24 - 25 March 2023
Venue: Max Atria

# EMBRACING CHANGE

## ADOPTION TO ADAPTATION

## 6TH ANNUAL SCIENTIFIC MEETING 2023

# PROGRAMME BOOKLET

SINGAPORE SOCIETY OF RADIOGRAPHERS

ASM

ANNUAL SCIENTIFIC MEETING 2023

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| **DAY 2 - Saturday 25 March 2023** | | |
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| **0900 - 0920** | **Understanding the Perception of Radiologists and Radiographers in Accepting or Rejecting X-ray Images to Reduce Reject Rate**<br>Ms Chen Yu Anna, Radiographer, SKH | **Improving the Quality and Standardization of the Technique of Automated Insufflation for Computed Tomography Colonography**<br>Ms Shafiqa Amirra Binte Omar, Student Radiographer, SIT |
| **0920 - 0940** | **Life Saver in Diagnostic Radiography (X-RAY)**<br>Mr Gan Why Nam, Radiographer, NHGD | **Appropriateness of Lumbar Spine Radiography in the Emergency Department: An Academic Medicine Center Experience**<br>Ms Mavis Tan Xin Ying, Student Radiographer, SIT |
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| **1200- 1230** | **Plenary: Embracing change at an individual level, NHGD stories**<br>Mr Chong Chun Meng, Principal Radiographer, NHGD | |
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| **1440 - 1500** | **Evidence-Based Sonographic Practice: Case Study of Evidence Implementation**<br>A/Prof Ooi Chin Chin, Senior Principal Radiographer, SGH | |
| **1500 - 1520** | **AI Solution to Mammography Imaging**<br>Ms Vanessa Lam, Radiographer, Gleneagles Hospital | |
| **1520 - 1540** | **Evaluation of Inter- and Intra-observer Variations in Prostate Gland Delineation Using CT-alone Versus CT/TPUS**<br>Ms Valerie Lim, Radiation Therapist, Mount Elizabeth Hospital | |
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| **1620 - 1650** | **Special Focus Talk 2**<br>Dr Roger Soh, Linac & MR-Linac Business Lead ASEAN+, Elekta Pte. Ltd.<br><br>*Advantages of MR-guided Radiotherapy with Comprehensive Motion Management using Elekta Unit* | |
| **1650 - 1720** | **Panel Discussion**<br>Dr Sharon Wong / A/Prof Michael Ong / Dr Eric Pang / Ms Chng Yi Hong<br>Moderator: Ms Denise Choong<br><br>*Radiography in 2023 and Beyond* | |
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# FOREWORD

"Continuity gives us roots; change gives us branches, letting us stretch and grow and reach new heights." - Pauline R. Kezer

Our profession exists because of the discovery of x-rays but it is clear that our current radiographic practice is vastly different from the medical imaging practice of yesteryears. We learn the lessons from our past to guide our practice for the future but what good are lessons when we do not apply them? The willingness to be better and change, adopt practice and adapt to new environments is essential to the longevity of our profession.

Our field of medical imaging is advancing so swiftly and we know that we have to change, but how? In this 6th Annual Scientific Meeting, we will continue to look at how we can be prepared for and better cope with change, and explore how radiography in Singapore might be changing in the years to come. We hope that this platform can continue to provide opportunities for you to grow your minds and push the boundaries so that we can better adopt new practices and adapt to the changing healthcare landscape effectively.

On behalf of the SSR Exco, I look forward to welcoming you all in person at the upcoming ASM at Max Atria and having an enriching experience with you all.

Denise Choong
President

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# SPEAKERS

# OPENING ADDRESS

**Ms. Denise Choong**
**President, Singapore Society of Radiographers**

# KEYNOTE ADDRESS

**Ms. Shiao-Yin Kuik**
**Executive Director, Common Ground**

Shiao-Yin Kuik is a former Nominated Member of Parliament (NMP) who, in her time in public office, worked on nurturing cross-cultural harmony, strengthening national identity and building a compassionate culture. Today, she is a cultural change strategist and the Executive Director of Common Ground, a cultural change consultancy that provides strategic designing, training, facilitating and coaching services. In partnership with MCCY's Resilience & Engagement Division, Common Ground also leads a civic centre that helps build whole communities.

# PLENARY

## Mr. Chong Chun Meng
## Principal Radiographer, NHG Diagnostics

## Embracing change at an individual level: NHGD stories

Chun Meng is a principal radiographer of NHG Diagnostics, a leading provider of imaging services in the primary and community healthcare sector in Singapore. Chun Meng oversees the general radiography, bone mineral densitometry and mobile services in NHGD. He is experienced in projection radiography, radiography education and radiography operations.

# PANEL DISCUSSION

## A/Prof Michael Ong
## Group Director, Allied Health, National University Health System

Adj. A/Prof Michael Ong remains active in radiography practice and education. He teaches in the Radiography programmes of Singapore Institute of Technology and Parkway College.

He led in implementing professional registration of diagnostic radiography and radiation therapy under the Allied Health Professions Council (AHPC), and developing the BSc (Hons) Diagnostic Radiography programme at the Singapore Institute of Technology (SIT) in 2016.

He served as past President of the Singapore Society of Radiographers and is currently a council member of the AHPC and serves on the Complaints Panels of the AHPC, SMC and SDC. He also holds several appointments internationally relating to Radiography and Radiological Informatics.

## Ms Chng Yi Hong
## Principal Radiographer, Woodlands Health

Yihong currently heads a team of diverse and dynamic Diagnostic Radiographers driven by purposeful work. The team is passionate about increasing value for patients, prioritising meaningful work for the team and co-creating a work culture of innovation, improvement and growth.

# PANEL DISCUSSION

## Dr Sharon Wong
## Associate Professor,
## Singapore Institute of Technology

Dr Sharon Wong completed her PhD in 2011 at Yong Loo Lin School of Medicine, National University of Singapore. She is an Associate Professor at Singapore Institute of Technology (SIT), Health and Social Sciences Cluster and has been involved in education, research and administration for over 20 years. Sharon also serves in various roles and committees in the Ministry of Health (MOH) and Ministry of Education (MOE) to develop new services, training, and educational frameworks for health care professionals. Working across all levels of healthcare professionals, Sharon was instrumental in encouraging and spearheading many initiatives at National and International level. She participated heavily in the evolution of Radiation Therapy and Diagnostic Radiography education including the developing of the first BSc (Hons) program in Radiation Therapy and Diagnostic Radiography at SIT, SingHealth Allied Health Professionals Residency Programs, Proton Therapy Program and the Advanced practice in Radiation Therapy and Medical Dosimetry residency program. She has also successfully established USA Board certification for the Medical dosimetry residency program- first program to be endorsed outside USA.

