Musculoskeletal Regenerative Medicine & Stem Cell Research Programme

The ultimate goal of the Stem Cell Research Programme is to provide effective solutions for tissue repair/regeneration with adult or foetal mesenchymal stem cells (MSCs) or MSCs derived factors. Our understanding of the biological roles of MSCs in various musculoskeletal problems is founded on basic research in fracture, distraction osteogenesis, osteoarthritis and tendon injury, as well as the underlying molecular mechanisms. This research also provides a foundation for exploring the therapeutic potential of MSCs and their derived factors. In recent years, we conducted two clinical studies that testify to the safety and efficacy of MSCs therapy for wrist chondral defect and knee osteoarthritis. A total of 19 cases have been finished without any adverse effects reported, and we expect to complete our one year follow-up assessments soon.

The experience we have gained through this clinical research has led to collaborations with industrial partners for developing cellular therapy in Hong Kong. In addition to the scientific research we carry out, we organise the annual CUHK International Symposium on Stem Cell Biology and Regenerative Medicine in Hong Kong, with many invited speakers from overseas, and host the Croucher Summer Course on Stem Cell Biology to encourage local-overseas collaborations and to nurture young local researchers.

Gang LI | gangli@cuhk.edu.hk

Sports Medicine and Regenerative Technology (SMART)

This team is focused on the prevention and treatment of sports injuries. Our research areas include rotator cuff tendinopathy, anterior cruciate ligaments (ACL) rehabilitation, bone tendon junction healing, and cartilage regeneration. Apart from the clinical and applied research we undertake in the management of sport injuries, we perform translational research on tendons, ACL and cartilage regeneration. The team has also taken the lead in promoting sports medicine in the community by providing CUHK sports clinics for university teams, field support for Hong Kong teams participating in large sporting events, and health promotion campaigns such as the SMART fun day, and injury prevention workshops (Active School).

Patrick Shu Hang YUNG | patrickyung@cuhk.edu.hk
Ling QIN | lingqin@cuhk.edu.hk

香港中文大學
The Chinese University of Hong Kong

www.med.cuhk.edu.hk

香港中文大學醫學院
Faculty of Medicine
The Chinese University of Hong Kong

Orthopaedics and Traumatology

The Orthopaedics and Traumatology Department was established in 1982 with a clear mission and vision: "To provide the highest quality patient care, research, education and teaching for medical students and postgraduates." Our staff have made many well-recognised achievements, locally and internationally, professionally and academically, in all major orthopaedic clinical subspecialties. These include hand and microsurgery, sports medicine, traumatology, paediatric orthopaedics, orthopaedic oncology, spinal disorders, orthopaedic rehabilitation, joint reconstruction surgery and the latest in foot and ankle surgery.

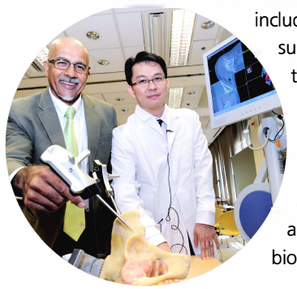
Since its establishment, the Department has steadily expanded to include relevant areas of basic and applied research through six strategic programmes and implemented functionalisation in research management. Active cross-disciplinary collaborations with other departments, universities and research institutions locally, regionally, and internationally have contributed to our development and the achievements we have made in our focused areas of research.

DEPARTMENT OF ORTHOPAEDICS AND TRAUMATOLOGY

"Our mission is to advance and provide the highest quality of patient care, research, education and training for medical undergraduates and postgraduates. Our staff are recognised professionally and academically, locally, regionally and internationally, in orthopaedics and related fields of musculoskeletal medicine and science."

Patrick Shu Hang YUNG
Chairman

Computer-Assisted Orthopaedic Surgery and Navigation Surgery Programme



Our research team is focused on the research and development of computer-assisted orthopaedic surgery, including computer-assisted trauma surgery, computer-assisted spinal surgery, and computer-assisted tumour surgery (CATS). All of these advanced technologies play a role in enhancing the quality of clinical services to orthopaedic patients.

With the advent of 3D printing technology, the team has established a computer-aided surgical modelling (CASM) laboratory, with the aim of providing personalised surgical models, surgical instrumentation and even prostheses to meet patients' surgical needs. The improved surgical accuracy and operative efficacy of this technology could translate into better clinical outcomes for patients. In addition to these applications, our state-of-art facilities have been used for teaching medical and biomedical engineering students at the undergraduate and postgraduate level.

