10th International Conference: 3D and Advanced Dosimetry

Duke Kunshan University, Sept 16-19, 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
FangFang.Yin@duke.edu
# Program at a glance

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<td>08:00-08:30</td>
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<td>ITR 1: 3D Fundamentals</td>
<td>ITR 2: MFG 3D Dosimeters</td>
<td>ITR 3: Dose Readout</td>
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<td>08:30 - 08:55</td>
<td>IR: Opportunities</td>
<td>IR: Pre-clinical</td>
<td>ICR: Carbon ions</td>
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<td>09:20 - 10:30</td>
<td>Proffered Talks: Clinical Opportunities</td>
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<td>Proffered Talks: EPID and general clinical applications</td>
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<td>IR: Dosimetry &amp; MR</td>
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<td>Proffered Talks: New Dosimetry Sys</td>
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<td>13:00 - 13:25</td>
<td>ICR: Dosimetry &amp; MRI Linacs</td>
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<td>ICR: Motion and 4D Dosimetry</td>
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<td>13:25 - 13:50</td>
<td>IR: MD Anderson Experience</td>
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<td>Proffered Talks: MRI Linacs</td>
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<td>Proffered Talks: Motion and Brachy</td>
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<td>15:20 - 15:45</td>
<td>IR: Cherenkov and optical Dosimetry</td>
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<td>15:45 - 16:45</td>
<td>Proffered Talks: optical and cherenkov</td>
<td>Social Event Tour</td>
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<td>16:45 +</td>
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<td>Budgeted Voyage !</td>
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<td>Late Period</td>
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## Co-Chairs:
Mark Oldham PhD¹, Fang-Fang Yin PhD¹,²
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 Wuu (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 (SHPIC), 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 Wuu, PhD, Professor, Director of Medical Physics, Department of Radiation Oncology, Columbia University, NEW YORK, NY
10th IC3D Dose Meeting Program

**Program at a Glance**

**Sunday**
12:15 - 13:00 Lunch and Posters
13:00 - 13:25 Invited Review: Chemical Dosimetry [IR]
13:50 - 15:00 Invited Review: Developing Countries [IR]
15:00 - 15:20 Break
15:45 - 16:45 Invited Review: Cherenkov and Optical Dosimetry [IR]

**Monday**
08:00 - 08:30 Invited Review: Epigenetics and Advanced Therapies [IR]
08:30 - 09:00 Review of Fundamentals of 3D and Advanced Dosimetry [TR]
09:00 - 10:15 Invited Review: 3D Fundamentals [TR]
10:15 - 10:45 Invited Review: Preclinical [IR]
10:45 - 12:00 Invited Review: Preclinical [IR]
12:00 - 13:00 Lunch and Posters
13:00 - 14:15 Invited Review: MR Linac Dosimetry [IR]
14:15 - 15:30 Invited Review: Protons [IR]
15:30 - 16:45 Invited Review: Protons [IR]

**Tuesday**
08:00 - 08:30 Invited Review: EPID Dosimetry [TR]
08:30 - 09:00 Invited Review: EPID Dosimetry [TR]
09:00 - 10:15 Invited Review: EPID Dosimetry [TR]
10:45 - 12:00 Invited Review: EPID Dosimetry [TR]
12:00 - 13:00 Lunch and Posters
13:00 - 14:15 Invited Review: EPID Dosimetry [TR]
14:15 - 15:30 Invited Review: EPID Dosimetry [TR]
15:30 - 16:45 Invited Review: EPID Dosimetry [TR]

**Wednesday**
08:00 - 08:30 Invited Review: EPID Dosimetry [TR]
08:30 - 09:00 Invited Review: EPID Dosimetry [TR]
09:00 - 10:15 Invited Review: EPID Dosimetry [TR]
10:45 - 12:00 Invited Review: EPID Dosimetry [TR]
12:00 - 13:00 Lunch and Posters
13:00 - 14:15 Invited Review: EPID Dosimetry [TR]
14:15 - 15:30 Invited Review: EPID Dosimetry [TR]
15:30 - 16:45 Invited Review: EPID Dosimetry [TR]

**Thursday**
08:00 - 08:30 Invited Review: EPID Dosimetry [TR]
08:30 - 09:00 Invited Review: EPID Dosimetry [TR]
09:00 - 10:15 Invited Review: EPID Dosimetry [TR]
10:45 - 12:00 Invited Review: EPID Dosimetry [TR]
12:00 - 13:00 Lunch and Posters
13:00 - 14:15 Invited Review: EPID Dosimetry [TR]
14:15 - 15:30 Invited Review: EPID Dosimetry [TR]
15:30 - 16:45 Invited Review: EPID Dosimetry [TR]

**Friday**
08:00 - 10:00 Invited Review: EPID Dosimetry [TR]
10:00 - 10:30 Break
10:30 - 12:00 Invited Review: EPID Dosimetry [TR]
12:00 - 13:00 Lunch and Posters
13:00 - 14:15 Invited Review: EPID Dosimetry [TR]
14:15 - 15:30 Invited Review: EPID Dosimetry [TR]
15:30 - 16:45 Invited Review: EPID Dosimetry [TR]

**Late Period**
11:45 - 12:15 Unmet needs and Opportunities of 3D dosimetry in low and middle income countries [IR]
12:15 - 12:45 New Dosimetry Systems [IR]
12:45 - 13:15 Proffered Talks: Motion and Brachy [IR]
13:15 - 13:45 Proffered Talks: Chemical Dosimetry [IR]
13:45 - 14:15 Proffered Talks: Optical and Cerenkov Dosimetry [IR]
14:15 - 14:45 Break
14:45 - 15:15 Proffered Talks: MRI Linacs [IR]
15:15 - 15:45 Break
15:45 - 16:15 Proffered Talks: MRI Linacs [IR]
16:15 - 16:45 Break
16:45 - 17:15 Proffered Talks: MRI Linacs [IR]
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 Hills, 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. Lee¹, 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 Costa¹, 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 McDonald¹, 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 Hikoki, 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 Roed¹, 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

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, 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, 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, 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 Wuu 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, 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, Yi-Fang Wang, John Adamovics, and Cheng-Shie Wuu
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 Wuu 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 Kadleubowski, R Wach and M Dudek
    1Department of Man-Made Fibres, Lodz University of Technology, Lodz, Poland
10th IC3DDose Meeting Program

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

Afternoon and evening
SOCIAL EXCURSION TO ZHOUZHUANG 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 Šeperienė1 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 Hayashi1, Mikio Nemoto, Takaoki Takanashi, Yoosuk Kang, Haruki Togo, Jun’ichi Kotoku, Takenori Kobayashi, Shin-icho 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 Wang1, Kevin Liu, John Adamovics, Cheng-Shie Wuu
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 Nemoto1, 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 Wheatley¹, 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. Maeyama¹, 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 Rajaee¹, 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 Olding¹, 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 DeVries², C Joshi and LJ Schreiner
²Department 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 Muurholm¹, 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 Colnot¹, 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 Watson¹, 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

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

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 Wuu 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.  
1Department 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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