A well-respected international speaker and expert, Sharon was awarded the 2021 AMEI Golden Apple Outstanding Educator Award, SSR Gold Medal for outstanding contribution to Diagnostic Radiography and Radiation Therapy profession in 2018 and Best Educator award by NCIS NUHS in 2010. She is also extensively involved in clinical research work and is on the editorial board of the Technical Innovations & Patient Support in Radiation Oncology and reviewer for many leading radiation oncology and imaging journals. Sharon is also a clinical faculty with the European Society of Radiotherapy and Oncology (ESTRO).

# PANEL DISCUSSION

## Dr Eric Pang
## Senior Manager (Radiotherapy services), NCCS DRO

Dr Eric Pang is a Senior Manager (Radiotherapy Services) at NCCS DRO and was appointed Clinical Assistant Professor in Duke-NUS Medical School. In 2014, he was awarded the MOH NMRC Research Training Fellowship and completed his PhD in 2018 with Monash University, Australia. He has secured multiple research grants and serves as reviewer for international journals.

# SCIENTIFIC SESSION

## Ms. Farhana Binti Md Kamal
## Senior Radiographer,
## National University Hospital

Farhana holds a degree in Diagnostic Imaging and Radiotherapy from National University Malaysia (UKM) and Masters in MRI from London Southbank University (LSBU). Her current main work is in Body and Breast MRI Imaging with a splash of MRI Safety on the side.

## Mr. Jacob Ng
## Computed Tomography Business Unit Manager,
## Canon Medical Systems Asia

Jacob graduated from Medical Imaging in Charles Sturt University and has more than 10 years of experience in the Computed Tomography business. He is passionate in CT Research and Development and keen to utilise new technologies to enhance the healthcare environment.

## Associate Prof Ooi Chin Chin
## Senior Principal Radiographer,
## Singapore General Hospital

Chin Chin specialized in ultrasound modality and has over 20 years' experience in clinical sonography. She is the Research Lead for Radiography Department, SGH. She has been appointed as Associate Professor at Singapore Institute of Technology (SIT). She is currently the Programme Lead for the Postgraduate Sonography Program in SIT.

## Ms. Vanessa Lam
## Radiographer,
## Gleneagles Hospital

Vanessa has been practicing as a radiographer in Gleneagles Hospital for the past 5 years with exposure to X-ray, mammography, CT, MRI and US imaging. She has particular interest in the field of breast imaging and breast biopsy procedures.

## Ms. Valerie Lim Ting
## Radiation Therapist,
## Mount Elizabeth Novena Hospital

Passionate Radiation Therapist with a BSc (Hons) in Radiation Therapy who is trained in delivering safe and accurate treatment. Skilled in CT simulation, motion management systems and immobilisation devices for radiotherapy. Works effectively in a team to provide comprehensive care for patients. Has cold hands, but a warm heart!

## Mr. Dias Cao
## Healthcare IT Business Unit Manager, Canon Medical Systems Asia

Dias is leader and expert in MedTech and health informatics. He is passionate about improving healthcare standards, assuring quality and streamlining workflow. With a background in biology, Dias earned his MBA from Singapore Management University.

## Dr. Roger Soh
## Linac & MR-Linac Business Lead ASEAN+, Elekta Pte. Ltd.

Dr Roger Soh is the Linac & MR-Linac Lead in Elekta. Previously he was from Philips, responsible for Oncology portfolio such as MR, CT and Treatment planning. He was a Radiation Physicist in National University Cancer Institute Singapore and Tan Tock Seng Hospital. Dr Soh attained his PhD from Nanyang Technological University and is a current member of Society of Medical Physicists (Singapore).

# ORAL SESSION

## Ms. Chen Yu Anna
## Radiographer,
## Sengkang General Hospital

Chen Yu is a radiographer graduated from Yang Ming University, Taiwan. She has 7 years of experience and is currently specializing in General Radiography, Bone Mineral Densitometry and Magnetic Resonance Imaging in Sengkang General Hospital. She is leading the Repeat Reject Analysis team together with General Radiography lead and is interested in the aspect of content creating for projects.

## Mr. Gan Why Nam
## Radiographer,
## National Healthcare Group Diagnostics

Joel Gan is currently a diagnostic radiographer in National Healthcare Group Diagnostics. He has a 5 years working experience in field. He involved in the training and development team on projects to improve the quality and workflow within the company.

## Ms. Lim Li Hoon (Lin LiYun)
## Principal & Breast Advanced Practice Radiation Therapist,
## National Cancer Center Singapore

Li Hoon is a Principal and Breast Advanced Practice Radiation Therapist in NCCS. She is involved in the development and implementation of treatment protocols and care plans and has led and published several research papers. Li Hoon was awarded the SingHealth TDF scholarship in 2011 where she pursued her Master of Science in Oncology Practice in the United Kingdom. She attends international conferences regularly to present topics close to her heart and has won several awards for her role in innovative practice as well as service quality.

## Ms. Lin Yixin Jeannie
## Advanced Practice Radiation Therapist, National Cancer Center Singapore

Jeannie is an Advanced Practice Radiation Therapist (Gynae Oncology) in National Cancer Centre Singapore (NCCS). Jeannie acts as a clinical specialist radiation therapist to lead and coordinate with multidisciplinary health workers to excel in gynaecological cancers radiotherapy services in her institution. She pioneered the setup and establishment of interstitial gynecological cancers brachytherapy in NCCS. Jeannie was a committee member of Singapore Society of Radiographers since 2011 and held both Honorary Treasurer and Vice President positions. She is also appointed to be the clinical educator of Singapore Institute of Technology to contribute in grooming the future generation of radiation therapists.

## Mr. Lee Kok Ming
## Senior Radiation Therapist
## National Cancer Center Singapore

Lee Kok Ming is a senior radiation therapist from National Cancer Centre Singapore. He graduated with Masters of Radiation Therapy from The University of Sydney in 2014 and worked in Lismore Base Hospital, Australia before joining NCCS in 2015. He has experience in CT simulation, mouldroom and specialises in head and neck (HN) treatment. He is trained in True Beam and Tomotherapy and currently, he is the senior in charge of the HN treatment room. Furthermore, he is a Clinical Educator for SIT students.

# WORKSHOP

## Prof. Peter Tay
## Assistant Professor,
## Singapore Institute of Technology

Peter Kay Chai TAY (PhD, Psychology, Singapore Management University) is a faculty at the Health and Social Sciences cluster at the Singapore Institute of Technology (SIT). He teaches allied health students subjects on Psychology and Change Management and his research includes the investigation of cognition and managing psychosocial changes in conditions such as dementia and low vision. Dr Tay has taught undergraduate, postgraduate and professional courses and conducted workshops on psychology and health topics across diverse settings including Institutes of Higher Learning, research centres, hospitals, and corporate companies. His current research examines the impact of solitary and social activities on health, and the effectiveness of binaural beats sound therapy in enhancing cognitive abilities and mental wellbeing.

