

10th International Conference: 3D and Advanced Dosimetry

Duke Kunshan University, Sept 16-19, 2018



DUKE UNIVERSITY
MEDICAL PHYSICS
GRADUATE PROGRAM

中国生物医学工程学会医学物理分会



昆山杜克大学
DUKE KUNSHAN
UNIVERSITY



AMERICAN ASSOCIATION
of PHYSICISTS IN MEDICINE

9/1/2018

Welcome Message:

We have yet to meet a clinical therapy physicist who does not readily acknowledge the great desirability for more comprehensive and efficient dosimetry tools, including 3D dosimetry systems, for the verification of modern radiation treatments. The innovations and progress toward this goal are remarkably captured in the proceedings of nine prior conferences, the last five of which are freely available in the [Journal of Physics: Conference Series](#). The current 10th IC3DDose meeting is the first to be held in China, and it is an exciting prospect to see the meeting expand and new researchers and ideas enter the field. The scientific program has been carefully crafted to try to meet the objectives listed below, and we are fortunate that many leading speakers will be sharing their experience and perspectives to achieve them.

Conference Objectives:

1. **To provide a forum** to discuss the latest research and developments in 3D and advanced radiation dosimetry.
2. **To elevate the quality** of radiation therapy treatments and quality assurance (QA) through improved clinical dosimetry.
3. **To explore** the dosimetric challenges posed by modern radiation treatment techniques
4. **To energize and diversify** dosimetry research and clinical practice by encouraging interaction and synergy between advanced, 3D, and semi-3D dosimetry techniques

On a personal note we would like to extend a very warm welcome to all conference attendees ! We have a very diverse group of clinical and research physicists from many parts of the world, and it is truly a pleasure to welcome you all.

Finally we would like to acknowledge the many people who have made the meeting possible. Special thanks go to the Local Organizing Committee (listed below) who put in many hours on the difficult challenge of arranging a meeting in a different continent and language. The Scientific Committee reviewed all the conference abstracts and participated in many planning conference calls, and meeting activities. We are also very grateful to our sponsors, both academic and industrial, who's support was vital to enabling this meeting.



Mark Oldham PhD, FAAPM
Professor, Radiation Oncology,
University Medical Center,
Durham, NC, USA
Mark.Oldham@duke.edu



Fang-Fang Yin, PhD, FAAPM
Chief of Physics, Radiation Oncology, Duke
Duke University Medical Center,
Durham, NC, USA
Director of Medical Physics
Duke Kunshan University
FangFang.Yin@duke.edu

Program at a glance

Time	Sunday Sept 16 th	Monday Sept 17 th	Tuesday Sept 18 th	Wednesday Sept 19 th
08:00-08:30		ITR 1: 3D Fundamentals	ITR 2: MFG 3D Dosimeters	ITR 3: Dose Readout
08:30 - 08:55	IR: Opportunities	IR: Pre-clinical	ICR: Carbon ions	ICR: EPIDS
08:55 - 09:20	IR: Med Phys China	IR: SRS & SBRT	ICR: Protons	ICR: IGRT 3D & QA
09:20 - 10:30	Proffered Talks: Clinical Opportunities	Proffered Talks: SRS and SBRT	Proffered Talks: Protons / new dosimetry systems	Proffered Talks: EPID and general clinical applications
10:30 - 10:50	Break			
10:50 - 12:00	IR: Dosimetry & MR	IR: Chem Dosimetry	Proffered Talks: New Dosimetry Sys	Proffered Talks:
	Proffered Talks: MRI	Proffered Talks		Concluding Comments
12:00 - 13:00	Lunch and Posters			
13:00 - 13:25	ICR: Dosimetry & MRI Linacs	Proffered Talks: Chemical Dosimetry	ICR: Motion and 4D Dosimetry	Bon Voyage !
13:25 - 13:50	IR: MD Anderson Experience		Proffered Talks: Motion and Brachy	
13:50 - 15:00	Proffered Talks: MRI Linacs			
15:00 - 15:20	Break	Break		
15:20 - 15:45	IR: Cherenkov and optical Dosimetry	IR: Developing Countries		
15:45 - 16:45	Proffered Talks: optical and cherenkov	IR: Innovation in Education		
16:45 +		Proffered: education		
Late Period			Workshops I and II	

