Penn-Ohio Chapter
American Association of Physicists in Medicine

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### 2012 Fall Symposium

**Friday Program of Events**

**Friday, September 21st, 2012**

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<td>11:00 am to 12:00pm</td>
<td>Vendor Setup</td>
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<tr>
<td>12:00 pm to 12:50 pm</td>
<td><strong>Check-In / On-Site Registration / Vendor Exhibits</strong></td>
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<tr>
<td>12:50 pm</td>
<td><strong>Welcome and Opening Remarks</strong></td>
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<tr>
<td></td>
<td>Michael J. Ohm, M.S., Penn-Ohio President, Cleveland Clinic</td>
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<td></td>
<td>Keli Wilson, M.S., Penn-Ohio President–Elect, UPMC CancerCenter</td>
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<tr>
<td>1:00 pm – 1:12 pm</td>
<td>Isoeffective Dose Display (EQD2) for Composite Plan of Radiosurgery and Conventional 3D Radiotherapy</td>
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<td>Jeffrey Fabien, M.S. – Student, University Hosp Seidman Cancer Center, Cleveland - OH</td>
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<tr>
<td>1:12 pm – 1:24 pm</td>
<td>A Web-based Research System for Outcome Analysis of NSCLC Treated with Stereotactic Ablative Radiation Therapy (SABR)</td>
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<td>Anh Le, Ph.D. – Student, University of Pittsburgh Medical Center, Pittsburgh - PA</td>
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<td>1:24 pm – 1:36 pm</td>
<td>Method for Verifying the Air Kerma Strength of Pre-Assembled I-125 Plaques for Ocular Melanoma</td>
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<td>Bill Zimmermann – Student, Cleveland State University, Cleveland - OH</td>
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<tr>
<td>1:36 pm – 1:40 pm</td>
<td><strong>Questions and Answers</strong></td>
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<tr>
<td>1:40 pm – 2:10 pm</td>
<td><strong>Vendor Technical Talk: 3D Dosimetry – Joint Expertise, Better Outcome</strong></td>
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<td>Stephen Gajdos, M.S.</td>
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<td>Sponsored by IBA</td>
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<td>2:10 pm – 2:40 pm</td>
<td><strong>Stake Holders and Bureau of Radiation Protection</strong></td>
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<td>Invited Speaker: James Castle, Administrator</td>
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<td>Bureau of Radiation Protection, Ohio Department of Health</td>
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<td>2:40 pm – 2:52 pm</td>
<td>Effect of contour accuracy on DVH parameters</td>
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<td>Anzi Zhao – Student, Cleveland State University, Cleveland - OH</td>
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<td>2:52 pm – 3:04 pm</td>
<td><strong>Interceptor and Phantom Trials of Emergency Radiation Detection and Notification system at UPMC CancerCenter</strong></td>
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<td>Ryan Dickson, Ph.D. – Student, University of Pittsburgh Medical Center, Pittsburgh - PA</td>
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<tr>
<td>3:04 pm – 3:16 pm</td>
<td>Effect of MLC Leaf Width on MLC Leaf Shifting Algorithm for Concurrent Treatment of Prostate and Pelvic Lymph Nodes</td>
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<td>Qingyang Shang, Ph.D. – Cleveland Clinic, Cleveland - OH</td>
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<td>3:16 pm – 3:20 pm</td>
<td><strong>Questions and Answers</strong></td>
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<td>3:20 pm to 4:00 pm</td>
<td><strong>Coffee Break / Vendor Exhibits</strong></td>
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| 4:00 pm – 4:30 pm | Vendor Technical Talk: Three-dimensional VMAT QA / Commissioning with a novel tank  
                        Jennifer Sessions, M.E.  
                        Sponsored by Sun Nuclear |
| 4:30 pm – 4:35 pm | Travel Grant Report – Student: Anh Le                                 |
| 4:35 pm – 4:40 pm | Travel Grant Report – Student: Qingyang Shang                          |
| 4:40 pm – 4:45 pm | Travel Grant Report – Student: David Albani                             |
| 4:45 pm – 4:50 pm | Travel Grant Report – Student: Anzi Zhao                                |
| 4:50 pm – 5:20 pm | Vendor Technical Talk: Statistical process control for analysis of routine machine QC  
                        Mac Clements, M.S.  
                        Sponsored by RIT               |
| 5:20 pm – 5:30 pm | Award Ceremony                                                        |
| 5:30 pm to 6:00 pm | Vendor Exhibits / Hotel Check-In                                     |
| 6:00 pm – 6:30 pm | Shuttle to Nautica Queen provided                                      |
| 6:30 pm – 7:30 pm | Wine Tasting                                                          |
| 7:30 pm – 10:30 pm | Dinner Cruise on the Nautica Queen, Downtown Cleveland              |
| 10:30 pm         | Return to Hotel (transportation provided)                              |
## Saturday Program of Events