# STUDENT SPEAKERS

**Ms. Shafiqa Amirra Binte Omar**
**Radiography Student,**
**Singapore Institute of Technology**

**Ms. Mavis Tan Xin Ying**
**Radiography Student,**
**Singapore Institute of Technology**

**Ms. Pang Li Jing**
**Radiography Student,**
**Parkway College**

**Ms. Jezz Choo Qian Ying**
**Radiography Student,**
**Singapore Institute of Technology**

# SCIENTIFIC PROGRAMME

# DR TRACK

## AIR Recon DL MRI

Nur Farhana Md Kamal,
Senior Radiographer, National University Hospital

In the pursuit of obtaining higher spatial resolution MR images with shorter scan time given that MRI is becoming more the imaging of choice by clinicians, Artificial Intelligence (AI) via its Deep Learning (DL) techniques is fast becoming the talk of town. Deep Learning (DL) technique has shown to be able to reduce scan time with improved image quality by improving image reconstruction. It is deemed as the next best thing to come out after the introduction of parallel imaging and compress sensing. We will be sharing at how AIR Recon DL, has been helping us radiographers in NUH.

## AI in CT Practice: A Gatekeeper

Jacob Ng,
Computed Tomography Business Unit Manager,
Canon Medical Systems Asia

Manpower shortage is a global problem for many businesses particularly in the healthcare sector. We observed increased waiting times for patients in the radiography department. This is amplified by the COVID-19 pandemic. This presentation will discuss the challenges and how we can use AI as safety net in CT practice.
Recently, Canon Medical introduced a new user interface for operators during CT scans. This total workflow experience is redesigned from ground up to set new standards in efficiency and consistency. Deep learning reconstruction algorithms are integrated into the protocols for automated radiation dose reduction and consistent high quality images.

## Evidence-Based Sonographic Practice: Case Study of Evidence Implementation

A/Prof Ooi Chin Chin,
Senior Principal Radiographer, Singapore General Hospital

Evidence-based practice (EBP) has become increasingly popular as a framework for facilitating clinical decision-making across all healthcare professions. EBP focuses on ensuring the best available evidence is used to inform clinical decision making and service delivery. Previous studies suggest that radiographers are keen to implement evidence-based approaches but barriers remain in practice. These include a lack of knowledge on where or how to find evidence, experience in appraising and applying evidence, time and ensuring an appropriate environment to implement changes. This presentation introduces key concepts of EBP framework and provides a practical guide to the application of employing evidence in the sonographic practice.

## AI Solution to Mammography Imaging

Vanessa Lam,
Radiographer, Gleneagles Hospital

In recent years, AI technology in mammography has been developed to improve the detection of suspicious breast lesions. They serve to highlight possible breast cancers and hence reduce time spent by the radiologists for analysis. This talk will highlight a trial run with Lunit INSIGHT MMG.

# RT TRACK

## Evaluation of Inter- and Intra-observer Variations in Prostate Gland Delieneation Using CT-alone Versus CT/TPUS

Valerie Lim,
Radiation Therapist, Mount Elizabeth Hospital

The presentation is about a study that aims to explore the role of four-dimensional (4D) transperineal ultrasound (TPUS) in the contouring of the prostate gland with planning computed tomography (CT) images, in the absence of magnetic resonance imaging (MRI). This study was published in the Reports of Practical Oncology and Radiotherapy in March 2022.

# SPECIAL FOCUS TALKS

**Big Data in Medtech - Personalise Healthcare and Workflow**

Dias Cao,
Healthcare IT Business Unit Manager,
Canon Medical Systems Asia

Globally, population growth, longer lifespan and heightened health awareness all arise from better care. They are also overloading healthcare resources. In this digital age, massive amount of personal and utility data is collected daily in healthcare settings. Utilizing big data approach and analysis, we can increase clinical confidence and enhance patient engagement while optimize resources. Canon is leading the technology trend in data integration, analytics and reporting to deliver clinical and business insights. We hope to provide meaningful innovation for better healthcare outcome.

**Advantages of MR-guided Radiotherapy with Comprehensive Motion Management using Elekta Unity**

Dr Roger Soh,
Linac & MR-Linac Business Lead ASEAN+, Elekta Pte. Ltd

In this talk, we will explore the advantages of having a high field MR-Linac and how it could bring cutting edge clinical advantages over conventional radiotherapy treatments. The newly released comprehensive motion management feature in Elekta Unity will also be one of the exciting topics to be discussed.

# ORAL ABSTRACTS

# SCIENTIFIC TRACK (DIAGNOSTIC RADIOGRAPHY)

## Understanding the perception of radiologists and radiographers in accepting or rejecting X-ray images to reduce reject rate

Chen Yu Anna
Radiographer, Sengkang General Hospital

AIM:
To understand the perception of radiologists and radiographers in accepting or rejecting X-ray images with the objective of reducing the reject rate. Reject rate is the number of rejected images divided by the total number of images acquired in general radiography

METHODS:
Radiologists and radiographers were given 50 random rejected images to justify the verdict on whether they accept or pass the image. Their responses were gathered on a spreadsheet and shared to the radiographers. The reject rate was monitored for a month after the sharing session.

RESULTS:
24 out of 50 images were accepted by radiologists, with some images being rejected by most radiographers but considered passable by radiologists. After the sharing session, the reject rate was reduced from 9.55% to 8.79%

CONCLUSION:
The results suggest that by understanding the perception of both radiologists and radiographers, it highlighted areas to which reject rate can be reduced. Such areas refer to cases where the image is acceptable for reporting by radiologists but was rejected by radiographers thus contributing to higher reject rate. Therefore, it allows the department to develop the relevant measures to potentially reduce reject rate.

## Life Saver in Diagnostic Radiography ( X-RAY)

Gan Why Nam
Radiographer, NHGD

AIM:
To accomplish zero number of serious reportable event (SRE) related to X-ray done on incorrect side through evidence based interventions, modified to be feasible in NHGD context

METHODS:
Colour-coded left and right stickers corresponding to the patient's laterality were specially designed to be placed on the patient region of interest, the correct site and side during the procedure.
These stickers helped radiographers to cross check with the side reminding them the correct side is being examined, easing the cognitive load when performing cases under pressure.

