



**International Atomic Energy Agency**

**Department of Technical Cooperation  
and  
Nuclear Medicine and Diagnostic Imaging Section  
Division of Human Health**

**in cooperation with the  
Government of Japan**

**through the**



**National Cancer Center Japan**

**ME-RAS6091-1901107**

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## **Regional Workshop on PET/CT and PET/MRI for Radiotherapy Treatment Planning**

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**9 - 13 December 2019**

**National Cancer Center  
Chiba and Tokyo, Japan**

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### **Local Course Director**

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## Participants

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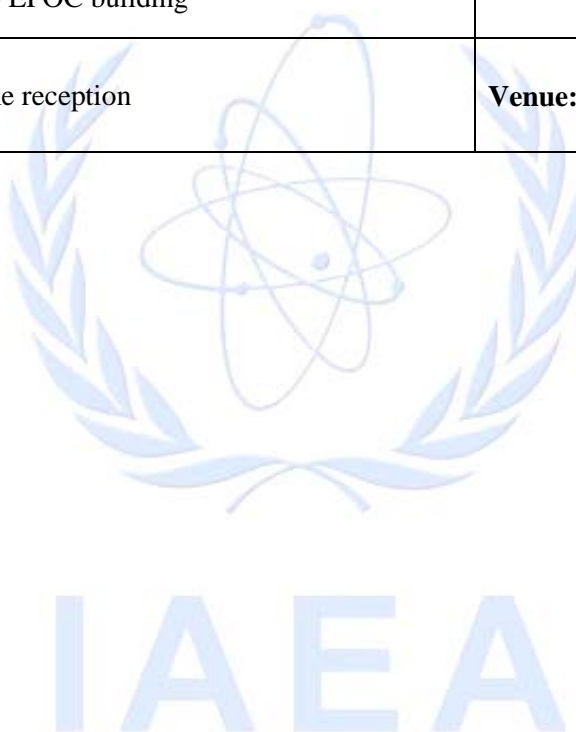
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Dr. Omniyat ALHAJERI		
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Dr. Amal Mubarak MADHI		
Department of Health	United Arab Emirates	
Dr. Ly NGUYEN	Viet Nam	
Dr. Sharaf SHAREEF		
National Oncology Center	Yemen	
Dr. Amani Saleh Hadi SAEED	Yemen	
Dr. Suman SHRESTHA	Nepal	

## PROGRAMME

Monday, 9 December 2019		
Introduction		
The 78 hall, NEXT building, Kashiwa Campus (Chiba)		
<b>CHAIR: Dr. Hirofumi Fujii</b>		
9:00-9:30	Registration Guidance	
9:30-9:40	Opening Remarks	Dr. Hitoshi Nakagama (President, NCC)
9:40-9:50	Welcome Greetings from Hospital East	Dr. Atsushi Ohtsu (Director, NCC Hospital East)
9:50-10:00	Welcome Greetings from EPOC	Dr. Atsushi Ochiai (Director-EPOC)
10:00-10:20	Consortium of Universities and Institutions in Japan for IAEA Technical Cooperation	Dr. Jun Hatazawa (Osaka University)
10:20-10:40	Coffee break	
10:40-11:00	NCC facilities overview Workshop Introduction	Dr. Hirofumi Fujii (NCC EPOC)
11:00-11:40	Pre-course evaluation	
End of Introduction		
12:00-13:00	Lunch Break	

Session 1		
The 78 hall, NEXT building, Kashiwa Campus (Chiba)		
CHAIR: Dr. Mitsuyoshi Yoshimoto		
13:00-13:30	<p>Radiopharmaceuticals useful for radiotherapy treatment planning</p> <p>ILO: Recognize the characteristics of radiopharmaceuticals used in radiotherapy treatment planning</p>	Professor Tomoya Uehara (Chiba University)
13:40-14:10	<p>Development of next generation PET systems and their use for range verification in particle therapy</p> <p>ILO: Understand fundamentals of PET imaging and state-of-the-art PET system developments for range verification in particle therapy</p>	Dr. Taiga Yamaya (National Institute of Radiological Sciences)
End of Session 1		
14:10-14:30	Coffee break	
Session 2		
The 78 hall, NEXT building, Kashiwa Campus (Chiba)		
CHAIR: Dr. Hirofumi Fujii		
14:30-15:30	<p>Impact of modern diagnostic imaging on radiotherapy.</p> <p>ILO: Understand the influence of improving sensitivity and specificity of imaging on radiotherapy field and dose definitions.</p>	Professor Wouter Vogel
15:30-16:30	<p>Normal tissue response to radiotherapy</p> <p>ILO: analyze and understand the potential of imaging in predicting acute and late radiation induced toxicity.</p>	Professor Berardino De Bari
End of Session 2		
16:30-16:45	Move to Proton Beam Therapy Building	

