

# REDEFINING MUSCULOSKELETAL SCIENCES



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INSIGHTS FROM  
LEADING EDUCATORS IN  
SINGHEALTH DUKE-NUS  
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# CHAIRMAN'S NOTE

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It has been four years since the launch of the Musculoskeletal Sciences Academic Clinical Programme (MSKSC ACP) in July 2016. As a pivotal member of the surgical fraternity within SingHealth, MSKSC ACP aims to build upon the foundation already laid by Surgery ACP. The ACP strives to promote advances for the musculoskeletal specialties, namely the disciplines of Orthopaedic Surgery, Plastic, Reconstructive & Aesthetic Surgery and Hand & Reconstructive Microsurgery.

MSKSC ACP consistently aspires to achieve excellence in clinical outcomes and in delivering integrated clinical care for musculoskeletal patients. This is coupled with the pursuit of our academic mission, which entails providing a holistic education for surgical trainees as well as developing a strong team of clinician researchers to drive medical innovation in the field of musculoskeletal sciences.

We are proud to have many dedicated clinicians and staff making outstanding contributions to academic medicine. It serves to open up broader pathways for all to redefine their roles in institutional practice. The recent establishment of the Faculty Affairs and Academic Development pillar under the ACP is key to nurturing and deepening the commitments of clinicians in these areas of academic medicine. It allows for greater recognition of their contributions beyond the traditional clinical domains.

At SingHealth, patients are at the core of what we do, and undergirding this commitment is a strong emphasis on innovation to advance patient care. In keeping with the spike in innovation over the last seventy years with discoveries like robotics, digital health, sensors, wearable technology and more pushing the frontiers of modern medicine, MSKSC ACP is also looking to drive innovation in the musculoskeletal sciences with the recent establishment of 'Innovation' as one of the arms under its Strategic Initiatives pillar.

In this inaugural issue, we highlight some of the meaningful work and achievements of our clinicians, researchers, and educators whose contributions will undoubtedly go a long way in the progression of musculoskeletal sciences at SingHealth.



Associate Professor Tan Mann Hong  
Chairman, Musculoskeletal Sciences Academic  
Clinical Programme



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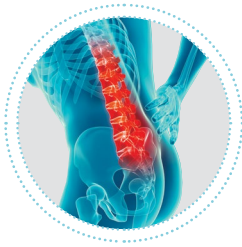


# INTRODUCTION

The SingHealth Duke-NUS Musculoskeletal Sciences (MSKSC) Academic Clinical Programme (ACP) was founded in 2016 to explore collaborative academic medicine initiatives. We aim to advance the three pillars of musculoskeletal sciences: Clinical Care, Research, and Education.

## Who We Are

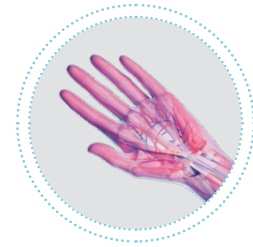
### Three Clinical Specialties



**Orthopaedic Surgery** with clinicians from the Orthopaedic Surgery Departments of Singapore General Hospital (SGH), KK Women's and Children's Hospital (KKH), Sengkang General Hospital (SKH), and Changi General Hospital (CGH)



**Plastic, Reconstructive and Aesthetic Surgery** with specialists from the Plastic Surgery Departments of SGH and KKH



**Hand Surgery** which includes clinicians from SGH's Department of Hand & Reconstructive Microsurgery, and KKH's Hand Surgery Unit (subsumed under its Orthopaedics Department)

We strive to promote advances for the musculoskeletal specialties in the surgical community, achieve continual improvements in clinical outcomes and integrated clinical care for musculoskeletal patients through:

- ▶ Providing a holistic education for surgical trainees and clinicians.
- ▶ Developing a strong team of clinician researchers to drive medical innovation.

As our dedicated clinicians and staff make outstanding contributions to the musculoskeletal field, they pave broader pathways for those with a keen interest in education and research to nurture and deepen these commitments.

SingHealth Duke-NUS' MSKSC ACP is redefining roles in institutional practice by:

- ▶ Advancing Clinical Care through patient-centric approaches and new perspectives
- ▶ Bringing about Transformation with new research and innovation
- ▶ Making the Difference by Inspiring Others

# ADVANCING CLINICAL CARE

▼  
Patient-centric  
approaches defining  
clinical care in  
SingHealth Duke-NUS  
MSKSC ACP

# BEYOND DUTY: JOURNEYING WITH A COMMON CAUSE

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**D**r Henry Soeharno reflects on his career in the Orthopaedic Tumour Surgery sub-specialty as a purposeful personal journey made possible by multiple stakeholders across disciplines and backgrounds.

A consultant with Singapore General Hospital (SGH)'s Department of Orthopaedic Surgery, Dr Henry Soeharno is one of the few Orthopaedic Tumour Surgeons in Singapore.

"I mainly deal with adult musculoskeletal tumours in my practice, which include both benign and malignant tumours of the musculoskeletal system," says Dr Soeharno. His work also includes working with patients with metastatic bone disease, which are cases where patients have other primary cancers that have spread to the bone.

Dr Soeharno believes that the high complexity and steep learning curve associated with tumour surgery are factors which cause trainees to shy away from choosing orthopaedic tumour surgery as a sub-specialty, though these challenges did not faze him from his choice.

Speaking candidly, he shares the strong sense of purpose that he felt in choosing the field as his sub-specialty: "The number of patients with metastatic bone disease has been on the rise in the past decade or so, ostensibly because of longer lifespans from better, modern cancer treatment, and better diagnostic modalities. As a trainee registrar, I observed that there were insufficient Orthopaedic Tumour surgeons both in SingHealth and the nation, and I felt the need to fill the gap for such an essential service."

Following his heart and contributing to a greater culture of a patient-focused, common good in SingHealth, Dr Soeharno most enjoys working in the multidisciplinary teams that tumour surgery calls for.

"From medical and radiation oncologists, to pathologists and palliative medicine experts, being able to interact and work together as one across disciplines feels truly rewarding, because we are all focused on a common cause," he enthuses. "Yes, working with patients with sarcoma can be rather stressful, especially when things don't go so well," Dr Soeharno says. "It is a challenge I still struggle with to this day. But the feeling when we can help clear someone of the disease—the satisfaction, joy, purpose and more—is truly indescribable," he says, affirmatively.

With an approach rooted in empathy, Dr Soeharno is part of a workforce fostering a stronger culture of caring in MSKSC ACP. "I try to treat patients as if they were my own family members," he tells us. "This means being approachable, honest, and a good listener, because my personal belief is that patients want someone who is empathetic, who engages them throughout the diagnostic process, pre-op planning and after care," he says.

Like his calling to the field, Dr Soeharno regards his relationship with patients as a long-term commitment, a journey with multiple stakeholders headed in a common direction. "I always tell my patients with sarcoma that our relationship is a joint partnership. It is my duty to see them for many years to come, to ensure that they remain cancer-free, and a journey that we will go through together," he says with firm conviction.

Recent advancements in his sub-specialty's field have also bolstered Dr Soeharno's hope and optimism for the future: "The availability of 3D printing offers tumour surgery highly customised and precise implants required to replace diseased bone in surgery. The new introduction of computer navigation to our sub-specialty will also greatly improve accuracy and planning in tumour surgery especially in areas with complex anatomical geometry such as the pelvis, which typically pose significant challenges in tumour resection."

Dr Soeharno believes that continued efforts in research and application of new technology will not only mean greater success and efficacy in treating Sarcoma and orthopaedic-related cancers, but also draw trainees to the field. "I've seen an increasing number of trainees expressing their interest in tumour surgery in recent years, and hopefully that means we will have more tumour surgeons serving the country in the near future," he adds, with a smile.



// It is a challenge I still struggle with to this day. But the feeling when we can help clear someone of the disease — the satisfaction, joy, purpose and more — is truly indescribable //

**Dr Henry Soeharno**

*Consultant  
Orthopaedic Surgery  
Singapore General Hospital*

# CLINICAL SERVICES

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REDEFINING MUSCULOSKELETAL SCIENCES | ADVANCING CLINICAL CARE

The Clinical Services arm of MSKSC ACP strives to enhance the patients' clinical experience by introducing initiatives that are innovative, patient-centric and specialised. Wherever possible, our clinical initiatives tap on the usage of technology for ease of accessibility. We also aim to raise patient awareness and educate them so as to improve their post-surgery quality of life.

## ORTHOPAEDIC SPORTS & JOINT CENTRE (OSJC) @ OUTRAM COMMUNITY HOSPITAL

Over the years, the department has grown and expanded its services to serve both local and regional patients. The outpatient workload for SGH Orthopaedic Surgery is the highest among all the restructured hospitals, with the Adult Reconstruction and Sports Medicine sub-specialties accounting for approximately half the entire workload.

The department embarked on the development of the Orthopaedic Sports and Joint Centre (OSJC) at Level 4 of Outram Community Hospital (OCH) in order to meet the growing demand, and maintain the department's competitive edge. It is a one-stop centre focused on those with sports injuries or joint conditions, and caters to both private and subsidised patients.

The OSJC brings together a team of practitioners for a wider spectrum of team-based treatment options and is supported by complementary services such as Diagnostic Radiology and Physiotherapy. Patient care is enhanced through coordinated workflows, joint consultation, and timely access for informed decision-making at a central location.

For more information: <https://www.sgh.com.sg/patient-care/specialties-services/orthopaedic-sports-and-joint-centre>

## ORTHOPAEDIC DIAGNOSTIC CENTRE (ODC)

The SGH Orthopaedic Diagnostic Centre (ODC) serves as an assessment and education centre for orthopaedic surgical patients. The team of specialised staff conducts pre- and post-operative functional assessments of the patients, as an independent objective evaluation of the patients' functional progress and ability to return to daily function. Pre-operative education is also conducted to mentally prepare orthopaedic patients for surgery and the rehabilitation process.

ODC believes in measuring outcomes that matter most to our patients to better understand how to improve their quality of life. ODC is possibly the only dedicated centre in Asia that monitors surgical outcomes, and systematically records the clinical performance and function of patients following surgery. The information collected in ODC has been undoubtedly useful for improvement in clinical care, research and development.

ODC has successfully established the following Clinical Outcomes Registries for Orthopaedics:

- 2007 - Foot and Ankle Surgery Clinical Outcomes Registry
- 2010 - Shoulder Surgery Clinical Outcomes Registry
- 2011 - Hip Fracture Fixation Clinical Outcomes Registry
- 2016 - Musculoskeletal Tumour Outcomes Registry
- 2019 - Knee Osteotomy Outcomes Registry



## BURNS CENTRE

The Burns Centre is the only specialised facility managing major burn injuries in Southeast Asia, committed to providing the best medical therapy to patients. The Burns Centre is run by a dedicated team of health care providers including doctors, nurses, physiotherapists, occupational therapists, nutritionists, medical social workers and other ancillary staff. Together, they look after burn patients from the point of injury to their post-hospital rehabilitative period.

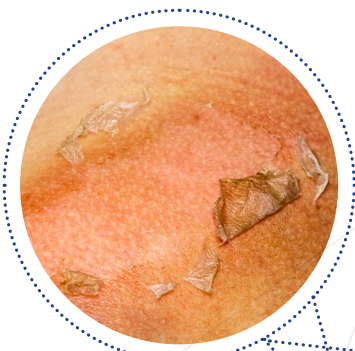
Department of Plastic, Reconstructive & Aesthetic Surgery's Burns Centre stood up to multiple challenges in its early days, such as the Spyros Greek oil tanker explosion incident in 1978, one of the worst mass casualty disasters in the history of Singapore, and Megan Loy's burn incident after the waterpark blast in Taipei back in 2015. Since then, it has continued to strengthen its position as a premier centre for burns management and surgery.

For more information: <https://www.sgh.com.sg/patient-care/specialties-services/burns-centre>

## SKIN BANK UNIT (SBU)

The Skin Bank Unit is located within the National Burns Centre and run by SGH's Department of Plastic, Reconstructive and Aesthetic Surgery for the recovery, preparation, preservation and distribution of donated skin. SBU's main objective is to provide a ready source of donor skin allografts to treat severe burns patients in Singapore.

SBU serves as a "national" bank providing skin allografts for the treatment of severe burns in Singapore and within the Southeast Asia region. There has been an increasing need for skin allografts for treatment of severe burns, particularly in times of mass disasters.



# AT THE HEART OF PATIENT-CENTRED SERVICE

**K**aren Zhang Ting is the Assistant Manager at Singapore General Hospital (SGH)'s Orthopaedic Diagnostic Centre (ODC).

With several outpatient clinics located around Singapore, the ODC's work in tracking clinical outcome measurements has lent critical insight and valuable information for MSKSC ACP, and advanced Singapore's orthopaedic practice in many international and regional papers with demonstrated excellent patient outcomes.

We speak with Karen to learn more about the important work she does with ODC and learn what drives her through the challenges of work that is changing the field.

***Tell us more about the ODC; what are its aims and objectives?***

The ODC is part of SGH's high-volume orthopaedic department, which sees up to a quarter of all orthopaedic patients in Singapore. This amounts to around 126,000 patients and 8,000 surgeries annually.

As an adjunct to the Orthopaedic Surgery department, we focus on monitoring clinical outcomes of patients who are undergoing surgery, utilising both physical or performance-based measures that are benchmarked against internationally published data from leading orthopaedic centres in the world, and patient-reported outcome measures. The outcome measures aim to chart functional progress of the patients and assist surgeons in their clinical practice.

***How does the information collected by ODC benefit both patients and clinicians?***

Outcomes for the selected orthopaedic surgeries monitored by ODC are presented in a progress chart and structured report. This helps both patients and clinicians understand a patient's recovery or progress at a glance.

***What is a day at the ODC like?***

A day in ODC involves staff going to different locations to both assess patients pre-surgery and ensure that post-surgery patients are assessed before doctor's consultation. Post-surgery patients who do not turn up for their follow-ups are also being contacted.

***As a pioneering patient-centred service, what are key objectives in your work?***

Our work at the ODC helps to manage patients' expectations at different milestones pre- and post-surgery. We do this by educating them on their condition and progress during assessment sessions.

One challenge is in completing our assessments accurately and professionally, in the shortest time possible. ODC is often the last station in a patient's pre-op journey, and many are often in pain, and exhausted from the station-to-station transfers. Some vent their frustrations on us, and there have been rare occasions where patients raise their voices and turn violent on our staff.

***Who or what is your best motivation at work?***

The most enjoyable aspect of my work is being able to see patients progress well and knowing how the surgery has given them a new lease in life.

***What are your particular responsibilities as Assistant Manager?***

My role mainly involves ensuring that ODC's daily operations continue smoothly, while the other staff of ODC perform the important task of conducting outcome assessments of patients at both pre- and post-surgery stages.