RESULTS:
There is observed decreased incidence rate of SRE reported on incorrect procedure. 70% of the staff are interested to keep the visual aid marker adapted into the workflow

CONCLUSION:
The intervention yielded a positive impact to the department. It increased confidence of radiographer in identifying correct side and faster decision making during procedure decreased stress in identifying correct side during procedure

# SCIENTIFIC TRACK (RADIATION THERAPY)

## Evaluation of a customized immobilization bra for patients with pendulous breast undergoing radiation therapy

Lim Li Hoon (Lin LiYun)
Principal and Breast Advanced Practice Radiation Therapist, National Cancer Centre Singapore

AIM:
To evaluate the use of a customized immobilization bra for patients with pendulous breast undergoing radiotherapy

METHODS:
Patients with large pendulous breasts were fitted with the Chabner XRT® radiation bra during CT simulation and treatment procedures. Effects of the bra on acute skin toxicities were monitored with photo document and assessed using the Radiation Therapy Oncology Group (RTOG) skin toxicity score system during weekly reviews. A mixed method questionnaire was administered to both radiation therapists (RTTs) and patients.

RESULTS:
Overall, minimal skin toxicity were observed for all patients at the end of the treatment and nob roken skin or adverse skin reactions were reported throughout. 8 RTTs agreed that although it was slightly more difficult to reproduce the breast tissue for daily treatment it has helped patient to maintain the treatment position throughout the procedure.Majority of the patients (n=23) felt comfortable wearing the bra while 20 patients felt less exposed during treatment.

CONCLUSION:
This study demonstrated the feasibility of using a customized immobilization bra which provided optimal setup reproducibility while maintaining minimal skin toxicity and patient's comfort. Increased experience also helped staff to overcome the initial difficulties faced in bra fitting and patient setup.

# SCIENTIFIC TRACK (RADIATION THERAPY)

**Pioneering Interstitial Ocular Brachytherapy in Southeast Asia – Clinical** experience & challenges

Lin Yixin Jeannie
Advanced Practice Radiation Therapist, National Cancer Centre; Division of Radiation Oncology

AIM:
To report the clinical experience and challenges faced for setting up the first interstitial ocular brachytherapy in Singapore and also Southeast Asia

METHODS:
Interstitial Ocular brachytherapy holds an upper hand in delivering escalated conformal doses to the tumour that is not surgically resectable because of the close proximity to the orbit. (1) It also provides an advantage over External Beam Radiation Therapy (EBRT) in reducing doses to orbit and neurological structures, and thereby potentially reducing risk of late toxicities of EBRT. Late toxicities of the EBRT reported cranio-facial deformities, visual adverse effects and neuroendocrine issues especially in very young children. (2) Brachytherapy also minimises the risk of child patients developing a second cancer due to the exposure of normal tissues to low dose radiation. (3)

RESULTS:
With its potential benefits in lowered risk of late toxicities and shortened treatment duration, interstitial ocular brachytherapy is an attractive treatment option for young children with orbital tumors, and should be considered as an alternative to EBRT whenever feasible

CONCLUSION:
The intervention yielded a positive impact to the The technical aspects of interstitial ocular brachytherapy can be challenging and demanding. The procedure carries the potential morbidities of both surgery and brachytherapy, including risks from general anaesthesia, infection, and patient immobilization over the duration of brachytherapy treatment. Hence, with careful case selection, optimum pre-planning and multi-disciplinary support from various institutions, a safe and effective treatment technique is developed.

# SCIENTIFIC TRACK (RADIATION THERAPY)

## Bi-Daily Radiotherapy Treatment in Recurrent Nasopharyngeal Carcinoma

Lee Kok Ming
Senior Radiation Therapist, NCCS

AIM:
To share the rationale behind bi-daily radiation therapy, treatment techniques as well as its clinical consideration. We will also discuss about the observations made with these group of patients in our centre and the role of radiation therapists (RTTs) in their treatment journey

METHODS:
44 previously irradiated NPC patients with recurrent disease and re-irradiated by IMRT between Jan 2017 to December 2022 had been retrospectively reviewed

RESULTS:
32 patients presented with inoperable diseases, 9 relapsed after nasopharyngectomy, and 3 declined surgery. Many of the local recurrences were noted to be in the high dose primary region. These patients were treated with a small fraction size of 1.1Gy to 1.2Gy, delivered twice a day with a minimal break of 6 hours or more. Generally, the re-irradiated volume is smaller. As the treatment margins are tight, daily online image guidance is the default practice for these cases to ensure high precision.

CONCLUSION:
With careful patient management, long term survival could be achieved in patients with local or regional relapse of NPC. Special care must be given to these patients since they went through multiple management over the years. The acute side effects that they experienced were observed to be much more manageable compared to the first course of radiotherapy. Beyond the technicalities in treatment planning and delivery, being in daily interaction with the patients place RTTs in a unique position to provide support, reassurance to patients and managing their expectations as well as side effects.

# STUDENT PRESENTATIONS

## Improving the quality and standardisation of the technique of automated insufflation for Computed Tomography Colonography

**Shafiqa Amirra Binte Omar,** Charmaine Chan Ying Xuan, A/Prof Pauline Soh Bao Lin, Chong Mei Choo

AIM:
Colonic insufflation is a dynamic process influenced by gas volume, pressure, flow rate, and positioning, which affect colonic distension and comfort. This study aims to determine how body mass index (BMI), age, gender, and mobility affects colonic distension and comfort during insufflation in Computed Tomography Colonography (CTC). Findings from this study will be used to optimise the automated insufflation protocol.

METHODS:
One hundred and sixty-four participants underwent CTC at a single centre hospital from July to August 2022. Participants were categorised according to their BMI, gender, age, and mobility. Participants rated their comfort based on 1) unable to tolerate; 2) mild discomfort but tolerable; or 3) mostly comfortable. The overall colonic distension was graded by radiologists into either good, fair or poor distension.

RESULTS:
The study found that low pressure (18-25mmHg) achieved good distension and comfort compared to high pressure (>25mmHg), which only demonstrated mostly fair colonic distension. The difference was significant in BMI<23 ($p=0.05$), females ($p=0.03$), and walker group ($p=0.04$).

All groups achieved good distension and tolerated both supine/prone and left/right decubitus positions with mean flow rate of 2.5-3ℓ/min and volume range of 3.4-5.8ℓ. Greater patient discomfort was observed when volume was increased beyond 6ℓ.

CONCLUSION:
The study concludes that insufflation pressure of 18-25mmHg, 2.5-3ℓ/min flow rate, and 3.4-5.8ℓ volume demonstrated adequate colonic distension while minimising patient discomfort across all groups. Both supine/prone and left/right decubitus positions achieved good distension and were well-tolerated, hence can be implemented according to patient capability.

