The Evolution of an (accidental) Surgeon Scientist

Pierce K.H Chow FRCSE PhD

Professor and Program Director, Duke-NUS Medical School Singapore

Senior Consultant Surgeon, National Cancer Centre and Singapore General Hospital

THE NMRC AWARDS CEREMONY AND RESEARCH SYMPOSIUM
Parkroyal Collection Marina Bay, Singapore.
28th May 2025

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GRADUATE MEDICAL SCHOOL SINGAPORE

Outline

1. How my journey to lucrative private practice surgery in Singapore was subverted – a personal story

2. Some important questions to be addressed about clinician scientists

3. Some recommendations if you want to be (also subverted) a Clinician-Scientist

Singapore General Hospital
SingHealth

National Cancer Centre Singapore
SingHealth

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long ago in a galaxy far away

.....all I wanted to do was to

go to a good Medical School

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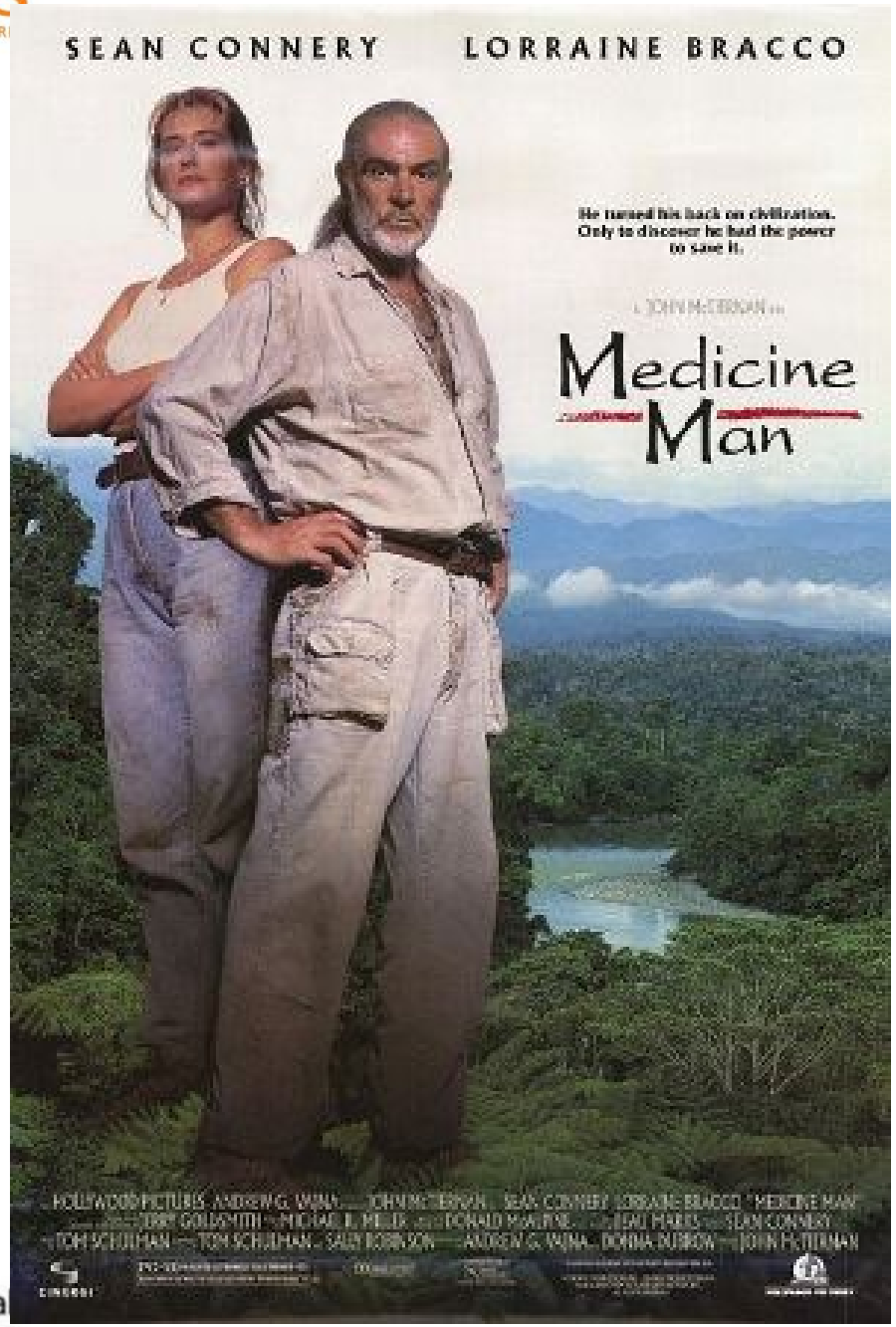

Because doctors are so smart and live such interesting lives!

..doctors in movies have such so much adventure!

….and even get to save lives in exotic place

And surgeons are even better!

..they are so cool!