I have been incharge of recruiting new ODC technicians since 2013, training and auditing them on all the required clinical outcomes assessments for various orthopaedic conditions. Besides planning and

executing smooth patient journeys through relocation, and migrating the cluster's electronic medical records across systems, I also help mitigate issues brought up by the recent hospital-wide manpower and recruitment freeze.

***What are recent challenges that you face in the line of duty?***

The past year has been rather eventful, with the manpower and recruitment freeze.

The Physiotherapy department was suddenly unable to support ODC's buying of a full-time employee due to right-sizing, which meant we had no alternative but to reduce our operational locations from three to two, in order to prevent staff burnout. This closure of our satellite at Camden Medical Centre was sudden and ahead of plans to relocate orthopedic clinics operating there by the 4th quarter of 2019. I needed to manage manpower in the department by putting up appeals to the Manpower Panel Review (MPPR) for hiring vacated ODC technician posts.

ODC was also a new addition to the Outpatient 1-Queue system which issues a unique queue number to every patient. Relocating from Block 2 to Block 3 at SGH meant ensuring that smooth patient journeys continued across the board. I worked closely with colleagues at the Pre-Admission Centre, calling every patient by phone, and following up with SMS or mailers. I chose to handle this task personally to minimise and prevent miscommunication and interruption to colleagues working on the ground, especially those who were still operating at the Camden Medical Centre.

***Moving forward, what is your vision for the ODC in the future?***

My vision is for ODC to be the region's premier Centre for tracking of clinical outcomes for musculoskeletal patients.

**Ms Karen Zhang Ting**

*Assistant Manager  
Orthopaedic Diagnostic Centre  
Singapore General Hospital*



# REACHING OUT FOR A GREATER GOOD

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REDEFINING MUSCULOSKELETAL SCIENCES | ADVANCING CLINICAL CARE

**We speak with Dr Chew Khong Yik, a consultant at the Department of Plastic, Reconstructive & Aesthetic Surgery at SGH, to learn how collaboration and sharing across fields and even national borders can bring about exponential good.**

## ***What are some of your clinical achievements?***

I am fortunate to have fulfilled my HDMP fellowship training in reconstructive microsurgery, especially cancer reconstruction, in 2012 to 2013.

The fellowship training was at the prestigious Chang Gung Memorial Hospital which allowed me to participate in liver transplant surgery, and be involved in Taiwan's first ever hand transplant, under Professor Yur-Ren Kuo.

## ***How have you applied this learning to the Singapore context?***

This knowledge enabled me to help establish the SingHealth Duke-NUS Disease Centres in Head and Neck Cancer, and Liver Transplant. We have achieved many firsts in Singapore since 2013, including the continued improvement to outcomes of liver transplants at SGH.

Participating in inter-disciplinary collaboration also inspired me to engage in multiple cross-institution and cross-disciplinary work with both Changi General Hospital and KK Women's and Children's Hospital—especially in enabling complex reconstructive surgeries.

For example, we performed the first combined orthognathic and reconstructive 3D-guided microsurgical reconstruction in a paediatric cancer patient in 2016. This was the result of collaboration between the Cleft and Craniofacial Centre in KK Hospital, the National Dental Centre, as well as the Otolaryngology department from Singapore General Hospital.

## ***What collaborative efforts are you especially proud of?***

Saving patients with severe and major burns through the collaborative efforts of medical, nursing, and allied health teams, plus our skin culture laboratory. This culminated in the successful treatment and rehabilitation of Ms Megan Loy in 2016.

A young victim with 80% third-degree flame burns, our combined efforts and advanced techniques in scar treatment were able to help her get back on her feet. Megan's case brought much interest to burn injuries and inspires us to do better in burns care—Associate Professor Tan Bien Keem who was key in the efforts to save Megan, had been instrumental in setting up the Scar and Laser Centre at SGH to treat severe intractable keloid scars.

## ***You have significant involvement in humanitarian outreach programmes. How did you get started?***

My involvement in humanitarian outreach work started with volunteer work in free clinics locally, beginning with Tzu Chi Foundation, a religious non-profit humanitarian medical group. I subsequently became interested in further humanitarian work overseas and many other organisations.

## ***Can you share more about your overseas humanitarian missions?***

In the last 8 years, I have been involved with Hainan Smile, the brainchild of Professor Lee Seng Teik and Mr Richard Cheng, a philanthropist and volunteer. Hainan Smile treats cleft lip and cleft palate patients in China's Hainan province, and since we began 8 years ago, we have been able to treat underprivileged children with cleft lip and palate issues at birth.

## ***How do you manage continual care for these patients throughout their growth?***

Our team usually returns to see these patients twice in a year, and the multi-disciplinary approach of our core group of volunteers means we have been able to continuously provide the full range of surgical, medical, dental and orthodontic care, plus speech rehabilitation therapy needed to address the complexities of cleft lip and cleft palate care.

## Dr Chew Khong Yik

Consultant  
Plastic, Reconstructive &  
Aesthetic Surgery  
Singapore General  
Hospital



Unfortunately, the COVID-19 crisis has cast a big cloud over future medical missions and my heart goes out to the innumerable patients who need help.

***How have these experiences enriched your understanding of your clinical work and personal life?***

Volunteering for humanitarian medical missions is immensely humbling. Basic medical and surgical care can be sorely lacking for our brethren in developing

countries around the region. It makes me appreciate the relatively vast healthcare resources that we have at our disposal, and there is a great sense of gratitude when I return to Singapore to see that we are blessed with world-class, affordable medical and surgical care that many may take for granted.

It has thus been a great privilege to be able to provide my surgical expertise for those who otherwise might not receive such help. I am also able to pay forward the kindness of my teachers who showed me the ropes, and though we expect nothing in return, seeing the gratitude in the faces of our patients or their parents has been an incomparable reward.

***How can we encourage more clinicians to take up humanitarian work?***

As with all things, charity begins at home. We should inspire younger clinicians to volunteer their time locally to give them a taste of the benefits of volunteerism.

For one, volunteering to help foreign workers with their medical needs during the COVID-19 crisis has been an enriching experience. These workers endure much anxiety in their career, finances, and separation from loved ones. Many also suffer from chronic medical conditions that would never have received attention without volunteers in the dormitories and quarantine facilities, and I have witnessed immense gratitude from them.

***What is something you would say to encourage greater volunteerism among clinicians?***

We must remember that being able to help our fellow human beings is a privilege and the basic principle of the Hippocratic Oath.

Most of us who join the medical, nursing or allied health profession start with a desire to connect, empathise with and care for our fellow human beings who may be in less-than-fortunate situations. Volunteering means keeping alive the hope of seeing the world become a better place, and our pleasure derives from being able to bring about positive change.

# WORKING WELL, WORKING RIGHT

Recalled midway through his fellowship training at Tulane University in New Orleans, Dr Puah Ken Lee had just days to pack and catch the last direct flight back to Singapore amid the COVID-19 lockdown happening across America.

Unfazed, Dr Puah hit the ground running by leaping right into leading COVID-19 emergency operations for dormitory clusters, after serving his two weeks Stay-Home Notice on home soil.

We speak with the consultant at SGH's Department of Orthopaedic Surgery and learn about how agile preparedness and dynamic cross-functional cooperation are critical to the future of Singapore's healthcare system.

**You were extensively involved in SingHealth's COVID-19 operations. Can you tell us about your role?**

I was SingHealth Dorm Ops Cell's Deputy Lead at the S11 dormitory, Singapore's biggest coronavirus cluster. My role involved syncing SingHealth's Mobile Medical Team deployed at S11 with the bigger multi-agency Joint Task Force mission.

This involved interpreting and coordinating the execution of orders between our Mobile Medical Team, The Singapore Police Force (SPF)'s FAST team, and the dormitory operator, while prioritising the safety and welfare of our team on the ground as we put in our best effort to provide medical support to the residents of the foreign worker dormitories.

**Did your background and training help?**

My training as an orthopaedic surgeon with SingHealth's Orthopaedic Surgery Residency programme helped, since we already work as small group leaders in a multidisciplinary environment.

This, plus leadership training from the Singapore Chief Residency Programme, and my NS training as a Mobile Surgical team leader came in handy because our S11 mobile medical team comprised of nursing staff and doctors from a wide range of specialties and backgrounds, as well as diverse medical professionals such as patient service assistants, physiotherapists, medical social workers, pharmacists, pharmacist technicians, an optometrist, plaster technician, student and even a full-time research scientist!



**Dr Puah Ken Lee**

Consultant  
Orthopaedic Surgery  
Singapore General Hospital

***How was it like working as an ad-hoc team in a crisis situation?***

I was most impressed with the resilience and ingenuity of our team on the ground, representing all aspects of SingHealth.

We had a strong, independent, and adaptable nursing and admin team that kept things together in a dynamic environment, and we quickly adapted to difficult conditions, outside of our comfort zones with a 'can-do' attitude.

Their can-do attitude was exemplified in how they performed both swab and serology operations while also running a medical post, and when they pitched in to carry a refrigerator up one storey when we shifted rest areas.

***Were there memorable moments from working on the COVID-19 operations?***

Despite the heat and humidity we felt wearing Personal Protective Equipment (PPE) outdoors, there were many moments that kept our team morale high.

For instance, our medical team made a gift of 110 large cakes and 75 cartons of canned drinks for the 1309 residents in the isolation blocks to celebrate Hari Raya while under isolation. The dormitory and SPF-led FAST teams also organised a parade on the day these workers were allowed out of their isolation blocks, and our medical team lined the path to cheer them on.

News like hearing the first batch of workers returning to work were small victories that we celebrated, and seeing the visual impact of our hard work bearing fruit helped us to push on.

***What has been your greatest takeaway in responding to the COVID-19 pandemic?***

The worldwide shortage of COVID-19 test kits and PPE hammered home the point that we need to be prepared for the unexpected, as a healthcare system.

At the expense of efficiency and economy, a built-in reserve and peacetime surge capability have to be factored into our future healthcare system projections, and the planning for our New SGH Campus.

***We understand you wear a few hats as a clinician. Could you share about the key administration portfolios you are holding?***

I'm currently a member of the New SGH Workgroup, a core member of the SingHealth Residency Leadership Programme, the Musculoskeletal Co-Lead for the Elective Surgery Taskforce, and a member of the Ministry of Health Workplace-Based Assessments Committee. The different workgroups and committees that I am in and have worked with previously, give me exposure to HR, Education and Leadership Training and Ops roles.

***Why is it important to gain perspective across these functions and roles?***

In order to contribute meaningfully as a junior clinician specialist in an Academic Medical Centre, it is important to understand how our hospital works as a whole. I get to meet the teams who keep our hospital running at an optimum level, and this has lent me enriching and valuable knowledge in understanding how all our processes are being examined and improved across the board. These include considerations such as navigating the challenges of service demands which also compete with training needs, and practising talent retention through maintaining an engaged and motivated workforce.

***What are your best tips for working effectively across specialties and functions?***

Have an open mind and a willingness to start from zero each time—it is important as there is a lot to learn from subject matter experts in each field. This means respecting differing opinions and understanding how different specialty teams work and think.

It is also important not to leave your administrative team out of important discussions, and to keep an open channel for communication by keeping them updated as decisions are made. The administrative teams do want to hear clinicians' points of view, especially as various matters arise. And don't hesitate to ask or clarify about terminology which sound alien to you—the teams know that you're a clinician!

# CLINICAL INITIATIVES



## MSKSC TELEHEALTH

Technology has effected new norms in the healthcare landscape, amid the COVID-19 pandemic. Telehealth aims to enhance access to care for MSKSC patients through the use of digital platforms, and improve efficiency as comparable to physical consultation. Our goal is to convert more than 50% of eligible outpatient visits to telehealth, which minimises the risk of infection from unnecessary hospital visits, for patients.

Video consultation services started in Aug 2020 and so far, there have been around 100 patient visits that indicated good patient satisfaction.

## WHATSAPP CHATBOT

The WhatsApp Chatbot aims to reduce dwell time for patients and their caregivers at the hospital's Pre-Admission Centre. It reduces the risk of infection, and also empowers patients in the new normal, post-COVID. The WhatsApp Chatbot engages patients by sending appointments and reminders in multi-lingual format as well as sending pertinent information to better prepare patients prior to surgery.

### Objectives:

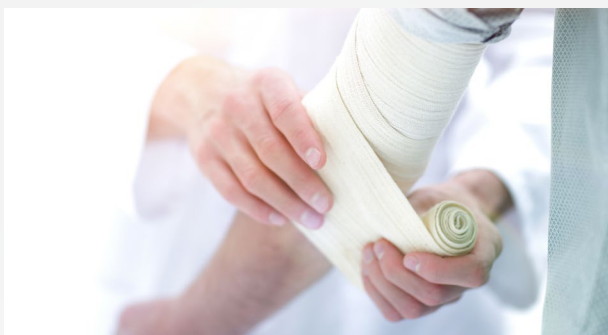
- Engage and educate patients with multimedia
- Minimise hardcopy leaflets thus reducing potential disease transmission
- Synergise with Enhanced Recovery After Surgery (ERAS)
- Improve patients' adherence to instructions and improve staff productivity
- Send multi-lingual appointments and reminders to patients
- Send pre/post-op questionnaires or surveys
- Send pre/post-op information and checklists for surgery



## ELECTIVE SURGERY TASK FORCE (ESTF)

ESTF's main objective focuses on empowering patients to better manage their care journey by transforming the end-to-end experience of SingHealth patients going through elective surgery. ESTF also aims to reduce patients' on-site waiting time, and reduce avoidable surgery cancellations, while optimising healthcare resources.





## EMERGENCY AMBULATORY SURGERY (EASY)

This new workflow allows patients in the emergency department to be admitted as day surgery cases under the Department of Hand & Reconstructive Microsurgery (HRM). Patients will be billed according to day surgery procedures, and discharged from the Department of Emergency Medicine (DEM). EASY continues to decrease the demand for inpatient bed space from acute HRM emergencies that can be managed on an ambulatory basis.

## ENHANCED RECOVERY AFTER SURGERY (ERAS) FOR HIP AND KNEE PATIENTS/ BREAST RECONSTRUCTION

**[Plastics Surgery]** ERAS for breast reconstruction targets to reduce post-surgery LOS to 5-7 days with cost benefits to the Asian population. The ERAS initiative targets non-inferior complication and re-admission rates, as well as achievement of high patient satisfaction rates with adequate pain control.

**[Orthopaedics]** ERAS aims to reduce length of stay (LOS) after surgery to one day for select group of patients, and minimise perioperative complication/admission rate. Besides reducing the LOS for patients, Orthopaedic specialists aim to achieve good patient outcomes and satisfaction.



## VALUE-DRIVEN CARE (VDC)

Value-Driven Care works on the analysis of costs of various surgical services, practices and outcomes across the three disciplines, to formalise the utilisation of VDC and its tools to observe trends in clinical quality. This allows for the identification of areas for advancement, innovation and cross-departmental collaboration, in order to improve post-surgical outcomes, contain or drive down costs, and reduce length of stay and complications.