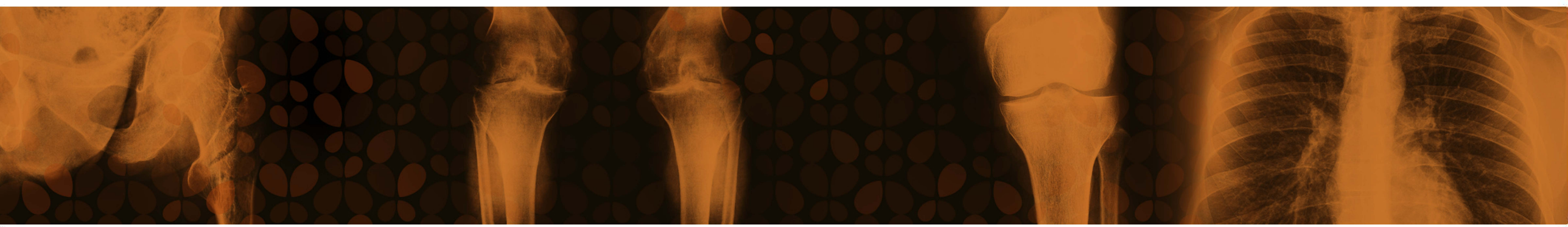
Shekhar Madhukar KUMTA | kumta@cuhk.edu.hk
Kwok Chuen WONG | skcwong@ort.cuhk.edu.hk

Innovative Orthopaedic Biomaterial and Drug Translational Research Programme

Musculoskeletal problems such as osteoporosis and osteonecrosis impose huge socioeconomic burdens on patients, their families, and the healthcare system. Our research is concerned with the development of orthopaedic biomaterials, medical implants, and medicines for treating these diseases. By integrating expertise from other disciplines, including medical science, life science, material science, imaging technology, and biomechanics, we hope to identify potential solutions for these clinical problems and transform our research into medical products that will benefit patients. Feedback from patients and clinicians will also help to refine our research and improve the quality of future products. Our research interests include (1) osteopromotive agents for the treatment of osteoporosis and osteonecrosis, (2) innovative bioactive scaffolds, and (3) biodegradable magnesium and its alloys as orthopaedic implants. To enhance our research on biodegradable implants, our team has established a joint laboratory with the Institute of Metal Research in the Chinese Academy of Sciences, with funding support from the Croucher Foundation.

Our team has published numerous papers in high impact journals, including Nature Medicine and Biomaterials. We have also received awards for our innovative orthopaedic implants at various international exhibitions.

Ling QIN | lingqin@cuhk.edu.hk
Ning TANG | ntang@ort.cuhk.edu.hk
Dick Ho Kiu CHOW | dickchow@cuhk.edu.hk



Adolescent Idiopathic Scoliosis (AIS) and Bone Health Research Programme

In line with its strategic direction, the Department's AIS programme carries out multidisciplinary and cross-institute research collaborations through the Joint Scoliosis Research Centre of CUHK-Nanjing University and the SH Ho Scoliosis Research Laboratory. Close collaboration in the form of joint projects, research grants and publications, and PhD training has been established with key investigators from Melbourne University, Texas Baylor College, Columbia University and ETH Zurich.

With increasing global awareness of vitamin D deficiency and the high prevalence of Adolescent Idiopathic Scoliosis in our young population, adolescent bone health and scoliosis remain a focus of the basic science and clinical research we carry out and the services we offer. Among our initiatives, we provided educational talks on vitamin D and children's bone health to over 25,000 local primary and secondary students. We also established a new, simplified Thumb Ossification Composite Index (TOCI) system for assessing skeletal maturity and peak height velocity in AIS and initiated many clinical and RCT projects in AIS. Through our extensive and multidisciplinary research activities, we hope to provide insights in the development of novel prognostic biomarkers and therapeutic strategies for preventing the occurrence or progression of the scoliosis deformity by targeting the bone cells and bone mineralisation pathway in AIS through timely non-invasive intervention.

Jack Chun Yiu CHENG | jackcheng@cuhk.edu.hk
Tsz Ping LAM | tplam@cuhk.edu.hk
Wayne Yuk Wai LEE | waynelee@cuhk.edu.hk

Musculoskeletal Aging Research Programme

Geriatric fracture is the most serious orthopaedic problem that has emerged in our ageing society. Through the research performed by our team, we are attempting to understand and solve geriatric musculoskeletal problems from many different perspectives, with the goal of preventing or improving these problems in the community.

Our basic science research covers sarcopenia, osteoporotic fracture healing, biophysical interventions (particularly vibration treatment), and related mechanical stimulation, using our well-established animal models of sarcopenia and osteoporotic metaphyseal fracture. The clinical and translational research we conduct involves fragility fracture registry, personalised orthopaedic prostheses and implants, and a community fall prevention campaign. Our team also regularly organises educational talks for the elderly on fall prevention.

Louis Wing Hoi CHEUNG | louischeung@cuhk.edu.hk
Simon Kwoon Ho CHOW | skhchow@ort.cuhk.edu.hk
Ning TANG | ntang@ort.cuhk.edu.hk