

## Course summary

This course provides a practical and theoretical background to Radiotherapy with its main focus on Radiotherapy Physics aspects. The course is aimed at recently qualified radiotherapy physicists and includes an MSc module for students at Kings College, London. However, the course should also be invaluable to PhD students, post doctoral researchers, newly specialising clinical oncologists, radiotherapy engineers, radiographers, manufacturers' representatives and, in fact, anyone needing to deepen or update their understanding of this rapidly evolving field. The faculty is composed of physicists, clinical oncologists and radiographers, many of whom are internationally renowned for their expertise. Saturday workshops and demonstrations make full use of the facilities of The Royal Marsdens' Radiotherapy Departments on the Chelsea and Sutton sites. The course is reviewed annually to reflect changes in practice and developing technology.

## Fees and registration

The cost for each full course week, including practical's, at £750. For those wishing to book the complete two weeks, the cost at £1250. Individual days of the course can be booked for £180 per day. The course meal will be an extra £40.00pp if not attending the full week.

External, full-time PhD students with proof of academic registration can book the 8 lecture days of both weeks for a total of £600.

All fees include course materials, lunches, light refreshments, a special buffet and cheese & wine both on Friday and a course dinner on Tuesday, as appropriate. Accommodation is available in a local hotel at approximately £90 per night extra. The link for the registration form is:

[www.icr.ac.uk/research/research\\_divisions/Radiotherapy\\_and\\_Imaging/Training\\_Courses/Radiotherapy\\_Physics](http://www.icr.ac.uk/research/research_divisions/Radiotherapy_and_Imaging/Training_Courses/Radiotherapy_Physics)

## Course administrator

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## Additional practical tutors

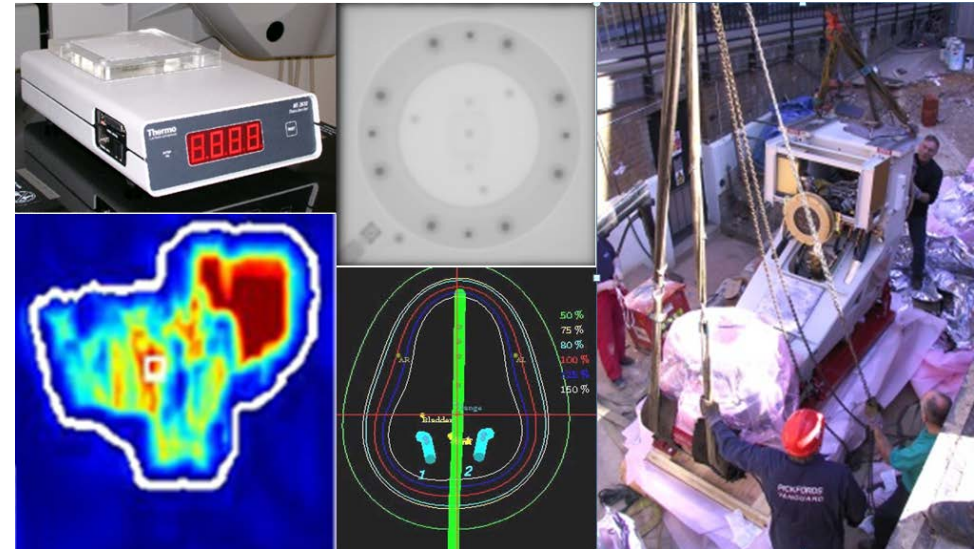
Alex Backshall, David Bernstein, Irena Blasiak-Wal, Natalie Bleackley, Helen Chapman, Ruth Colgan, Patrick Conaghan, Helen Convery, Katie Edmunds, Ian Hanson, Caroline Jones, Kate Roome, Matthew Seithel, Katy Taylor, and Karole Warren-Oseni.

## Key to external lecturers

1) Maastricht University Hospital, The Netherlands. 2) Clatterbridge Cancer Centre, The Wirral. 3) Royal Surrey County Hospital, Guildford. 4) The Christie Hospital, Manchester. 5) St James' Hospital, Leeds. 6) Imperial College Hospitals, London. 7) Consultant Physicist, Edinburgh. 8) Cromwell Hospital, London. 9) Medical University of Vienna, Austria. 10) National Cancer Institute, Amsterdam.

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# A Course in Radiotherapy Physics

**11 – 15 November 2014**

Radiation Dosimetry, Imaging for Radiotherapy, Treatment Planning and Patient Specific Dosimetry (Sutton Site)

**3 – 7 March 2015**

Radiobiology, Accelerator design and Quality Assurance, Brachytherapy and Radiotherapy Verification Imaging (Chelsea Site)

## Radiation Dosimetry, Imaging for Radiotherapy, Treatment Planning and Patient Specific Dosimetry (Sutton site)

Course Organisers: Dr Vibeke Hansen and Ms Margaret Bidmead

### Tuesday 11 November 2014 – Fundamentals Radiation Dosimetry

Photon Interaction Mechanisms Electron	Professor F Verhaegen <sup>1</sup>
Interaction Mechanisms Fundamental	Professor F Verhaegen
Principles of Dosimetry I Fundamental	Professor A Nahum <sup>2</sup>
Principles of Dosimetry II	Professor A Nahum
Characteristics and Calculations for Photon Beams	Mr P Childs
Radiotherapy and Cancer	Dr L Welsh
Ionisation Chamber Design and Measurements	Dr T Jordan <sup>3</sup>