## INTER-HOSPITAL REFERRAL FOR CLEFT NEW-BORN FEEDING

This initiative at KKH aims to provide an outline of the workflow for referral of inpatient new-borns with cleft lip and palate, to the Department of Plastic, Reconstructive and Aesthetic Surgery (PRAS). The affected new-born will be transferred under the care of PRAS and an Allied Health team who will then arrange training and competency assessments for the caregiver on feeding techniques. This workflow includes all the necessary steps to provide further comprehensive cleft care as required.

# SPECIALTY CENTRES

## OUR VISION: WHY SPECIALTY CENTRES?

**Excellence in Care** – Specialised competencies help to promote learning and improvement in specific processes.

**Increased Satisfaction & Cost Efficiency** – For both patient and providers.

### SINGHEALTH PAEDIATRIC & UPPER LIMB CENTRE

This collaborative effort between SGH and KKH manages children with hand trauma, congenital upper limb differences and upper limb movement disorders such as neonatal brachial plexus palsy and cerebral palsy. The centre’s vision is to be the healthcare leader for children with congenital or acquired hand and upper limb conditions, with goals such as evidence-based medical care, being a centre of education for healthcare workers and students, and innovating through research, to advance.



### SINGHEALTH MUSCULOSKELETAL CENTRE



#### CLINICAL CARE

With clinical focus areas in reconstructive surgery, joint preservation, congenital defects and more, patients will enjoy comprehensive, seamless care under multidisciplinary teams harnessing surgical innovations and technology such as robotics. Enabling facilities such as a Performance & Assessment Centre, Imaging Centre and Centre for Value-Driven Care will aid quicker discharge to community and home.



#### MUSCULOSKELETAL TRAINING CENTRE OF EXCELLENCE

The specialty centre aims to pioneer a centre of training excellence, holistically developing musculoskeletal trainees locally and in the region, through competency-based training in Minimally Invasive Surgery/Robotics. It will deepen training and innovation with renowned academic and industry partners through synergistic collaborations, undergirded by education research and pedagogy frameworks.



#### CORE RESEARCH ACTIVITIES

The centre will spearhead core research activities in musculoskeletal sciences, such as biomechanics, regenerative medicine, device development and health services research, in the form of a Musculoskeletal Centre for Biomechanics, a Musculoskeletal Soft Tissue Regenerative Medicine (STIRM) Centre, and a Centre for Medical Technology Innovation.

# BRINGING ABOUT TRANSFORMATION

▼  
Breakthroughs in  
research and innovation  
in SingHealth Duke-NUS  
MSKSC ACP



The Research arm of MSKSC ACP strives to identify and support aspiring individuals interested in research-focused careers, as well as to create a sustainable culture of research and development in the following areas:



## CELLULAR / TISSUE BASED THERAPY

Both cellular and tissue engineering centre on the application of physical and engineering principles to understand and control cell and tissue behaviour. Cellular engineering focuses on cell-level phenomena, while tissue engineering and regenerative medicine seek to generate or stimulate new tissue for disease treatment.

This core research programme under MSKSC ACP seeks to build up relevant expertise in cell-culture of new cells for orthopaedic, hand and plastic applications, large animal translation for clinical trials, application of GMP-grade cells in clinical trials and stem cell research. The other aspect of this programme is to set up a platform to develop specific tissues focusing on bone, skin, cartilage, muscles, tendons, ligaments, blood vessels and nerves for eventual clinical translation.



## DEVICE DEVELOPMENT

Device development entails the pragmatic and systematic step-by-step method of identifying a core subset of clinical needs, out of the hundreds observed. Validated solutions are then developed to be used in day to day clinical practice. In the world of basic and clinical research, it represents the perfect fertile ground for pursuit of new ideas.

The MSKSC ACP will focus on supporting research on innovative medical devices/implants with potential for commercialisation, resulting from discoveries in our core research programmes. Our device development unit plays an important role in further refinement of a prototype, and is responsible for any eventual transfer of technology/licensing to interested entities by liaising with SingHealth Medical Technology Office.



## BIOMECHANICS CORE

The biomechanics research programme focuses on hard and soft tissue, and cellular level biomechanics, which is the study of how human joints and tissue move and bear weight during functional or sports specific tasks such as running, jumping and throwing. It also looks at the effectiveness of musculoskeletal implants, such as trauma plate-screws, joint replacements and spinal implants, as well as their interaction with the relevant musculoskeletal joints.

The critical objective of this core is to set up a research and educational platform for medical students and residents to develop in-depth knowledge in specific areas of musculoskeletal disorders and plastic conditions. It is essential for MSKSC ACP to continuously develop the biomechanics core initiative in order to support advancements in treatment of musculoskeletal disorders and plastic conditions, for the future generation of clinicians.



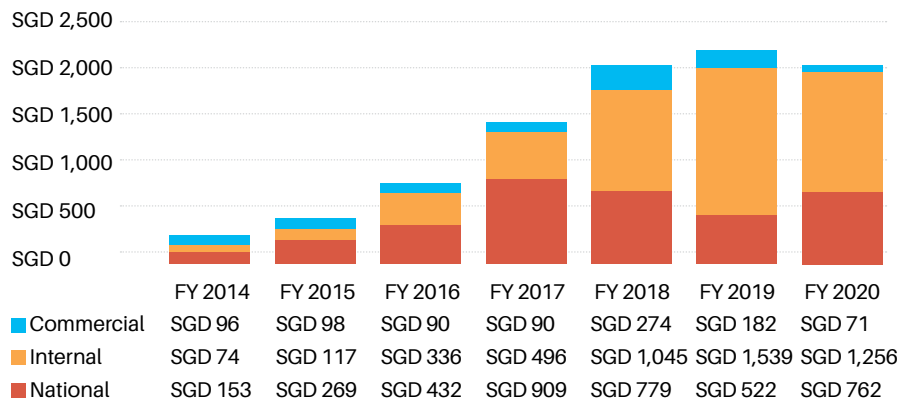
## HEALTH SERVICES / OUTCOMES RESEARCH

Health services research is a multidisciplinary field of inquiry, both basic and applied, that examines access to, and the use, costs, quality, delivery, organisation, financing, and outcomes of healthcare services to produce new knowledge about the structure, processes, and effects of health services for individuals and populations.

The aim is to expand our current capability of collecting measured outcome scores for musculoskeletal patients under the MSKSC ACP. The data collected will allow us to rigorously pursue evidence-based clinical research that can lead to better outcomes for our patients.

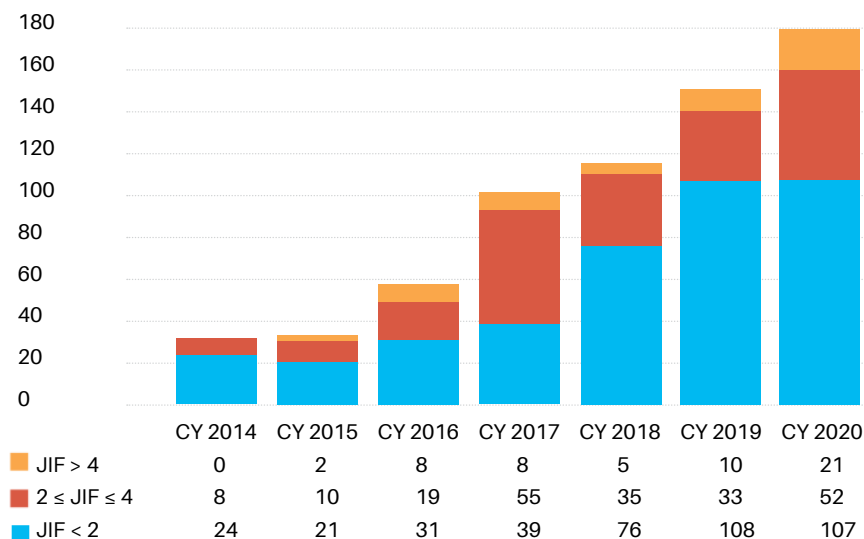
# RESEARCH FUNDING AND PUBLICATIONS

**Total Grant Funding Per Year ('000)**



Since its inception, MSKSC ACP has taken huge strides in securing research funding, at the internal, national and commercial levels. Our clinicians have demonstrated keen interest and great proactiveness in sourcing for funds for their research ideas and projects. Their success in doing so reflects the quality and calibre of research within MSKSC ACP.

**Total Academic Publications**



Apart from research funding, MSKSC ACP has also made strong contributions to research literature through its publications in various well-known journals with significant Journal Impact Factor (JIF).

Source: MSKSC ACP Internal Data Registry

# TEAMWORK MAKES THE DREAM WORK

Orthobiologics has always been at the forefront of research in the specialty of Sports Surgery, and the potential for its progress is immense given the myriad of options and technology available for research and translation.

We speak with Assistant Professor (Asst. Prof) Francis Wong, a consultant in the Department of Orthopaedic Surgery at Sengkang General Hospital (SKH) and author of *Intra-Articular Injections of Mesenchymal Stem Cell Exosomes and Hyaluronic Acid Improve Structural and Mechanical Properties of Repaired Cartilage in a Rabbit Model in Arthroscopy*<sup>1</sup>, to gain an insider's perspective of the field of translational science.

The most memorable experience in Asst. Prof Francis Wong's research journey thus far, would be witnessing neocartilage filling up a 4.5mm diameter-large chondral defect in rabbit knees.

"I will not forget the exhilaration I felt, seeing months of blood, sweat and tears culminate in the filling up of a 4.5mm diameter-large chondral defect," he recollects fondly. This success was what provided much-needed proof that Asst. Prof Wong's PhD hypothesis on the use of Mesenchymal Stem Cell (MSC) therapy and its derivative MSC exosomes, offers a viable cell-free therapy option for joint pathologies.

A surgeon-scientist in translational sciences, the bulk of Asst. Prof Wong's research is currently focused on soft tissue repair and regeneration in the knee.

Lending insight to his choice, he tells us, "There's a Chinese proverb that goes, 'A superior doctor prevents sickness; a mediocre doctor attends to impending sickness; and an inferior doctor treats sickness.' Therefore, because treatment options for joint conditions in orthopaedic surgery are broadly classified into either joint-sacrificing or joint-preserving, I have always been intrigued by the potential of joint-preserving options—especially preventive treatments to avoid the development of joint pathologies."

Asst. Prof Wong is quick to note however, that his success has been by no means a solo accomplishment. He credits a strong culture of teamwork at both the hospital and in the laboratory for allowing him to pursue his part-time PhD at the National University of Singapore (NUS), under the National Medical Research Council (NMRC)'s Research Training Fellowship that he received in 2017.

"I have been blessed with understanding colleagues at the hospital," Asst. Prof Wong shares. "Junior staff help keep things running smoothly on the ground, while fellow consultants have helped share my general orthopaedic clinical load, and senior colleagues such as my Head of Department, Associate Prof Wong Merng Koon, provide essential help and resources whenever needed," he adds.

"In the laboratory, respect, dedication and teamwork again, are important," Asst. Prof. Wong declares. "I try to avoid being an 'arm-chair PI' by performing tasks as a team as much as possible, whether they are complex animal surgeries to simple pipette tip sterilisation," he states, emphasising that while it helps to be a people-person, earning the respect of one's colleagues remains key.

Afterall, their support has allowed him to perform laboratory work while maintaining clinical competency as an orthopaedic surgeon, taking him a step closer to becoming like his role-model, Professor Tom Minas, the current President of the International Cartilage Regeneration & Joint Preservation Society (ICRS).

"I had the privilege of spending quality time with Prof. Minas during my ICRS travelling fellowship," says Asst. Prof Wong. "Tom has demonstrated the essence of being a true surgeon-scientist, excelling in both clinical skills and research. He exemplified bench-to-bedside research by being part of the founding team who translated Autologous Chondrocyte Implantations (ACI) research to ACI surgeries," Asst. Prof Wong enthuses.

Admiring Prof. Minas' ability to merge clinical practice with academic interests—he has published more than 100 peer-reviewed articles and performed the most ACI surgeries in the world—Asst. Prof. Wong also hopes to play a pivotal role in developing the next generation of cartilage generation strategies.

“My patients have always been, and will always be, my inspiration to do research.” Asst. Prof Wong states emphatically, adding that his main goal in translating new discoveries and technologies from laboratory bench to the bedside, remains in “seeing benefits to patients and ensure improvements to their quality of life”.

// ...respect,  
dedication, and  
teamwork  
are important. //

## Asst. Prof Francis Wong

Consultant  
Orthopaedic Surgery  
Sengkang General  
Hospital

### Reference:

1. Wong KL, Zhang S, Wang M, Ren X, Afizah H, Lai RC, Lim SK, Lee EH, Hoi PHJ, Toh WS. IntraArticular Injections of Mesenchymal Stem Cell Exosomes and Hyaluronic Acid Improve Structural and Mechanical Properties of Repaired Cartilage in a Rabbit Model. *Arthroscopy*. 2020 Apr 14;S0749-8063(20)30276-0. doi:10.1016/j.arthro.2020.03.031. PMID: 32302651



# LARGE JOINTS BIOMECHANICS – OUR MUSCULOSKELETAL SIMULATOR



*The musculoskeletal simulator is better able to simulate complex human joint motions as compared to traditional mechanical testing systems.*

To cater to a wider group of orthopaedic, hand, and plastics clinicians and researchers, and collaborate further with other specialties within and outside of the institution, we have identified a robotic biomechanical simulator to be a significant upgrade in our research capability over existing technology in the PSL biomechanics laboratory space.

Currently, the PSL biomechanics space only has a material testing machine (Instron 8875) that is only capable of a maximum of two degrees of freedom (DOF) testing. However, true physiological joint studies such as foot and ankle joint, spinal cord or even craniomaxillofacial functions typically have more than two DOF and could sometimes reach six DOF for specific physiological kinematic movements. To overcome this deficiency, increasing number of biomechanics-related studies have reported the use of musculoskeletal simulators capable of supporting six DOF.

Musculoskeletal simulators developed for in vitro biomechanics research consisted of either material testing machines or customised jigs used in the application of joint forces or moments. While useful information can be collected using





▲ The *simVITRO Robotic Universal Musculoskeletal Simulator* is designed to combine the accuracy, repeatability, and ubiquity of a standard KUKA robot with *simVITRO* software that provides a biomechanics-centric control interface.

material testing machines or customised jigs, a high level of difficulty remains in simulating multidirectional physiologic loading conditions without controlling both the force and moment applied to the joint. Experimental outcomes could also be affected by the weight of the clamps holding the joint which inherently impedes the joint's natural movement.

