International Organization for Medical Physics

Postgraduate Program Accreditation Report

Program Name: **Master of Science in Medical Physics (MScMP)**

Location: **The Hong Kong Polytechnic University, Hong Kong**

Date of Report : **8 May 2024**

Assessment Team (AT)

Application Document AT:
1. **Prof. Dr. Arun Chougule**
2. **Prof. Dr. Renato Padovani**
3. **Prof. Dr. Chai Hong Yeong**

On-Site AT:
1. **Prof. Dr. Arun Chougule**
2. **Prof. Dr. Chai Hong Yeong**

Date of On-Site Visit: **2-3 May 2024**

Executive Summary

The Master of Science in Medical Physics (MScMP) program offered by the Hong Kong Polytechnic University was founded in 2020 by Professor Jing CAI. It is by far the only postgraduate medical physics education program in Hong Kong. The program closely follows the academic syllabus of the Graduate Medical Physics program in Duke University, North Carolina, USA, as Professor Jing CAI was the associate professor of the Graduate Medical Physics program in Duke University from 2009-2017. The MScMP program is supported by the Hong Kong Institution of Physicists in Medicine (HKIPM) and Hong Kong Association of Medical Physics (HKAMP).

The program requires students to complete 30 credits over 1.5 to 3 years, covering a compulsory subject (Research Methods and Biostatistics), 18 credits from core subjects in medical physics, and 9 credits from elective subjects (relevant to advanced topics in medical physics). Most of the theoretical classes are conducted in the evening (6.30 - 9.30PM). The maximum Grade Point Average (GPA) is 4.30, and the passing GPA is 1.70 or above.

The faculty comprises a diverse team of core medical physics lecturers, other university academic staff, clinical medical physicists, oncologists/radiologists, and international scholars. The program provides state-of-the-art teaching and laboratory facilities, including virtual environment radiotherapy training (VERT) system, multiple radiotherapy treatment planning systems with remote access, 3T human research MRI, 4 digital radiography systems, 10 ultrasound systems, nuclear medicine labs, etc. Additional, clinical practicum and site visits to advanced clinical centers at collaborating hospitals further enrich students' practical experiences.

The Program Director, Assoc. Prof. Jung Sun YOO applied for IOMP Accreditation on 8 February 2024. The Chair of IOMP Accreditation Board assessed the documents submitted, provided preliminary feedback, and requested additional information. The Chair of Accreditation Board constituted the assessment team and had multiple email communications with the Program Director to fine tune the application documents. The Program Directed submitted revised/updated application with all relevant information on 15 April 2024. Finally, an accreditation visit to the program was arranged on 2-3 May 2024, and the IOMP On-Site Accreditation Team members include Professor Dr Arun Chougule (Chair of the IOMP Accreditation Board) and Professor Dr Chai Hong YEONG (IOMP Accreditation Board member). The accreditation visit was successfully conducted and the IOMP On-Site Accreditation Team was satisfied with the assessment outcome.

Background

There was no dedicated postgraduate degree in medical physics offered in any university in Hong Kong before 2020 and most medical physicists in Hong Kong obtained postgraduate degree in Physics/Engineering or Medical Physics from overseas countries. There is a severe shortage of medical physicist in Hong Kong and mainland China. Government decided to encourage and permit University to start structured master's in medical physics program abiding international guidelines. The first government authority approved master's in medical physics program established at PolyU in 2020.

The Master of Science in Medical Physics (MScMP) program of the Hong Kong Polytechnic University (PolyU) is offered by the Department of Health Technology and Informatics (HTI) in close collaboration with the Department of Applied Physics (AP). It is the only postgraduate medical physics education program in Hong Kong to date, and is supported by the local medical physics societies, Hong Kong Institution of Physicists in Medicine (HKIPM) and Hong Kong Association of Medical Physics (HKAMP).

The program was founded by Professor Dr Jing CAI (PhD in Engineering Physics, Fellow of AAPM, ABR certified in therapeutic medical physics) in 2020. Professor Cai was an assistant professor, then promoted to an associate professor in Duke University Medical Centre, USA from 2009-2017 before he returned to Hong Kong in 2017. He is currently the Associate Dean of the Faculty of Health and Social Sciences in PolyU. The current Programme Leader of the MScMP program is Associate Professor Dr Jung Sun YOO (PhD in Biomedical Physics, formerly an Assistant Professor at Seoul National University, 2014-2016). She is assisted by the Deputy Programme Leader, Dr Tian Li (PhD in Medical Physics, an alumnus of PolyU PhD programme).

The MScMP program follows closely the structure of the Medical Physics Graduate Program at Duke University, North Carolina. There are a total of 30 credits (equivalent to 390 study hours) to be completed by the students within 1.5 years (full time) or 3 years (part time). The 30 credits include 3 credits from a compulsory subject (Research Methods and Biostatistics), 18 credits from core subjects in medical physics, and 9 credits from elective subjects (relevant to advanced topics in medical physics). The maximum Grade Point Average (GPA) is 4.30, and a final GPA of 1.70 or above is necessary to pass the program. Students will be awarded either Distinction, Credit or Pass in their certificate.

