

Jun Hao Phua

SENIOR MEDICAL PHYSICIST

Current Appointment

National Cancer Centre Singapore

Singapore

SENIOR MEDICAL PHYSICIST

Jan 2019 - PRESENT

- Lead Physicist in Stereotactic Radiosurgery Programme
 - Responsible for the clinical operations of the SRS/SRT
 - * Familiar across multiple treatment planning systems such as Varian Eclipse, Brainlab iPlan, Brainlab Elements
 - Commission the Eclipse Varian treatment planning system for SRS planning using Truebeam
 - Commission the Brainlab Elements treatment planning system for SRS planning using Truebeam within 2 weeks
 - * Design and implement workflow to tackle daily SRS treatment planning to have high turnover rate
 - In-house class solutions introduced for cranium planning
 - High standard of planning established between trainees and experienced planners with shorter number of days
 - Designing a robust patient specific quality assurance programme
 - Workflow and documentation of small field dosimetry in-house audit for SRS/SRT
 - Collection of data for small field output factors for different detectors
 - Optimization of energy for single isocenter multiple cranial lesions planning
 - Employ the use of the Velocity for SRS evaluation and QA
- Medical Physicist Residency Programme Trainer since 2018
 - Provide lectures on basic motion management
 - Provide lectures on small field dosimetry and stereotactic treatment planning concepts
 - Treatment planning specializing in stereotactic radiotherapy treatment planning across different treatment planning systems
 - Responsible for education of the residents for the SRS clinical program

Publications

- Co-Author**, Tomohisa Furuya, Young K. Lee, Ben R. Archibald-Heeren, Mikel Byrne, Bruno Bosco, **Jun H. Phua**, Hidetoshi Shimizu, Shimpei Hashimoto, Hiroshi Tanaka, Arjun Sahgal, Katsuyuki Karasawa. Evaluation of multi-institutional end-to-end testing for post-operative spine stereotactic body radiation therapy, *Physics and Imaging in Radiation Oncology*, Vol16, 2020, 61-68, 2405-6316
- 2020
- Co-Author**, Hong Qi Tan, Wei Yang Calvin Koh, Lloyd Kuan Rui Tan, **Jun Hao Phua**, Khong Wei Ang, Sung Yong Park, Wen Siang Lew, James Cheow Lei Lee. Dependence of LET on material and its impact on current RBE model, *Phys. Med. Biol.*, 64 135022
- 2019
- Co-Author**, Zhong-Guo Liang, Hong Qi Tan, Fan Zhang, Lloyd Kuan Rui Tan, Li Lin, Jacopo Lenkovicz, Haitao Wang, Enya Hui Wen Ong, Grace Kusumawidjaja, **Jun Hao Phua**, Soon Ann Gan, Sze Yarn Sin, Yan Yee Ng, Terence Wee Kiat Tan, Yoke Lim Soong, Kam Weng Fong, Sung Yong Park, Khee-Chee Soo, Joseph Tien Seng Wee, Xiao-Dong Zhu, Vincenzo Valentini, Luca Boldrini, Ying Sun, Melvin Lee Kiang Chua. Comparison of radiomics tools for image analyses and clinical prediction in nasopharyngeal carcinoma, *The British Journal of Radiology* 2019 92:1102
- 2019
- Co-Author**, Tomohisa Furuya, **Jun H. Phua**, Mark Ruschin, Hiroshi Tanaka, Keiji Nihei, Dilini Pinnaduwege, Yu Kumazaki, Masao Nakayama, Hideki Nishimura, Jason St-Hilaire, Isabelle Thibault, Daniel T. Yat Harn, Lijun Ma, Naoto Shikama, Arjun Sahgal, Katsuyuki Karasawa. Assessing Functionality and Benefits of Comprehensive Dose Volume Prescriptions: An International, Multi-Institutional, Treatment Planning Study in Spine Stereotactic Body Radiation Therapy, *Practical Radiation Oncology*. 2019;9:9-15
- 2019
- Author**, Tan H.Q., **Phua J.H.**, Tan L., Ang K.W., Lee J., Bettiol A.A. (2019) Geant4 Simulation for Commissioning of Proton Therapy Centre. *World Congress on Medical Physics and Biomedical Engineering 2018*. IFMBE Proceedings, vol 68/1. Springer, Singapore
- 2018
- Author**, **Phua JH**, Ang KW. Interplay effect in lung cancer proton therapy. *J Xiangya Med* 2018;3:43

Education and Training

NUS (National University Singapore)

Singapore

MENG BIOMEDICAL ENGINEERING

Aug 2015 - Dec 2018

- Development of A Clinical Evaluation Tool for Lung SBRT Treatment Plan Quality Assurance
 - Lung tumour is under constant motion due to breathing motion. Despite the use of the 4DCT to acquire the average scans of the tumour motion, the dose delivered to the tumour could be degraded. This project aims to quantify the severity of the dose degradation to the tumour under motion.