**Saturday, September 22rd, 2012**

<table>
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<tr>
<td>7:15 am to 8:00 am</td>
<td>Continental Breakfast / Vendor Exhibits</td>
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| 8:00 am | Welcome and Opening Remarks  
Michael J. Ohm, M.S., Penn-Ohio President, Cleveland Clinic  
Keli Wilson, M.S., Penn-Ohio President–Elect, University of Pittsburgh Medical Center |
| 8:10 am – 8:55 am | Advanced Image Guided Radiation therapy and the potential role for molecular imaging in Prostate Cancer  
Invited Speaker: Rodney Ellis, M.D.  
Seidman Cancer Center University Hospitals Case Medical Center, Cleveland - OH |
| 8:55 am – 9:40 am | VMAT treatment planning and QA  
Invited Speaker: Daliang Cao, Ph.D.  
Swedish Cancer Institute, First Hill, Seattle, WA |
| 9:40 am – 10:10 am | Vendor Technical Talk: MR-based Simulation + MR-guided High Intensity Focused Ultrasound for Radiation Oncology  
Melanie Traughber, D.Sc.  
Sponsored by Phillips Medical Systems |
| 10:10 am to 10:30 am | Coffee Break / Vendor Exhibits                                       |
| 10:30 am – 11:15 am | Using Risk Analysis in Modern Radiotherapy: AAPM Task Group 100  
Invited Speaker: Ellen Yorke, Ph.D.  
Memorial Sloan-Kettering Cancer Center, New York, NY |
| 11:15 am – 12:00 am | Facts / Fiction / Fear (FFF) of Flattening Filter Free (FFF) X-ray Beams  
Invited Speaker: Joseph Ting, Ph.D.  
Melbourne Cancer Center, Melbourne, FL |
| 12:00 am – 12:30 pm | Vendor Technical Talk: Advanced Imaging Techniques for Ultrasound-Guided Prostate Brachytherapy Using the Hitachi HISION System  
Michael McTighe  
Sponsored by Hitachi |
| 12:30 pm to 1:15 pm | Buffet Lunch Provided / Vendor Exhibits                               |
| 1:15 pm – 2:00 pm | Concluding Remarks and Penn-Ohio Business Meeting  
Penn-Ohio Chapter Officers |
| 2:00 pm | Vendor Tear Down |
F01: Isoeffective Dose Display (EQD2) for Composite Plan of Radiosurgery and Conventional 3D Radiotherapy

Speaker: Jeffrey Fabien, M.S. – Student, University Hospitals Seidman Cancer Center, Cleveland - OH

Purpose: Direct addition of doses between plans with different fractionation fails to provide accurate dose-response information to anticipate clinical outcome. To combine different fractionation patterns, first-order biological model correction for dose-rate must be included. Moreover, 3-D isoeffect patterns of the combined doses must be displayed so that overlap area to elegant volumes can be avoided. The linear quadratic (LQ) model and biologically effective dose (BED) method were used to produce a combined plan in equivalent 2 Gy fractions (EQD2) for radiosurgery and conventional 3D radiotherapy.

Methods: For patients with multiple courses of radiotherapy, dose distributions of the prior and boost treatment plans were converted to BED. The fraction size specified by the prescription was applied globally for each BED calculation. α/β ratio of 10 and 2.5 was used for early and late effect, respectively. Image registration with CT or MR was performed for initial and boost plans. The registration information was applied to dose distributions to obtain the composite EQD2.

Results: As a demonstration of this method, two patients were selected who had combined treatments from substantially different modalities. A patient with liver cancer initially received radiotherapy of 30 Gy/10 Fx and re-irradiation with CyberKnife radiosurgery (15 Gy/1 Fx). The combined plan showed that the PTV received EQD2 of 63.8 Gy. Another patient had brain metastasis treated with GammaKnife of 18 Gy (50% isodose) followed by conventional 3D whole brain radiation of 30 Gy/10 Fx. The minimal combined tumor EQD2 was 74.5 Gy. Early and late calculated responses showed that all critical organ doses were within tolerance.