Using robots to simulate complex human joint began sometime between the 1980s and 1990s. The technological advancement of industrial robotics allowed increasingly complex loading regimes to be applied to various joints and tissues. Various researchers pioneered the development of a unique application of hybrid control that permits the estimation of tissue loads and their functions during passive joint motion and applied in vitro loads. One main advantage of this robotic testing system over traditional mechanical

testing systems is that the latter typically operate in one or up to two planes of motion (up and down, to apply tension and compression, or in rotation to apply torque) while the former is able to translate and rotate around all three axes simultaneously. The other advantage is that the three-dimensional (3-D) path of the joint motion can be reproduced by the robotic system through the use of position control. This implies that for the complex physiologic loading that is applied to an intact joint, a similar 3-D motion can be repeated in a partially dissected joint. The ability to reproduce the same 3-D motion is very much appreciated by researchers, as this allows for the sequential removal of structures from a joint to determine their contribution to joint biomechanics.

To date, there are a number of biomechanics research centres worldwide that possess robotic testing systems and most of them are located in Australia, Europe and North America. In Asia, apart from Japan, Korea and possibly China, there are no countries which use a robot for in vitro orthopaedic biomechanics research. Within the ASEAN region, we did not come across any institution that has such robotic testing systems. The purchase and operation of this robotic musculoskeletal simulator will put our clinicians at the cutting edge of technology as this would help to enhance their scientific and medical knowledge, and at the same time allow them to develop better surgical techniques.

In Singapore, there is no single biomechanics laboratory equipped with a robotic testing system dedicated for biomechanical research. Most of the biomechanics laboratories in this region are equipped with material testing machines and customize complex jigs to translate a single planar motion to a three-directional loading and movement profile. With an increasing number of publications reporting the use of the robotic testing system, it is foreseeable in the future that robotic testing system will be considered the gold standard for in vitro orthopaedic biomechanics research. We are confident that the purchase of this equipment would ramp up biomechanics research in SingHealth and put the ACP in a good position to secure future research grants and be a leader in the biomechanical research field in the region.



# ENVISIONING A SUPERHUMAN FUTURE WITH ROBOTICS

**W**e explore the exponential benefits of robotics in plastic surgery with Dr Savitha Ramachandran, a consultant in SingHealth, who practices with the Department of Plastic, Reconstructive & Aesthetic Surgery at KK Women's and Children's Hospital (KKH) and Singapore General Hospital (SGH).

## ***When did you first hear about robotic applications in the field of plastic and reconstructive surgery?***

I first learnt about robotic applications to the field in 2011, as a master's degree student attending and presenting at the annual meeting of the Italian Society for Microsurgery. Professor Jesse Selber from the University of Texas MD Anderson Cancer Centre had presented his experience with using transoral robotic technology for head and neck reconstruction, and discussed minimally invasive harvest of latissimus dorsi (LD) and abdominal rectus flaps using robotic technology.

## ***What are the greatest benefits of integrating robotics to plastic surgery?***

Minimal access is just one important benefit of using surgical robots. Precision is another, since almost everything we do in plastic surgery requires high levels of precision.

The surgical robot has 100% tremor elimination, and up to 5:1 motion scaling, endowing it with superhuman precision. It is thus a quintessential example of how robotic microsurgery can be applied to benefit our specialty and patients.

## ***In which areas would robotic application to plastic and reconstructive surgery be most beneficial?***

Robotic technology has the most potential in enhancing outcomes in:

- transoral reconstructive procedures
- minimally-invasive breast cancer resection and reconstruction
- abdominoperineal reconstruction; and
- brachial plexus surgery

By enabling heightened access and greater visibility in operations while avoiding large incisions, robotic technology helps reduce patient morbidity significantly, and speeds up post-operative recovery times.

## ***What are the greatest inhibitors to the take up of robotics in your field?***

Cost. The main challenge of adopting robotics in microsurgery and plastic and reconstructive surgery is making the technology cost effective for both the patient and institution. There are also currently no fellowships for robotic plastic surgery, although there are courses and ways that one can acquire the necessary skills.

I sought firsthand experience with robotic plastic surgery at a trial session with Dr Sijo Parakatill in Orlando, Florida, after being inspired by the talk in 2011. I had also attended the Robotic Assisted Microsurgical & Endoscopic Society (RAMSES) inaugural meeting in 2012, where I met fellow surgeons from around the world including Dr. Jesse Selber, who have a collective interest and passion in robotic applications to reconstructive surgery.

## ***Do you see the uptake of robotics in your specialty remaining status quo?***

Far from it. I am confident that as new robotic platforms emerge with evolving technology, costs will become much less prohibitive, especially with a greater number of procedures reducing cost per operation. The recent COVID-19 pandemic has also demonstrated the utility of online platforms like telemedicine, where robotic surgical platforms can be combined to deliver surgical treatment to patients, without need for doctors to be in physical proximity to patients. There is no doubt that this technology will be more readily available and applied in the future.

**What is being done to advance robotics in Singapore's plastic and reconstructive surgery landscape?**

We are currently developing collaborative research efforts with medical device company, Microsure, and Maastricht University in the Netherlands to trial a new robotic platform for microsurgery that they have developed. We are also planning to collaborate with Medical Micro Instruments (MMI), a company based in Italy that has developed a new robotic platform and micro instruments for microsurgery.

**// I am confident that as new robotic platforms emerge with evolving technology, we will see more breakthroughs in Singapore's plastic and reconstructive surgery landscape. //**

**Dr Savitha  
Ramachandran**

*Consultant  
Plastic, Reconstructive & Aesthetic  
Surgery  
KK Women's and Children's Hospital &  
Singapore General Hospital*



# HOPE THROUGH TISSUE TRANSPLANTATION AND RESEARCH

**A**s Assistant Director, Transplant Research at SGH, Associate Professor Alvin Chua wears many hats. Read about the life-saving work the unit does, and how one can make a difference.

## **What is a typical work day like for you?**

Besides working on tissue culture studies in the laboratory and wound healing projects at the animal facility, I manage the operations and quality assurance of a comprehensive tissue banking service comprising of skin, cardiovascular tissues and iliac vessels. This involves managing manpower resources, budgets and audits.

I also work with my team to chart the direction for tissue banking and skin cell culture as we adapt to the evolving national regulatory framework to ensure the safety of the grafts that we process for clinical transplantation.

One major project that I am working hard on with my cell culture team is to transform our skin culture processes to meet upcoming regulatory requirement of Good Manufacturing Practice (GMP), a pharmaceutical quality standard which ensures that our cellular therapy products are consistent and safe for clinical use.

## **Tell us more about your current research work and breakthroughs?**

I am more of an application scientist or tissue engineer, and my research is always part of a larger collective effort to improve wound healing outcomes, especially for the treatment of severe burns and non-healing diabetic ulcers.

I am currently collaborating with Professor Karl Tryggvason from Duke-NUS Medical School to use specialised skin basement membrane protein called laminins to culture skin cells in a defined and fully human platform to expand skin epithelial cells.

The objective is to replace the conventional way of growing skin cells which employs animal ingredients in the cell culture system for the treatment of extensive and severe burns. These undefined components expose patients to potential risk of zoonotic infections and adverse immune reactions. Ensuring that these animal products meet the stringent GMP standard can also be very challenging.

So far, we have managed to culture skin epithelial cells robustly using two distinct combinations of human laminin proteins without compromising the progenitor (or regenerative) cell population. We further demonstrated that a fully matured human epidermis can be regenerated

on an animal model using this method. We have filed a patent for the abovementioned cell culture technique and reported the findings and methods in *Nature Communications* (Oct 2018) and *Nature Protocols* (Feb 2020) respectively.

We are now preparing for a first-in-human clinical trial to evaluate the safety and efficacy of the newly developed cultured skin graft. If this new technique can be translated for eventual patient use, this would represent a breakthrough in replacing a 40-year-old practice of using animal products to culture skin cells for patients.

## **So, human skin cells can be grown for patients with severe burns. How does that work?**

The "human skin" that we grow, termed Cultured Epithelial Autograft (CEA), is made up of a patient's own (autologous) skin epithelial cells that are expanded for use back on the same patient with no issue of immunorejection.

We will first take a piece of healthy, fifty-cent-coin size skin biopsy from the patient and isolate the epithelial cells by digesting the skin tissue with an enzyme. These isolated skin epithelial cells will then be grown on tissue culture dish as attached cells with the help of nutrients provided by specialized cell culture liquid medium. These cultured cells will be harvested and are further expanded in several more dishes to produce enough pieces of cell sheets (each 100cm<sup>2</sup>) for repair of the burn wound injuries on the patient.

## **If you can "grow" human skin, what need is there for human skin donations?**

Donated human skin grafts, or cadaveric skin allografts promote wound healing and act as temporary "natural bandages" to protect patients with large burn areas from environmental pathogens. Therefore, these skin allografts play a critical role in the survival of patients with extensive burns. These allografts stay on the patient for up to 3 weeks before his/her immune system starts rejecting them. This buys time for our skin culture laboratory to grow patient's own skin epithelial cells (which typically takes between 3 to 4 weeks) for definitive grafting on the wound sites where the skin allografts are peeling off.



### *Is skin donation common?*

Unfortunately, local skin donation rates are still low compared to many developed countries. In Singapore, it falls under a voluntary, opt-in system, **Medical, Therapy and Research Act (MTERA)**, where such donation only happens if the deceased had made a pledge during his/her lifetime, or if the next-of-kin give consent upon a donor's death. Not many next-of-kin will consent to skin donation while grieving the loss of their loved ones. Therefore, it is important to have public awareness on donated skin, which like donated blood, can help save lives.

We are currently working with the National Organ Transplant Unit, MOH and SingHealth Duke NUS Transplant Centre to organise roadshows and talks for fellow healthcare workers, schools and the public to raise awareness on skin donation.

**// If the first-in-human trial proves successful, this would represent a breakthrough of replacing a 40-year-old practice of using animal products to culture skin cells for patients. //**

### **Associate Professor Alvin Chua**

*Assistant Director  
Transplant Research  
Singapore General Hospital*

For more information on skin donation, visit:

<http://www.sgh.com.sg/patient-care/specialties-services/Burns-Centre/pages/skin-donation.aspx>

<http://www.singhealth.com.sg/patient-care/specialties-services/sd-transplant-centre/Pages/zz-Skin-Transplant.aspx>

# NURTURING CLIN INNOVATORS &



**Patent:**  
Method of Culturing  
Human Keratinocytes

**Inventor:**  
Alvin Chua,  
Karl Tryggvason,  
Monica Suryana Tjin



**Jerry Chen**

Nurturing Clinician  
Scientist Scheme  
Award



**James Mok**

Singapore Stanford  
Biodesign (SSB)  
Fellow

2015

2017

2018



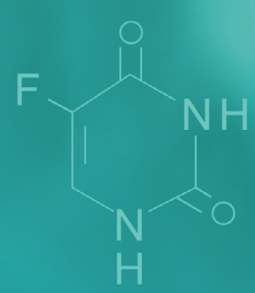
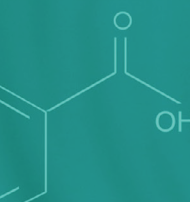
**Patent:**  
Hip Prosthesis  
Device

**Inventor:**  
Kenon Chua and  
Andy Yew



**Vincent Tay &  
Feng Jiajun**

National Outstanding  
Clinician Scientist  
Resident Awards



# CLINICIAN SCIENTISTS, INVESTIGATORS

**Francis Wong**

NMRC Clinician  
Scientist IRG-NIG  
2018



**Adrian Ooi**

MSKSC ACP  
Clinical Innovator  
Programme  
Funding



**Lam Kai Yet**

MSKSC ACP  
Nurturing Clinician  
Scientist Scheme  
Award

**Hamid Razak**

Khoo Pilot Award  
2018



**Francis Wong**

NMRC Research  
Training Fellowship  
(PHD NUS)  
  
ICRS Travelling  
Fellowship



**Lincoln Liow**

MSKSC ACP  
Nurturing Clinician  
Scientist Scheme  
Award

2019

2020

**Law Gin Way**

MSKSC ACP  
Clinical Innovator  
Programme  
Funding



**Hamid Razak**

NMRC Research  
Training Fellowship  
  
MD Imperial  
College, London



**Kok Yee Onn**

MOH Healthcare  
Research  
Scholarship  
  
Senior Resident  
Plastic Surgery, SGH

**Lam Kai Yet**

MSKSC ACP  
Clinical Innovator  
Programme  
Funding



**Jiang Lei**

NMRC Research  
Training Fellowship



**Feng Jiajun**

MOH Healthcare  
Research  
Scholarship  
  
Senior Resident  
Plastic Surgery, SKH

# A CHANGE-MAKER INSPIRED BY OTHERS

30

REDEFINING MUSCULOSKELETAL SCIENCES | BRINGING ABOUT TRANSFORMATION

**A**PNs, or Advanced Practice Nurses are a relatively new line of nursing professionals in the Singapore context. Being an APN requires one to achieve a Master of Nursing, which our local tertiary education system began offering in 2003. Today, APNs form an increasingly essential part of Singapore's healthcare services, especially in the face of an aging population and growing levels of chronic illness.

Registered Nurses (RNs) who become APNs are trained to diagnose and manage common medical conditions. They work collaboratively with doctors and other healthcare professionals to provide complex nursing care to patients. As both nurse practitioners and clinical specialists, they have acquired expert knowledge bases, complex decision-making skills and clinical competencies for extended practice.

We speak with Sister Wen Jing, an APN with the Department of Hand & Reconstructive Microsurgery (HRM) team at the Singapore General Hospital (SGH), to learn more about her roles and responsibilities, and the meaning of her work.

## BEING AN APN...

### *What does a day at work look like for you?*

I am currently the only APN working with the Hand & Reconstructive Microsurgery (HRM) team at SGH.

I begin my mornings by reviewing patients' overnight events and all their relevant results and medications. I also check on patients who had microsurgery to ensure that the appropriate observations and care are provided as required, and then attend morning teaching sessions before doing rounds with the HRM doctors.

After our morning rounds, I continue to review patients and perform various advanced procedures such as removing drains, complex wound management, as well as complete postoperative reviews. I also conduct follow-up sessions with discharged patients in the Specialist Outpatient Clinic on Wednesday afternoons to assess their progress in healing and recovery.

### *What are your key responsibilities?*

Besides clinical work, I am involved in research, as well as teaching junior nurses and medical students. I am currently precepting a Resident Nurse Intern and an APN intern, plus working on research and quality improvement projects. Being new to this service, I also developed nursing care procedures related to HRM patient care.

### *It sounds like a full plate. What is most challenging about your job?*

Role transition. It is difficult balancing between being a nurse practitioner and a clinical nurse specialist. There are also misconceptions about our role as APNs, as some think that we are taking over the job of a doctor. I see APNs as a bridge helping to connect different healthcare workers. We are a complement to the current healthcare system that help improve patient care and outcomes.