The program has enrolled a total of 73 students since 2020, and 51 students have graduated from the program. The students were admitted from various BSc programmes in the relevant fields from Hong Kong, Mainland China, United States, United Kingdom, Canada, Australia, etc. Among them, 13 local students received the targeted taught postgraduate programme fellowship awards, funded by the University Grants Committee of Hong Kong.

The faculty involves in the teaching and training of the MScMP program includes 10 core medical physics lecturers, > 20 other academic staff from PolyU, > 30 clinical medical physicists, > 10 oncologists/radiologists, and > 20 overseas scholars. The program provides comprehensive teaching and laboratory facilities, such as the first Virtual Environment in Radiotherapy Training (VERT) in Hong Kong, 18 Eclipse and 15 RayStation treatment planning systems (TPS) for education and training purposes, a 3T human MRI facility, 4 digital radiography systems, 10 ultrasound systems, an upcoming nuclear medicine laboratory, etc. which are fully accessed by the medical physics students and lecturers. The program also includes site visits to state-of-the-art clinical centers such as proton therapy, heavy ion therapy, cyclotrons, etc. at nearby hospitals in Hong Kong and mainland China. Students can also apply for additional internship at the collaborating hospitals (subject to approval) during their summer breaks.

The program also provides additional guest lecture series by distinguished medical physicists from local and international regions to inspire and promote interactions between the MScMP students and practicing medical physicists. Additionally, the program has also organized two Global Medical Physics Education Forums in 2021 and 2022, Annual Medical Physics Career Day, PolyU Medical Physics Day in May 2023, and Greater Bay Area Medical Physics Summit in January 2024.

Description of the program

Please refer to the details of the program at: https://www.polyu.edu.hk/en/hti/

On-Site Visit Observations

First Day of the Visit (2 May 2024):

On the first day of the accreditation visit, detailed presentations on the overview of the program, admission statistics and graduation profile, clinical practicum subject introduction, as well as dissertation subject introduction were delivered by the program and subject coordinators. From the presentations, it was learnt that the program is well structured and closely mimics the curriculum structure of the Medical Physics Graduate Program at Duke University, Durham, North Carolina, USA (as the program founder, Professor Jing CAI was an academic staff at Duke University from 2009-2017). It is the first postgraduate medical physics program in Hong Kong, founded in 2020 by Professor Jing CAI. By far, it is the largest postgraduate medical physics programme that enrolls the highest number of students within China.

There are a total of 30 credits (390 hours) to be completed in this program. Students can choose to do either full time (average 1.5 years) or part time (average 3 years) to complete the program. Most of the theoretical classes are conducted in the evening (6.30 – 9.30 pm) to cater for the part time students who are working during day time.

It is a self-financed program, with a tuition fee of HK$6,000 per credit or a total of HK$180,000 (for 30 credits). However, the Hong Kong government also offers the Government Fellowships Scheme to selected candidates, that has been successfully awarded to 13 local students from 2020/21-2023/24 (HK$120,000 per student).

The program implements Grade Point Average (GPA) system with maximum GPA of 4.3. Student must obtain a final GPA of 1.70 or above to pass the program. The award classification include: Distinction, Credit, and Pass.

The number of faculty members involved in the teaching and training of the program are as follows:

- ~10 core academic staff from HTI and AP Departments (4 have PhD in medical physics, 1 has PhD in molecular imaging, 1 has PhD in neurology, 1 has PhD in metabolic disorder, 1 has PhD in radiation therapy, 1 has PhD in physical chemistry, and 1 has PhD in physics). Among them, 1 is full Professor, 2 are Associate Professors, 7 are Assistant Professors/lectures.
- > 20 other PolyU staff
- > 30 practicing clinical medical physicists
- > 10 oncologists/radiologists
- > 20 overseas scholars

The list of clinical medical physicists and overseas scholars is shown below:

Clinical Educators

1. LEE Chi Hang Michael, PhD, CMPhy
   Manager of Medical Physics (Senior Medical Physicist), Pamela Youde Nethersole Eastern Hospital, Hong Kong
2. LEE Kar Ho Francis, PhD, DABR
   Manager of Medical Physics (Senior Medical Physicist), Queen Mary Hospital, Hong Kong
3. KAN Wai Kwan Monica, PhD, CMPhy
   Manager of Medical Physics (Senior Medical Physicist), Prince of Wales Hospital, Hong Kong
4. NG Sherry, PhD, CMPhy
   Manager of Medical Physics (Senior Medical Physicist), Queen mary Hospital, Hong Kong
5. NGAR Dennis, PhD, CMPhy, Radiation Therapy
   Manager of Medical Physics (Senior Medical Physicist), Tuen Mun Hospital, Hong Kong
6. LEE Louise, PhD, CMPhy
   Manager of Medical Physics (Senior Medical Physicist), CUHK Medical Centre, Hong Kong
7. YU Siu Ki Ben, PhD, CMPhy
   Manager of Medical Physics (Senior Medical Physicist), Sanatorium & Hospital, Hong Kong
8. KONG Feng-Ming Spring, MD, FACR, FASTRO
   Professor (Clinical Oncology), The University of Hong Kong, Hong Kong
9. VARDHANABHUTI Vince, MD
   Clinical Assistant Professor (Radiology), The University of Hong Kong, Hong Kong
10. HO Wai-Yin, MD
    Consultant Radiologist (Nuclear Medicine), Queen Mary Hospital, Hong Kong
11. DAI Jianrong, PhD
    Director of Medical Physics, National Cancer Center/Cancer Hospital, The Cancer Institute and Hospital of Chinese Acadamy of Medical Sciences, Beijing, China
12. DENG Xiaowu Dennis, PhD
    Director of Medical Physics, Sun Yat-sen University Cancer Center, Guangzhou, China
13. HU Weigang, PhD
    Director of Medical Physics, Fudan University Cancer Hospital, Shanghai, China
14. WANG Yuenan, PhD, DABR
    Director of Medical Physics, Chinese Academy of Medical Sciences Cancer Hospital Shenzhen Center, Shenzhen, China

Visiting Instructors

1. YUAN Jing, PhD, CMPhy, Diagnosis Imaging and Radiation Therapy
   Medical Physicist, Sanatorium & Hospital, Hong Kong
2. YANG Kimi, PhD, CMPhy, Radiation Therapy
   Medical Physicist, Sanatorium & Hospital, Hong Kong
3. WU Po Man, PhD, CMPhy, Radiation Protection and Safety
   Senior Medical Physicist, Hong Kong Sanatorium & Hospital, Hong Kong
4. CHANG Hing Chiu Charles, PhD, Diagnostic Imaging
   Assistant Professor, The University of Hong Kong, Hong Kong
5. CHANG Tian Yee Amy, MD, FRCR, FHKCR, FHKAM, Clinical Oncology
   Specialist in Clinical Oncology, Hong Kong Sanatorium & Hospital, Hong Kong
6. XIE Yaoqin, PhD, Diagnosis Imaging and Radiation Therapy
   Professor, Shenzhen Institutes of Advanced Technology, Chinese Academy of Science, Shenzhen, China
7. LEE Ho Fun Victor, MD, FRCR, FHKCR, FHKAM, Clinical Oncology
   Clinical Associate Professor, The University of Hong Kong, Hong Kong
8. CHU Ricky, PhD, CMPhy, Radiation Therapy
   Senior Medical Physicist, Queen Elizabeth Hospital, Hong Kong
9. CHEUNG Kin Yin, PhD, CMPhy, Radiation Therapy
   Senior Medical Physicist, Hong Kong Sanatorium & Hospital, Hong Kong
10. TONG Carrison, PhD, CMPhy, Nuclear Medicine
    Medical Scientist, Pamela Youde Nethersole Eastern Hospital, Hong Kong
11. YEUNG David, PhD, CMPhy, Diagnostic Imaging
    Medical Physicist, Prince of Wales Hospital, Hong Kong
12. WONG Kwok Fai, MSc, CMPhy, Diagnostic Imaging
    Medical Physicist, Princess Margaret Hospital, Hong Kong
13. CHAN Simon, MSc, CMPhy, Radiation Therapy
    Medical Physicist, Queen Elizabeth Hospital, Hong Kong
14. CHEUNG Andy, MSc, CMPhy, Radiation Therapy
    Medical Physicist, Queen Mary Hospital, Hong Kong
15. CHEUNG Anson, MSc, CMPhy, Radiation Therapy
    Medical Physicist, Baptist Hospital, Hong Kong
16. LEE Siu Keung, MS, CMPhy, Radiation Health
    Senior Physicist, Radiation Health Division, Regulatory Affairs, Department of Health, Hong Kong

All the faculty members are highly qualified for the taught subjects.

In the afternoon, the IOMP Accreditation Team had the opportunity to interview a graduate student from the program and a current applicant of the program. The graduate student is one of the top scholars of the program (GPA 4.12/4.30). He is currently pursuing PhD (in the area of MRI finger printing) at the same department under the supervision of Associate Professor Dr Jung-Sun Yoo. His undergraduate degree is BSc in Mathematics from the University of Liverpool, UK. When asked about his experiences in the MScMP program, he commented that he did not face any difficulties in physics and biology subjects, as he was able to use his mathematics skills to scrutinize the topics and understand them. On the other hand, the current applicant is a fresh graduate from the BSc in Radiography program of the same department. He has been awarded the prestigious Hong Kong PhD Scholarship Scheme to further his study in PhD due to his distinctive results in BSc. However, he applied for the MScMP program as he has strong interest in medical physics and would like to pursue his future career in medical physics. He plans to pursue both MScMP and PhD programmes concurrently.