Conclusions: For patients receiving radiation with different fractionation schemes, combined isoeffective dose distributions were calculated and displayed. In both cases, crucial information regarding 3-D dose distributions assisted the physicians in determining whether tolerance limits of overlap areas of retreated critical structures were preserved.

F02: A Web-based Research System for Outcome Analysis of NSCLC Treated with Stereotactic Ablative Radiation Therapy (SABR)

Speaker: Anh Le, Ph.D. – Student, University of Pittsburgh Medical Center, Pittsburgh - PA

Purpose: To establish a web-based software system, an electronic patient record (ePR), to consolidate and evaluate clinical data for dose delivery and treatment outcomes for non small cell lung cancer (NSCLC) patients treated with hypofractionated stereotactic ablative radiation therapy (SABR) across institutions.
Methods: The new trend of information technology in medical imaging and informatics is towards the development of an ePR, in which all health and medical information of each patient are organized under the patient’s name and identification number. The core of the ePR used is the database providing a systemic way not only to integrate data for all patients but also to facilitate patient data input and management, and evaluation of clinical data for dose delivery and outcome analysis across institution using web-based technology. The data of each patient to be recorded in the database include but are not limited to demographics data, pathology condition, cancer staging, treatment plan in DICOM-RT format and follow-up data, such as survival status, local tumor control and toxicity. The clinical data are entered to the system using a web page interface while the treatment plan data are imported from the treatment planning system using DICOM communication.

Results: The collection of data of NSCLC patients treated with SABR is stored in the ePR. Data as saved in an ePR for this SABR-based database is always accessible and can be retrieved and processed in the future.

Conclusions: The web-based DICOM RT ePR system developed in-house utilizes the current state-of-the-art medical informatics approach to investigate the combination and consolidation of patient data and outcome results. It combines data from various sources and store data under unique patient key in database allowing future clinically-driven data mining. This system could allow for quantification of efficacy of SABR in treating NSCLC patients.

Acknowledgements: This research work is supported by Cure Grant – PA Department of Health; M. Saiful Huq, Ph.D. as principle investigator.
This work was partially presented at AAPM Annual Meeting 2012, Charlotte, NC

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F03: Method for Verifying the Air Kerma Strength of Pre-Assembled I-125 Plaques for Ocular Melanoma

Speaker: L. Zimmermann – Student, Cleveland State University, Cleveland - OH

Purpose: To develop a method of easily verifying the activity or air kerma strength of pre-assembled COMS and Eye Physics EP917 eye plaques.

Method and Materials: A Carpintec CRC-7 Dose Calibrator with its standard vial/syringe sample holder was used to measure the activity of pre-assembled eye plaques using IsoAid Advantage I-125 seeds. Plaque activity measurements were made by placing the plaque face up in the center of a 10 cm tall Styrofoam insert in the source holder. The source holder was rotated to four angles (0°, 90°, 180°, and 270°). The average of these four values was compared to the assay air kerma strength, decayed to the plaque measurement date, to establish a plaque calibration factor. The average and standard deviation of several plaque measurements were then calculated to determine the repeatability of the process. Activity measurements were also made to determine the contribution of each seed position to the total measured activity of the EP 917 plaque.

Results: Activity measurements were taken on seven vendor-preloaded Eye Physics EP917 eye plaques. For the EP917, the average plaque calibration factor was 0.344 with a standard deviation of 0.012. For the COMS plaques with a silastic carrier, the plaque calibration factors ranged from 0.237 for a COMS 16N to 0.281 for a
COMS 20. The average plaque calibration factor was 0.256 and the standard deviation was 0.015. The individual seed measurements were made using three different EP-917 plaques. The data from these measurements show that the contribution of a single seed to the total plaque activity is approximately 5.9% or \( \frac{1}{17} \) of the total activity.

**Conclusions:** Plaque calibration factors based on this methodology may be used to verify the activity of preassembled plaques to within 5%.

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**F04: 3D Dosimetry – Joint Expertise, Better Outcome**

**Speaker:** Stephen Gajdos, M.S. – Akron General Medical Center, Akron - OH

**Educational Objectives:**

Participant should be able to:

1. Understand how using COMPASS can improve intra-departmental communication as it relates to patient QA and safety.
2. Identify why independent 3-D volumetric dose reconstruction is advantageous to the clinical decision making process when it comes to patient QA.