# STUDENT PRESENTATIONS

## Appropriateness of lumbar spine radiography in the emergency department: an academic medicine center experience

**Mavis Tan Xin Ying,** Er Yi Xuan Ian, Teo Jun Hao Aldric, Ooi Chin Chin, Tay Yi Xiang

AIM:
The primary aim is to ascertain the appropriateness of lumbar spine (LS) radiography requests amongst patients reporting lower back pain (LBP) in an emergency department (ED) following the implementation of imaging referral guidelines. The secondary aims are to determine the clinical effectiveness and impact of imaging referral guidelines on the quality of LS radiography referrals.

METHODS:
Between August and November 2022, LS radiography referrals performed in Singapore General Hospital ED was retrospectively analyzed. The referrals' appropriateness was evaluated using a locally developed imaging referral guidelines - the Orthopaedic Radiographs Appropriateness Criteria (ORAC). All patients referred for LS radiography were followed-up for 72-hours to determine the reattendance rate and radiological abnormality. Quality of LS radiography referrals were graded using 'Reason for exam Imaging Reporting and Data System' (RI-RADS). Our findings were compared with the baseline data obtained from a prior study conducted in 2020.

RESULTS:
A total of 1053 referrals were analyzed. After implementation of guidelines, inappropriate LS X-ray referrals reduced from 36.2% (373/1030) from the previous study, to 30.7% (323/1053) in the present study ($p=0.007$). The proportion of LS radiography referrals that fall under RI-RADS grade D (deficient clinical information) reduced significantly from 88.3% to 60.9% ($p<0.001$).

During the 72-hours follow-up, 11 (1.05%) patients reattended the ED, with the most common reason being persistent LBP. The false negative rate of the referral guidelines was 6.35%.

CONCLUSION:
The recommended ORAC guidelines had significantly reduced a proportion of inappropriate and inadequate LS X-ray requests. Our preliminary data has important implications as it can potentially improve patient outcomes and healthcare expenditures by reducing imaging redundancy. With a minimal re-attendance rate and a low false negative rate, we are quietly confident that ORAC is effective in identifying patients who require imaging. Future larger scale studies are needed to validate our findings.

# STUDENT PRESENTATIONS

## Proton Magnetic Resonance Spectroscopy versus Dynamic Contrast-Enhanced Magnetic Resonance Imaging in distinguishing recurrent brain tumors from brain radiation necrosis

**Pang Li Jing**

AIM:
Distinguishing recurrent brain tumours from (RBTs) and radiation necrosis (RN) is crucial in determining the treatment pathway. However, it remains unclear which imaging study is suitable to be the preferred diagnostic imaging for distinguishing RBTs from RN in practice. This systematic review aims to evaluate the diagnostic accuracy of Proton Magnetic Resonance Spectroscopy (1H-MRS) and Dynamic Contrast-Enhanced Magnetic Resonance Imaging (DCE) in distinguishing RBTs from RN.

METHODS:
Studies which used 1H-MRS or DCE to distinguish RBTs or RN were searched from ScienceDirect Journals and PubMed, up to Sep 30, 2022. Data were extracted for analysis using descriptive statistics, and for calculation of sensitivity and specificity.

RESULTS:
A comprehensive systematic search on ScienceDirect Journals and PubMed. A total of thirteen studies satisfied inclusion criteria and were selected for the review, which provided a sample size of 995 for 1H-MRS and 1,554 for DCE. Analysis showed that Choline (Cho)/Creatine (Cr), Cho/N-acetylaspartate (NAA), and K-trans were higher in RBTs than RN. Based on cut-off values of Cho/Cr, Cho/NAA, or K-trans, sensitivity and specificity were 88.3% and 83.2% for 1H-MRS, and 76.1% and 81.9% for DCE.

1H-MRS performed with SVS may have limited ability to evaluate small lesions, especially those in pediatrics or near the calvarium or skull base, or those which are heterogeneous. DCE is unable to distinguish lesions solely based on capillary leakiness and is limited by its dependence on contrast.

CONCLUSION:
This systematic review concluded that Cho/Cr, Cho/NAA, and K-trans tend to be higher in RBTs than RN and this may assist in distinguishing them. 1H-MRS and DCE appeared to have moderate accuracy in distinguishing RBTs from RN, and 1H-MRS has slightly outperforms DCE. Both techniques are subjected to limitations, and should have their data cross-checked with those of MRI and other advanced MRI techniques for RBTs and RN to be distinguished more accurately.

# STUDENT PRESENTATIONS

## Effectiveness of AI Algorithm in De-identification of Eyes, Mouth and Ears in CT and MR Head Images

**Jezz Choo Qian Ying,** A/Prof Eric Chua, Nur Wadiah Bte Zulkifle, Nurul Afiqah Bte Shaharudin, Shuhadah Radiah Bte Hilmi

AIM:
The aim of this research is to automate the defacing of CT and MR images without losing essential information so that these datasets can be used for various research purposes.

METHODS:
Using inter-rater reliability to determine the IoU values, utilizing Roboflow to annotate the facial features, using Google Colab for YOLOv5 training and to generate the mAP values to determine the effectiveness of YOLOv5 in detecting the facial features.

RESULTS:
IoU values were more than 0.6 between the annotations done by the researchers. mAP values were able to determine that YOLOv5 can recognize the facial features.

CONCLUSION:
In conclusion, results have shown that YOLOv5 can accurately detect the eyes and ears for subsequent defacing of the CT and MR images. However, it can be challenging for AI to precisely detect the mouth in CT images since it is a relatively small object in object detection.

# POSTERS

# SCIENTIFIC POSTERS

**Poster 1**

**Diagnostic accuracy of contrast-enhanced ultrasound in differentiating benign and malignant hepatic lesion: A meta-analysis**

Ariel Novrianto Afandy
Radiographer, NTFGH
and Nathania Octaviani Afandy
Radiographer and Mammographer, KTPH

AIM:
This meta-analysis aims to determine the diagnostic accuracy of contrast-enhanced ultrasound (CEUS) in differentiating benign and malignant liver lesions in adult patients.

METHODS:
Following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines, searches were conducted by two independent reviewers via PubMed, ScienceDirect, Cochrane and CINAHL databases. The search included literature published from 2010 to 2020, in English language. Quality Assessment of Diagnostic Accuracy Studies-2 (QUADAS-2) checklist was used to assess the risk of bias of each article. On the basis of the extracted data from the two-by-two contingency table, pooled sensitivity, specificity, diagnostic odd ratio (DOR), area under the curve (AUC), positive (+LR) and negative likelihood ratios (-LR) were evaluated with a hierarchical summary receiver operating characteristic (HSROC) model.

RESULTS:
Overall, 16 studies involving 1570 patients with 2011 liver lesions were included. Of these studies, 8 were prospective and 8 were retrospective. CEUS demonstrated a pooled sensitivity of 84.2% (95% confidence interval (CI): 71.2–91.9%) and specificity of 93.0% (95% CI: 86.1–96.6%) in differentiating between benign and malignant liver lesions, with a DOR of 70 (95% CI: 19–255). The +LR and -LR were 11.95 (95% CI: 5.56–25.70) and 0.17 (95% CI: 0.09–0.33) respectively. The area under the HSROC curve was 0.930 (95% CI: 0.922–0938).