DUKE NUS GRAD

To become a surgeon, I would need to go to medical school first

Fresh off the boat from a small(ish) town in Borneo

Looking haggard in medical school

Too little sleep in Kent Ridge Hall, NUS

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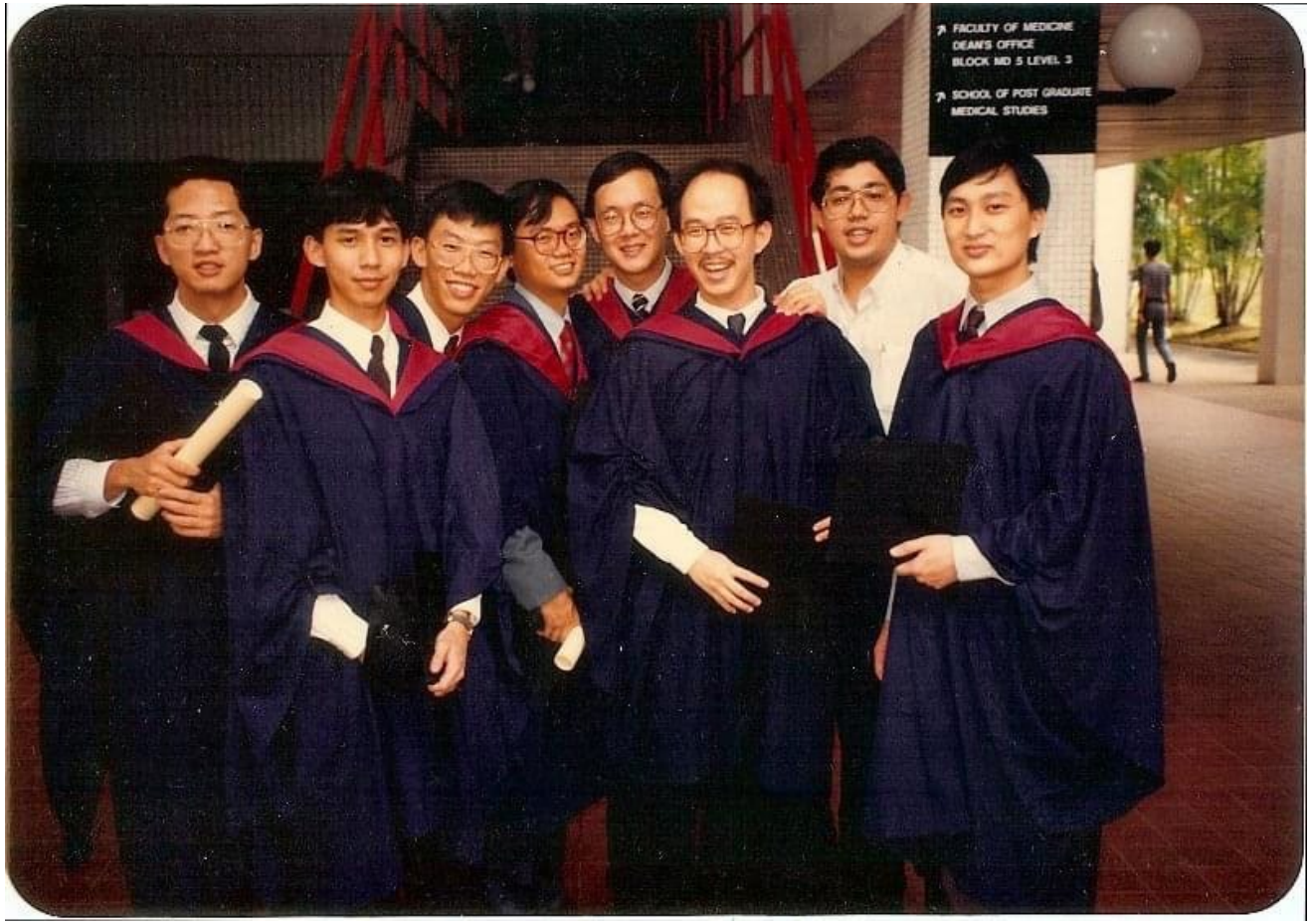
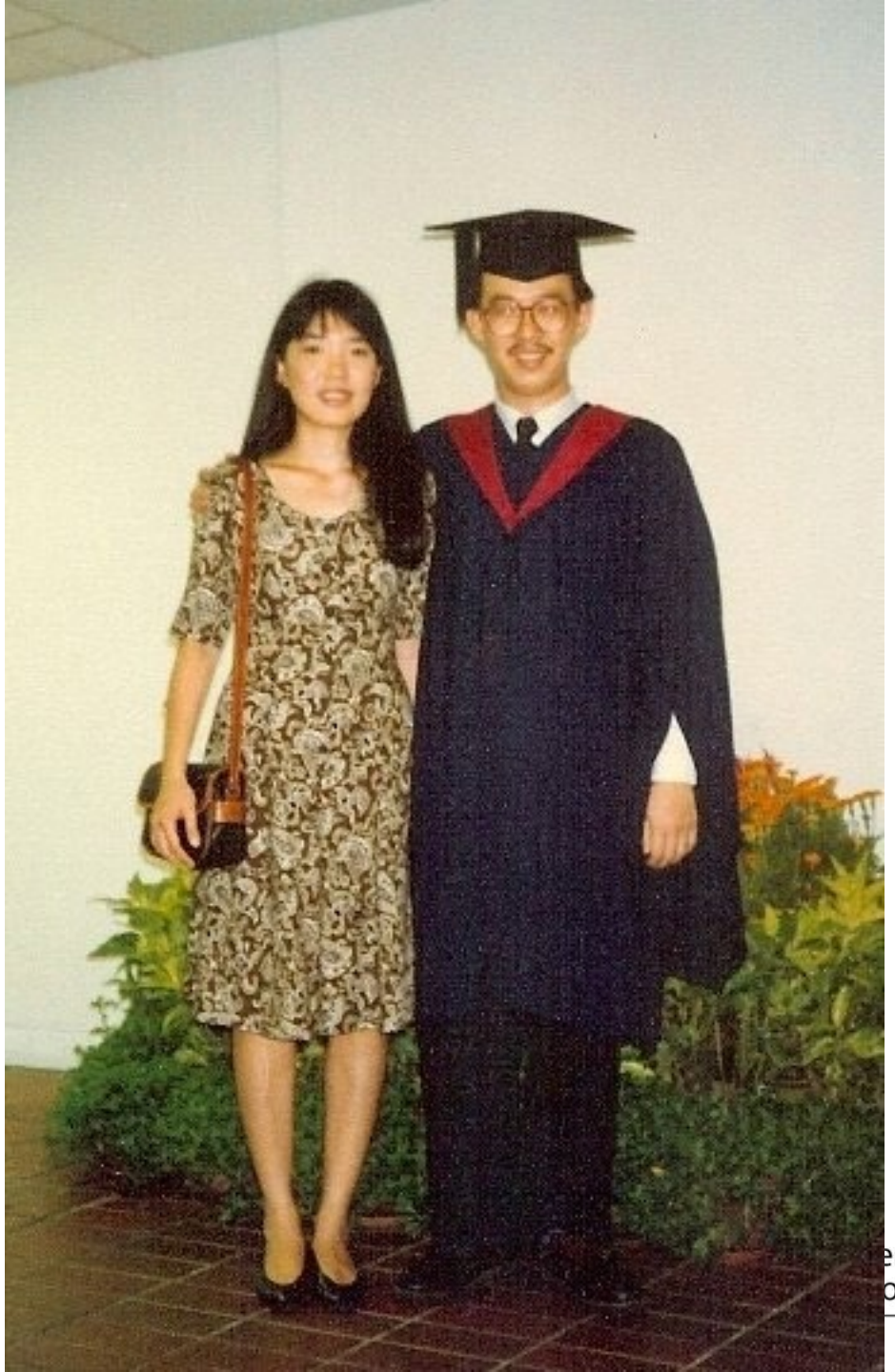
Graduated from Medical School





Met someone interesting

Singapore General Hospital
SingHealth

Surgical Training

- The training is **long** and **ardous**
- You feel that you have to give up a lot during the **“best times”** of your life
- Once you begin it is **difficult** to move away laterally to start something else

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Made many friends

Got Married

Singapore General Hospital
SingHealth

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✓ passed FRCSE and MMed (Surgery)

✓ had our 1st child

Singapore General Hospital
SingHealth

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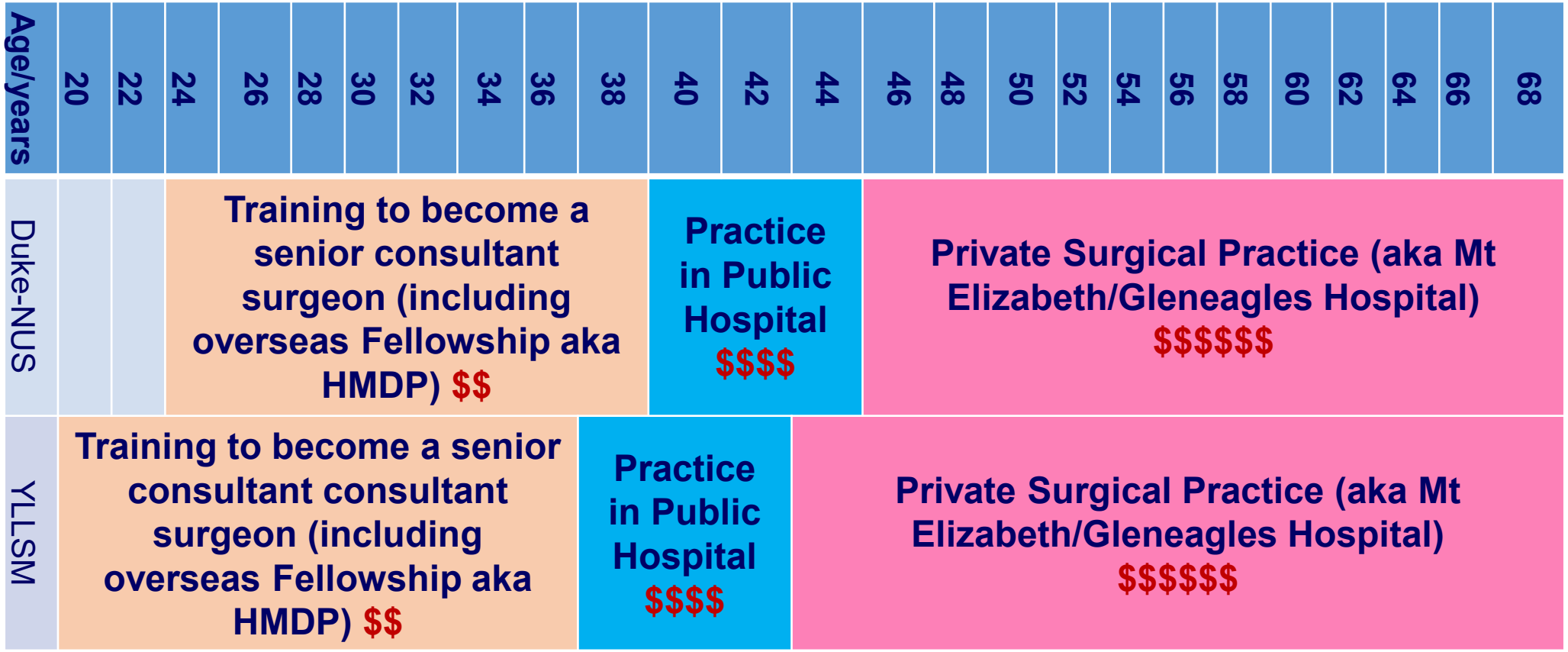
Completed Advanced Surgical Training and Fellowship in Liver Transplantation

Professor Russell Strong

National Cancer Centre Singapore
SingHealth

Professional Trajectory of a Surgeon in Singapore



Professional trajectory changed during AST

Head of General Surgery, Singapore General Hospital

"the better surgeon is the one who understands science and can conduct research – PhD is a good idea"