Co-Chairs:

Mark Oldham PhD¹, Fang-Fang Yin PhD^{1,2},
¹Duke University Medical Center, NC, USA
²Duke Kunshan University, Kunshan, China

Local Organizing Committee:

Ying-Chiang (David) Huang PhD, James Bowsher PhD,
 Claire Kaimei Luo, Zhidong Xue and Hongrui Wang.
 Duke Kunshan University, Kunshan, China

International Scientific Committee:

Sven Back (Sweden), Clive Baldock (AUS), Sam Beddar (USA), Yves De Deene (AUS), Simon Doran (UK), Geoffrey Ibbott (USA), Andrew Jirasek (CA), Kevin Jordan (Canada), Ben Mijnheer (NL), Mark Oldham (USA), John Schreiner (CA), Cheng-Shie Wu (USA)

Invited Speaker Listing:

Sven Back, PhD, Associate Professor, Medical Radiation Physics, Lund University, Sweden

Clive Baldock, PhD, Professor, Pro-Vice Chancellor, Dean of Graduate Research, University of Tasmania, Australia

Andy Beavis, PhD Head of Radiation Physics, Castle Hill Hospital, Cottingham, UK

Sam Beddar, PhD, Professor and Chief of Research, Department of Radiation Physics, UT MD Anderson Cancer Center, TX USA

Petr Bruza, PhD, Thayer School of Engineering, Dartmouth College, NH, USA

Sha Chang PhD, Professor, UNC School of Medicine, Chapel Hill, NC, USA

Jianron Dai, PhD, Vice Chairman, Department of Radiation Oncology, Cancer Institute (Hospital), Beijing, CHINA

Yves DeDeene, PhD, Professor of BME, Faculty of Science and Engineering, Macquarie University, Sydney, Australia

Simon Doran, PhD, Senior Staff Scientist, CRUK Cancer Imaging Center, Institute of Cancer Research, Sutton, UK

Geoffrey Ibbott, PhD, Professor and Deputy Head, Radiation Oncology, UT MD Anderson Cancer Center, TX, USA

Urszula Jelen PhD, Medical Physics Post-doctoral Scientist, Medical Physics Department, Ingham Institute for Applied Medical Research, Liverpool, NSW, Australia

Andrew Jirasek, PhD, Associate Professor, Director, CAMPEP Graduate Program in Medical Physics, Mathematics, Statistics, Physics, and Computer Science, I.K. Barber School of Arts and Sciences, The University of British Columbia, Okanagan, BC Canada

Kevin Jordan, PhD, Physicist, Physics and Engineering, London Regional Cancer Program, London , ON, CANADA

Dan Low, Professor and Vice Chair of Physics, Radiation Oncology, University of California and Los Angeles, USA

Jiade Lu, Professor, Shanghai Proton and Heavy Ion Center (SPHIC), Fudan University Shanghai Cancer Center (FUSCC), CHINA

Ben Mijnheer PhD, FIOMP, DEPT of Radiation Oncology, Netherlands Cancer Institute, Amsterdam , NETHERLANDS

John Schreiner, PhD, FAAPM, FCCPM, FCOMP, Chief Medical Physics, Cancer Center of Southeastern Ontario, Kingston , ON CANADA

Cheng-Shie Wu, PhD, Professor, Director of Medical Physics, Department of Radiation Oncology, Columbia University, NEW YORK , NY