**Outline**

1. Introduction to the COMPASS product
2. How COMPASS improves patient safety and clinical outcomes via intra-departmental communication/collaboration. Discuss the advantages of anatomically localized dose reconstruction during the patient QA process.
3. Elaborate on how COMPASS is able to provide much more clinically relevant data during the QA process while reducing the overall time burden compared to more traditional and less advanced processes.
4. Discuss the reasons why 3-D volumetric independent dose reconstruction is the future of Radiotherapy QA.

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**F05: Stake Holders and Bureau of Radiation Protection**

**Speaker:** James Castle, Ohio Department of Health

**Educational Objectives:**

Participant should be able to:

1. Identify stake holders of the Bureau of Radiation Protection
2. Know how to get involved
3. Identify that more participation = more collaboration = better results
Outline

1. Stake holder identification
2. Current stake holder involvement in rule making
3. Current stake holder involvement with inspections
4. Requesting more stake holder participation

F06: Effect of contour accuracy on DVH parameters

**Speaker:** Anzi Zhao – Student, Cleveland State University, Cleveland - OH

**Purpose:** Dose Volume Histograms (DVH) are the main assessment of IMRT plans, yet they rely on organ contour accuracy. This study quantifies the change in DVH parameters caused by systematic modification of contours to replicate typical inter-observer and auto-contouring errors.

**Methods:** Eight prostate patients planned for 78 Gy IMRT with margins of 8 mm, (6 mm anterior and posterior) were selected. Prostate contours were uniformly expanded by ±1 and 2 mm, bladder contours uniformly by 1 and 2 mm and in the posterior and inferior by ±1, 1.5 and 2 mm, and rectum contours uniformly by 1 and 2 mm and anteriorly by ±1 and 1.5 mm. This simulated typical contouring errors due to low contrast at the prostate and bladder/rectum borders. The following DVH parameters were calculated for the rectum and bladder contours: V70 and V60 (% and cc), and prostate contours: D100, D98 and mean dose.

**Results:** For prostate, the contour error had no substantial effect on the DVH. For bladder, at the 1 mm level, the deviations in V70 and V60(%) are below 4.6% and for rectum below 7.1%. The bladder, and particularly rectum, showed dramatic (22-56%) increase in absolute volume (cc) receiving 60 and 70 Gy when contour errors were greater than 1 mm, but this absolute change is <12.4% with errors <1 mm. Because V70 and V60 are initially small in the plan, the <12.4% increase was still clinically acceptable. When a 4 mm (2 mm anterior and posterior) margin plan was assessed, the prostate D100 deviation at 1 mm is still <1%, while bladder and rectum deviation were reduced, implying 1 mm accuracy is a robust target level.

**Conclusion:** Agreement between contours of 1 mm must be achieved to ensure comparable DVHs. Changes in the DVH occur precipitously above this level.

F07: Interceptor and Phantom Trials of Emergency Radiation Detection and Notification system at UPMC CancerCenter

**Speaker:** Ryan Dickson, Ph.D. – Student, University of Pittsburgh Medical Center, Pittsburgh - PA

**Purpose:** Evaluation of a portable personal radiation monitor, the Interceptor™ manufactured by Thermo Fisher Scientific, as an ambulance-based extension of the Emergency Radiation Detection and Notification System (EDNS).
Method and Materials: $^{137}$Cs, $^{133}$Ba and $^{60}$Co sealed sources were used to test the detector response and identification capabilities of the Interceptor at distances typical of an ambulance interior. A Rando® phantom was used to simulate attenuation for different patient geometry. The time-to-identification (TTI), count-rate, dose-rate, and confidence level (CL) of isotope identification reported by the device’s internal routine were measured versus distance (0.5 to 2.5 m) and thickness of phantom material (0-12.5 cm).

Results: Identification performance in terms of TTI and CL was excellent at close range. For a 5MBq $^{133}$Ba source the expected identification time is less than ten minutes at typical operating distance of 1.5 meters. The lower activity $^{137}$Cs and $^{60}$Co sources were identified with high accuracy but required up to 20 minutes at this distance. Attenuation of gamma spectra from phantom caused significant identification ambiguity for $^{133}$Ba and less so for $^{60}$Co.

Conclusions: The Interceptor detector has many features which make it well suited for early radiation detection and identification in an ambulance. Isotope identification is a key feature to prevent false alarms from medical sources. The device is sensitive enough to detect low–moderate activity radiation sources. The accuracy of identification, however, depends greatly upon spectral complexity and attenuation from human tissue in the case of internal contamination.