→ **PhD (Surgical Physiology)**

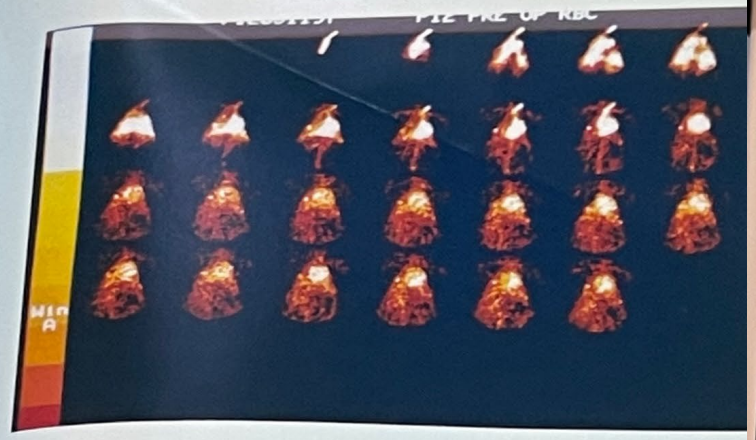


FIGURE 4 Data acquisition at 1 second per frame using the Gamma camera

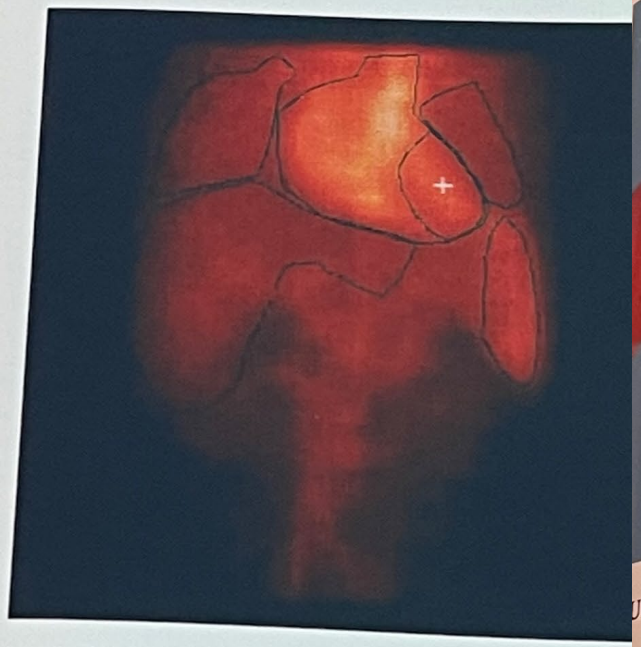


FIGURE 5 Regions of interest over the heart, left ventricle, lu and the aorta.

Handling radionuclides

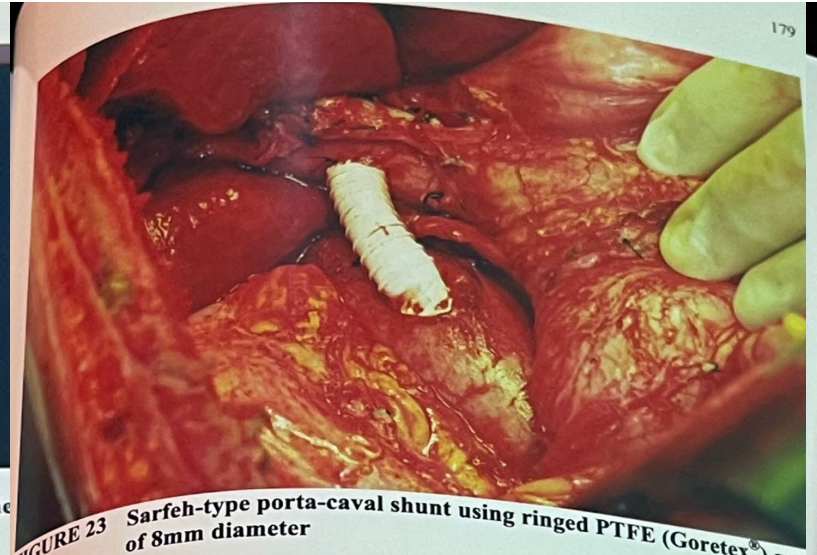
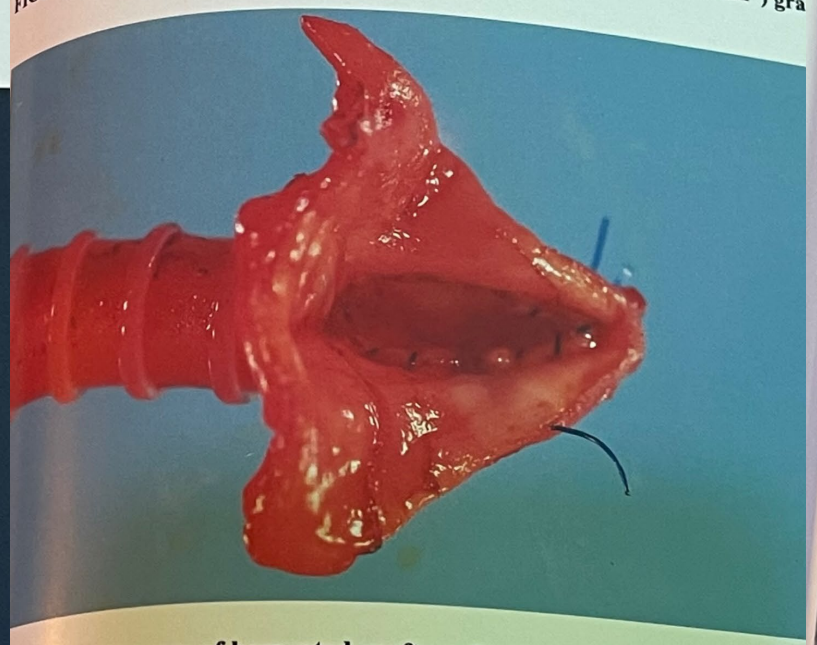


FIGURE 23 Sarfeh-type porta-caval shunt using ringed PTFE (Goretex®) gra of 8mm diameter



URE 24 Patency of harvested graft confirmed

Complex surgery in large animal models

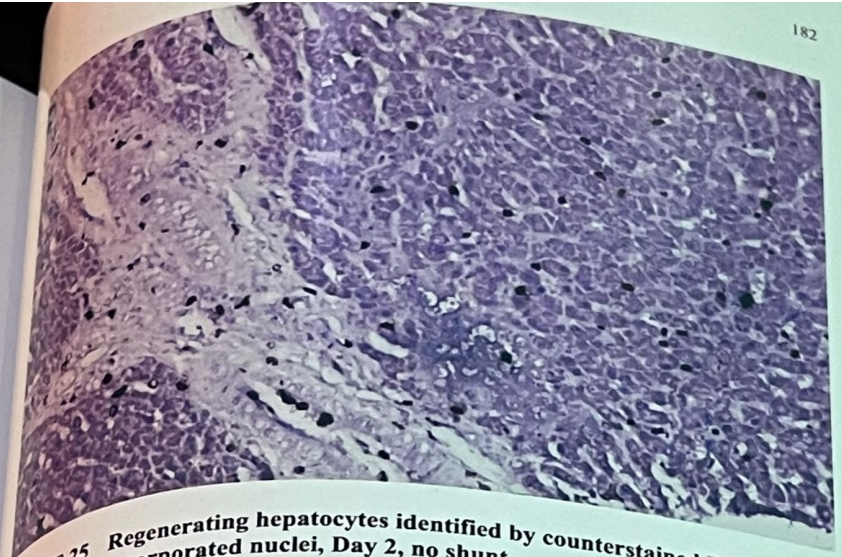


FIGURE 25 Regenerating hepatocytes identified by counterstained BrdU-incorporated nuclei, Day 2, no shunt.

FIGURE 26 Regenerating hepatocytes identified by counterstained BrdU-incorporated nuclei, Day 2, with porta-caval shunt.