<b>On-site discussion 1 and 2</b> <b>at Proton Beam Therapy Building</b>		
16:45-17:30	On-site discussion 1 Proton beam therapy facilities On-site discussion 2 PET probe laboratory with GMP standard  ILO: Discuss about the proton beam therapy and PET Drug synthesis facilities under GMP standards	Dr. Tetsuo Akimoto (NCC Hospital East and EPOC) Dr. Daisuke Kano (NCC Hospital East)
<b>End of on-site discussion 1 and 2</b>		
17:30-17:45	Move to EPOC building	
17:45 -19:00	Welcome reception	<b>Venue: Auditorium</b>



**Tuesday, 10 December 2019**

**Session 3**

The 78 hall, NEXT building, Kashiwa Campus (Chiba)

**CHAIR: Professor Berardino de Bari and Professor Wouter Vogel**

9:10-9:40	Visualization of tumor microenvironment for radiotherapy treatment planning including case discussion  ILO: Recognize the significance of tumor hypoxia imaging tests for radiotherapy treatment planning, especially lung cancer	Dr. Hirofumi Fujii (NCC EPOC)
9:40-10:10	MRI imaging to predict the effects of radiotherapy  ILO: Explain the difference in the mechanisms of action among various MR contrast agents	Dr. Masayuki Yamaguchi (NCC EPOC)
10:10-10:40	Quantification in PET/CT and PET/MRI tests for radiotherapy treatment planning  ILO: Recognize how the trace uptake can be accurately measured for radiotherapy treatment planning, focusing on attenuation correction on PET/MR system	Dr. Tetsuro Sekine (Nippon Medical University)
10:40-11:00	Coffee break	
11:00-12:00	Clinical case discussions	Professor Berardino De Bari and Professor Wouter Vogel
<b>End of Session 3</b>		
12:00-13:00	Lunch Break	

<b>Session 4</b> The 78 hall, NEXT building, Kashiwa Campus (Chiba) <b>CHAIR: Dr. Hirofumi Fujii</b>		
13:00-13:30	Micro-dosimetry for radionuclide therapy  ILO: Concept of microscopic and macroscopic dosimetry relative biological effectiveness of radiotherapy	Professor Tatsuhiko Sato ( Osaka University and JAEA)
13:30-14:00	Multimodality imaging for radiotherapy treatment planning of head and neck cancer including case discussion  ILO: Understand the role of multimodality imaging in radiotherapy treatment planning of head and neck cancer	Dr. Hirofumi Kuno (NCC Hospital East)
14:00-15:00	Radiomics and radiotherapy: the past, the present and the future  ILO: Understand the tips and tricks of radiomics applied to radiation oncology and show the current and future applications of radiomics to predict the efficacy of radiation therapy	Professor Berardino De Bari
15:00-15:20	Coffee break	
15:20-15:50	PET/CT imaging to evaluate the effects of radiotherapy for head and neck cancer including case discussion  ILO: Recognize the best time for PET/CT after radiotherapy and difference between recurrence and mucositis	Dr. Yuri Ueda (NCC Hospital East)
15:50-16:50	Clinical case discussions	Professor Berardino De Bari and Professor Wouter Vogel
<b>End of Session 4</b>		



**Wednesday, 11 December 2019**

**Session 5**

Meeting Room 6D, 6F Research Building, Tsukiji Campus (Tokyo)

**CHAIR: Dr. Jun Itami**

10:00-10:15	Opening remarks at Tsukiji Campus	Dr. Toshiro Nishida (Director, NCCH)
10:15-11:00	Overview of RT  ILO: 1. Review the concept and overview of radiation oncology. 2. Understand the basic application and safety of radiotherapy.	Dr. Jun Itami (Chief - radiation oncology, NCCH )
11:00-12:00	Image-guided adaptive radiotherapy  ILO: Understand the influence of imaging realized during radiotherapy treatments in order to adapt the treatment depending on tumor morphology and biology changes.	Professor Berardino De Bari
<b>End of Session 5</b>		
12:00-13:00	Lunch	