CONCLUSION:
CEUS demonstrates excellent diagnostic accuracy in differentiating between benign and malignant liver lesions with high sensitivity and specificity. It may become the first-line of diagnostic imaging where contrast-enhanced computed tomography and/or magnetic resonance imaging is contraindicated or unavailable.

# SCIENTIFIC POSTERS

**Poster 2**

**Providing weekly feedback sessions to radiography students increases student placement satisfaction scores**

Joanne Low Shi Hui
Radiographer, NUHS
and Adriel Goh Guang Wei
Radiologist, NUHS

AIM:
To share the perspective of a clinical educator in a teaching hospital in improving radiography student clinical placement experience.

METHODS:
Providing constructive and timely feedback has been touted as the best teaching and learning strategy in clinical placement. Students can reflect and hone their skills based on the feedback given, promoting deep learning in students. Such practice has existed in other healthcare disciplines such as medicine, nursing, and physiotherapy. However, in the context of radiography teaching programs, there is little literature on providing feedback for students on clinical placement. This is not commonly practiced in healthcare institutions due to the high caseload in the profession. In my institution, a team of clinical educators has implemented weekly individual feedback sessions for all rotating students since end-2021.

RESULTS:
The weekly individual feedback sessions are held via Zoom at the end of the week. The session provides a safe environment for students to reflect on their weekly performance, review the feedback that was given by the supervising radiographers, and set learning goals for them to achieve for the following weeks of placement. Follow-up on learning goals is done in subsequent sessions. The session also provides insight for educators to understand the student's learning needs and tackle some issues which the students face during their placement that potentially hinder learning. Since the implementation, there has been an improvement in overall student clinical placement satisfaction scores. Students were pleased that their educational goals have been met during their placement with us.

CONCLUSION:
By providing feedback to both students and clinical educators, students are reassured that their learning is not neglected and their learning needs have been met, making the learning environment better for all.

# SCIENTIFIC POSTERS

**Poster 3**

**An Evaluation of Different Dental Materials in the Fabrication of Oral Positioning Stents for Head and Neck Radiotherapy**

Shana Lee, Jessie Ng, Serene Cher, John Villalon and Tabitha Chan
Department of Radiation Oncology, National University Cancer Institute Singapore, NUHS

AIM:
Our centre uses oral positioning stents (OPS) in head and neck radiotherapy to reduce toxicity to adjacent normal oral tissues. The ideal stent material should be durable, with material density close to 0 Hounsfield unit (HU) so it does not create image distortion, interfere with dose calculation or delivery. Currently, we fabricate OPS using clear self-cured acrylic resin by hand. We aim to evaluate the clinical suitability of different dental materials by evaluating radiodensity variation and presence of image distortion.

METHODS:
12 clear and coloured samples of six different types of commonly available dental materials (self-cured resin, light-cured resin, heat-cured resin, 3D-printed resin, silicone and wax) were fabricated to a thickness of 3cm. A CT scan was done for each sample suspended in water. The mean CT value (HU) was measured from five random points in the sample to determine material density and presence or absence of image distortion was recorded.

RESULTS:
5 out of 12 samples (light-cured, self-cured, heat-cured, wax, clear silicone) had HU similar to human tissues (bone, cartilage, cartilage, adipose, muscle, respectively). The coloured silicone sample had HU similar to polyvinylchloride. Both 3D-printed samples had HU similar to polymethylmethacrylate. The coloured dental silicone material, and both clear and coloured light-cured materials had high HU (525 HU, 1240 HU and 1432 HU respectively). Image distortion was also present in these 3 samples.

CONCLUSION:
Materials with high HU ≥525 resulted in image distortion. This may affect accuracy of organ delineation and interfere with dose calculation or delivery. While this feasibility study demonstrated image distortion in samples with high HU, there is insufficient evidence to determine if any material is superior or inferior to the currently used material.

# SCIENTIFIC POSTERS

**Poster 4**

**A pilot study to investigate the feasibility of a work from home arrangement for Radiation Therapy Planning and its impact on clinical services**

Cai Shao Bin
Senior Radiation Therapist, Department of Radiation Oncology, National University Cancer Institute Singapore, NUHS
and Desiree Chen
Senior Radiation Therapist, Department of Radiation Oncology, National University Cancer Institute Singapore, NUHS

AIM:
This study aims to investigate the feasibility of a Work From Home (WFH) arrangement for Radiation Therapy (RT) planners.

METHODS:
RT planners are given remote access to the treatment planning system. This is achieved using a corporate issued laptop that is connected to the HVPN. A work roster was used to schedule planners to WFH or onsite respectively. A survey was conducted before the rollout of the pilot. The purpose of the survey was to understand what concerns staff may have when working remotely.

RESULTS:
There was also no evidence to suggest that productivity was affected. In the period of the study there were no reported delays in treatment delivery due to staff being off-site.

CONCLUSION:
A hybrid model that combines WFH and time in office is feasible for RT planners. It did not affect the timely delivery of care to patients.

# SCIENTIFIC POSTERS

**Poster 5**

**A Pilot Initiative Using Telemedicine In Online Reviewing of Cone-Beam Computed Tomography (CBCT) For Stereotactic Radiation Therapy**

Yuen Nee Yvonne Loh
Senior Principal Radiation Therapist, Department of Radiation Oncology, National University Cancer Institute Singapore, NUHS
and David Wei Tsau Chia
Consultant, Department of Radiation Oncology, National University Cancer Institute Singapore, NUHS

AIM:
This study aims to quantify the realized time savings and utilization of appointment slots for patients.

METHODS:
Pre-Change, Implementation of Change, Post-Change

RESULTS:
There are 162 out 168 patients receiving stereotactic radiation therapy to the body, 50 out of 97 receiving stereotactic radiation therapy to the brain trial under the initiative. Baseline data was collected and patients often spend an average of 60 minutes in the department on the day of their treatment. The median time patient spent was reduced to 45 minutes. Prior the intervention, radiation oncologists have to travel between hospitals and be on-site to view and approve the cone-beam computed tomography and often delay at the other centre's clinics, weather, road conditions are causes of the delay to be on-site. Intervention to improve workflow was implemented with the introduction of using telemedicine for viewing and approval of cone-beam computed tomography.

CONCLUSION:
The modified work process has managed to reduce the time spent for patients during their day of radiation therapy and time saving for staff with improved utilization and allocation of appointment slots. We will continue to monitor and discussions for ongoing strategies to ensure sustainability.