Conflict of Interest and Disclosures: EDNS System hardware and software manufactured by Thermo Fisher Scientific (Thermo Fisher Scientific, Inc., 81 Wyman Street, Waltham, MA 02454)

F08: Effect of MLC Leaf Width on MLC Leaf Shifting Algorithm for Concurrent Treatment of Prostate and Pelvic Lymph Nodes

Speaker: Qingyang Shang – Cleveland Clinic, Cleveland - OH

Purpose: Our previous study showed that adjusting selected MLC leaf pairs to follow prostate movement is an effective strategy to account for daily prostate displacement during concurrent treatment with pelvic lymph nodes. MLC leaf width affects the quality of MLC shifting plans for longitudinal prostate motion compensation. This study is to investigate the effect of the MLC leaf width in compensating of the prostate movement.

Methods: Fifty-one daily CT on-rail scans from three patients were available for this study. On these CTs, the prostate, bladder and rectum were manually contoured, and the lymph nodes contours were transferred from the planning CT after rigid bony registration. For each patient, three different IMRT plans were created based on a planning CT using leaf width of 2.5, 5, and 10 mm, respectively. For each CT, the prostate displacement was determined by dual imaging registration and compensated by shifting MLC resulting in a total of 153 MLC shifted plans.

Results: Among 51 daily CTs, the average prostate movement along the superior/inferior direction was $1.1\pm3.7$ mm (range: -6 to 6.5 mm). The differences in D99 of the prostate between the dose of the day and dose of the plan were $2.3\pm3.3\%$, $1.3\pm2.0\%$, and $4.4\pm5.1\%$ for 2.5, 5, and 10 mm leaf width plans, respectively.
(p << 0.05). The corresponding differences in D99 of the lymph nodes were 0.7±0.9%, 0.6±0.9%, and 1.4±0.8%. The mean differences in D50 were 0.8%, 1.6%, and 2.7% for the bladder, and 10.0%, 3.9%, and 5.7% for the rectum, respectively.

**Conclusions**: Using the MLC Shifting method to compensate for prostate movement in the longitudinal direction depends on the MLC leaf width and the magnitude of the prostate motion. The use of leaf width of 5 mm can provide sufficient tumor coverage without significantly affecting doses to the critical structures.

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**F09: Three-dimensional VMAT QA / Commissioning with a novel tank**

**Speaker**: Jennifer Sessions, M.E. – Sun Nuclear

**Educational Objectives:**

- Participant should be able to:
  1. Understand the challenges of VMAT QA, and why 3 dimensional devices are required.
  2. Describe various ways that VMAT QA can be approached – composite analysis, sub-arc analysis, 3D dose and DVH analysis.
  3. Understand current research on Gamma passing rate correlation to clinical criteria and how this impacts our current approach to VMAT/IMRT QA.
  4. Understand the 3DVH dose perturbation method for reconstructing 3D patient dose
  5. Understand the TG-106 recommendations for commissioning, particularly the problems of using the chambers in non-ideal orientations and cable/stem effects that can result.
  6. Understand the clinical benefits of a circular tank and how it may affect their collected data (less ripple, less cable/stem effects, setup stability due to long range, etc.)

**Outline**

1. Introduction on different approaches to VMAT QA
2. Review of current tools, applications, and the design thoughts behind current VMAT QA
3. Review of literature on gamma passing rates vs. clinical criteria
4. Details on how the how current VMAT QA tools can be implemented
5. Introduction on the current challenges with commissioning Linacs
6. Review of how a novel circular design attempts to meet these challenges
7. Details on exactly how a user-independent tank setup can be accomplished.
F10: Statistical process control for analysis of routine machine QC

**Speaker:** Mac Clements, M.S. - RIT

**Educational Objectives:**

Participant should be able to:
1. Have a basic understanding of the principles of Statistical Process Control (SPC)
2. Understand the need for statistical analysis in QC data
3. Provide an overview of tools available for performing SPC measurements.