The first day program was continued with a visit to the Queen Elizabeth Hospital (QEH), which is located about 10 minutes' drive away from the Hong Kong Polytechnic campus. The hospital is a well-equipped multidisciplinary hospital and it has a Medical Physics Department. The Chief Medical Physicist as well as the Head of Department is Dr. Francis Lee, who is also the current President of the Hong Kong Association of Medical Physics (HKAMP). Dr. Francis Lee gave a

detailed presentation on the structure of medical physics in Hong Kong, followed by the introduction of the QEH Medical Physics Department, and clinical teaching of the MScMP students. Dr. Francis Lee has answered all the questions from the IOMP Accreditation Team regarding the clinical training and residency program of medical physicists in Hong Kong. He also invited a current medical physics resident to share his experience. In Hong Kong, the medical physics residency program is mandatory since 2004 for those who want to be certified as a clinical medical physicist. It is a two-year residency program whereby the first year focuses on four general areas of medical physics (i.e. medical imaging, radiotherapy, nuclear medicine and radiation safety), whereas the second year will be based on the sub-specialized area chosen by the resident. There is an exit exam upon completion of the residency, and it is divided into three parts: MCQ, written exam, and oral exam. The exam is conducted by two local examiners and one external examiner. Once the candidate is certified as a clinical medical physicist, he/she will need to maintain a minimum CPD points of 60+30 points for a period of 3 years.

Second Day of the Visit (3 May 2024):

The second day of the visit started with an interview with five current batch full-time students. students, whereas another three students are from mainland China. The two local students are both having BSc in Nuclear and Risk Engineering. Both students are performing well in all their subjects. In comparison, the three students from mainland China found anatomy & physiology and radiation biology are the most challenging subjects in this program. This is understandable as two of them are from BSc of Applied Physics and one from BSc of Biomedical Engineering. In addition, some of the China students have expressed their challenges in language (English) barrier and culture discrepancy which might have hindered their academic performance in the program. However, all of the students have acknowledged the strong support and guidance given by all the lecturers and department staff. All the students were satisfied with the teaching facilities and support given by the department and University.

The IOMP Accreditation Team then met the core academic team of the program. The academic team consists of well-balanced expertise in all the medical physics relevant subjects. The team shared teaching workloads with other undergraduate and postgraduate programmes, such as the BSc in Medical Laboratory and Radiography, MSc in Medical Laboratory Science, MSc in Medical Imaging and Radiation Science, etc. The team is under a strong leadership of Professor Jing CAI and Professor Shea-ping YIP (HOD). All the academic staff are actively involved in teaching, research and administrative work. The Accreditation Team has also met some lecturers from other departments, such as the Applied Physics Department who have contributed significantly in teaching the MScMP program.

The visit continued with a tour to the teaching and research facilities in PolyU campus. The program provides adequate and easily accessed classrooms, discussion rooms, seminar rooms,

meeting rooms, library, practical rooms, laboratories, etc. to the MScMP students. The practical rooms and laboratories are all well-equipped with state-of-the art teaching facilities, such as the 18 Eclipse and 15 RayStation treatment planning systems, Virtual Environment for Radiotherapy Teaching (VERT) system, 4 digital radiography systems, and 10 ultrasound machines (some have shear wave elastography). All the students are happy with the teaching and training facilities, although we found that the TPS and VERT might be under-utilized. The Accreditation Team also had a chance to visit the 3T human MRI facility at the Behavioral and Systems Neuroscience Laboratory which is fully used for research purposes only. All the facilities are under well maintenance and follow the strict safety guidelines.

Subsequently, the IOMP Accreditation Team went through all the relevant documentation to ensure that the program is conducted under the good practice as recommended by the IOMP. The Program Director has provided all the requested documents and managed to address all the queries posted by the IOMP Accreditation Board.

Finally, the visit was wrapped up by giving the feedback and advices from the IOMP Accreditation Team.