Immuno-histochemistry

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CHANGES IN LIVER BLOOD FLOW AFTER MAJOR HEPATECTOMY

PIERCE K.H. CHOW

MBBS (Singapore), MMed. (Surgery), FRCS (Edinburgh),

FAMS (General Surgery)

A THESIS SUBMITTED

FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF SURGERY

NATIONAL UNIVERSITY OF SINGAPORE

2003

- Completed HMDP Fellowship in Liver Transplantation
- Consultant Surgeon
- After SARS

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SingHealth

National Cancer Centre Singapore
SingHealth

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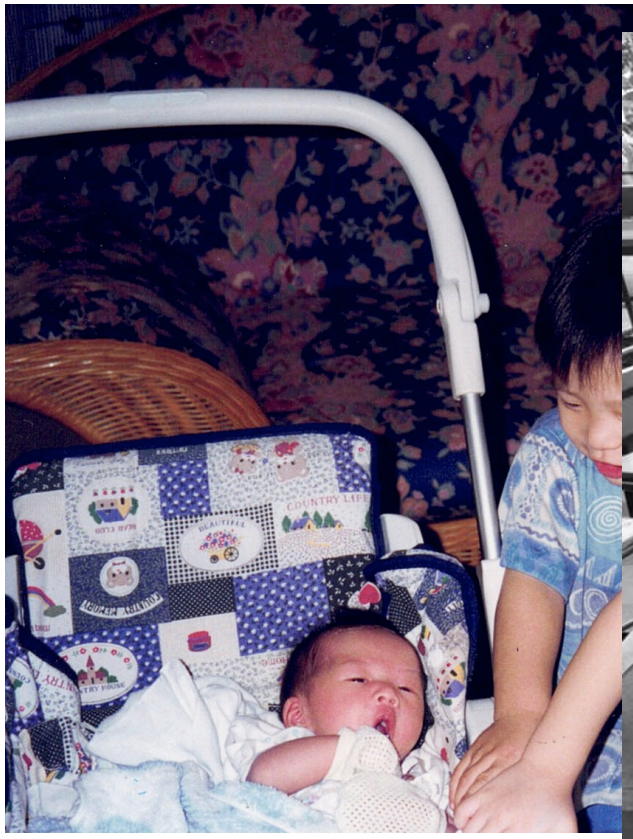
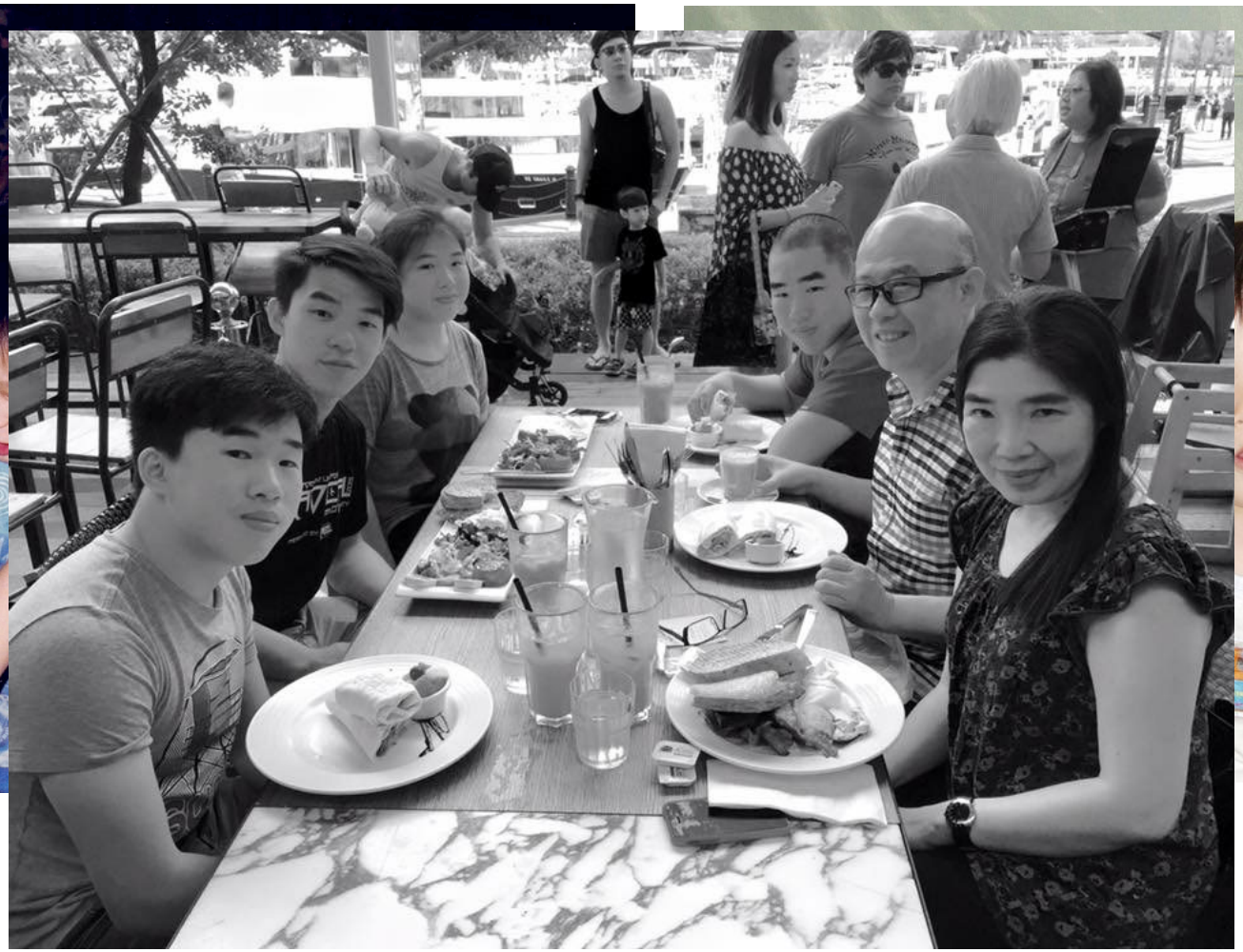
Some small people appeared……





……and they never left

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National Cancer Centre Singapore
SingHealth

Professional trajectory changed during AST

Head of General Surgery, Singapore General Hospital

"the better surgeon is the one who understands science and can conduct research – PhD is a good idea"

→ **PhD (Surgical Physiology)**

"can you do some research to improve the outcomes of patients with hepatocellular carcinoma (HCC)"

→ **Randomized controlled trials (RCTs)**
Started the Asia-Pacific HCC trials group

The Beginning of the Asia-Pacific Hepatocellular Carcinoma (AHCC) trials group

- Created in **1997** when clinicians from:
  - The Chinese University of Hong Kong
  - The Undayana University, Bali, Indonesia
  - The University Kebangsaan in Malaysia
- Joined a RCT in HCC proposed by the Dept of General Surgery, Singapore General Hospital (SGH) and NMRC Clinical Trials and Epidemiology Research Unit (CTERU) – SCRI
- The 1st collaborative oncology trial in the region - became truly Asia-Pacific with centers Myanmar, Thailand, Australia and South Korea and New Zealand

AHCC Trials Group

Aim: to carry out definitive multi-centre trials and other research on HCC in the Asia-Pacific where the disease is endemic.

- In 1997 - very few therapeutic options for HCC and relatively few large clinical studies in HCC
- Clinicians looking after HCC patients in the Asia-pacific were bonded by a common need for a trials group that seek efficacious treatment for a common cancer that had few therapeutic options

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Travelled off the beaten path

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Using various forms of transport

Asia-Pacific HCC (AHCC) Trials Group 2025 – 57 centres

Australia
- Royal Prince Alfred Hospital
- Royal Adelaide Hospital

Brunei
- The Brunei Cancer Centre

China
- Nanjing Bayi Hospital
- Zhongshan Hospital, Fudan University Shanghai
- Beijing Cancer Hospital
- Guangxi Medical University Cancer Centre
- Second Affiliated Hospital Zhejiang University School of Medicine
- Harbin Medical University Cancer Hospital

Hong Kong
- Queen Mary Hospital

Indonesia
- Sanglah General Hospital
- University of Indonesia

Japan
- Kyorin University School of Medicine
- University of Tokyo
- Kinkai University Hospital
- National Cancer Centre
- National Center of Global Health and Medicine

Malaysia
- Penang Adventist Hospital
- Prince Court Medical Centre
- Sarawak General Hospital
- University Malaya Medical Center

Mongolia
- National Cancer Centre

Myanmar
- Yangon GI & Liver Centre

New Zealand
- Auckland City Hospital
- Cancer Trials New Zealand

Philippines
- Davao Doctors' Hospital
- Makati Medical Center
- St. Luke's Medical Center
- The Medical City

Singapore
- Changi General Hospital
- Singapore General Hospital
- Sengkang General Hospital
- SingHealth Polyclinics
- Khoo Teck Puat Hospital
- National Cancer Centre
- National University Hospital
- Tan Tock Seng Hospital

South Korea
- Samsung Medical Center
- Ajou University Hospital
- Asan Medical Centre
- Korea University Anam Hospital
- Seoul National University Bundang Hospital
- Severance Hospital, Yonsei University College of Medicine
- St Mary's Hospital
- St Vincent Hospital, Catholic University Medical College