**Outline**

1. Introduction to SPC
2. Understanding the data – why normal distribution is not “normal”
3. Analyzing data with process and control charts
4. Achieving Quality “Control” – moving the process towards minimum deviation.
5. Examples of SPC measurements

S01: Advanced Image Guided Radiation therapy and the potential role for molecular imaging in Prostate Cancer

**Speaker:** Rodney Ellis, M.D. - Seidman Cancer Center University Hosp Case Medical Center, Cleveland - OH

**Educational Objectives:**

Participant should be able to:
1. Identify the potential role for molecular imaging in IGRT
2. Discuss how to integrate molecular imaging studies into treatment planning and delivery

**Outline**

1. Introduction of Case example for Indium-111 SPECT/CT Capromab Pendetide for Localized Prostate Cancer
2. Review of increasing role for imaging in the care of prostate cancer including IGRT
3. Details regarding the role for dose escalation in prostate cancer to improve biochemical disease free survival and potential for molecular imaging to help improve the therapeutic ratio for dose escalation
4. Integration of pathology and correlation with molecular imaging to validate studies in-vivo for segmentation and treatment planning
**S02: VMAT Treatment Planning and QA**

**Speaker:** Daliang Cao, Ph.D. - Swedish Cancer Institute, First Hill, Seattle, WA

**Educational Objectives:**

Participant should be able to:
1. Learn about different VMAT planning methods and techniques
2. Understand the difference in plan quality and delivery efficiency between VMAT and Tomotherapy
3. Learn about various QA methods and devices for VMAT patient specific QA and machine specific QA

**Outline**

1. Introduction of VMAT and VMAT treatment planning
2. Comparison of different VMAT planning techniques
3. Comparison of VMAT and Tomotherapy plans.
4. VMAT machine specific QA
5. VMAT patient specific QA

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**S03: Single acquisition UTE-mDIXON for a full clinical solution to MR-based Simulation and MR-PET attenuation correction** and **“MR-guided High Intensity Focused Ultrasound for Radiation Oncology: potential applications**

**Speaker:** Melanie Traughber, D.Sc. – Phillips Medical Systems

**Educational Objectives:**

Participant should be able to:
1. Understand the current status of MR for dose calculation and attenuation correction, including the information available for a complete MRI-based simulation and clinical MR-PET solution
2. Understand the potential of Magnetic Resonance Imaging guided High Intensity Focused Ultrasound (MR-HIFU) for non-invasive ablative or hyperthermia treatment for benign and cancerous tumors

**Outline**

1. MR-based Simulation and MR-guided HIFU for Radiation Oncology
2. Review of current technologies and applications of MR in Radiation Oncology
3. Research and potential future applications of MR in Radiation Oncology
**S04: Using Risk Analysis in Modern Radiotherapy: AAPM Task Group 100**

**Speaker:** Ellen Yorke, Ph.D. - Memorial Sloan-Kettering Cancer Center, New York, NY

**Educational Objectives:**

Participant should be able to:
1. Identify 3 reasons for Radiation Therapy groups to adopt risk-based methods for design of QM programs.
2. Generate a Process Tree and perform an FMEA for one sub-process of the RT process (e.g. for “First Treatment Day”)

**Outline**

1. Motivation for Increased Interest in RT Safety
2. Problems with Current QM paradigm and TG 100 Risk-Based methodology
3. Process Mapping, FMEA, FTA applied to example IMRT Process
4. Guidance for those wishing to do similar analyses

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**S05: Facts / Fiction / Fear (FFF) of Flattening Filter Free (FFF) X-rays Beams**

**Speaker:** Joseph Ting, Ph.D. - Melbourne Cancer Center, Melbourne, FL

**Educational Objectives:**

Participant should be able to understand:
1. the production and benefits of Flattening Filter Free (FFF) X-ray beams
2. the physics and dosimetry issues of FFF X-ray beams
3. the radiation properties of FFF beams and able to produce clinically acceptable treatment plans
4. the clinicians’ points of view and hesitation in the use of these FFF beams

**Outline**

1. Production of FFF beams
2. Clinical benefits from high dose rates
3. Dosimetric properties
4. Physics characteristics
5. Clinical and treatment planning examples and comparison with conventional beams
6. Treatment room design considerations
7. Clinicians concerns about using these beams
**SO6: Advanced Imaging Techniques for Ultrasound-Guided Prostate Brachytherapy Using the Hitachi HIVISION System**

**Speaker:** Michael McTighe – Hitachi-Aloka Medical

**Educational Objectives:**

Participant should be able to:
1. Learn about various ultrasound parameters for prostate imaging
2. Understand the techniques of US imaging
3. Compare the features and benefits of the system
4. Discuss the advantages of enhanced ultrasound imaging for prostate brachytherapy

**Outline**

1. Review of prostate brachytherapy
2. General description of the HIVISION System
3. Discussion of advanced features for anatomy visualization
4. Comparative analysis of systems
5. Potential benefits of using the HIVISION platform
### Invited Speaker Supporters

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### Bronze Level Sponsors

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