National Cancer Centre Singapore

Singapore

ASSOCIATE PHYSICIST

Jul 2013 - Dec 2016

- Residency for physicist training
- Demonstrates independent work initiatives in Physics aspects of Radiation Therapy
- Maintain relevant experience and knowledge by constant upgrading through workshops and conferences
- Constantly looking for improvements and streamlining department dosimetry workflow
- Takes part in the annual IAEA SSDL dosimetry audit measurement
- Performs Quality Assurance of the Linear Accelerators (LINAC) in the department
- Takes part in the commissioning and acceptance of the LINAC, Varian IX in 2015
- Well versed and familiar with planning
 - Different planning systems such as Eclipse, iPlan
 - Different planning techniques such as VMAT, IMRT, 3DCRT
 - Involve in generating the clinical plans for patients
 - Knows clinical requirements and constraints of various treatment sites
- Brachytherapy
 - Absolute dose calibration and machine QA for Oncentra HDR Afterloader
 - Treatment planning for gynaecology and prostate cases
 - Radiation survey of patients with radioactive seeds implants

NTU (Nanyang Technological University)

Singapore

BSc (HONS) PHYSICS

Aug 2009 - May 2013

- With one module in Medical Physics
- Poster presentation in World Congress on Medical Physics and Biomedical Engineering, Beijing 2012
 - Commissioning of the commercial software IMSure for clinical use through the use of the diode array for IMRT verification
- Oral presentation in 12th AOCMP and 10th SEACOMP, Chang Mai, 2012
 - Development of gamma evaluation program for evaluation of independent software to evaluate commercial software for IMRT QA

National Environment Agency, CRPNS

Singapore

CORPORATE SUPPORT OFFICER

Dec 2008 - Jul 2009

- Organize the different type of licenses according radiation safety regulations
- Analyze wipe samples for radiation leak or contamination taken from industrial area
- Invigilate the examinations for qualifying test on Radiation Safety
- Utilize the knowledge in the areas of radiation and health Physics for the site inspections at medical establishments with fellow technical officers in CRPNS
- Achieved a sense of driving oneself to strive for high quality work and avoid possible mistakes
- Transportation of radiation meters from the clients from CRPNS/NEA to SSDL at Outram for calibration

Previous Appointments

National Cancer Centre Singapore

Singapore

RADIATION/ MEDICAL PHYSICIST

Jan 2017 - Dec 2018

- Commissioning and characterization of the first FFF of the Clinac IX in the department in April 2017
 - Measurements of the different field sizes with different detectors
 - Characterization of beam matching with Truebeam LINAC FFF beam
 - Wrote a script for efficient beam data analysis
- Commissioning of cones for SRS treatment in the new Truebeam LINAC 2018
 - Organize evaluation of the PTW Beamscan water tank and its accompanying software for radiation therapy beam measurements and commissioning
- Collaboration with Tokyo Metropolitan Cancer and Infectious Diseases Centre Komagome Hospital on Spine SRS studies
 - Dosimetric planning study on different volumes of spine metastasis
 - Phantom irradiation of Spine SRS using different modality of machines Vero4D, Clinac Trilogy
 - Paper published in 2019 titled 'Evaluation of multi-institutional end-to-end testing for post-operative spine stereotactic body radiation therapy'
- 2nd Physicist in charge of NCCS Stereotactic Radiation Therapy program
 - End-to-end of patient treatment such as CT simulation, fusion of the patient images for planning, clinical treatment planning, as well as patient specific QA
 - Machine QA such as dose calibration and imaging QA
 - Proficient in film dosimetry
- Proton Knowledge
 - Involvement in NCC Proton Beam Therapy commissioning
 - Presented in department proton lecture series on Motion Management and Interplay Effect in Proton Therapy - "Motion Management in Proton Therapy"