Program at a Glance

Time	Sunday Sept 16th	Monday Sept 17th	Tuesday Sept 18th	Wednesday Sept 19th	IR = Invited Review (ICR = Clinical, ITR = Technical)
08:00-08:30		ITR 1: 3D Fundamentals	ITR 2: MFG 3D Dosimeters	ITR 3: Dose Readout	ITR Baldoek/Schreiner Review of Fundamentals of 3D and Advanced Dosimetry
08:30 - 08:55	IR: Opportunities	IR: Pre-clinical	ICR: Carbon ions	ICR: EPIDS	ITR Jordan / DeDene Making your own 3D Dosimeters
08:55 - 09:20	IR: Med Phys China	IR: SRS & SBRT	ICR: Protons	ICR: IGRT 3D & QA	ITR Doran / Jirasek 3D Dosimetry Read-Out Techniques
09:20 - 10:30	Proffered Talks: Clinical Opportunities	Proffered Talks: SRS and SBRT	Proffered Talks: Protons / new dosimetry systems	Proffered Talks: EPID and general clinical applications	ICR: China Med Phys Jianrong Dai Medical Physics and Dosimetry in China
10:30 - 10:50	Break				ICR: Opportunities Daniel Low Dosimetry challenges and opportunities in modern RT
10:50 - 12:00	IR: Dosimetry & MR Proffered Talks: MRI	IR: Chem Dosimetry Proffered Talks	Proffered Talks: New Dosimetry Sys	Proffered Talks: Concluding Comments	ICR: SRT/SBRT Mark Oldham SRT/SBRT: QA dosimetry and 3D
12:00 - 13:00	Lunch and Posters				ICR: Pre-Clinical Cheng-Shie Wu Pre-clinical and small field dosimetry
13:00 - 13:25	ICR: Dosimetry & MRI Linacs	Proffered Talks: Chemical Dosimetry	ICR: Motion and 4D Dosimetry	Bon Voyage I	ICR: Protons Sam Beddar 3D dosimetry for proton therapy
13:25 - 13:50	IR: MD Anderson Experience		Proffered Talks: Motion and Brachy		ICR: Carbon Jlade Lu 3D dosimetry for heavy ion therapy
13:50 - 15:00	Proffered Talks: MRI Linacs	Break	Proffered Talks: Education	Workshops I and II	ICR: 4D & Gating Sven Back 4D and Motion: Dosimetry and motion management
15:00 - 15:20	Break		IR: Developing Countries		ICR: IGRT and QA John Schreiner IGRT 3D & QA: End to end QA IGRT
15:20 - 15:45	IR: Cherenkov and optical Dosimetry	Social Event Tour	IR: Innovation in Education	Workshops I and II	WkShp1 Kevin Jordan Data Challenge: optical-CT, x-ray-CT, MRI
15:45 - 16:45	Proffered Talks: optical and cherenkov		IR: Innovation in Education		WkShp 2 John Schreiner Data Analysts Tools: 3D Slicer and CERR
16:45 +					ICR: Dosimetry & B fields Simon Doran Radiotherapy in the presence of Magnetic Fields
Late Period					ICR: MR Linac Dosimetry Geoff Ibbott MRI Linacs: the MD Anderson Experience
					ICR: Chemical Dosimetry Kevin Jordan Chemical 3D Dosimetry
					IR:Cherenkov Dosimetry Petr Bruza Optical and Cherenkov Dosimetry
					ICR: EPID dosimetry I Ben Miljineer EPIDS and QA of advanced treatments
					ICR:Developing Countries Sha Chang Unmet needs and opportunities of 3D radiation dosimetry in the low and middle income countries
					IR Innovation in Education Andy Beavis Innovation in Education of Advanced Dosimetry: Computer simulation in physics training