Appendices


Department of
Health Technology
and Informatics

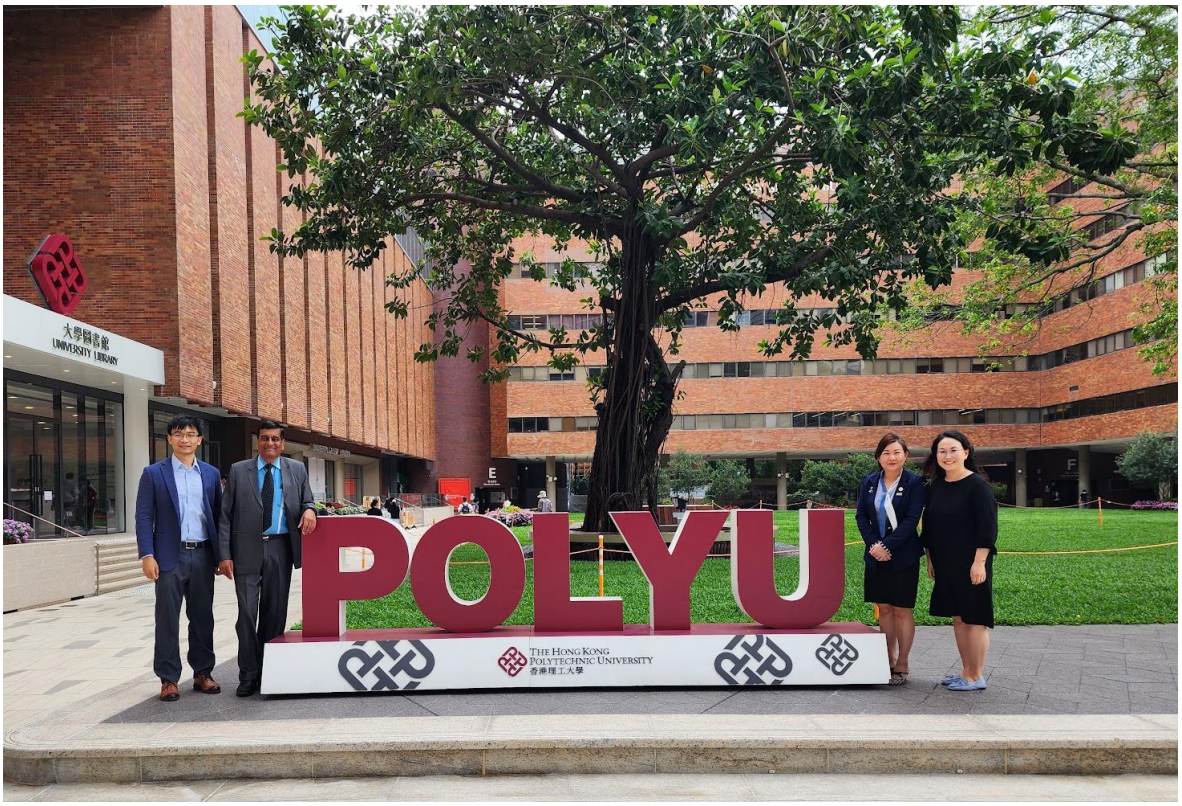

Accreditation of PolyU MSc in Medical
Physics Programme by International
Organization for Medical Ph
May
MP GROUP @ PolyU


Over 87 Years of Impact for Societal Benefit
Government Trade School
1937
Hong Kong Technical College
1947
Hong Kong Polytechnic
1972
The Hong Kong Polytechnic University
1994
PolyU Today


Department of Health Technology and Informatics (HTI)
Bachelor's Degree
BSc (Hons) in Medical Laboratory Science (PolyU entrance score Top 4)
BSc (Hons) in Radiography (PolyU entrance score Top 2)
Medical Laboratory Science
Medical Imaging and Radiation Science
Medical Physics (Launched in 2020/21)
Data Science (Will be launched in 2024/25)
Imaging (Will be launched in 2024/25)
Laboratory Science (Will be launched in 2024/25)


Accreditation of PolyU MSc in Medical Physics Programme by International Organization for Medical Physics
MP GROUP @ PolyU
THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學
Government-funded programme


THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學
Government-funded programme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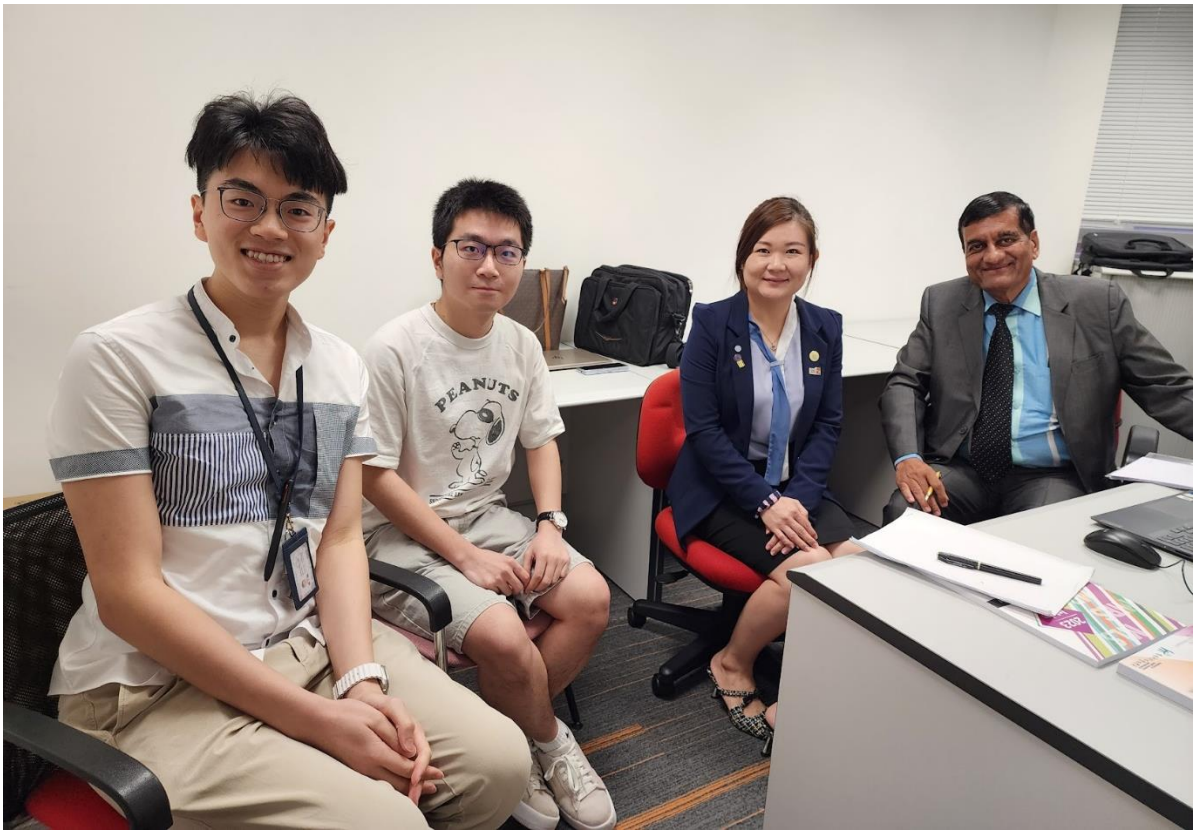
PEANUTS