Post Graduate Training and Specialization

ESTRO School

ESTRO School Online

PARTICIPANT

02 Nov - 09 Dec 2021

- Implementation and Practice of Image-guided Stereotactic Body Radiotherapy

Hokkaido University

Hokkaido, Japan

PARTICIPANT

15 Feb - 19 Feb 2021

- GI-CoRE Summer School for Medical Physics
 - jointly organized by Hokkaido University and Stanford University via Zoom platform

Korea Institute of Radiological & Medical Sciences (KIRAMS)

Seoul, Republic of Korea

TRAINER TRAINING COURSE

11 Nov - 15 Nov 2019

- ASEAN / RCARO/ KIRAMS Trainer Training Course on Hypofractionated Radiotherapy

IAEA

Chicago, USA

PARTICIPANT

5 Dec - 10 Dec 2018

- IAEA Training Course - TRS483

Varian

Alabama, USA

PARTICIPANT

19 Aug - 22 Aug 2018

- UAB401 Clinical School for SRS

Hokkaido University

Hokkaido, Japan

PARTICIPANT

21 Aug - 24 Aug 2017

- GI-CoRE Summer School for Medical Physics
 - jointly organized by Hokkaido University and Stanford University

Varian

Las Vegas, USA

PARTICIPANT

28 Nov - 9 Dec 2016

- EC201 - Eclipse 13 Commissioning I - Administration and Algorithms
- EC202 - Eclipse 13 Commissioning II - IMRT and VMAT

Invited Talks

Division Journal Club

Singapore

Mar 2021

- Operational use of Clinac IX 6FFF
 - Educate and advise the radiation oncologists on the use of the FFF beam
 - Advise on the type of cases that can be treated using this type of beam as well as setup

2nd IAEA/ RCA National Training Course (Thoracic IMRT)

Kuala Lumpur, Malaysia

Sep 2017

- Planning Optimization - Lung and Oesophagus
- National Cancer Centre Singapore Experience

Asia Australasia Conference of Radiological Technologists

Singapore

Aug 2015

- Spine SRS Treatment Planning – NCCS Class Solution, Results of An International Multi Centre Planning Study

Radiology Asia

Singapore

May 2015

- Spine SRS Treatment Planning – NCCS Class Solution and Preliminary Results of An International Multi Centre Planning Study

Research Interest

National Cancer Center Singapore

Singapore

- Small field dosimetry in stereotactic treatments
 - Small field dosimetry is a highly complex form of physics dosimetry. It poses a challenge to the uncertainty in the verification of the doses delivered using small fields. With the popular clinical regime of hypofractionations and radiosurgeries, the issues of the small field dosimetry is further compounded by the moving multileaves collimators (MLCs). The recent IAEA publication TRS483 in 2018 has addressed the issues of the small static fields in dosimetry. However it failed to address the issues involving the use of the moving MLCs. The use of the appropriate detectors has always been an issue in the small field dosimetry. Hence, my interest in investigating the verification of the small field dosimetry for clinical use, as well as for patient treatments. This is in tandem with the use of the SBRT, SRS where highly modulated small fields are used in treatment, and verification of the doses has never been much more important in such treatment regime.
- Motion management for both photon and proton (in aspect of Lung SBRT)
 - Motion management has always been a troubling issue in the field of radiation therapy. This problem is further compounded by the need of the high accuracy of dose delivery in terms of stereotactic treatment. As stereotactic treatment demands robust in terms of geographical localization and dose accuracy, motion management has always been the key to deliver a optimum and effective dose to the patient for tumour control. In view of the prevalent use of proton therapy, this issue is much more tricky in proton therapy due to the nature of the proton beam. The dosimetry of the proton treatment is much affected by the changes path density. Hence, tackling the problem of motion management in proton therapy has always been an interest of mine. It poses challenges of not just the physics itself but also the clinical significance of it.

Professional Affiliations

Society of Medical Physics Singapore

Singapore

MEMBER

Sep 2013 - PRESENT

- Position of auditor in 2014

Consultancy

Parkway Medini Hospital

Johor, Malaysia

HIRED CONSULTANT

Dec 2018

- Requested by the HOD of Radiation Oncology to evaluate their treatment unit
- Hospital uses Elekta systems for both planning and delivery
- Tasked to provide an evaluation of the system to include commissioning their centre for the use of IMRT and VMAT treatments
- Address their problems of having poor PSQA results for IMRT and VMAT treatment
- Problems were addressed, and directed them to the respective application specialist of the system to request for the necessary data and the centre is ready to treat IMRT and VMAT by end of Feb 2019