## SHAPING THE FUTURE OF NURSING...

### *Could you tell us more about the project you are currently working on?*

I received a grant of 45 thousand dollars from the MSKSC ACP Clinical Innovation Support Programme to work on delivering patient education information through gamification. We aim to develop a series of simulated and interactive games that impart knowledge of hand-related conditions to patients.



### ***How does your project address the future needs of healthcare?***

The move towards a virtual healthcare system has sped up, especially with the recent COVID-19 pandemic. With the use of the games, patients will be able to revisit the educational information at their convenience. We hope playing the games will help to sustain their interest in learning about their condition(s) and encourage them to make relevant changes to their lifestyles. Our aim is to empower patients towards better self-care through improved knowledge.

## **WHAT GIVES HER PURPOSE...**

### ***What do you enjoy most about your work?***

As an APN I have greater autonomy in clinical decision-making, which helps with planning for and managing patients in a collaborative way. With more in-depth theoretical knowledge and clinical reasoning, I am also able to help patients understand their conditions better. Being able to work closely with different healthcare professionals allows me to be more informed—I get to see a broader picture and understand issues from different perspectives.

### ***Why did you decide to become an APN?***

The Orthopaedic APNs that I met while working as a nurse inspired me with both their knowledge, and the changes they led to improve patient care and outcome. My mentor, APN Michelle, also encouraged me to join the pioneer batch of SingHealth's Resident Nurse Programme, which helped build the foundation for, and my interest in an APN career.

### ***What advice do you have for aspiring nurses?***

Never forget the reason or purpose that you became a nurse for. Always keeping that in mind will ensure you achieve what you set out to do.

### ***Why did you decide to join nursing?***

Nursing was less a choice than a given for me, as my dad is a doctor and he always wished for me to join him as a healthcare worker. Nonetheless, I have loved my job since becoming a nurse, and I am passionate about the profession. My parents have been delighted with my career progression, and both them and my husband have given me lots of support throughout my journey as an APN.

### ***How can working as a nurse at SGH be improved?***

SGH has lots of training opportunities for nurses and provides upgrading courses for nurses at work. I feel we are fortunate to be a part of the organisation.

## **Sister Wen Jing**

*Advanced Practice Nurse  
Speciality Nursing  
Singapore General  
Hospital*



# FIRM & SURE-FOOTED: A WOMAN IN ORTHOPAEDIC SURGERY

Often taken for granted or overlooked, our feet and ankles are silent workhorses that bear the brunt of the grunt work supporting our body weight through the unrelenting daily stresses of work, life and sports. It is a demanding job that can lead to painful injuries and conditions at all stages of life, making the work of Dr Kinjal Mehta especially relevant to the general populace.

Dr Kinjal Mehta is a senior consultant and Director of Foot & Ankle Surgery with Changi General Hospital (CGH)'s Department of Orthopaedic Surgery.

The Foot & Ankle Surgery unit is highly specialised in the diagnosis, management, and treatment of patients with musculoskeletal conditions of the foot and ankle. Focused on improved patient outcomes, the unit actively collaborates with podiatrists and physiotherapists, and uses sports and exercise medicine for greater efficacy across disciplines.

Among the unit's achievements are the development of minimally invasive surgical techniques reducing patient morbidity and recovery periods for earlier return to daily activities and work. Their dedicated regional approach to musculoskeletal conditions of the foot and ankle also means that the team has wide-ranging, in-depth capabilities ranging from fixation of complex fractures to reconstruction of degenerated ankles, and deformity correction.

## 5 QUESTIONS WITH DR KINJAL

We ask Dr Kinjal 5 quick questions, for a brief but informative insight to her role and the work of CGH's Foot & Ankle Unit.

### ***What are the main focuses of CGH's Foot & Ankle Surgery research?***

CGH's Foot & Ankle Surgery unit are primarily patient-centric, focused on outcome studies and management options. With an emphasis on trauma management, we are involved in multiple areas of research with publications spanning trauma, sports and degenerative conditions.

My particular area of interest is in orthopaedic trauma for foot and ankle conditions. This stems from my speciality as

a Foot and Ankle Reconstructive Surgeon; as I am actively involved in foot and ankle trauma management. I have keen interest in both clinical and research work.

### ***What makes clinical research at CGH particularly effective?***

We see a significant load of orthopaedic trauma at CGH, which makes clinical work exciting. This in turn fuels our interest and motivation in research work, and I can say that all the Orthopaedic surgeons at CGH find their clinical research work particularly meaningful and enjoyable. We also encourage both senior surgeons and junior doctors to undertake research projects by providing plenty of opportunities for it, and encourage them by providing the necessary supervision and resources.

### ***What are plans for CGH's research future?***

We plan to increase research output as a department, providing more support and resource allocation. We are also looking to broaden and deepen collaborative opportunities with other disciplines, which will give us a wider variety of research with different emphasis and aims. As a whole, it will offer more holistic approaches and outcomes that can perhaps function as creative incubators for greater, even unexpected growth in the field.

### ***You are one of a few women in the male-dominated field of Orthopaedics. What are some challenges as a woman in the role?***

Especially with regard to the MSKSC ACP's focus on research and education, the great thing is that there are no gender differences when it comes to undertaking research. If you are committed to doing it, you will not face any challenges or bias. I simply recommend good time management and prioritisation of tasks, so one can achieve maximal output.

***Your best advice for women interested in Orthopaedics?***

One, do not give up. Two, do not be afraid of asking for help. Persevere in challenging situations—things have a way of working out successfully in the end.

**// We also encourage both senior surgeons and junior doctors to undertake research projects by providing plenty of opportunities for it, and encourage them by providing the necessary supervision and resources. //**

**Dr Kinjal Mehta**

*Senior Consultant  
Director (Foot & Ankle Surgery)  
Orthopaedic Surgery  
Changi General Hospital*



# RESEARCH AWARDS

## SINGHEALTH DUKE-NUS RESEARCH TEAM AWARDS 2019 (2<sup>ND</sup> PRIZE)

In recognition of outstanding and invaluable contribution to the biomedical research landscape at the Duke-NUS AMC.

INSTITUTION	AWARDEE
Duke-NUS Medical School	Prof Karl Tryggvason Dr Monica Tjin
Plastic, Reconstructive & Aesthetic Surgery, SGH	Assoc Prof Alvin Chua Wen Choon Assoc Prof Tan Bien Keem

## BRUCE CONNOLLY AWARD 2019

International Best Paper, Australian Hand Society

INSTITUTION	AWARDEE
Hand & Reconstructive Microsurgery, SGH	Prof Duncan Angus McGrouther

## RESEARCH ACHIEVEMENTS - PUBLICATIONS

**A/Prof Joyce Koh Suang Bee -  
HSR Aging Hip Fracture  
collaboration with MOH**  
Orthopaedic Surgery, SGH

*Risk Factors and Trends Associated  
With Mortality Among Adults With Hip  
Fracture in Singapore*  
**JAMA Network Open**

**Dr Bryon Teo Jun Xiong -  
SingHealth Publish! Award 2020**  
Orthopaedic Surgery, SGH

*Association of the 36 - Item Short Form  
Health Survey Physical Component  
Summary Score With Patient  
Satisfaction and Improvement 2 Years  
After Total Knee Arthroplasty*  
**JAMA Network Open**

**Dr Kenny Tay Xian Khing -  
First author of a Special  
Review Article**  
Orthopaedic Surgery, SGH

*Bony Anatomy around the Watershed  
Line of the Distal Radius*  
**Journal of Wrist Surgery -  
Special Review Article**

## OTHER NOTABLE AWARDS

### The STaR (Surgical Training and Research) Budding Researchers Award

This award supports start-up research for young and budding researchers in SingHealth.

YEAR	AWARDEE
2018	Dr Benjamin Ang Fu Hong <i>Orthopaedic Surgery, SGH</i>  Dr Jerry Delphi Chen Yongqiang <i>Orthopaedic Surgery, SGH</i>

# MAKING THE DIFFERENCE

▼  
Insights from leading  
educators in SingHealth  
Duke-NUS MSKSC ACP

# EDUCATION

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The education arm of MSKSC ACP coordinates the activities across the different education programmes. Local and foreign undergraduate and graduate medical students are engaged through practical and insightful teaching sessions, to enhance their interest in joining musculoskeletal disciplines.



## DUKE-NUS MEDICAL SCHOOL

The Duke-NUS Medical School is a unique graduate entry medical school that plays an integral and strategic role in the Singapore healthcare ecosystem through its translational and clinical research excellence, training of medical talents, and its Academic Medicine collaboration with SingHealth, the largest medical and health cluster in the country. Duke-NUS' curriculum is patterned after that of the renowned Duke University School of Medicine in Durham, North Carolina.

MSKSC ACP plays host to the Duke-NUS medical students as part of the musculoskeletal core rotation in their fourth year of study. All three musculoskeletal disciplines - Orthopaedic Surgery, Plastic Surgery and Hand Surgery, together with Rheumatology - are involved in the teaching of these medical students during their clinical posting with MSK, providing them with a diverse and all-rounded exposure to the different musculoskeletal specialties. Beyond conventional teaching methods such as didactic lectures, students also benefit through small-group tutorials and hands-on practical sessions to test and hone their basic skills.



## NUS YONG LOO LIN SCHOOL OF MEDICINE

The NUS Yong Loo Lin (YLL) School of Medicine is a leading medical educational and research institution in Asia. The School's undergraduate curriculum, developed and taught by faculty comprising distinguished clinicians as well as scientists, provides students with a solid foundation in the medical sciences. In keeping with its age-old vision of educating and producing compassionate and competent healthcare professionals, emphasis is placed on the inculcation and development of patient empathy in students.

Orthopaedics has long been a core component of the undergraduate curriculum for NUS YLL medical students, primarily in their third and fifth year of study. A bulk of each year's cohort will go through their Orthopaedics clinical posting within the SingHealth Orthopaedic departments including from Singapore General Hospital, KK Women's and Children's Hospital and Changi General Hospital. Under the guidance and mentorship of our clinician educators, students will be equipped with the medical knowledge, and will be able to develop competencies in patient care skills, interpersonal and communication skills, as well as professionalism.



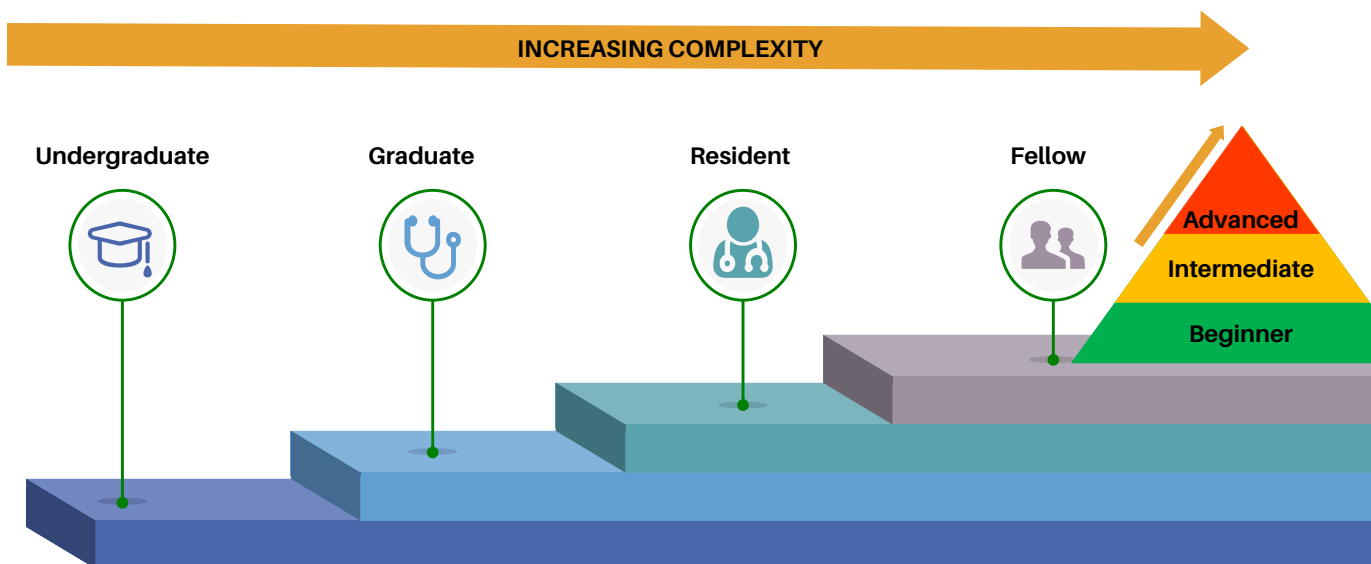
## LEE KONG CHIAN SCHOOL OF MEDICINE

The Lee Kong Chian (LKC) School of Medicine is a partnership between Nanyang Technological University, Singapore, and Imperial College London. Officially opened in August 2017, the LKC School of Medicine aims to be a model for innovative medical education and a centre for transformative research, training doctors who put patients at the centre of their exemplary care.

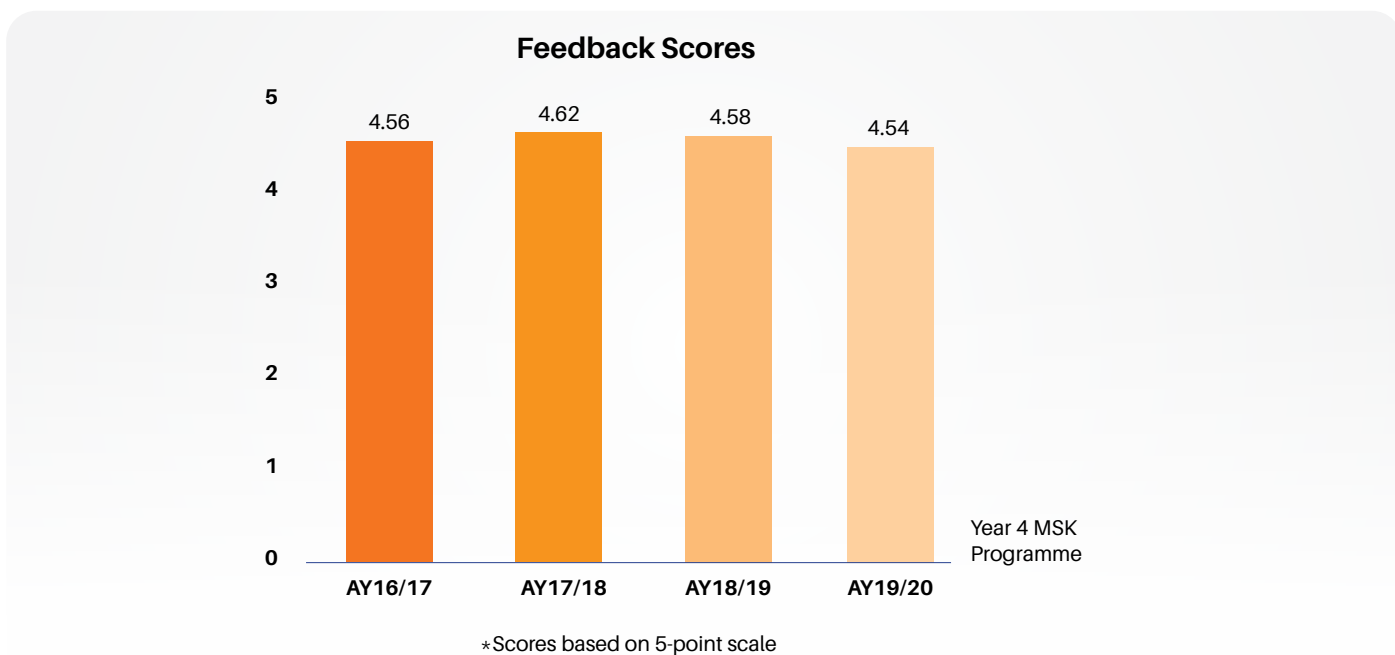
Similar to those from the Yong Loo Lin School of Medicine, a smaller number of LKC medical students will also carry out their Orthopaedics clinical posting within the SingHealth Orthopaedic departments, where they will be equipped with the necessary knowledge, skills and competencies through didactic lectures, small-group tutorials, physical examination tutorials, ward rounds, teaching rounds and so on.