Taiwan
- National Taiwan University Hospital
- Taipei Veterans General Hospital
- Chang Gung Memorial Hospital – KS
- Chang Gung Memorial Hospital – LK
- China Medical University Hospital
- National Cheng Kung University Hospital

Thailand
- Siriraj Hospital, Mahidol University
- National Cancer Institute
- Chulabhorn Hospital

Vietnam
- Choray Hospital
- National Cancer Institute K

USA
- Duke University School of Medicine

THE Asia-Pacific Hepatocellular Carcinoma Trials Group

National Cancer Centre Singapore SingHealth

Professional trajectory is now changed

Head of General Surgery, Singapore General Hospital

"the better surgeon is the one who understands science and can conduct research – PhD is a good idea"

PhD (Surgical Physiology)

NMRC Clinician Scientist (Senior)
- translational research
- randomized controlled trials (RCTs)

2008

Deviation from expected natural trajectory

"can you do some research to improve the outcomes of patients with hepatocellular carcinoma (HCC)"

Randomized controlled trials (RCTs)

Started the Asia-Pacific HCC trials group

MINISTRY OF HEALTH
SINGAPORE

National Medical Excellence Award 2012

National Outstanding Clinician Scientist Award 2012

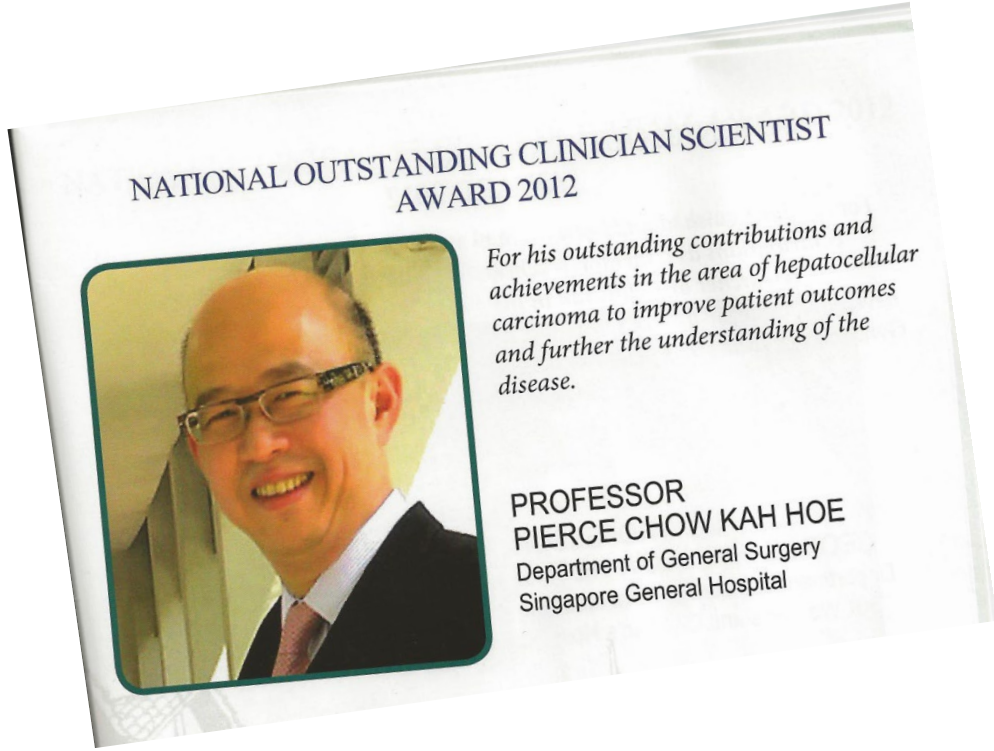
Presented to

Professor Pierce Chow

Singapore General Hospital
National Cancer Centre Singapore
Duke-NUS Graduate Medical School

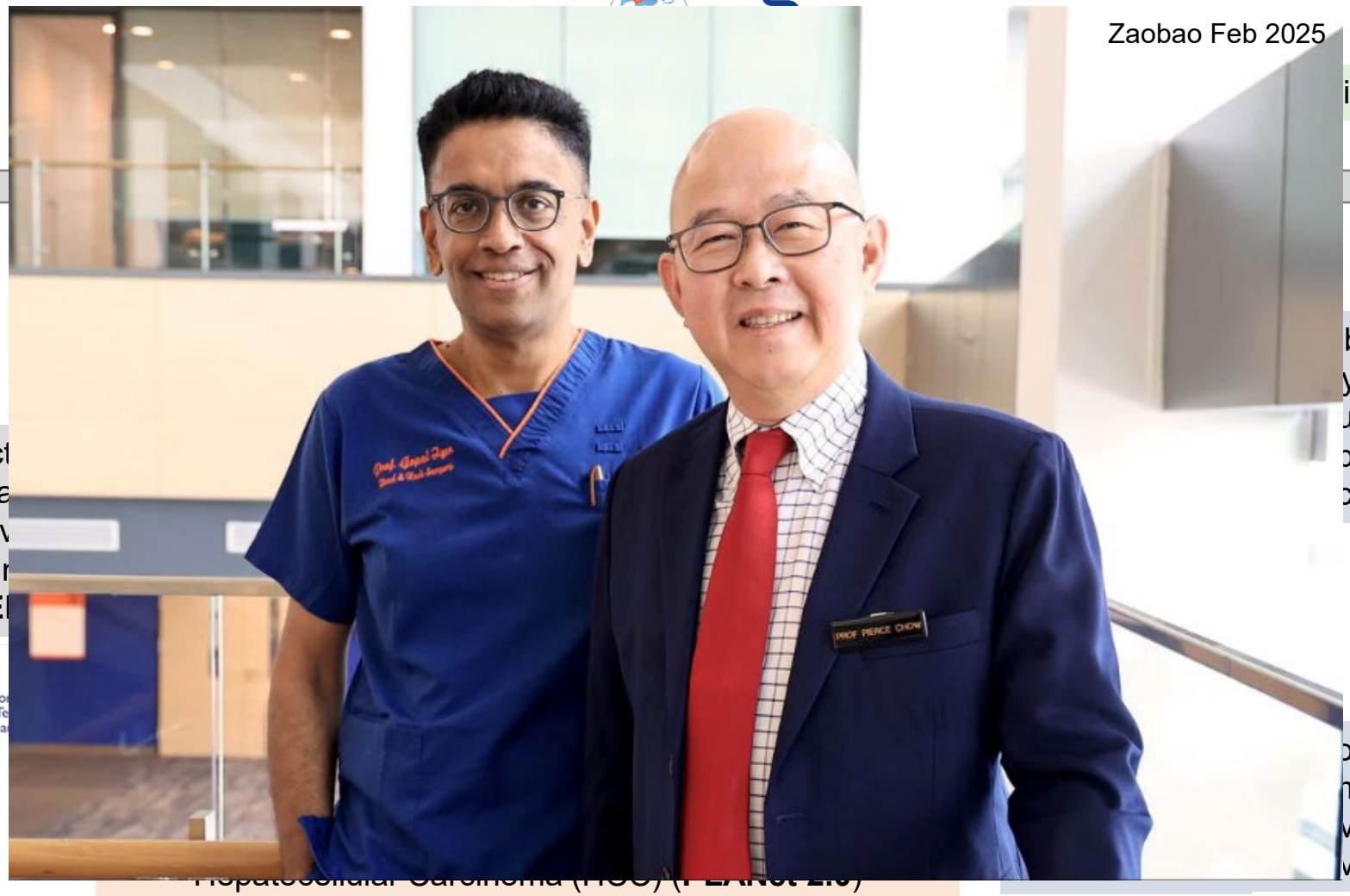
"For his outstanding contributions and achievements in the area of hepatocellular carcinoma to improve patient outcomes and further the understanding of the disease"

Mr Gan Kim Yong
Minister for Health



National Cancer Centre Singapore
SingHealth

Spectrum of Clinical and Translational Research on HCC at the NCCS



Zaobao Feb 2025

in Asia

HIGH-RISK

ADVANCED

AHCC10: Early detect
miRNA, microbiome a
biomarkers in the ev
chronic liver disease i
prospective cohort (E

ble-blind, randomized phase II
y and efficacy of SIRT-Y90
us bevacizumab versus SIRT-
patients with locally advanced
cinoma (**STRATUM**)

SIRTeX

Agency fo
Science, Te
and Resea
SINGAPORE

opsy based identification of
markers of response in
vanced HCC receiving Y90 +/-
veraging on **AHCC09**

Hepatocellular Carcinoma

THE Asia-Pacific Singapore General Hospital SingHealth

NMRC National Medical Research Council Singapore

NMRC National Medical Research Council Singapore

National Cancer Centre Singapore SingHealth

What the point of the story?