<b>Session 6</b>		
Meeting Room 6D, 6F Research Building, Tsukiji Campus (Tokyo)		
<b>CHAIR: Professor Berardino de Bari and Professor Wouter Vogel</b>		
13:00-14:00	PSMA PET for evaluation of salivary glands  ILO: To understand the clinical implications of newly detected organs at risk and new strategies to define dose-effect relations.	Professor Wouter Vogel
14:00-14:45	lecture including case presentation 1 Nucleic acid PET and esophagus  ILO: 1. Review the diagnostic PET/CT imaging for esophagus 2. Understand the Nucleic acid PET/CT	Professor Ryogo Minamimoto (Nuclear medicine, NCGM )
14:45-15:15	Coffee break	
15:15-16:00	lecture including case discussion 2 Head and Neck  ILO: 1. Review the radiotherapy for head and neck 2. Understand the planning of radiotherapy using PET images	Dr. Naoya Murakami (Radiation oncology, NCCH)
<b>End of Session 6</b>		
<b>On-site discussion 3</b>		
16:00-17:00	On-site discussion  ILO: Discuss about the radiotherapy and PET future.	Drs. Kimiteru Ito /Takahiro Morita (Nuclear medicine NCCH) Dr. Hiroshi Igaki (Radiation Oncology, NCCH)
<b>End of on-site discussion 3</b>		

**Thursday, 12 December 2019**

**Session 7**

Meeting Room 6D, 6F Research Building, Tsukiji Campus (Tokyo)

**CHAIR: Dr. Hiroshi Igaki**

9:15-10:15	lecture with practical reading 3 amino acid PET and CNS, colon ILO: 1. Review the diagnostic PET/CT imaging for brain tumors and colon 2. Understand the amino acid PET/CT	Dr. Kazuo Kubota (Nuclear medicine, Southern Tohoku General Hospital)
10:15-10:45	Coffee break	
10:45-11:30	lecture including case presentation 4 BNCT and MERIdian  ILO: Understand the mechanism of new machines for radiotherapy	Dr. Hiroshi Igaki (Radiation Oncology, NCCH)
11:30-12:15	New opportunities and challenges: PET-MR- Linac twinning and PSMA-directed NCT.  ILO: To create awareness of new opportunities and strategies to improve RT dose delivery.	Professor Wouter Vogel
<b>End of Session 7</b>		
12:15-13:15	Lunch Break	

## Session 8

Meeting Room 6D, 6F Research Building, Tsukiji Campus (Tokyo)

**CHAIR: Dr. Kimiteru Ito**

13:15-14:00	<p>lecture with practical reading 5 PET imaging of hypoxia and estrogen receptor in breast cancer</p> <p>ILO: Review the diagnostic PET/CT imaging using hypoxia and estrogen receptor</p>	Dr. Tomohiko Yamane (Nuclear medicine, Saitama Medical University International Medical Center)
14:00-14:45	<p>lecture including case discussion 6 breast cancer</p> <p>ILO: Understand the radiotherapy for breast cancer</p>	Dr. Kenshiro Shiraishi (Radiation oncology, Teikyo University Hospital)
14:45-15:00	Coffee break	
15:00-16:00	clinical case discussions	Professor Berardino De Bari Professor Wouter Vogel
16:00-17:00	<p>Overview of PET and radionuclide therapy ILO:</p> <ol style="list-style-type: none"> <li>1. Review the concept and overview of PET tracers.</li> <li>2. Understand the nuclide therapies in Japan.</li> </ol>	Dr. Kimiteru Ito (Nuclear medicine, NCCH)