### Wednesday 12 November 2014 – Imaging for Radiotherapy

Radiotherapy Applications of Monte-Carlo methods	Professor F Verhaegen
MR Imaging for Radiotherapy Planning	Dr M Schmidt
PET Imaging for Radiotherapy Planning Treatment	Dr I Murray
Planning Margins; ICRU 50, 62 and 83	Dr C Rowbottom <sup>4</sup>
Stereotactic Body Radiotherapy (SBRT) for Lung Tumours	Dr V Cosgrove <sup>5</sup>
Evaluation Tools in Treatment Planning	Ms M Bidmead
Electron Beam Therapy in Clinical Practice	Mr P Childs

### Thursday 13 November 2014– Treatment Planning

Photon Beam Algorithms in Treatment Planning Systems	Dr J Bedford
Intensity Modulated Radiotherapy Algorithms (IMRT)	Dr J Bedford
Prostate Cancer: XBRT Techniques and Trials	Dr C South <sup>3</sup>
Quality Control in Treatment Planning	Mr R Trouncer
Inverse Treatment Planning for IMRT	Mr G Smyth
Radiotherapy for Oesophageal and Liver Tumors	Dr M Hawkins
Large Field Techniques in Radiotherapy	Dr W Ingram

### Friday 14 November 2014 – Patient Specific Dosimetry

Radiotherapy of the Head and Neck	Dr K Newbold
Implementing New Treatment Techniques in the Clinic	Dr H McNair
Adaptive Radiotherapy for Bladder Cancer in Clinical Practice	Dr S Hafeez
Radiotherapy for Breast Cancer: Current and Future Practice	Dr A Kirby
Guest Lecture: Dosimetry for Molecular Radiotherapy	Dr G Flux
Radiotherapy with Protons and Heavy Ions	Professor U Oelfke
Radiochromic Film Dosimetry	Dr M Thomas
Verification and Image based Dosimetry for IMRT	Dr V Hansen
<i>Vivo Dosimetry</i> for Point Measurements	Dr W Ingram

## Radiobiology, Accelerator design and Quality Control, Brachytherapy and Radiotherapy Verification Imaging (Chelsea site)

Saturday workshops and demonstrations include calibration and *in vivo* dosimetry, treatment planning for different tumour sites, plan verification, after loading equipment, radiotherapy machine quality control, intracavitary and implant dosimetry in brachytherapy.

### Tuesday 3 March 2015 – Radiobiology

Tumour Cell Radiobiology	Professor A Nahum
Modelling the Probability of Tumour Control (TCP)	Professor A Nahum
Radiobiology of Normal Tissues	Dr S Gulliford
Modelling Normal Tissue Complication Probability (NTCP)	Dr S Gulliford
Fractionation & Iso-effect in Radiotherapy	Professor R Dale <sup>6</sup>
Compensation for Treatment Gaps in Radiotherapy	Professor R Dale
Practical use of Radiobiology in Treatment Planning	Professor P Mayles <sup>2</sup>

### Wednesday 4 March 2015 – Accelerator design & QA

Medical Electron Linear Accelerators:	Dr H Porter <sup>7</sup>
Production of a Clinically Beam	Professor P Mayles
Multileaf Collimators: Characteristics and Commissioning	Dr V Cosgrove
Accuracy and Quality in Radiotherapy: An Overview	Professor P Mayles
kV X-ray Units	Mrs L Fernandez
Cyberknife	Mrs C Meehan
Tomotherapy and Gamma Knife	Dr D Nicholas <sup>8</sup>
Quality Control of Linacs	Mr R Moore
Quality Assurance in Clinical Trials	Mrs O Naismith
Quality Management Systems	Ms P Markovic

### Thursday 5 March 2015 – Brachytherapy

Calibration and QA of Brachytherapy Sources	Miss C Jones
The Radiobiology of Brachytherapy	Professor R Dale
Intracavitary Dosimetry	Ms M Bidmead
Gynaecology Cancers	Dr A Taylor
3D Image-Based Brachytherapy Planning	Dr C Kirisits <sup>9</sup>
Transperineal Prostate Brachytherapy	Mr P Bownes <sup>5</sup>
Radiation Protection in Brachytherapy	Mr J Thurston

### Friday 6 March 2015 – Verification Imaging

Radiation Protection in External Beam Radiotherapy	Mr P Childs
Brachytherapy for other clinical sites	Dr S Lalondrelle
IGRT Techniques	Dr E Harris
Image Quality and Patient Dose in IGRT & IMRT	Dr E Donovan
EPID Imaging in Routine Practice: Quality Control and Dosimetry	Dr V Hansen
Image Handling in Radiotherapy	Professor M Van Herk <sup>10</sup>
Errors & Margins in Image Guided Radiation Therapy	Professor M Van Herk