Accreditation of PolyU MSc in Medical
Physics Programme by International
Organization for Medical Physics
May
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MP GROUP @ PolyU
MEDICAL PHYSICS


Accreditation of PolyU MSc in Medical
Physics Programme by International
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IOMP visit to QEH


Clinical Attachment provided by QEH
to Medical Physics students


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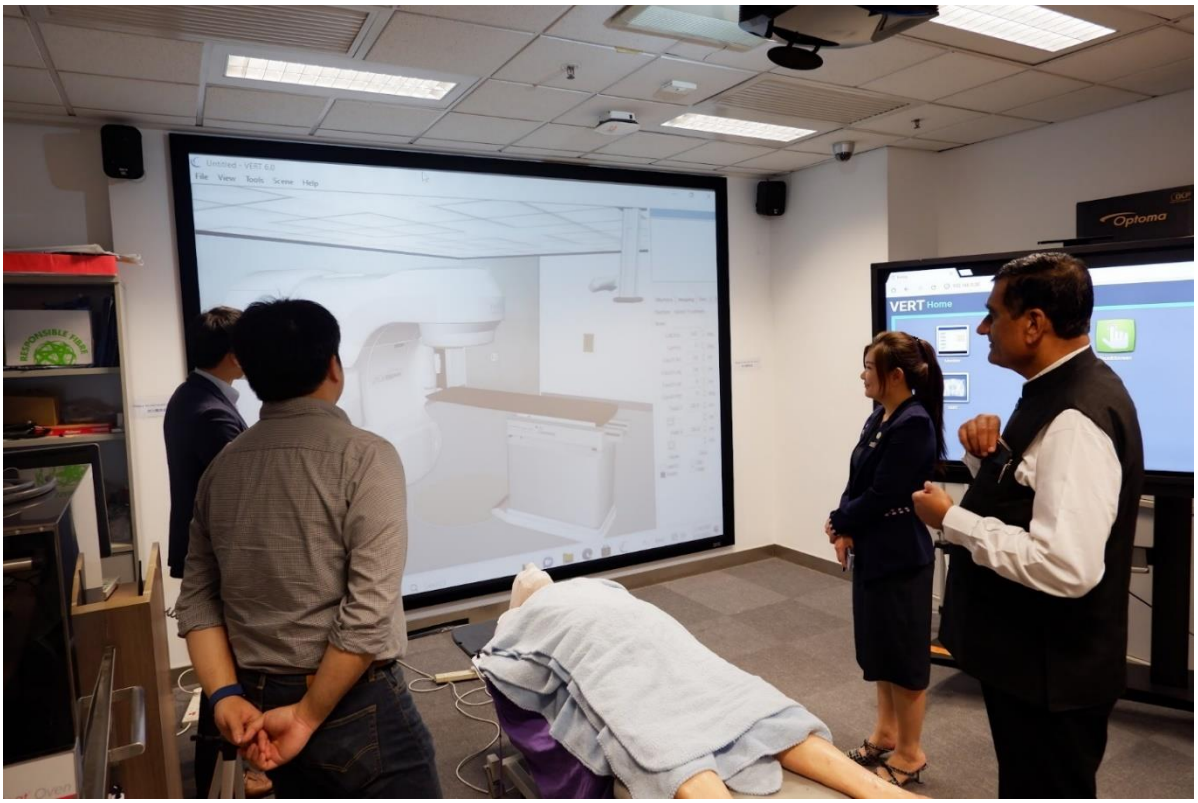
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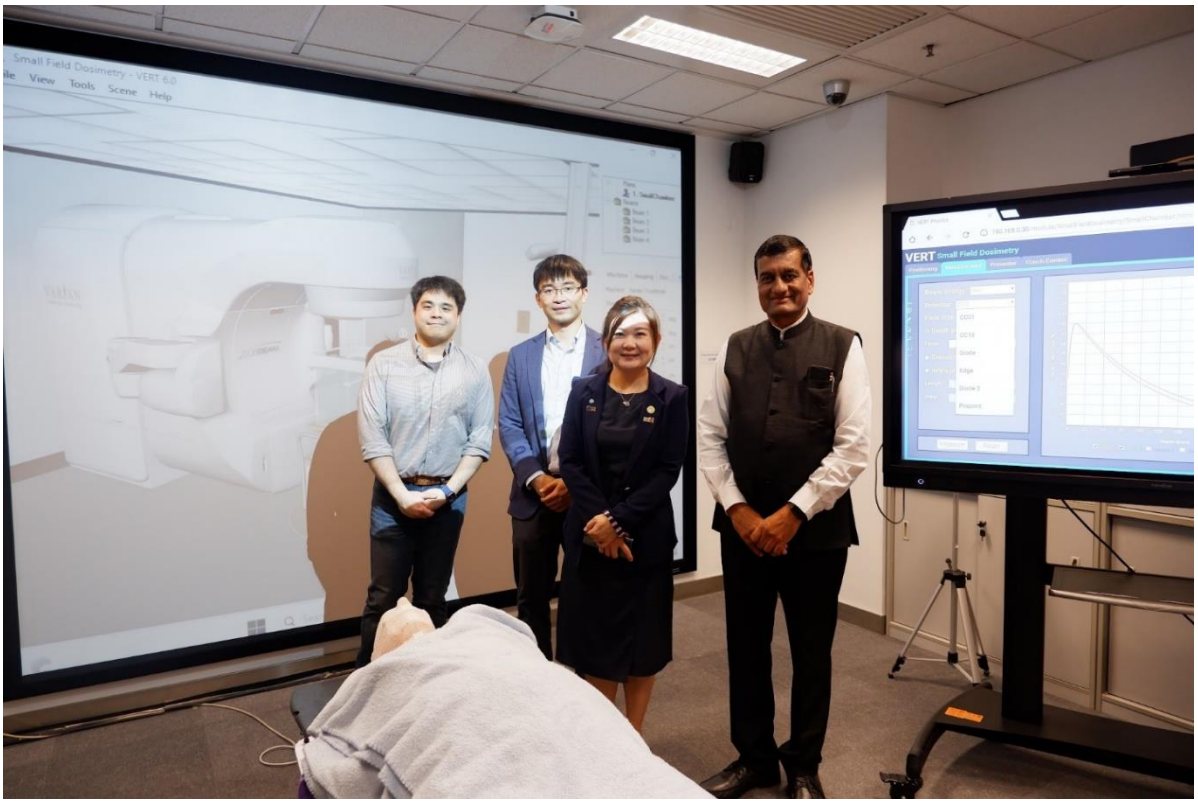
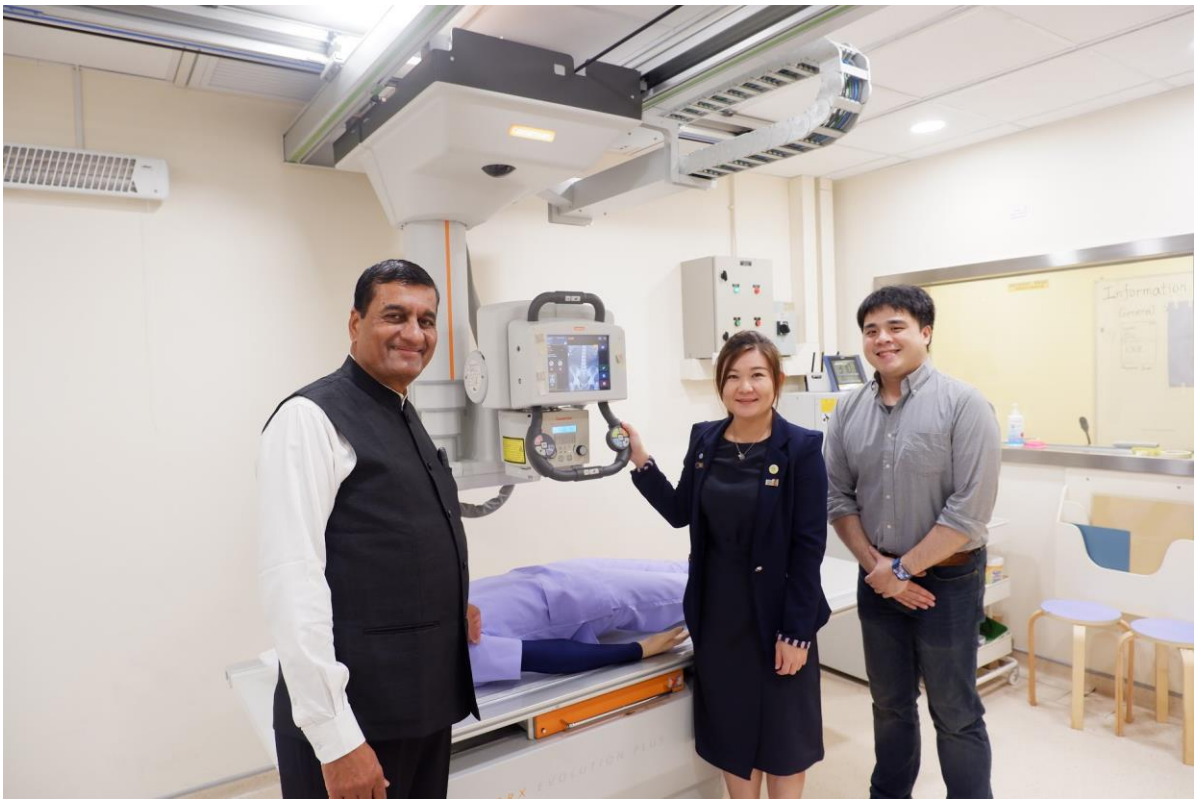