# SCIENTIFIC POSTERS

**Poster 6**

**An Evaluation Study on the Distress Level and Perceived Outcomes of Head and Neck Cancer Patient Support Group**

Hoy So Hing Wendy
Principal Radiation Therapist, Department of Radiation Oncology, National University Cancer Institute Singapore, NUHS

AIM:
This study aims to evaluate the distress levels and perceived outcomes of the members in the OneHeart Support Group

METHODS:
An anonymous online survey was distributed to the members of the support group via social media to gather responses on perceived outcomes and distress levels. Questions on perceived outcomes were modelled from previous literature. The NCCN Distress Thermometer and Problem List were used to asssess the pre & post distress levels and identify possible causes. 52 members (median age 41-50 years, 61.5% male, 98.1% Chinese) responded to the survey.

RESULTS:
Frequency of attendance was the most impactful factor with significant associations to emotional and informational support on perceived outcomes. Emotional support was found to be the main perceived outcome for caregivers, pre-treatment support participation and longer membership duration. Additionally, high distress levels were reported before joining the support group (mean 7.00) and were associated with emotional and physical concerns such as fear and nervousness. However, the distress was significantly decreased after joining the support group (mean 3.00). The greatest impact was found among the nervous participants.

CONCLUSION:
Significant positive ratings on perceived outcomes were observed in the support group. Furthermore, the significant decline in distress and notable improvements demonstrated the effectiveness of the oneHeart support group in managing psychological distress.

# SCIENTIFIC POSTERS

**Poster 7**

**Enchancing the Full Bladder Instructions Given to Patients Undergoing Pelvic Radiotherapy**

Nur Fathiah Binti Abdul Razak
Radiation Therapist, Department of Radiation Oncology, National University Cancer Institute Singapore, NUHS
and Loh Yuen Nee Yvonne
Senior Principal Radiation Therapist, Department of Radiation Oncology, National University Cancer Institute Singapore, NUHS

AIM:
This study aims to streamline and improve existing full bladder instruction by an easy comprehend informative instruction accompanied with pictorials and available in multi-languages, to increase compliance rate

METHODS:
An online survey on Radiation Therapists' perceptions on the existing full bladder instructions. Retrospective data were obtained from existing bladder scanning protocol in the department to assess non-compliance in full bladder patients. A new instruction handout was made available in three languages - English, Chinese and Malay. An online survey conducted to obtain views and feedback on the new enhanced full bladder instruction. A log was used to track non-compliance in all patients during implementation of change.

RESULTS:
The new insruction improves full bladder compliance rate from 10% to 45%. The non-compliance rate on the 1st and 2nd day of treatment have reduced by at least 15%. High compliance rate reflected with new instruction, information was conveyed to patients in more effective manner and reinforced with a handout. The majority of respondents felt the new instruction was beneficial to patients across all ages as it provided with detailed explanations and information. The availability of multiple languages handouts were also plus points and well-received by respondents.

CONCLUSION:
This project proved that an easy comprehend informative instructions improves the compliance of patients undergoing full bladder pelvic radiotherapy. The new instruction benefits patients with its clear instruction, informative details and pictorials. The availability of multiple languages also helps to meet the needs of different patients.

# EDUCATIONAL POSTERS

**Poster 1**

**Analysing the Diagnostic Radiography (DR) undergraduates infection control practical session lesson plan from the lens of educational theories.**

Hajmath Begum
Educator, Singapore Institute of Technology

LEARNING OBJECTIVES:
To understand the application of educational theories in a practical lesson plan

CASE DESCRIPTION (SIGNS, SYMPTOMS, DIAGNOSIS, TREATMENT, FOLLOW-UP):
Singapore Institute of Technology (SIT) is an Applied Learning and Applied Research driven university. Being an educator in SIT, the curriculum and lesson plan for all the undergraduate programmes have been calibrated through varied processes to align with the university's vision. Here the development of lesson plans, curriculum and assessments are predominantly grounded on Active and Collaborative Learning approaches and augmented by Authentic Assessment methods. This lesson plan is on the Standard Precautions (SP) practical session for Diagnostic Radiography students and it focusses on the subtopic of SP, the Infection Control. I have decided to critically analyze this lesson plan as it is my third round of conducting it hence a review is much needed. In addition, this topic on Infection Control has been placed under the scrutiny of the global community in this recent pandemic. Thus, I intend to redesign the curriculum to be in alignment with Singapore's Ministry of Health (MOH) and World Health Organization (WHO) infection control standards.

CONCLUSION:
SIT's academic model comprises of the faculty (mainly lecturers) and Professional Officers. I belong to Professional Officers division where my clinical expertise from the industry is an integral factor to this role. Hence, I am constantly engaging in an apprenticeship with the students in the practical sessions. I am able to create an environment that brings the cognitive processes into the open, where students can observe and practice them. And I have unlimited opportunities to create the best situated learning environment for the students. The understanding and assimilation of these theories to practice is taking shape for me and inspiring me to explore evidence -based practices for learning.

# WORKSHOP

# Change Management Workshop

MARCH
24
19:00-20:30

**Prof. Peter Tay**
Assistant Professor,
Singapore Institute of Technology

## Workshop Aims:

Change is the only constant in any organization and people are at the heart of change management. In an expanding world of science and technological advancement and social flux, managing change effectively has become an important factor in determining the success of any organization. In this foundational workshop on change management, participants will develop an understanding of how change occurs, and what we can do to anticipate, encourage, and manage change. Organizational change models will be introduced, and we will examine how we can address challenges associated with managing change in others and in ourselves.

## Learning Outcomes:

- Define and explain the dimensions of change and change management.
- Explain and apply organizational change models in the context of your workplace.
- Develop plans to manage challenges associated with managing change in others and yourself.

# VISITOR INFO

SINGAPORE EXPO
CONVENTION AND EXHIBITION CENTRE


**SSR 6TH ANNUAL SCIENTIFIC MEETING**

1. Constellar Office
2. Concierge & Business Centre
3. Cashcard Top-up
4. Carpark Station
5. Prayer Room (Level 2)
6. Nursing Room
7. OCBC ATM