- Why do we need to have **Clinician Scientists**?
- Why would you ever want to be a **Clinician Scientist**?
  - Why did I become a clinician scientist?

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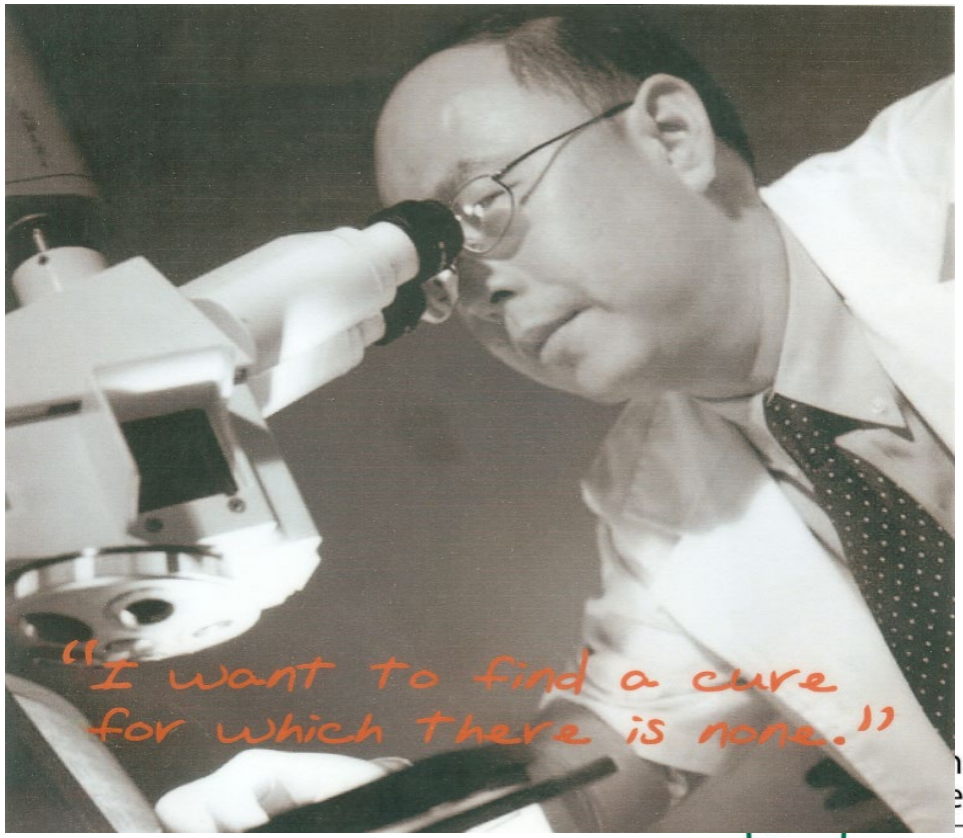
We need Clinician Scientists because there are increasing number of things which only they can do

What a clinician (surgeon) does

What a research scientist does



SingHealth

al Cancer
e Singapore
SingHealth

This is because the world has changed in important ways and is continuing to change rapidly

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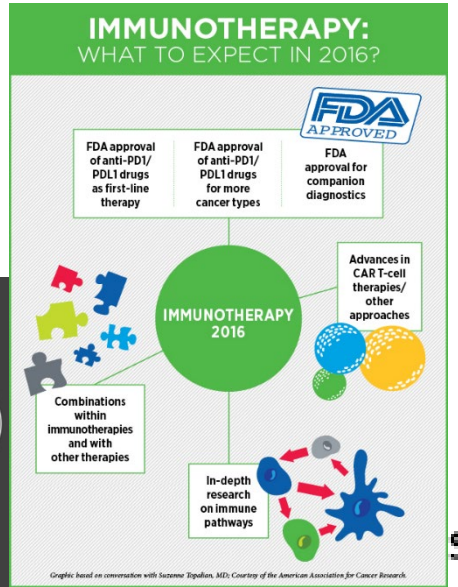
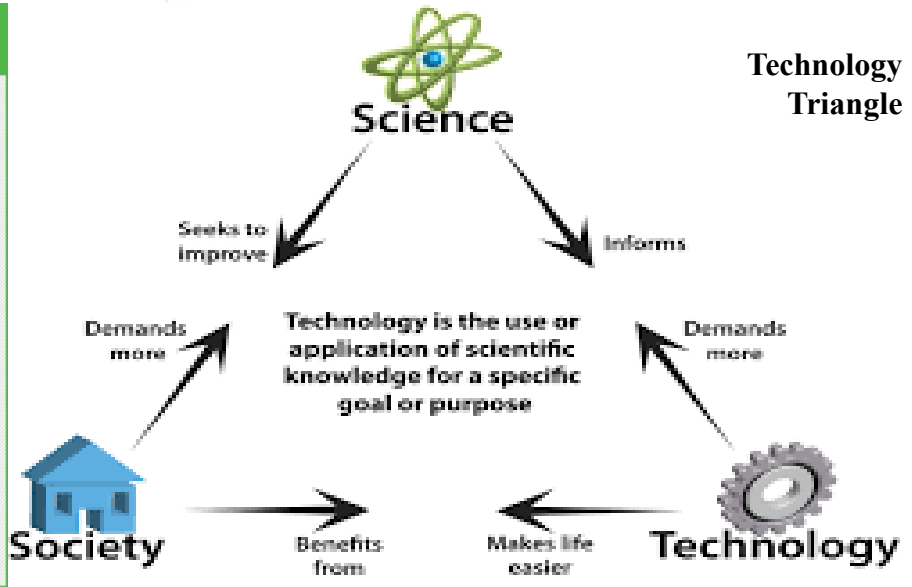
A Vastly Changed Landscape

- Advances in the recent 2 decades not been only in Biomedical Science but also in the: *physical, computational, behavioral and social sciences.*
- These sciences have integrated





Technology Triangle

Singapore General Hospital
SingHealth

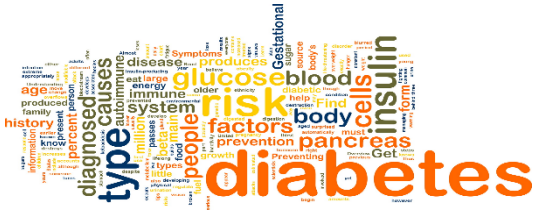
National Cancer Centre Singapore
SingHealth

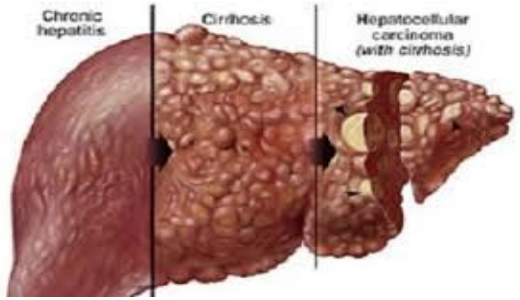
Scientific research has changed

Increasing Need for Inter-disciplinary Research to impact patient outcomes

Major Diseases

- Multi-faceted
- Share risk factors with other diseases
- Multiple etiologies e.g. diabetes mellitus, HCC





Requires

- Broad-based
- Large scale
- Trans-institutional

National Cancer Centre Singapore, SingHealth

Singapore General Hospital, SingHealth

Genome Institute of Singapore, A*STAR

NUH National University Hospital

DukeNUS Medical School

Institute of Molecular and Cell Biology, A*STAR

Lee Kong Chian School of Medicine

Redefining Medicine, Transforming Healthcare

Challenges

(for single PI/small group)

1.No single lab has **sufficient breadth**

2.Logistically challenging **coordination** *of large multi-institutional projects*