# EDUCATION VISUALS & DUKE-NUS SCORES

## TEACHING AT DIFFERENT COMPLEXITIES - STUDENTS AND FACULTY



## GRADUATE EDUCATION: DUKE-NUS



# LIGHTING THE WAY

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REDEFINING MUSCULOSKELETAL SCIENCES | MAKING THE DIFFERENCE

**L**earn about the daily work of a Nurse Clinician in Spine Services, and how Sister Lilian Ow is a force for education, change and hope among colleagues and patients.

Nurse Clinician Sister Lilian Ow has been in the nursing line since 1997, and a part of Changi General Hospital (CGH)'s team for 20 years. She worked in both the Orthopaedic and Surgery wards before joining its Spine Services when it was set up in 2009, and now works closely with the spine surgeons and team in helping to care for and rehabilitate its patients.

## FINDING FULFILLMENT

Reflecting on her career choice, Sister Lilian says: "I always wanted a job that is meaningful and interesting—one that makes a difference in people's lives." In fact, she first found her calling to the nursing profession as a young teenager who experienced the illness and loss of a close family member in hospital.

"Having that experience made me want to be able to help people get well," she shares, "it has been a fulfilling journey for me to be able to collaborate with different healthcare staff in the hospital to do our part in managing and caring for patients."

Most memorably, she recalls having a former patient approach her on a bus when she was on her way to work one day. "He came up to thank me for looking after him in the hospital and I realised that he was a patient who had been unable to walk due to weakness in the limbs from an incomplete traumatic injury to his cervical spinal cord. I looked after him for over a month as he underwent surgery before being discharged to a community hospital," she shares. "I felt incredibly happy to see that he could walk again," she remarks.

Motivated by her ability to positively impact lives, Sister Lilian feels she gets her greatest satisfaction from both being able to assist and motivate patient recoveries, as well as through imparting the knowledge and skills gathered through school and decades of on-the-job training.





## MAKING THE DIFFERENCE

In her role as a Nurse Clinician, Sister Lilian provides direct care to patients and their families, while leading a team dedicated to providing comprehensive, holistic care in her specialised discipline.

An average morning at work for her involves checking on and meeting with the patients scheduled for surgeries. She provides both patients and their families with bedside pre- and post-surgery counselling, helping to allay their fears and anxiety with her in-depth knowledge of the procedures.

This is followed by special counselling for patients who need neck or back braces, where she explains to them the valid need for the equipment, its cost and makes arrangements to do fittings with the orthotist. Once fitted, she sees them through the process by reviewing the brace and educating them with useful back care education and advice.

Working hard to oversee a wide-ranging group of patients, Sister Lilian also provides care and monitoring for patients in post-surgery/rehabilitative stages in the CGH Integrated building, and also provides outpatient care in the form of counselling at the Orthopaedic clinic.

**// Never be afraid to ask questions. There is always something to learn in the field of nursing. //**

### Sister Lilian Ow

*Nurse Clinician  
Speciality Nursing  
Changi General Hospital*

While her plate is full, Sister Lilian finds deep satisfaction in her work and has even made the time to work on improving the hospital nurse call system for patients.

She and her team have been working on modifying the current wireless Nurse Call System for patients with impaired or no hand function. Familiar with the struggle of such patients who had to either shout for help or rely on neighbouring patients to get nurses' attention, the team put their heads together to develop a wireless Nurse Call System to fix the situation, by drawing on the CGH Innovation Grant and collaborating with an external partner. With the aim to benefit patients across the board, Nurse Lilian and her team are hopeful that the trial will bring about positive improvements.

## A GUIDING LIGHT

As a Nurse Clinician and leader, Sister Lilian divulges that some of the most challenging aspects of her role are managing the expectations of her patients and their family members, and juggling her clinical work with looking after a group of nurses under different services. "It can be mentally draining and tiring," she admits. Yet, as a committed educator who finds meaning in sharing her knowledge not just with junior nurses but also patients, she finds the strength to overcome the mental and physical drain by working to maintain a positive mindset and drawing on her passion for teaching and guiding others.

"A nurse's role has never been easy because it involves both the physical aspects of caring for patients, as well as managing their mental expectations and emotional wellbeing," she says, adding that "nurses should be encouraged to exercise regularly outside of work with classes and simple exercises to maintain good health, fitness and energy levels."

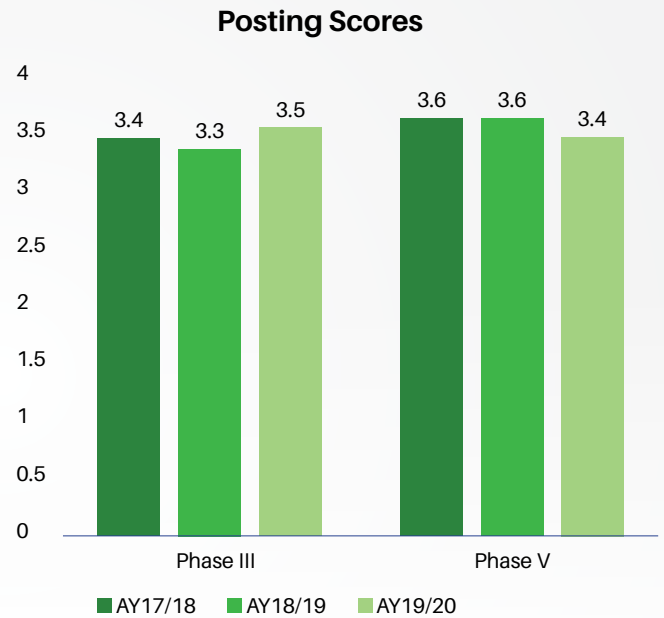
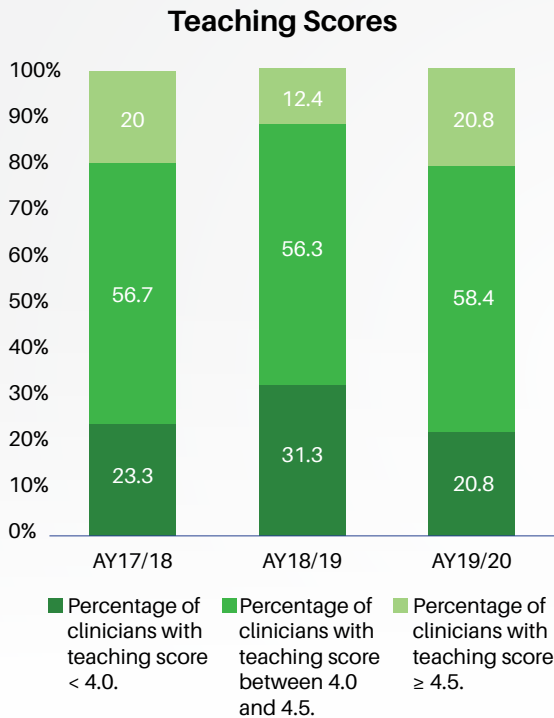
By always keeping a clear sense of purpose and strong channels of communication, Sister Lilian hopes to inspire others to take up the meaningful vocation of nursing. Here are her three key tips for aspiring nurses:

- Never be afraid to ask questions. There is always something to learn in the field of nursing.
- Do not hesitate to clarify, always ask when in doubt.
- Remain calm even in stressful situations. Prioritise your work and focus on the things to be done first.

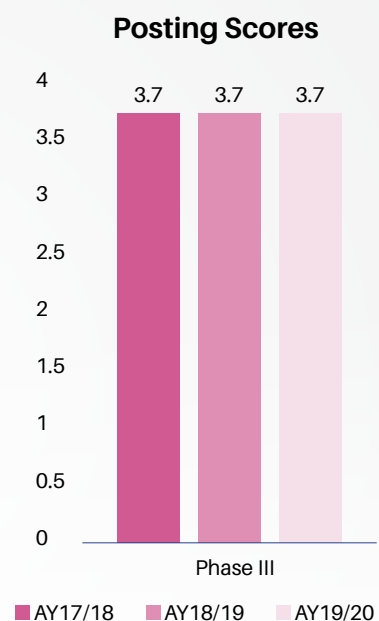
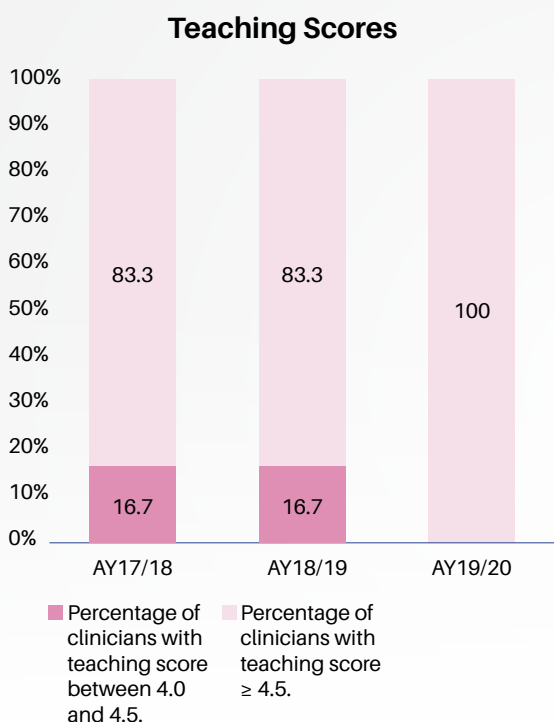
# EDUCATION SCORES

Teaching scores and posting scores are among the key indicators to assess the effectiveness of the various undergraduate and graduate education programmes. Students are given the opportunity to provide feedback on the teaching quality of the educators as well as their overall learning experience with the departments.