10th IC3DDose Conference Program, Sept. 2018

Sunday 16 September 2018

- 8:15-8:30** **Welcome: Mark Oldham^{*}, Fang-Fang Yin^{*}, Ying Chiang Huang[#]**
^{*} Radiation Oncology, Duke University, NC, USA
[#] Duke Kunshan University, Kunshan, China
- 8:30-10:30** **Session: Clinical Challenges and Opportunities**
Moderators – John Schreiner and Mark Oldham
- 8:30-8:55** **Invited Review – Dosimetry challenges and opportunities in modern RT**
Dan Low PhD,
Department of Radiation Oncology, UCLA, California, USA
- 8:55-9:20** **Invited Review – Medical Physics and Clinical Dosimetry in China**
Jianrong Dai PhD,
Department of Radiation Oncology, Cancer Institute, Beijing, China
- 9:20-9:35** Evaluation of a Clinical Dose Accumulation Algorithm Using Deformable Gel Dosimetry
Charles K Matrosic¹, Shannon Holmes, Bryan Bednarz, and Wesley Culberson
¹Department of Medical Physics, School of Medicine and Public Health, University of Wisconsin – Madison, WI
- 9:35-9:50** Investigation of lung tumour peripheral doses using normoxic polymer gel and film dosimetry techniques
A Venning¹, M Mundayadan Chandroth, B Chick, B Waller and C Morgan
¹Mid-North Coast Cancer Institute, Port Macquarie Base Hospital, Port Macquarie, NSW, Australia
- 9:50-10:05** Feasibility of radiosurgery dosimetry using NIPAM 3D dosimeters and x-ray CT
Justus Adamson¹, Jaclyn Carroll, Michael Trager, Paul Yoon, Jacob Kodra, Fang-Fang Yin, Evan Maynard, Michelle Hilts, Mark Oldham, Andrew Jirasik
¹Department of Radiation Oncology, Duke University Medical Center, Durham, North Carolina, USA
- 10:05-10:20** Surface Dose Accuracy in VMAT Head & Neck Radiation Treatment Using Bolus
KM Alexander¹, J Gooding, LJ Schreiner and T Olding
¹Department of Physics, Queen's University, Kingston, Ontario, Canada
- 10:20-10:50** *Tea/Coffee Break*
- 10:50-12:00** **Session: Dosimetry and MRI Linacs**
Moderators – Yves De Deene and Geoffrey Ibbott
- 10:50 – 11:15** **Invited Review – Radiotherapy in the presence of magnetic fields**
Simon Doran PhD,
Institute of Cancer Research, Sutton, Surrey, UK
- 11:15 - 11:30** Polymer gel-based measurements of the isocenter accuracy in an MR-LINAC
S Dorsch¹, P Mann, A Elter, A Runz, S Klüter and C P Karger
¹Department of Medical Physics in Radiation Oncology, German Cancer Research Center (DKFZ), Heidelberg, Germany

- 11:30-11:45 Dose rate and fractionation dependence of methacrylic acid based polymer gels using optical and MRI techniques
*Hannah J. Lee*¹, Yvonne Roed, Geoffrey S. Ibbott
¹Department of Radiation Physics, UT MD Anderson Cancer Center, Houston, TX
- 11:45-12:00 Characterization of small PRESAGE® samples for measurements near the dosimeter edges
*Filipa Costa*¹, Simon Doran, John Adamovics, Simeon Nill, Ian M Hanson and Uwe Oelfke
¹Joint Department of Physics, The Institute of Cancer Research and The Royal Marsden NHS Foundation Trust, London, UK
- 12:00 – 1:00pm *Lunch Break***
- 1:00-3:00pm Session: Dosimetry and MRI Linacs II**
Moderators – Dan Low and Andy Beavis
- 1:00 – 1:25 **Invited Review – Dosimetry requirements for MRI Linacs**
Urszula Jelen PhD,
Medical Physics Department, Ingham Institute for Applied Medical Research, Liverpool, NSW, Australia
- 1:25 – 1:50 Invited Review – The MD Anderson MRI Linac Experience**
Geoff Ibbott PhD,
MD Anderson Cancer Center, Houston, TX
- 1:50-2:05 Evaluation of a lung-equivalent gel dosimeter for MR image-guided radiation therapy
*BA McDonald*¹, HJ Lee, and GS Ibbott
¹Department of Radiation Physics, UT MD Anderson Cancer Center, Houston, TX
- 2:05-2:20 MRI-based iPAGAT polymer gel dosimetry using fast recovery spin echo sequences
K Fujino¹, K Ono, S Hayashi, K Hioki, M Miyazawa, Y Akagi and Y Hirokawa
¹High-precision Radiotherapy Center, Hiroshima Heiwa Clinic, Hiroshima, Japan
- 2:20-2:35 Polymer gel dosimetry in the presence of a strong magnetic fields
*Y Roed*¹, L Pinsky, and G Ibbott
¹Department of Physics, University of Houston, Houston, TX, USA
- 2:35 – 3pm ***BREAKOUT ACTIVITY !***
- 3:00 – 3:20 ***Tea/Coffee Break***
- 3:20-5:00 Session: Optical and Cherenkov Dosimetry (60mins: 4-5)**
Moderators – Kevin Jordan and Simon Doran
- 3:20 – 3:45 **Invited Review – Dosimetry from Cherenkov Imaging**
Petr Bruza PhD,
Thayer School of Engineering, Dartmouth College, NH, USA