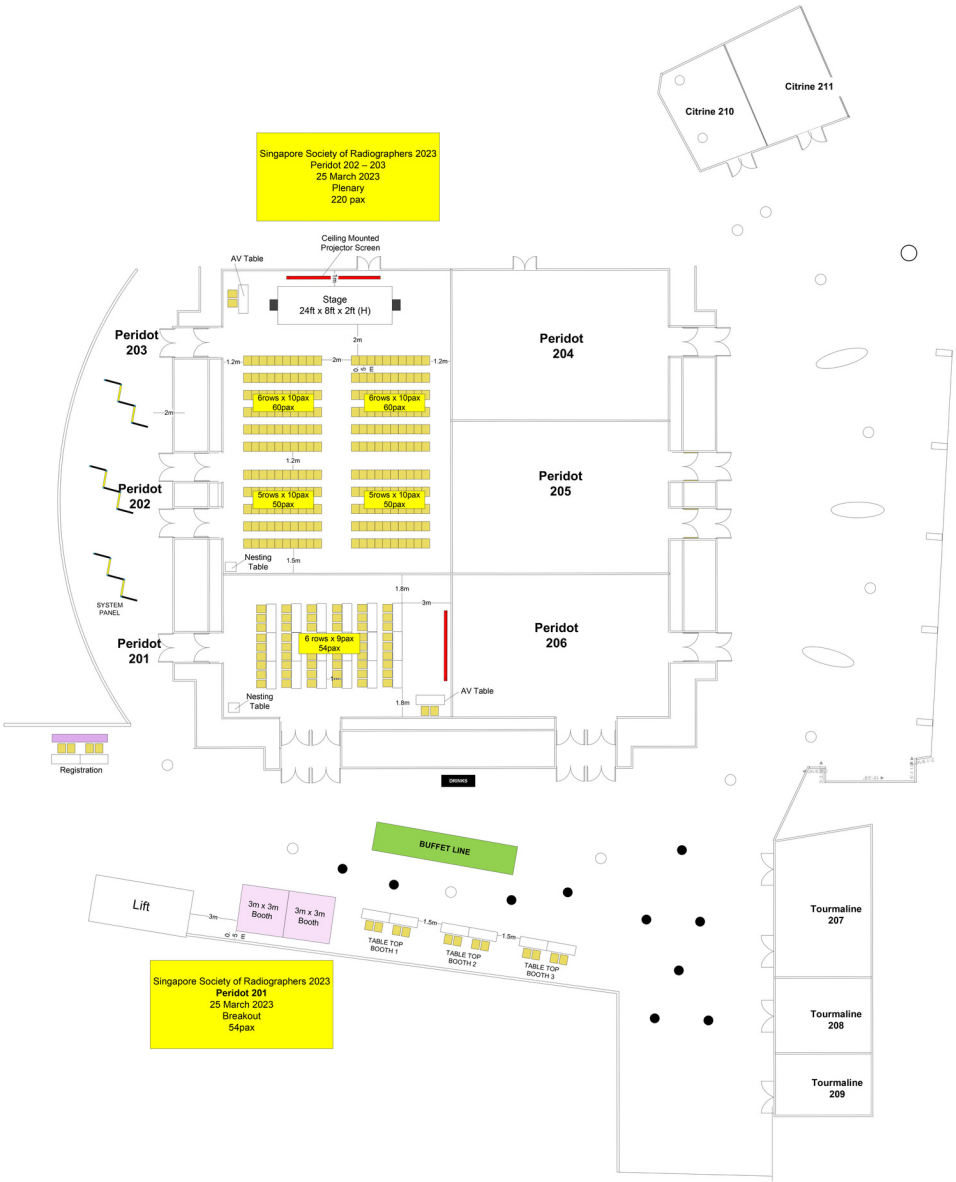
AED

**PLAY@EXPO**

- FUN KARTING @ CARPARK H
- PASTRY CLASSES @ HALL 3 ATRIUM

**FEAST@EXPO**

- FOYER ONE (L2) & FOYER TWO
- FOYER TWO
- FOYER TWO
- HALL 3 ATRIUM (FACING CARPARK D)
- CARPARK B (OUTSIDE HALL 5)




**LOGISTICAL ARRANGEMENTS**

**Peridot 201**
- 18 x 6ft x 2ft Table with Skirting (Classroom)
- 01 x 6ft x 2ft Table with Skirting ( AV)
- 54 x Chairs (for Classroom)
- 02 x Chairs (for AV)
- 06 x Single Seater Sofa
- 03 x Coffee Table
- 08 x Flip Charts with papers
- 06 x Cocktail Tables
- 01 x Nesting Table with bottled water

**AV Requirement**
- 01 x HDMI Cable & Audio Feed
- 03 x Wireless Microphones (for Panel Discussion)
- 01 x Wireless Microphones (for Q&A)

**Peridot 202 – 203**
- Stage: 24ft x 8ft x 2ftH with 2 staircases
- 01 x 6ft x 2ft Table with Skirting ( AV)
- 220 x Chairs
- 02 x Chairs (for AV)
- 04 x Single Seater Sofa (for panel)
- 03 x Coffee Table (for panel)
- 01 x Nesting Table with bottled water

**AV Requirement**
- 01 x HDMI Cable & Audio Feed
- 03 x Wireless Microphones (for Panel Discussion)
- 01 x Wireless Microphones (for Q&A)

**Peridot Pre-Function Area**
- 02 x 6ft x 2ft Table with Skirting (Reg)
- 04 x Chairs
- 06 x 6ft x 2ft Table with Skirting (Tabletop booth)
- 12 x Chairs
- 10 x Cocktail Tables

SINGAPORE EXPO CONVENTION AND EXHIBITION CENTRE — Maxtria @ Singapore EXPO — Certified BCA Green Mark Platinum

| | |
|---|---|
| Event Name | Singapore Society of Radiographers Annual Scientific Meeting 2023 |
| Version Date | 9th Mar 2023 |
| Drawn By | Jasmine Chua |
| Verified By SM | Silvan Chua |
| Verified By FSM | |

**Disclaimer:**
Please Note that the layout is not drawn to scale and is subjected to changes

LTWRAP
RADIOGRAPHY ADVANCED PRACTICE

# 4th Biennial Global Conference

17-18th Nov 2023 Singapore

# LEADING THE WAY IN RADIOGRAPHY & RADIOTHERAPY ADVANCED PRACTICE

## Conference Theme

- Celebrate Achievements
- Celebrate Collaborations
- Celebrate Impact

LTWRAP is an international community working towards the advancement of the medical radiation sciences professions. This year's conference theme echoes our ethos - to share and develop new roles and directions; collaboratively promote our profession while inspiring next generation to make a positive difference.

## CALL FOR ABSTRACTS

**Submission deadline:**
**31st MAY 2023**

| Conference Fees | Early Birds (before 31/7) | Normal | On-Site |
|---|---|---|---|
| **Associate Members** | SGD 250 | SGD 300 | SGD 350 |
| **Non Members** | SGD 300 | SGD 350 | SGD 400 |
| **Students** | SGD 50 | SGD 80 | SGD 100 |

## Register Now

website: ltwrap2023.com

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# ASM2024

UPCOMING

ASM

ANNUAL SCIENTIFIC MEETING 2023

# 22-23 MARCH 2024

## SAVE THE DATE!

DETAILS WILL BE OUT IN Q3 OF 2023