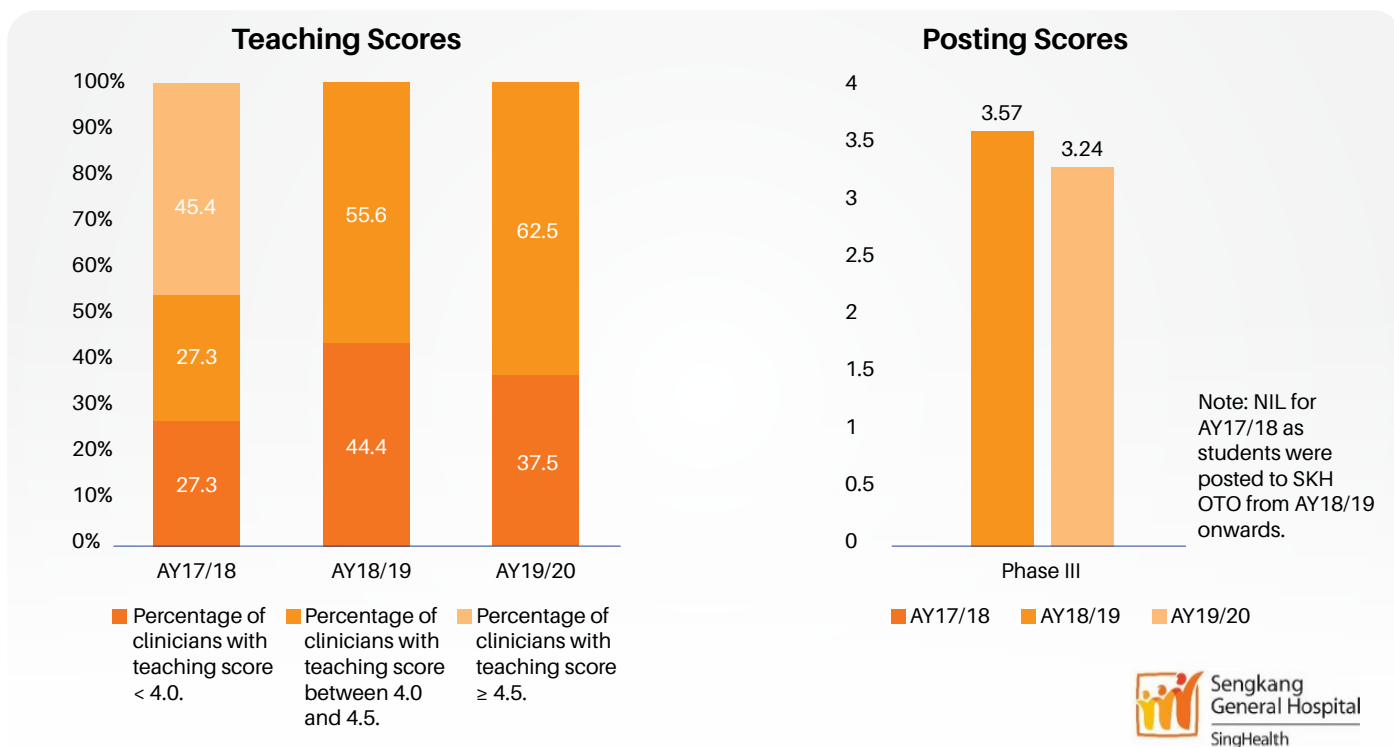
## YONG LOO LIN SCHOOL OF MEDICINE SGH ORTHOPAEDIC SURGERY & HAND SURGERY



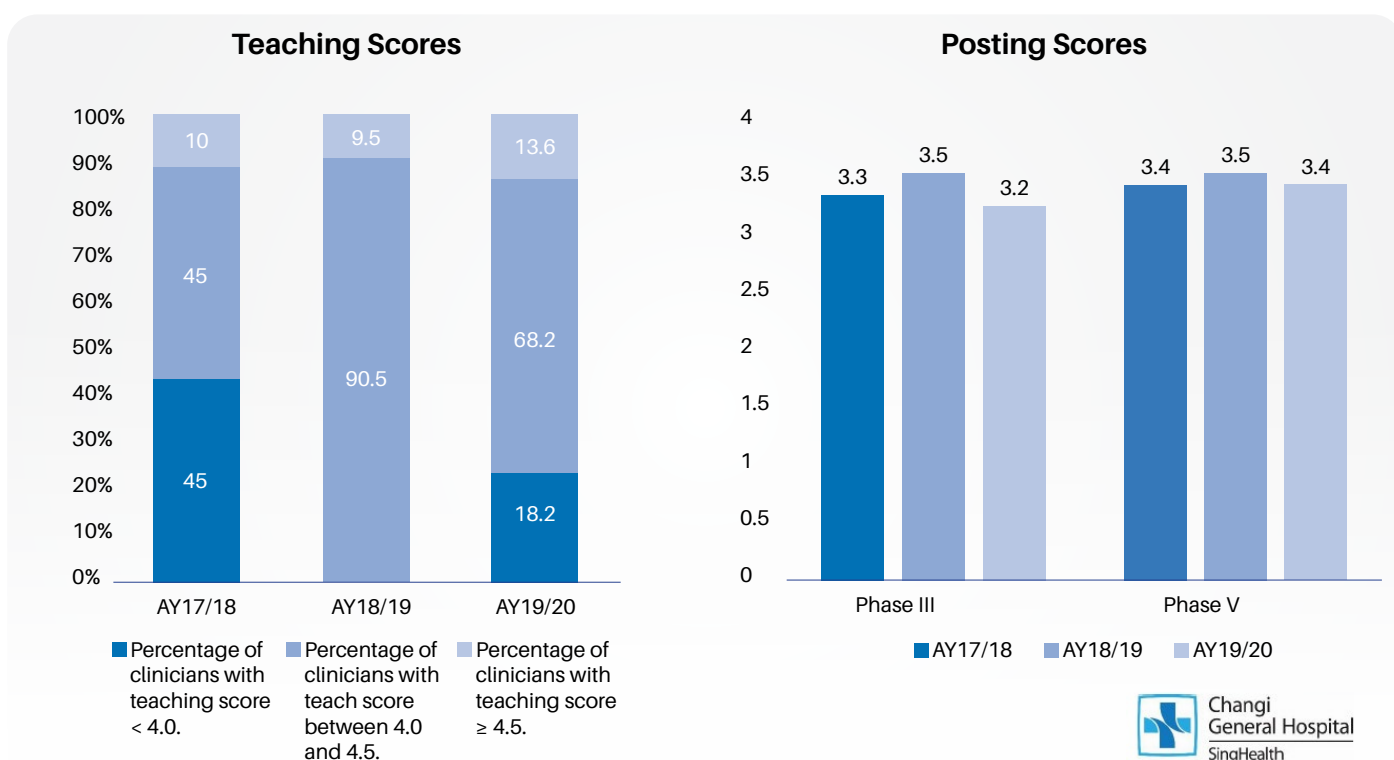
## YONG LOO LIN SCHOOL OF MEDICINE KKH ORTHOPAEDIC SURGERY



### YONG LOO LIN SCHOOL OF MEDICINE SKH ORTHOPAEDIC SURGERY



### YONG LOO LIN SCHOOL OF MEDICINE CGH ORTHOPAEDIC SURGERY



# FOSTERING A CULTURE OF TEACHING & MENTORSHIP

We speak with Dr Reuben Soh, a spine surgeon and senior consultant with the Department of Orthopaedic Surgery at SGH to learn about a clinical educator's perspective.

Dr Soh holds academic appointments with Yong Loo Lin School of Medicine at the National University of Singapore (NUS), and with Duke-NUS Medical School. He has been greatly and consistently engaged in the teaching of medical students in electives and research projects, and is also involved in driving the education programme as part of the Orthopaedic Surgery department's core education group.

## ON TEACHING

*"Education does not stop after finishing medical school. As educators, we look after the various educational needs of undergraduates, postgraduates, as well as consultants and specialists who must constantly acquire new information and knowledge."*

### **What makes a good educator or mentor?**

I think a good educator or mentor is able to engage learners at all levels, taking them to where they want to be. An educator pushes students to new heights of knowledge and capability, and in terms of technical ability in surgical specialties.

### **How did you become a clinical educator?**

I was already a part of the Clinical Faculty Scheme in NUS as a registrar, which means that I have been scheduled for teaching at least once a week since I began as an associate consultant at KKH.

### **What motivates you to teach?**

Firstly, satisfaction in seeing learners apply the knowledge—when my students send in quality referral reports as polyclinic doctors, showing proper patient history and examination. Secondly, I believe teaching is paying it forward to ensure good traditions and community are maintained, especially since the generations after will be treating me in my old age.

### **What are key takeaways from your experience as an educator or mentor?**

I believe that "Every class is better than the last". Make it fun and enjoy doing it by seeing how you can enrich yourself through the experience.

At the most basic level, teaching forces clinicians to read more, and identify and cluster thoughts in a more structured manner. This helps them perform better in consultation with patients, as we are often educating our patients when we speak to them. Teaching helps to concise ideas and present patients with information that is easy to understand in a very short amount of time.

### **Do you have advice for young aspiring educators?**

For those interested in teaching, AMEI courses are a definite help in refining one's teaching techniques. I did an Academic Medicine fellowship by AMEI to gain the tools necessary to teach our teachers to teach better. They train you in giving feedback and appraising education papers, and the experience really enabled me to improve as an educator's educator.

## ON THE CHALLENGE OF TIME

*“If teaching is factored into the timetable from the start, clinicians will not feel as if teaching takes time away from clinical duties. We never know who might have a passion for teaching, until they’ve actually tried their hand at it. We must create opportunity.”*

### **What are challenges you face as an educator?**

Time is a major challenge. As clinicians, we are stretched for time and tend to schedule tutorials after hours, which takes away from family and leisure. This is particularly challenging for the younger consultants trying to build a career and clinical volume, and for whom education often takes a backseat.

### **How do you overcome these challenges?**

By having shorter tutorials with more focused teaching, I have found it better to do a few half-hour tutorial sessions, versus a single 1.5-hour tutorial. We also have tutorials in the operating room and clinics, so students are present as clinicians end their clinic session. They see my last patient with me and continue discussing them afterwards to develop on learning points while saving time for everyone.

I also believe that registrars should begin teaching once they turn to Associate Consultants. This could mean giving them teaching roles in their final year as registrars and requiring departments to maintain that 10% of their time is set aside for teaching. By operating with the understanding that I have to keep time for students, I rush less and am more prepared, which leads to better teaching.

### **What do you think can be done to improve the mentorship culture within the departments and the ACP?**

We could allocate more time to teaching, such as having certain clinics dedicated to teaching students. They’ll see less patients in their day-to-day operations, which allows students more time and opportunity for

proper examination. Time and money ‘lost’ by the department can be calculated as a part of clinical responsibility, which provides a better idea of the true ‘value’ versus ‘cost’ of such a practice.

A better experience also means students will be more inclined to return to teach, thus propagating a cycle of better educators and interest in teaching.



**Dr Reuben Soh**

Senior Consultant  
Orthopaedic Surgery  
Singapore General Hospital

# IMPROVING YOUNG LIVES THROUGH EDUCATION

**As a specialist in children's hand and wrist conditions, including malformations, neuromuscular problems and trauma, Dr Darryl Chew shares with us the ins-and-outs of his work with the Paediatric Hand Service. Read on to discover how patient-centred learning and academic sharing have shaped his career.**

Nested under the KKH Department of Orthopaedic Surgery, most of the Paediatric Hand Service's elective surgical cases are handled on a day surgery basis. This year, the outpatient clinical service has been streamlined into 3 different clinics: General Trauma, Congenital Hand Differences, and Upper Limb Movement Disorders (covering neonatal brachial plexus palsy and cerebral palsy), further improving the efficiency and efficacy of its specialist care.

## EDUCATION THROUGH COLLABORATION

***What is something others might not know about the Paediatric Hand Service?***

Besides trauma which forms the bulk of our cases, education is another focal point of the Paediatric Hand Service. I have realised as a surgeon that we can only do so much for children who are born with congenital hand defects. Even in the best of hands, good surgery can optimise function only to the extent that the child's hand allows. This means we work closely with other professionals to ensure that the full spectrum of needs can be addressed.

***What is one educational aspect that the Paediatric Hand Service addresses?***

The social dimension of each child and their family has to be addressed in order to reach an ideal outcome. This care comes from both professional psychosocial support, and the children's peers. Many still face social embarrassment, awkwardness and upfront bullying in school and society because their hands do not look or work like their friends'. We are exploring ways we can do better for these children and their families in the short-term.

***How important is cross-disciplinary collaboration in your field?***

We work hand-in-hand with our Occupational Therapists to bring the children a good outcome. We also conduct quarterly interprofessional sessions with each other to strengthen common understanding of disease pathology and management strategies. Our service will also be reaching out to community service providers to improve education and understanding of hand injuries, seeing as how it is one of the most common cases we see at KKH.

## EDUCATION THROUGH SHARING & INNOVATION

***Your research interests are mainly clinical. Could you share about them?***

Data collection and analysis have been my recent focus since we have certain common practices lacking evidential backing. One example is a relatively unheard-of technique that Associate Professor (A/P) Teoh Lam Chuan taught me for closing wedge osteotomies in reconstructing thumb duplication. K-wires are traditionally used to fix osteotomies, but they can cause problems such as pin track infection and wire migration. A/P Teoh's solution was to abandon metalwork and literally stitch the bone together. We had been using this technique for a while when I realised we did not have any data to back it up, so I am glad to say that our manuscript is finally in the hands of journal reviewers!

***We understand you have also won an award for innovation.***

Yes, another interesting research point has been applying existing surgical techniques to completely different contexts. One of our projects particularly impressed the Australians and clinched the Tim Herbert Award for Innovation in Hand Surgery at their 2019 annual scientific meeting.

**Could you describe the idea behind the project?**

We faced difficulties in reconstructing nice and rounded fingertips for children undergoing syndactyly release. Existing surgical techniques resulted in tapered fingertips that were not pleasing to the eye, and the challenge was performing tissue expansion in the small fingers of a 1-year-old.

By adapting the use of Suzuki pins and the rubber band system—traditionally used for fracture dislocations—we were able to provide transverse soft tissue distraction in children with syndactyly to achieve tissue expansion around the fingertips.

**In what other practical areas can your research be of help?**

I am currently studying the outcomes of conservative treatment of paediatric trigger thumbs, and studying the remodeling potential of phalangeal neck fractures, as these are two common cases I see in my clinics.

**PASSING ON THE PASSION****What is your best advice to aspiring Residents?**

***“Twenty years from now, you should wake up in the morning looking forward to work because you want to, and not because you have to.”***

Professor Soo Khee Chee shared this with me when I was a Medical Officer. Personal passion and interests are important motivators throughout one’s career, so it is important to take time to explore and discover them. Part of this exploration is understanding that passion and interest can be cultivated as well. This is important since there are not always obvious matches in subspecialty jobs available.

**How do resident physicians benefit from training with the Paediatric Hand Service?**

There is hesitancy in treating the paediatric age group, due to the niche work with a steep learning curve, and a lack of familiarity with handling children and their parents. I was able to pick up and strengthen the skills needed for this subspecialty during my fellowships.

My professors were good role models in how they navigated each child and their family, and becoming a parent was also helpful. The Hand, Orthopaedic and Plastic Surgery Residents who rotate through us get to do, see and manage real-world cases. Instead of just reading about this unique part of their syllabus in textbooks, they benefit greatly in experience handling the paediatric hand.

**Dr Darryl Chew**

*Senior Consultant  
Hand and Reconstructive  
Microsurgery  
Singapore General  
Hospital*



To fulfill the important educational and training role within SingHealth, SingHealth Residency nurtures the future generation of medical professionals. SingHealth Residency strives to develop its residents into highly skilled medical leaders, who are innovative, self-directed learners with a strong sense of ethics and compassion. The education arm of MSKSC ACP aims to establish SingHealth Orthopaedic. Plastic and Hand Surgery Residency Programmes as the Programme of Choice for surgical trainees. These residency programmes integrate cross-disciplinary lectures into their curricula, providing the platform for synergistic learning opportunities.

## ORTHOPAEDIC SURGERY

MAR 2019

### FRCS MOCK EXAM

► Spearheaded by Vice Chair (Education), A/Prof Arjandas Mahadev.

MAY 2019

### CROSS CLUSTER ROTATION

► Beginning of **Cross Cluster Rotation** among three Sponsoring Institutions (SIs) - CGH OTO the first to host residents from NHG and NUH

JUN 2019

### RESIDENCY GRADUATION

### MMED MOCK EXAM

SEP 2019

### ARTHROSCOPY SIMULATOR

► Access to the **Arthroscopy Simulator** in SIMS lab granted for all Sports Faculty.