- 3:45-4:00 Cherenkov imaging of total skin electron irradiation (TSEI)
*Timothy C. Zhu*¹,
¹Dept. of Radiation Oncology, University of Pennsylvania, Philadelphia, PA, USA
- 4:00-4:15 Measurement of build-up region dose with optical cone-beam computed tomography Scanner
*Sarah Garisto*¹, Kevin Jordan
¹London Regional Cancer Program, London Health Sciences Centre, Canada
- 4:15-4:30 Feasibility study of a dry optical CT scanner using aspherical lenses
Yves De Deene,
School of Engineering, Macquarie University, North Ryde, Sydney, Australia
- 4:30-4:45 Preliminary characterization of the Duke Integrated-Lens Optical-CT scanner (DIOS)
*Cielle Collins*¹, Suk Whan Yoon, Jacob Kodra, John Adamovics, & Mark Oldham
¹Duke University, Durham, North Carolina, USA
- 4:45-5:00 Cause of cupping artifacts from radiochromic micelle gel dosimeters used in optical CT scanner measurement
*Takaoki Takanashi*¹, Kazuya Hayashi, Mikio Nemoto, Hiraku Kawamura, Shin-ichiro Hayashi and Hiroaki Gotoh
¹3D Gel Dosimeter Research Laboratory, Cluster for Science, Technology and Innovation Hub, RIKEN, 2-1,Hirosawa, Wako, Saitam, Japan

Monday 17 September 2018

- 8:00 – 8:30 **Invited Technical Review (Refresher): Fundamentals of 3D Dosimetry**
J Schreiner PhD,
Cancer Center of South Eastern Ontario, Kingston, ON, Canada
- 8:30-10:30 **Session: Small Fields, Radiosurgery and Pre-Clinical Irradiators**
Moderators – Sven Back and Sam Beddar
- 8:30 – 8:55 **Invited Review – Pre-clinical and Small Field Dosimetry**
Cheng Shie Wu PhD,
Department of Radiation Oncology, Columbia University, New York, USA
- 8:30 – 9:20 **Invited Review - SRS and SBRT and Small Fields**
Mark Oldham PhD,
Duke University Medical Center, Durham, USA
- 9:20-9:35 Verification of stereotactic cranial radiotherapy treatments with MR-based gel dosimeters: practical aspects
*Filipa Costa*¹, Evanthia Kousi, Anne Gasnier, Emma Wells, Caroline Lamb, Maria A Schmidt and Rollo Moore
¹Joint Department of Physics, The Institute of Cancer Research and The Royal Marsden NHS Foundation Trust, London, UK
- 9:35-9:50 Assessing CBCT-based patient positioning accuracy on the Gamma Knife IconTM via Presage[®] 3D absolute dosimetry
*Andy Y. Xu*¹, Yi-Fang Wang, John Admovics, and Cheng-Shie Wu
¹Department of Radiation Oncology, Columbia University, New York, USA

- 9:50-10:05 Initial Commissioning Measurements of Respiratory Gated Liver VMAT Stereotactic Ablative Body Radiotherapy
KM Alexander¹, A Kerr and T Olding
¹Department of Physics, Queen's University, Kingston, Ontario, Canada
- 10:05 – 10:20 **BREAKOUT ACTIVITY !**
The utility of 3D Dosimetry for small fields, SRS/SBRT and Pre-clinical
- 10:20-10:50 *Tea/Coffee Break*
- 10:50-12:00 Session: Chemical Dosimeters I**
Moderators – Cheng Shie Wu and Yves De Deene
- 10:50 – 11:15 **Invited Review - Chemical Dosimetry**
Kevin Jordan PhD and *John Adamovics PhD*,
Rider University, NJ, USA
- 11:15 – 11:30 Optimization for stability of the deformable FlexyDos3D radiation dosimeter and curing effects
M J Wheatley¹, A S Balatinac, J T Booth and Y De Deene
¹School of Engineering, Macquarie University, North Ryde, Sydney, Australia
- 11:30 - 11:45 Influence of the components on the dose response of a radiochromic gel dosimeter based on a polyvinyl alcohol - iodide complex
Shin-ichiro Hayashi¹, Kaoru Ono, Keisuke Fujino, Sachie Fujimoto
¹Department of Clinical Radiology, Faculty of Health Sciences, Hiroshima International University, Higashi-Hiroshima, Hiroshima, Japan
- 11:45 - 12:00 Preliminary investigation of a reusable radiochromic sheet for radiation dosimetry
Cielle Collins¹, Jacob Kodra, Suk Whan Yoon, Robert Coakley, John Adamovics, Mark Oldham
¹Duke University, Durham, North Carolina, USA
- 12:00 – 1:00pm LUNCH BREAK**
- 1:00-2:30 Session: Chemical Dosimetry II**
Moderators – Mark Oldham and Kevin Jordan
- 1:00-1:15 Benzothiazole-containing tetrazolium salts as radiochromic indicators in gel dosimetry
Kalin I Penev¹ and Kibret Mequanint
¹Department of Chemical and Biochemical Engineering, the University of Western Ontario, London, ON, Canada
- 1:15-1:30 Development of a reusable PVA-GTA-I gel dosimeter for 3D radiation dose assessments
J Taño¹, S Hayashi, S Hirota, CA Gonzales, H Yasuda
¹Department of Radiation Biophysics, Research Institute for Radiation Biology and Medicine, Hiroshima University, 1 Kasumi 2-3, Minami-ku, Hiroshima, Japan
- 1:30-1:45 Three-dimensional radiochromic and polymer gel dosimeters with Pluronic F-127 matrix – a review of current research
M Kozicki¹, M Jaszczak, K Kwiatos, P Maras, S Kadlubowski, R Wach and M Dudek
¹Department of Man-Made Fibres, Lodz University of Technology, Lodz, Poland