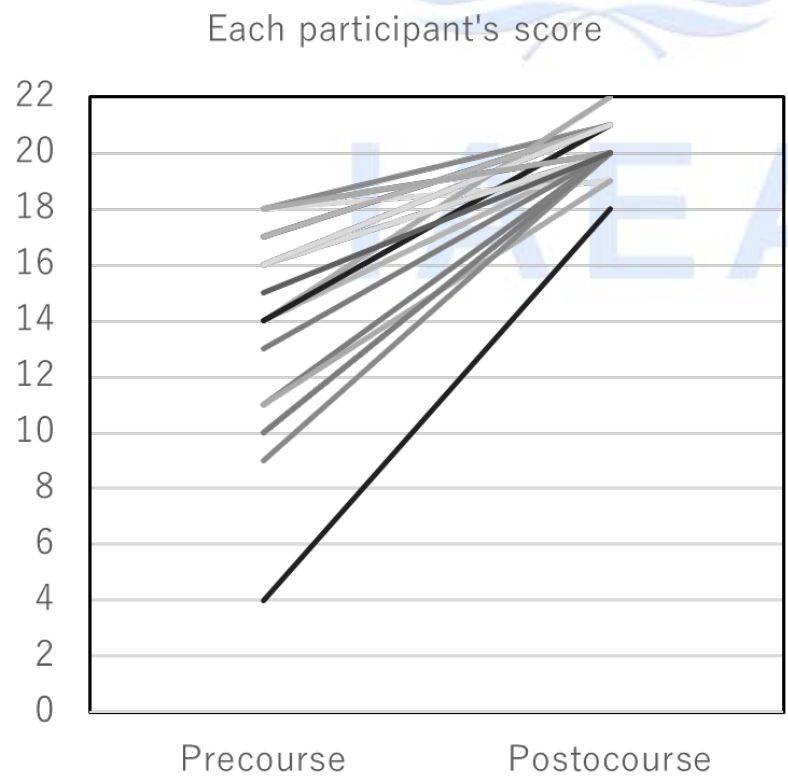
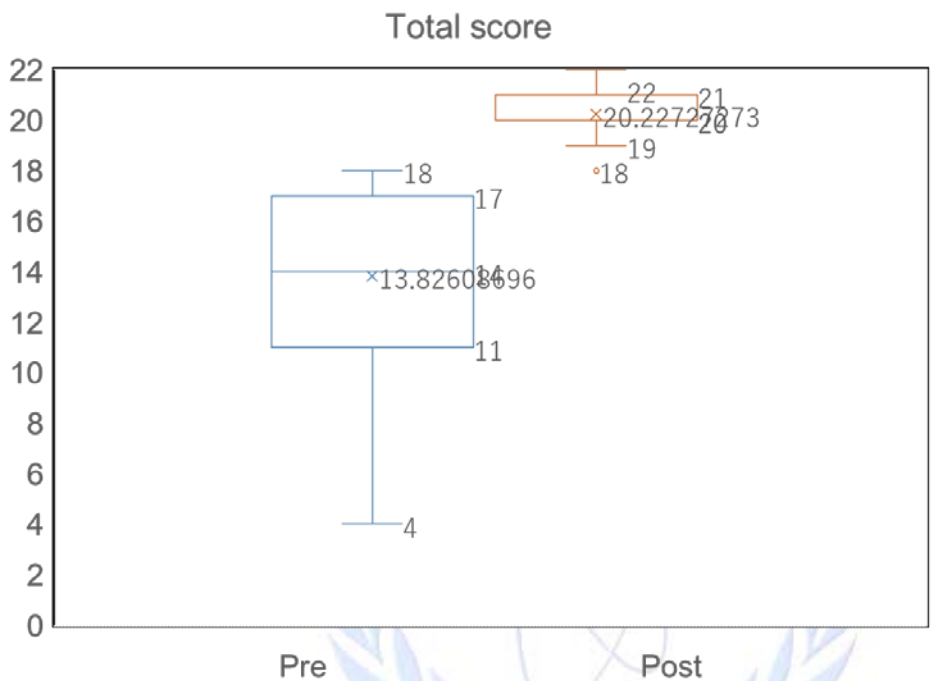
**End of Session 8**

Friday, 13 December 2019		
Session 9		
Meeting Room 6D, 6F Research Building, Tsukiji Campus (Tokyo)		
CHAIR: Dr. Kimiteru Ito		
9:15-10:00	lecture with practical reading 7 lung PET, breast  ILO: Understand the practical PET reading skill about lung and breast malignancies	Dr. Yoko Satoh (Diagnostic Radiology, Yamanashi PET imaging clinic)
10:00-10:30	Coffee break	
10:30-11:15	lecture including case presentation 8 lymphoma  ILO: Understand the radiotherapy for lymphoma	Dr. Masahiko Oguchi (Radiation oncology, Cancer Institute Hospital of JFCR)
End of Session 9		
11:15-11:45	Post-course evaluation	
11:45-12:00	Closing remarks	Dr. Masahiko Kusumoto (Chief - Diagnostic Radiology, NCCH)

The summary of this workshop

Change of scores of course evaluation tests

The score of postcourse evaluation test of each participant was always superior to that of precourse test.





## Photos



Group photo on the 1<sup>st</sup> day



Dr. Hitoshi Nakagama  
The president of NCC



Dr. Atsushi Ohtsu  
The Director  
of Hospital East



Dr. Atsushi Ochiai  
The Director  
of EPOC



Dr. Berardino De Bari  
IAEA expert



Dr. Wouter Vogel  
IAEA expert



Dr. Toshiro Nishida  
Director of Hospital



Dr. Hatazawa (rt) and Dr. Fujii (lt)  
at Welcome party



Welcome party at the auditorium



A session at Kashiwa Campus





A session at Tsukiji Campus



Group photo at the end of the workshop

This workshop is accredited by the UEMS- EACCME (European Union of Medical Specialists - European Accreditation Council for Continuing Medical Education) with 22 European CME credits.

