit the patients.



Sam SHUM

(2017 BEng (Biomedical Engineering) graduate)

Assistant Engineer, Electrical and Mechanical Services
Department, HKSAR Government

Population expansion and the prevalence of aging have accelerated the growth of healthcare services. To support the delivery of medical and clinical services, BMEngineers play a significant role in the discipline of medical devices by bringing constant improvements in safety, efficacy, and quality. CUHK BME has equipped graduates with a solid foundation in engineering and medical sciences. Examples of which include electronic design, hands-on practice in circuitry, in-depth understanding of physio- and medical phenomena. Topics related to regulatory affairs have ensured that students are well aware of the importance of market requirements concerning quality and risk management. The exposure to clinical environment and making contact with industry professionals also help students explore their potential and career prospects in various fields of BME.

Carmen SIN

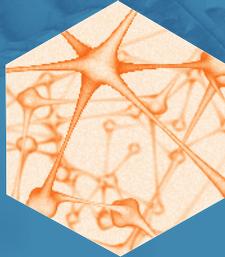
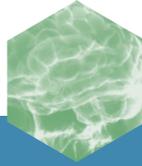
(2017 BEng (Biomedical Engineering) graduate)

Assistant Engineer, Electrical and Mechanical Services
Department, HKSAR Government



In this day and age, the awareness of the safety, efficacy, and quality of medical devices in Hong Kong is always increasing. This in turn has given rise to a need for new legislation concerning medical devices, and therefore more opportunities for the likes of me and others studying BME. The BME programme educates students on a variety of theoretical concepts concerning engineering, biology and medical sciences. This, coupled with the practical skills gained in courses such as Global Regulatory Affairs and exposure to a clinical environment, has led me to a career as a biomedical engineer, acting as a middle man between both medical and engineering experts.

Explore Innovate, Care



Location: Department of Biomedical Engineering,
The Chinese University of Hong Kong, Shatin, N.T., Hong Kong

Phone number: 852 3943 1935

Webpage: <http://www.bme.cuhk.edu.hk>

Email: bmeinfo@cuhk.edu.hk

Facebook: <http://www.facebook.com/CuhkBiomedicalEngineering>