1:45 – 2:00 Initial performance evaluation of a 3D gel dosimeter based on modified tetrazolium compounds ClearView2
*Rubin Hazarika*¹, Kalin I Penev, Kibret Mequanint and Kevin Jordan
¹London Regional Cancer Program, London Health Sciences Centre, London, Canada

Afternoon and evening

SOCIAL EXCURSION TO ZHOZHANG WATERTOWN

Tuesday 18 September 2018

- 8:00 – 8:30 Invited Technical Review (Refresher): Making 3D Dosimeters**
Kevin Jordan and Yves De Deene
London Regional Cancer Program, ON, Canada and Macquarie University, Sydney, Australia
- 8:30-10:30 Session: Heavy Particles and New Dosimetry Systems**
Moderators – Geoff Ibbott and Sha Chang
- 8:30 – 8:55 Invited Review: Advanced Dosimetry for Heavy Ion Therapy**
Jiade Lu PhD,
Professor, Shanghai Proton and Heavy Ion Center (SPHIC), Fudan University Shanghai Cancer Center (FUSCC), CHINA
- 8:55 – 9:20 Invited Review: Proton Therapy and the potential for 3D Dosimetry**
Sam Beddar PhD,
Professor and Chief of Research, Department of Radiation Physics, UT MD Anderson Cancer Center, TX USA
- 9:20-9:35** Comparison of low dose proton and photon irradiation induced polymerization processes in advanced nMAG gels using Raman spectroscopy
*N Šeperienė*¹ and D Adlienė
¹Physics Department, Kaunas University of Technology, Studentu St.50, Kaunas, LT51368 Lithuania
- 9:35–9:50** Clear micelle gel dosimeter with nanoclay
*Kazuya Hayashi*¹, Mikio Nemoto, Takaoki Takanashi, Yoosuk Kang, Haruki Togo, Jun'ichi Kotoku, Takenori Kobayashi, Shin-ichiro Hayashi and Hiroaki Gotoh
¹Department of Chemistry and Life Science, Graduate School of Engineering Science, Yokohama National University, Yokohama, Kanagawa, Japan
- 9:50-10:05** An Investigation of Dosimetric Accuracy of A Novel PRESAGE Radiochromic Sheet and Its Clinical Applications
*Yi-Fang Wang*¹, Kevin Liu, John Adamovics, Cheng-Shie Wu
¹Department of Radiation Oncology, Columbia University Medical Center, New York, NY
- 10:05-10:20** Basic characteristics of an AQUAJOINT®-based VIPET polymer gel dosimeter
*Mikio Nemoto*¹, Ayumi Oe, Tomokazu Kotani, Daniel Antonio Sahade, and Toshimasa Hamada
¹3D Gel Dosimeter Research Laboratory, Cluster for Science, Technology and Innovation Hub, RIKEN, 2-1, Hirosawa, Wako, Saitama, Japan
- 10:20-10:50** *Tea/Coffee Break*