3.Technology resides in **different intuitions**

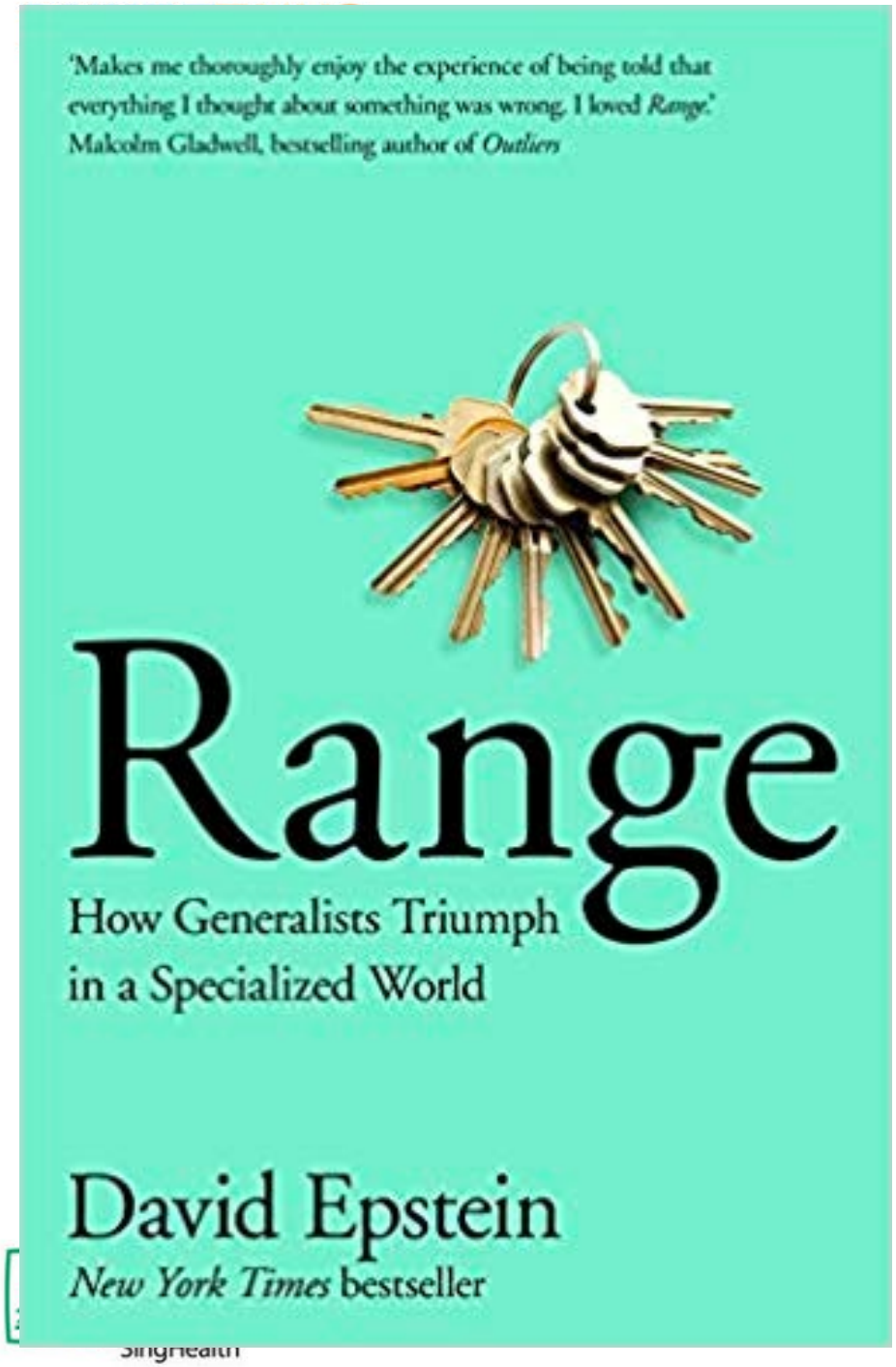
Singapore General Hospital, SingHealth

National Cancer Centre Singapore, SingHealth

What has changed in the Landscape?

1. The nature of Biomedical Research has fundamentally changed

2. With this change, it becomes crucial to have Range, in order to identify opportunities and develop strategies.



Specialization and massive amounts of data create deep Silos

- Very few people will have a wide range of knowledge and experience
- But a wide range of knowledge and experience is necessary to understand trends and implications and to identify opportunities and create strategies
- Clinician-Scientists have the range of knowledge and experience that clinicians and scientists do not have

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What is Needed

Major Diseases

- Multi-faceted
- Share risk factors with other diseases
- Multiple etiologies e.g. diabetes mellitus, HCC

Requires

- Broad-based
- Large scale
- Trans-institutional

Challenges

(for single PI/small group)

1.Not single lab has sufficient breadth
2.Logistically challenging coordination *of large project multi-institutional projects*
3.Technology resides in different intuitions

Direction

- Multi-disciplinary
- Multi-institution
- Large collaborative grant

- *Clinical Data*
- *Imaging Data*
- *Pre-clinical data*
- *Genomics*
- *Proteomics*
- *Metabolomics*
- *Immunomics*
- *Data science*

New breed of interdisciplinary CLINICIAN SCIENTIST

Singapore General Hospital
SingHealth

National Cancer Centre Singapore
SingHealth

What has changed in the Landscape?

1. The nature of Biomedical Research has fundamentally changed

2. With this change, it becomes crucial to have Range, in order to identify opportunities and develop strategies.

3. Leaders required to lead multi-disciplinary teams

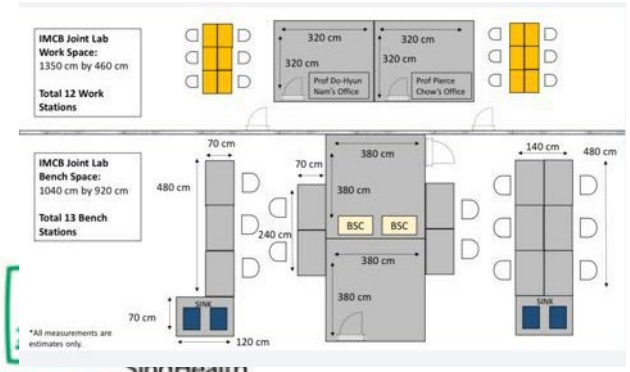
Only Clinician-Scientists can lead Multi-Disciplinary Teams

Multi-Disciplinary, Multi-Institution, Multi-National – lead by NCCS

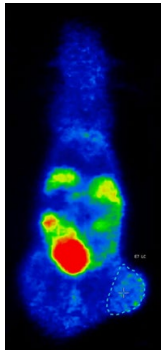
Multi-omics and clinical approach

Singapore Liver Cancer Consortium (SLCC)

Joint Lab at Biopolis
an NCC-lead collaboration
With NUHS/CIS, GIS, IMCB, Samsung Medical Center

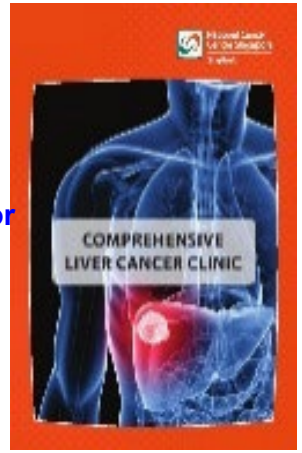


Laboratory for Translational Liver Research
at Academia



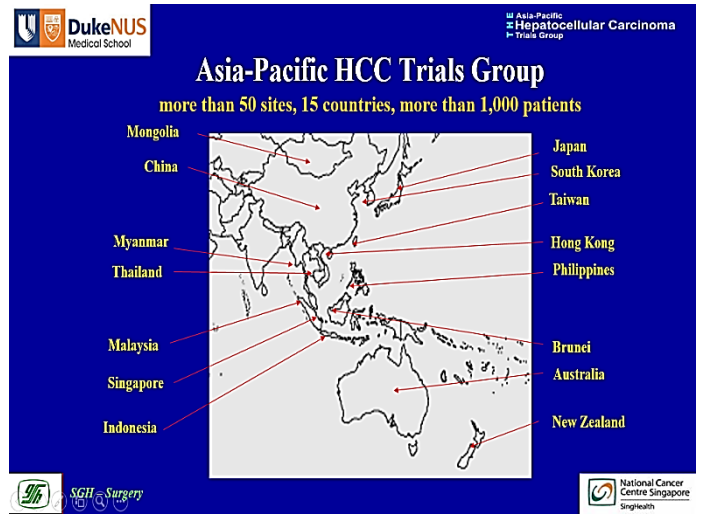
With radiation, animal and imaging facilities at SEMC

Comprehensive Liver Cancer Clinic (CLCC)
At NCCS



Multi-disciplinary consensus
Prospective patient samples

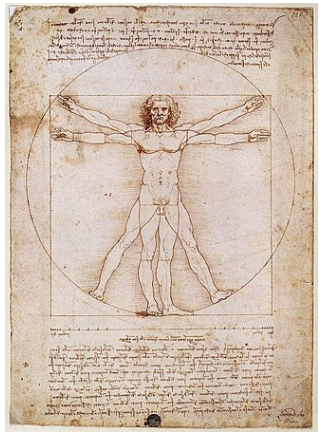
Asia-Pacific Hepatocellular Carcinoma Trials Group



In 2017 joined by **China** *and* **Japan**

What Trajectories need to Intersect to create a Clinician-Scientist?