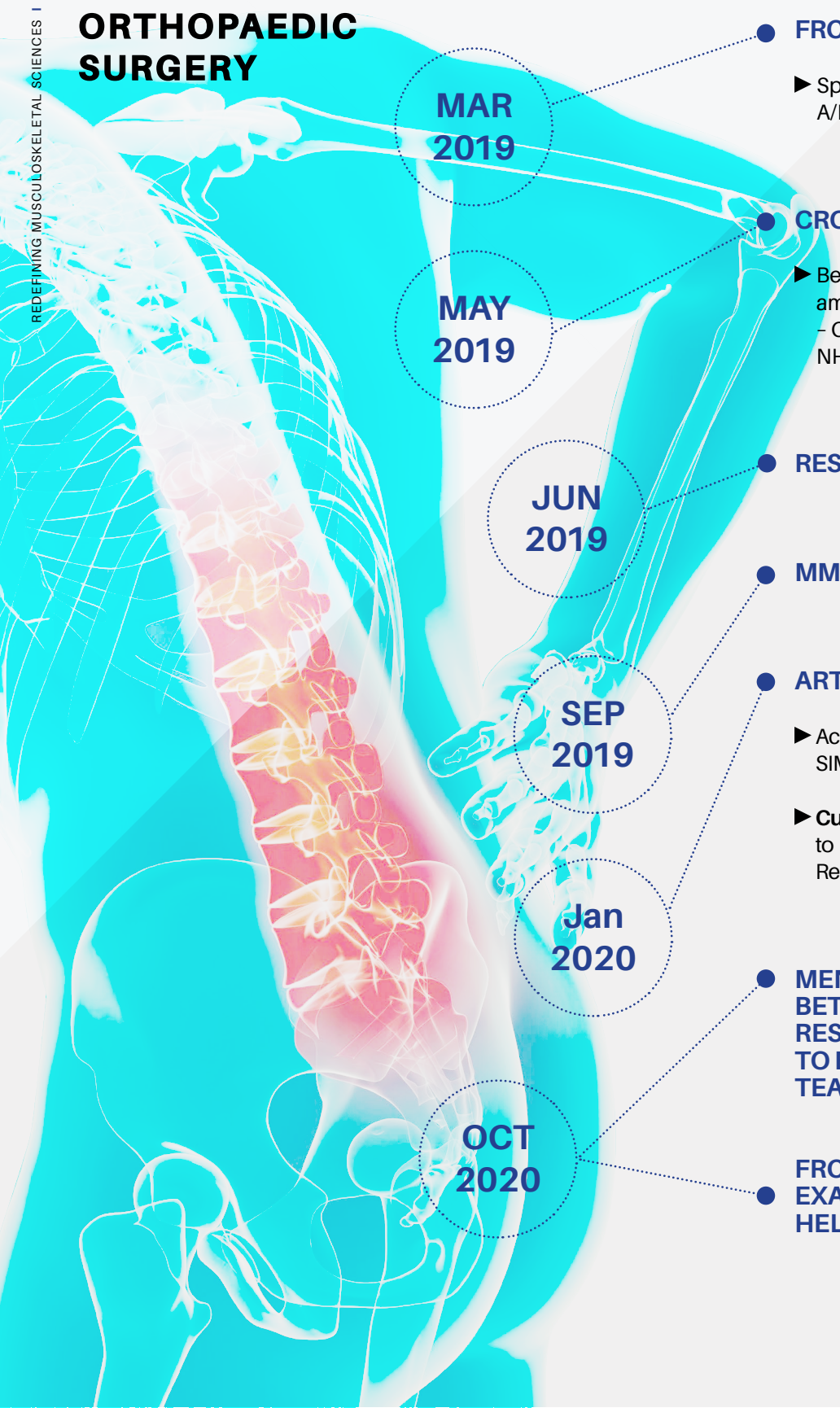
► **Curriculum for Arthroscopy Simulation** to be developed by the Sports faculty and Residency team.

Jan 2020

### MENTORSHIP PROGRAMME BETWEEN JUNIOR/SENIOR RESIDENTS IMPLEMENTED TO BRING ABOUT EFFECTIVE TEACHING SYSTEM


OCT 2020

### FRCS(ED (ORTHO) MOCK EXAMINATION COVID EDITION HELD ON 24 OCTOBER 2020





## PLASTIC SURGERY



**JUN  
2019**

**SUCCESSFULLY-  
CONDUCTED VIVA**

The Viva component conducted for all Plastic residents across the 3 SIs during the annual In-Service Examination serves to streamline the annual assessment processes and gear towards helping residents develop techniques for exit exam.

**AUG  
2019**

**BEST IMPROVED  
JCST PROGRAMME**

Awarded **Most Improved Medical Subspecialty Programme Award** during the SingHealth Residency RiSE Award Ceremony.

**JAN  
2020**

**SELECTION FOR  
4TH SRLP COHORT**

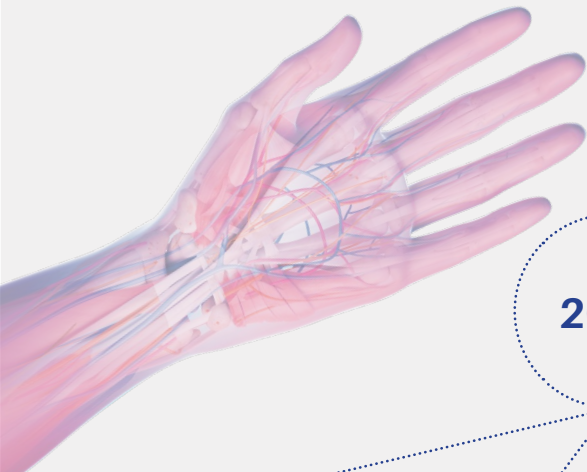
Dr Michael Hsieh, 1st Plastic resident to be selected to join the 4th cohort of the **SingHealth Residency Leadership Programme (SRLP)**.

**2021**

**ENHANCED EDUCATION  
PLATFORM**

Purchase of Thieme MedOne Plastic Surgery Online Portal to enhance education platforms through innovation and technology

## HAND SURGERY



**2019**

**OUTSTANDING  
FACULTY  
AWARD AT RiSE  
2019**

Dr Yap Tze-Jin  
Robert

**2019**

**OUTSTANDING  
RESIDENT  
AWARD AT RiSE  
2019**

Dr Joyce Tie Lin

**2019**

**RESIDENCY  
GRADUATION**

1st resident graduated from the Hand Surgery Residency Training Programme on 30 June 2019.

**2020**

**EXIT  
EXAMINATION**

100% pass rate for SingHealth in the 2019 Hand Surgery exit examination.

**2020**

**ACCREDITATION**

Hand Surgery Residency and Plastic Surgery Residency nationalised in July 2020



### FACULTY APPRECIATION AWARD

*Plastic, Reconstructive & Aesthetic Surgery*  
Dr Terence Goh Lin Hon

*Orthopaedic Surgery*  
A/Prof Arjandas Mahadev

*Hand & Reconstructive Microsurgery*  
A/Prof Andrew Chin Yuan Hui

*Plastic, Reconstructive & Aesthetic Surgery*  
Dr Gale Lim Jue Shuang

### INSPIRING RESIDENT-EDUCATOR AWARD

*Orthopaedic Surgery*  
Dr Andrew Chou Chia Chen

### RESIDENTS' COMMITTEE APPRECIATION AWARD

*Orthopaedic Surgery*  
Dr Christian Heng Hwee Yee

### QUALITY IMPROVEMENT PROJECT AWARD

Programme *Orthopaedic Surgery*

Project Title: DOse REduction for MInimising radiation in children, as easy as DOREMI

Dr Li Zongxian

Dr Neeraj Mishra

Dr Kenneth Wong Pak Leung

A/Prof Arjandas Mahadev

### OUTSTANDING FACULTY AWARD

*Hand & Reconstructive Microsurgery*  
Dr Robert Yap Tze-Jin

*Orthopaedic Surgery*  
Dr Dinesh Kumar  
Dr Lam Kai Yet

Dr Reuben Soh Chee Cheong  
A/Prof Darren Tay Keng Jin

*Plastic, Reconstructive & Aesthetic Surgery*  
Prof Tan Kok Chai

*Orthopaedic Surgery*  
Dr Adrian Lau Cheng Kiang  
A/Prof Denny Lie Tjjauw Tjoen  
Dr Reuben Soh Chee Cheong  
A/Prof Wong Merng Koon

*Hand & Reconstructive Microsurgery*  
Prof Duncan Angus McGruther

*Plastic, Reconstructive & Aesthetic Surgery*  
Dr Jonah Kua Ee Hsiang

### OUTSTANDING RESIDENT AWARD

*Hand & Reconstructive Microsurgery*  
Dr Joyce Tie Lin

*Orthopaedic Surgery*  
Dr Jonathan Gan Zhi-Wei  
Dr Kenny Tay Xian Khing  
Dr Tay Kae Sian

*Plastic, Reconstructive & Aesthetic Surgery*  
Dr Cindy Goh Siaw Lin  
Dr Michael Hsieh Ku-Hung

*Orthopaedic Surgery*  
Dr Andrew Chou Chia Chen  
Dr Leong Dalun

*Hand & Reconstructive Microsurgery*  
Dr Chung Sze Ryn

*Plastic, Reconstructive & Aesthetic Surgery*  
Dr Kok Yee Onn

### OTHER AWARDS

### NUS MEDICINE APPRECIATION FOR CLINICAL EDUCATORS 2020



*Dean's Award for Teaching Excellence*  
Dr Henry Soeharno  
Consultant  
Orthopaedic Surgery  
Singapore General Hospital



*Special Recognition Award*  
Dr Reuben Soh Chee Cheong  
Senior Consultant  
Orthopaedic Surgery  
Singapore General Hospital



*Junior Doctors Teaching Award*  
Dr Zackary Chua Kerk Hsiang  
Consultant  
Orthopaedic Surgery  
KK Women's and Children's Hospital



*Junior Doctors Teaching Award*  
Dr Elvin Salioc Lokino  
Senior Resident Physician  
Orthopaedic Surgery  
KK Women's and Children's Hospital

# FACULTY AFFAIRS AND ACADEMIC DEVELOPMENT

The Faculty Affairs and Academic Development (FAAD) arm of MSKSC ACP is dedicated to working with the clinical services, education and research offices of MSKSC ACP to establish a framework for faculty development and promoting an environment where we actively recruit and retain a diverse faculty of talented educators, clinicians and researchers who share a vision on advancing patient care through Academic Medicine.



## IDENTIFY & GROOM PROMISING INDIVIDUALS ACCORDING TO DIFFERENT PATHWAYS FOR DEVELOPMENT:

- Clinician Innovator – One who demonstrates great interest & aptitude in developing novel solutions & innovative enhancements to the healthcare system.
- Clinician Administrator – One who undertakes critical roles in administrative duties, particularly one with headship positions & responsibilities.
- Clinician Scientist – One who demonstrates passion and interest in research, be it in the basic sciences, translational or clinical.
- Clinician Educator – One who demonstrates a strong dedication to teaching & imparting knowledge to future generations of medical students.
- Clinician Mentor – One who can provide guidance, training, support, help define a strong career development plan, and serve as a role model for the mentee.



## DEVELOP A MENTORING PROGRAMME WHICH IS VITAL TO PROFESSIONAL DEVELOPMENT IN THE FIELD OF MEDICINE, INFLUENCING CAREER CHOICE AND FACULTY RETENTION



## DEVELOP ALL-ROUNDED COMPETENCIES IN CLINICAL SERVICES, RESEARCH AND EDUCATION



## TITLING FOR ALLIED HEALTH & NURSING TO PROMOTE SYNERGY, PROVIDE RECOGNITION AND ENHANCE INCLUSIVITY FOR ALLIED HEALTH AND NURSING PROFESSIONALS



## INCULCATE RESILIENCE WITHIN THE ACP THROUGH EDUCATIONAL TALKS BY INVITED EXPERTS, REGULAR ENGAGEMENT SESSIONS AND BONDING TO PROMOTE COHESION



International faculty; (L) Dr Andrea Atzei & (R) Prof Jan Ragnar Haugstvedt

## 4<sup>th</sup> Singapore Wrist Arthroscopy Course - Jan 2019

An interactive course with two streams - The Fundamentals (Basic) of Wrist Arthroscopy and Mastering Wrist Arthroscopy (Advanced) - with supervision by expert international faculty.

Participants in the basic course were taught the fundamentals of wrist arthroscopy, including performing diagnosis and simple therapeutic procedures of the scope. In the advanced course, clinicians were able to refine and stretch their technical skills and abilities to achieve the highest level of mastery in wrist arthroscopy.

## Looking Good, Feeling Great - Jul 2019

Public forum collaboratively organised by Plastic, Reconstructive and Aesthetic Surgery, Dermatology & Vascular Surgery

With interesting topics ranging from skin issues such as skin cancer, pigmentation & pigmented lesions and spider & varicose veins, the turnout for the event was encouraging albeit on a weekend morning. The speakers also shared on the surgical & non-surgical methods available for facial rejuvenation which definitely piqued the interest of the attendees. The ACP looks forward to organizing more of such events to reach out to the community.



Speakers for the event

## Kwong Wai Shiu Hospital Community Day - Mar 2019

Collaboration between Orthopaedic Surgery, Physiotherapy, Occupational Therapy & Nursing



The multi-disciplinary team behind the community outreach initiative

On 30 Mar 2019, Kwong Wai Shiu Hospital had hosted a group of staff from the Singapore General Hospital who organised a community outreach programme. The target participants were senior citizens of Geylang Bahru area.

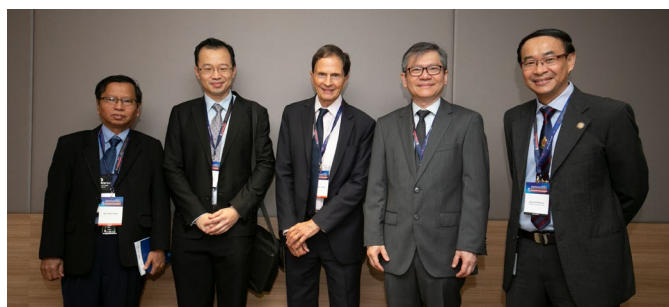
The senior citizens were given a free holistic assessment of their health in particular their predisposition to osteoporosis as well as fall risk factors via the onsite screening and evaluation provided.

It was a fruitful day for the team from SGH, as they were able to raise the level of awareness and educate the seniors on the importance of healthy lifestyle habits, good posture and comfortable footwear.

## Surgical & Anaesthesia Congress 2019 - Sep 2019



▲ Guests were treated to a performance by the Silent Stars Samba Drummers during the opening ceremony



▲ Members of the organising committee with a guest and one of the invited speakers; Dr David L. Heymann

## 12<sup>th</sup> Asia Pacific Burns Congress - Aug 2019



▲ Welcome remarks by the organising co-chairperson

▲ Opening of the Burn Centre by Dr Lam Pin Min; Senior Minister of State, Ministry of Health

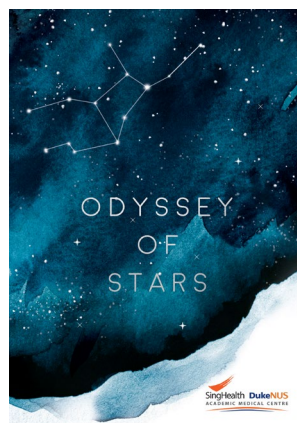
With the theme "Burn Care Excellence through Multidisciplinary Team Work", the event showcased the infrastructure available and the specialised capabilities of the staff in handling burn injuries.

### Global Surgery, Global Partnerships

This exciting biennial event was a resounding success! With a series of surgical workshops conducted in addition to the exciting line-up of distinguished plenary lectures, symposium talks, panel discussions, oral & poster presentations over the span of two days, Academia was bustling with activity throughout.

Together with industry partners who were invited to showcase the latest technology available in the market, there was also a lively exchange of multi-disciplinary knowledge and best practices as clinicians from multiple disciplines, researchers, students, allied health professionals, and nurses convened for the event. The very first transplant symposium was organised by the Transplant Centre as well.

## SingHealth Duke-NUS Gala Dinner - Sep 2019



A night filled with glitz befitting the theme of the event; "Odyssey of Stars", the event was graced by Mr Teo Chee Hean; Senior Minister & Coordinating Minister for National Security.

Held at the swanky Ritz-Carlton, Millenia Singapore, the event was attended by 800 guests. With generous donations from the Goh

Foundation as well as Ngee Ann Development, these funds will facilitate healthcare advances aimed at saving more lives and improving quality of life for patients.

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