10:50-12:00 Session: New Dosimetry Systems

Moderators – Simon Doran and Sam Beddar

- 10:50-11:05 Novel Dual-Wavelength Optical-CT Imaging Method for Gel Dosimeter Readout
Yi Du¹, Xiangang Wang, Xincheng Xiang, Yves, De Deene
¹Key Laboratory of Carcinogenesis and Translational Research (Ministry of Education/Beijing), Department of Radiotherapy, Peking University Cancer Hospital & Institute, Beijing, China
- 11:05-11:20 Evaporation and diffusion of chloroform with the deformable FlexyDos3D radiation dosimeter
*M J Wheatley*¹, J T Booth and Y De Deene
¹School of Engineering, Macquarie University, North Ryde, Sydney, Australia
- 11:20-11:35 Radiation induced degradation of rhodamine 6G and 7-Diethylamino-4-methylcoumarin in nano-clay gel for use in dosimeter
*T. Maeyama*¹, T. Takanashi
¹Department of Chemistry, School of Science, Kitasato University, Kanagawa, Japan
- 11:35-11:50 Gel dosimetry measurement of dose enhancement bismuth-based nanoparticles in radiation therapy
*Azimeh Rajaei*¹, Lingyun Zhao², Shi Wang¹, Yaqiang Liu¹
¹Institute of Medical Physics and Engineering, Department of Engineering Physics, Tsinghua University, Beijing, China
- 11:50 – 12:10 **BREAKOUT ACTIVITY !**

12:10 – 1:00pm LUNCH BREAK and Varian Presentation

1:00-3:00 Session: Brachytherapy and Motion

Moderators – John Schreiner and Ben Mijnheer

- 1:00 – 1:25 **Invited Review: Dosimetry and Motion Management**
Sven Back PhD,
Associate Professor, Medical Radiation Physics, Lund University, Sweden
- 1:25-1:30 Validation of an Ultrasound-Guided Prostate HDR Brachytherapy Dose Delivery
*T Olding*¹, KM Alexander, C Joshi and LJ Schreiner
¹Department of Physics, Queen's University, Kingston, Ontario, Canada
- 1:30-1:45 High dose rate brachytherapy three-dimensional gel dosimetry using optical computed tomography readout
*DA DeVries*¹, C Joshi and LJ Schreiner
¹Department of Physics, Queen's University, Kingston, Ontario, Canada
- 1:45-2:00 Spatial dose distribution analysis of Co-60 HDR brachytherapy of cervical cancer using an AQUAJoint®-based VIPET polymer gel dosimeter,
Ayumi Oe¹, Mikio Nemoto, Masanori Miyazawa, Daniel Antonio Sahade and Toshimasa Hamada,
¹Department of Radiology, Jichi Medical University Hospital, Yakushiji, Shimotsuke, Tochigi, Japan

- 2:00-2:15 Dose reconstruction including dynamic six-degree of freedom motion during prostate radiotherapy
*C G Muurholm*¹, T Ravkilde, S Skouboe, T Eade, D T Nguyen, J Booth, P J Keall and P R Poulsen
¹Department of Physics and Astronomy, Aarhus University, Denmark
- 2:15-2:30 Development of an experimental 3-D tool based on radiochromic films to determine normal tissue doses in external radiotherapy
*J Colnot*¹, G Garnier, S Zefkili, J-L Dumas, R Gschwind, C Huet
¹Institut de Radioprotection et de Sûreté Nucléaire (IRSN), Service de Recherche en Dosimétrie, Laboratoire de Dosimétrie des Rayonnements Ionisants, Fontenay-aux-Roses, France
- 2:30-2:45 Deformable gel dosimeter containing an X-ray visible dose sensitive target region
*C J Watson*¹, A U Yeo, J R Supple, M Geso, T Kron and R D Franich
¹School of Science, RMIT University, Melbourne, Australia
- 2:45 – 3:05pm *Tea/Coffee Break*
- 3:05 – 4:00 Session: Dosimetry and Education**
Moderators – Mark Oldham and Urszula Jelen
- 3:05 – 3:20 **Invited Review:** Unmet needs and opportunities of 3D radiation therapy dosimetry in the low- and middle-income countries.
Sha Chang PhD,
Professor, UNC School of Medicine, Chapel Hill, NC, USA
- 3:20 – 3:35 **Invited Review:** Innovation in Dosimetry Education: Computer Simulation in Physics training.
Andy Beavis PhD,
Head of Radiation Physics, Castle Hill Hospital, Cottingham, UK
- 3:35 – 3:45 Teaching the principles of X-ray CT and SPECT using optical CT, glowsticks and a scaled anthropomorphic phantom.
Yves De Deene,
School of Engineering, Macquarie University, North Ryde, Sydney, Australia [WIP]
- 3:45 – 4:00 How important is the dose rate sensitivity of 2D and 3D radiation dosimeters?
Yves De Deene,
School of Engineering, Macquarie University, North Ryde, Sydney, Australia
- 4:00-4:15 Exact MLC Control and Dosimetric Effects in Dynamic MLC,
Shidong Li,
Department of Radiation Oncology, Fox Chase Cancer Center at Temple University Hospital, Philadelphia, PA, USA
- 4:15 – 5:15 pm **WORKSHOPS ! Kevin Jordan and John Schreiner**