Mentor
- accomplished
- inspires, teaches
- opens doors



Clinician
- Aspirant – wants to be a clinician scientists
- innate talents
- characteristics
  - fortitude
  - adaptability
  - patience

Terrior
- unique environmental conditions
- Institutional culture
- critical mass

What the point of the story?

- Why do we need to have **Clinician Scientists**?

- Why would you ever want to be a **Clinician Scientist**?
  - Why did I become a clinician scientist?

Why did I become a clinician scientist

1. Because patients need clinician scientists
2. Because I found that I am competitive in research
3. Because I want life to be interesting

1. Patients need Clinician-Scientists

- A ***critical mass*** of clinician-scientists is required if patients were to benefit from science and have better clinical outcomes.
- Only clinician-scientists can successfully lead
  - *Translational research*
  - *Clinical trials*
- Very few clinicians from each cohort will *have the aptitude and stamina - <5%*

2. I am Competitive in Research

- A clinician-scientist career is highly Darwinian

Research Article
Hepatic and Biliary Cancer

A multimodal atlas of hepatocellular carcinoma reveals convergent evolutionary paths and 'bad apple' effect on clinical trajectory

Authors

Jianbin Chen, Neslihan Arife Kaya, Ying Zhang, …, Wai Leong Tam, Weiwei Zhai, Pierce Kah-Hoe Chow

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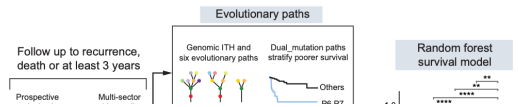
Graphical abstract

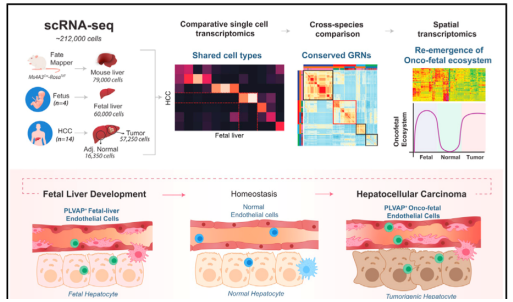


JOURNAL OF HEPATOLOGY

Cell

Onco-fetal Reprogramming of Endothelial Cells Drives Immunosuppressive Macrophages in Hepatocellular Carcinoma

Graphical Abstract



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Article

Articles

Atezolizumab plus bevacizumab versus active surveillance in patients with resected or ablated high-risk hepatocellular carcinoma (IMbrave050): a randomised, open-label, multicentre, phase 3 trial

Shukui Qin, Minshan Chen*, Ann-Lii Cheng*, Ahmed O Kaseb*, Masatoshi Kudo*, Han Chu Lee*, Adam C Yopp*, Jian Zhou, Lu Wang, Xiaoyu Wen, Jeong Heo, Won Young Tak, Shinichiro Nakamura, Kazushi Numata, Thomas Uguen, David Hsiehchen, Edward Cha, Stephen P Hack, Qinshu Lian, Ning Ma, Jessica H Spahn, Yulei Wang, Chun Wu, Pierce K H Chow*, for the IMbrave050 investigators†*

Summary

Background No adjuvant treatment has been established for patients who remain at high risk for hepatocellular carcinoma recurrence after curative-intent resection or ablation. We aimed to assess the efficacy of adjuvant atezolizumab plus bevacizumab versus active surveillance in patients with high-risk hepatocellular carcinoma.

Lancet 2023; 402: 1835–47
Published Online October 20, 2023
https://doi.org/10.1016/

MOH-001683-00
NMRC OF-LCG OFLCG21Jun-0016
A*Star IAF ICP I2001E0072
A*Star IAF ICP I2101E0011

3. A Clinician Scientist's life is more interesting

SIV in Mongolia

International advisory board in Barcelona

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Outline

1. How my journey to lucrative private practice surgery in Singapore was subverted – a personal story

2. Some important questions to be addressed about clinician scientists

3. Some recommendations if you want to be (also subverted) a Clinician-Scientist

Singapore General Hospital
SingHealth

National Cancer Centre Singapore
SingHealth

Key Performance Indicators of a career clinician scientist

1. Grants: continual success in securing competitive national or international research grants to pay for staff, consumables, rent etc to conduct research

2. Publications: in high impact journals in the field

3. Research leadership: both collaborate in and initiate/lead research enterprises

4. Recognized expertise: international recognition of expertise: (chairs) advisory boards, plenary/keynote speaker etc

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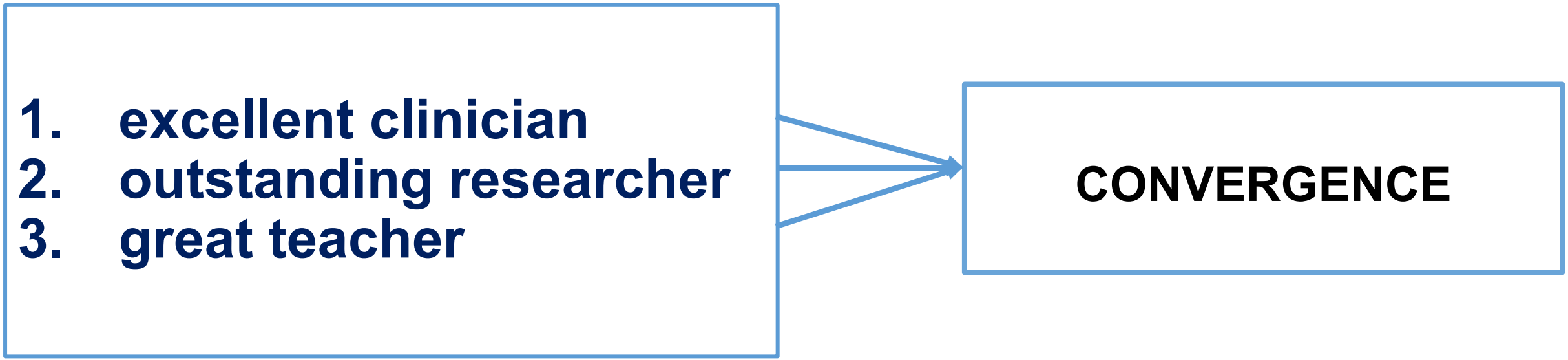
How to make this work



- pick an area to focus on:
  - natural affinity, good mentor, institution has natural strengths
- converge on the area you have chosen to focus on:
  - clinical work, research, teaching

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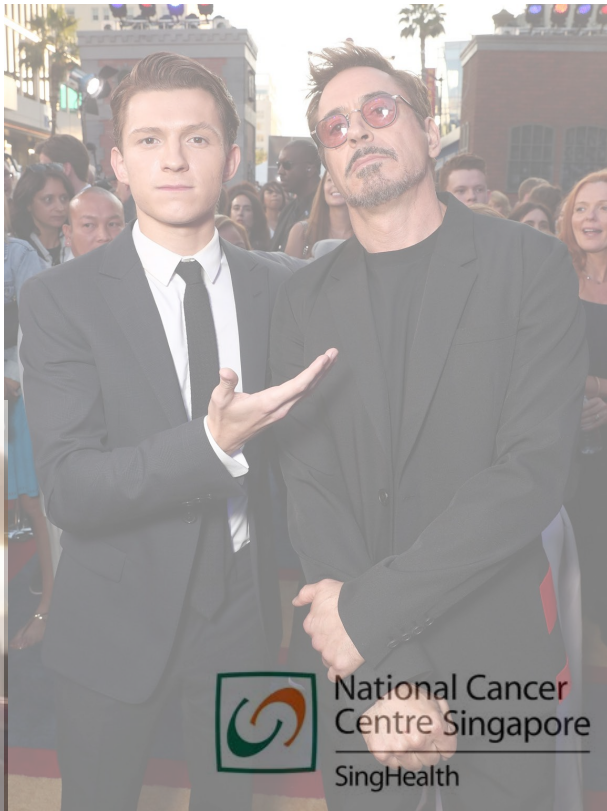
Final Advice

- Think **long-term**
  - Disasters will occur – move on
- Spend effort demonstrating that you are **reliable** and **provide value**
- Be **brave**
- But be **smart**



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Its so cool to be a clinician –scientist

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THANK YOU!

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