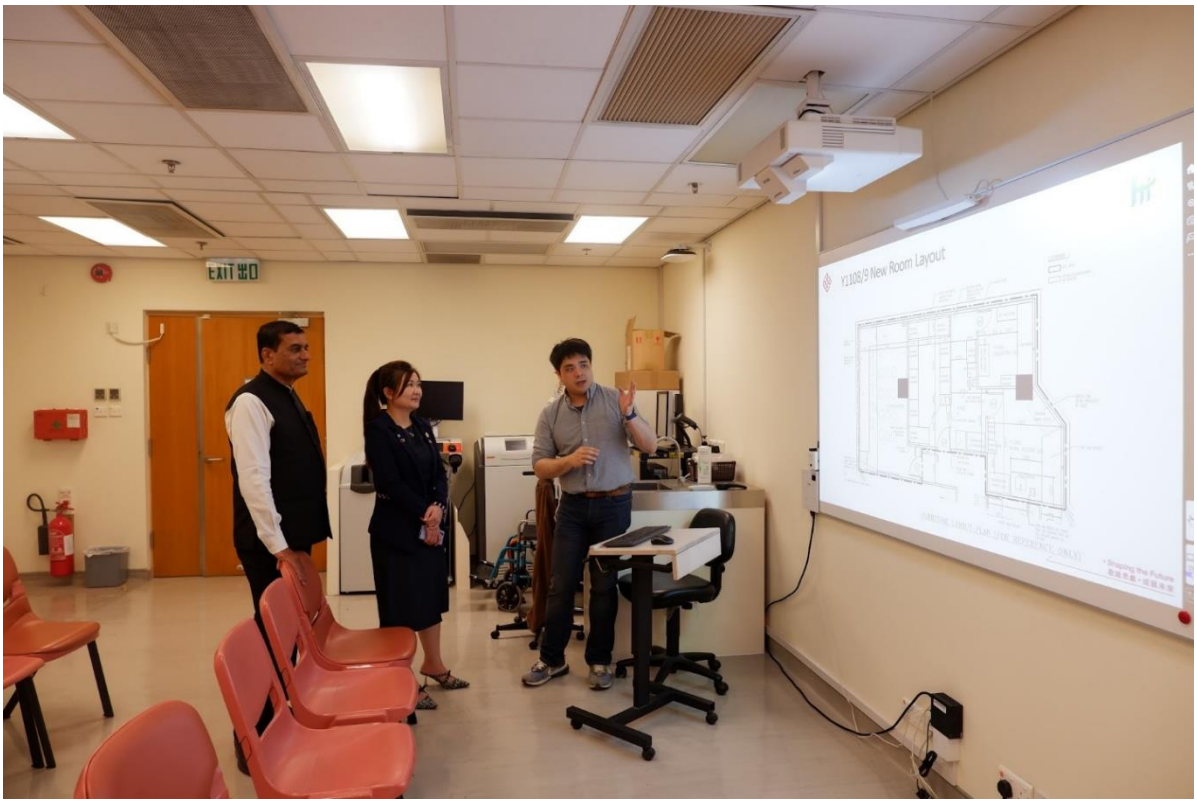

Small Field Dosimetry - VERT 6.0
File View Tools Scene Help
VERT Small Field Dosimetry




EXIT
Y1108/9 New Room Layout


Accreditation of PolyU MSc in Medical
Physics Programme by International
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