Wednesday 19 September 2018

- 8:00 – 8:30** **Invited Technical Review (Refresher): Dosimetry Read-Out Techniques**
Simon Doran and Andy Jirasek
- 8:30-10:30** **Session: Dosimetry with EPIDS and end-to-end QA (70 mins: 4-5 talks)**
Moderators – Andy Beavis and Ben Mijnheer
- 8:30 – 8:55 **Invited Review:** EPIDs and QA of advanced treatments
Ben Mijnheer PhD, FIOMP,
DEPT of Radiation Oncology, Netherlands Cancer Institute, Amsterdam ,
NETHERLANDS
- 8:55 – 9:20 **Invited Review:** IGRT 3D & QA: End to end QA IGRT
John Schreiner, PhD,
Chief Medical Physics, Cancer Center of Southeastern Ontario, Kingston, ON CANADA
- 9:20-9:35 EPID-based beam matching for linear accelerators using pixel sensitivity map
Baozhou. Sun¹, Sreekrishna M. Goddu, Sasa Mutic, Bin Cai
¹Department of Radiation Oncology, Washington University, St. Louis, MO, USA
- 9:35-9:50 Quantitative evaluation of transmission EPID daily imaging on a Halcyon Linac
P Jin¹, Y H Xie, M Huang, T C. Zhu
¹Department of Radiation Oncology, University of Pennsylvania, Philadelphia, PA USA
- 9:50-10:05 A sliding-window approach for improved VMAT dose calculation accuracy
J G Li¹, J-Y Park, N J Potter, B Lu, G Yan, C-R Liu and H N Alahmad
¹Department of Radiation Oncology, University of Florida College of Medicine,
Gainesville, FL USA
- 10:05-10:20 *Tea/Coffee Break*
- 10:20-12:10** **Session: Multi-scale and Novel 3D Dosimetry**
Moderators – Cheng Shie Wu and Simon Doran
- 10:20 – 10:35 Multi-scale dosimetry with multi-scale Chinese reference phantoms
Rui Qiu¹, Zhen Wu, Chunyan Li, Li Ren, Wenjing Wang, Ruiyao Ma, An kang Hu,
Hongyu Zhu, Junli Li.
¹ Department of Engineering Physics, Tsinghua University, Beijing, China
- 10:35-10:55 A chemical evolution of NVP-containing VIPAR-family 3D polymer gel dosimeters – a
brief overview
M Kozicki¹, M Jaszczak, P Maras and M Dudek
¹Department of Man-Made Fibres, Lodz University of Technology, Lodz, Poland
- 10:55-11:10 Dose verification of dynamic MLC-tracked radiotherapy using small PRESAGE® 3D
dosimeters and a motion phantom
Filipa Costa¹, Martin J Menten, Simon Doran, John Adamovics, Ian M Hanson, Simeon
Nill and Uwe Oelfke
¹Joint Department of Physics, The Institute of Cancer Research and The Royal
Marsden NHS Foundation Trust, London, UK
- 11:10-11:35 A benchtop UV irradiator for 3D dosimetry laboratories with dosimetric considerations in
a spinning NMR test tube
Yves De Deene
School of Engineering, Macquarie University, North Ryde, Sydney, Australia
- 11:45 am **Concluding Remarks**, John Schreiner and Mark Oldham

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