“Current Status of Image-guided Radiation Therapies – Progress or Promise?”

October 28 – 29, 2011

Oglebay Resort & Conference Center
465 Lodge Drive, Wheeling, WV
www.oglebay-resort.com
Gold Level and Speaker Supporters

ELEKTA
http://www.elekta.com/

IBA Dosimetry
http://www.iba-dosimetry.com/

MEVION medical systems
http://www.mevion.com/ (formerly Still River Systems)

PTW
http://www.ptw.de/

VARIAN medical systems
http://www.varian.com/

Silver Level

ACCURAY
http://www.accuray.com/

BARD
http://www.crbard.com/

Best
http://www.teambest.com/

HITACHI Inspire the Next
http://www.hitachimedical.com/

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LACO
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http://www.standardimaging.com/

SUN NUCLEAR corporation
http://www.sunnucler.com/

superDimension
http://www.superdimension.com/

UNFORS
http://www.unfors.com/
Penn-Ohio Chapter
American Association of Physicists in Medicine

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## Friday Program of Events

**Penn-Ohio Chapter**  
**2011 Fall Symposium**  
**Friday Program of Events**

**Friday, October 28th, 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>11:00 am to 12:00pm</td>
<td>Vendor Setup</td>
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</tbody>
</table>
| 12:00 pm to 12:50 pm  | **Welcome and Opening Remarks**  
Barry Wessels, Ph.D., Penn-Ohio President, University Hospitals of Cleveland  
Michael J. Ohm, M.S., Penn-Ohio President–Elect, Cleveland Clinic  
**F1: Comparison of IMRT and VMAT/RapidArc Treatment Plans for Intracranial and Extra-cranial Stereotactic Cases for Selected Anatomical Sites**  
Ravi Bhatnagar, Ph.D.  
TRCC / University of Pittsburgh Medical Center, Erie, PA  |
| 1:00 pm  | **F2: Daily Prostate Rotation Should be Compensated in Translation Correction and Not be Ignored**  
Qingyang Shang, Ph.D., Physics Resident  
Cleveland Clinic, Cleveland, OH  |
| 1:20 pm  | **F3: Direct Measurement of Tumor Deformation**  
Dariusz Michalski, M.S.  
University of Pittsburgh Medical Center, Pittsburgh, PA  |
| 1:40 pm  | **F4: Vendor Technical Talk**  
The Octavius System  
Sotirios Stathakis, Ph.D., CTRC, San Antonio, TX  
Sponsored by PTW New York  |
| 2:00 pm  | **F5: Quality Assurance Tool for Radiation Therapy Patients: Peer Review System Design and Implementation**  
Anh Le, Ph.D., Physics Resident  
University of Pittsburgh Medical Center, Pittsburgh, PA  |
| 2:30 pm to 3:30 pm  | **Coffee Break / Vendor Exhibits**  
Drinks (cash bar) / Snacks / Vendor Exhibits / Hotel Check-In  |
| 3:30 pm  | **F6: The Linear Quadratic Model Normal Tissue Tolerances in Hypofractionated Radiation Therapy**  
Jeff Fabien, M.S.  
University Hospitals of Cleveland, Cleveland, OH  |
| 3:50 pm  | **F7: Invited Talk: The Paperless Experience: MOSAIQ**  
Renu Sharma, M.S.  
West Michigan Cancer Center, Kalamazoo, MI  |
| 4:10 pm  | **F8: Invited Talk: The Paperless Experience: ARIA**  
Teamour (Tim) Nurushev, Ph.D.  
Henry Ford Health System, Detroit, MI  |
| 4:55 pm  | **F6: The Linear Quadratic Model Normal Tissue Tolerances in Hypofractionated Radiation Therapy**  
Jeff Fabien, M.S.  
University Hospitals of Cleveland, Cleveland, OH  |
| 5:40 pm to 7:00 pm  | **Drinks (cash bar) / Snacks / Vendor Exhibits / Hotel Check-In**  |
| 7:00 pm  | **Buffet Dinner in the Fort Henry Room (cash bar)**  |
# Saturday Program of Events

**Saturday, October 29th, 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>7:15 am to 8:00 am</td>
<td>Continental Breakfast</td>
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<tr>
<td>8:00 am</td>
<td>Welcome and Opening Remarks</td>
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<td></td>
<td>Michael Ohm, M.S. &amp; Barry Wessels, Ph.D.</td>
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<tr>
<td>8:10 am</td>
<td>S1: Invited Talk: Proton Beam Therapy in the 21st Century</td>
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<td>Omar Zeiden, Ph.D.</td>
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<td>ProCure Proton Therapy Center, Oklahoma City, OK</td>
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<tr>
<td>8:55 am</td>
<td>S2: Invited Talk: The Physics of Clinical Proton Beam Therapy</td>
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<td>Charles Bloch, Ph.D.</td>
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<td>Washington University, St. Louis, MO</td>
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<td>9:40 am</td>
<td>S3: Invited Talk: Plan Comparison and Optimization for IMRT and Proton Radiotherapy (IMPT)</td>
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<td></td>
<td>Matt Palmer, MBA, CMD</td>
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<td>UT MD Anderson Cancer Center – Proton Therapy Center, Houston, TX</td>
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<td>10:25 am</td>
<td>Proton Roundtable - Active vs. Passive Scattering Technique: What is the Future?</td>
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<td>Conference Group</td>
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<tr>
<td>10:45 am to 11:20 am</td>
<td>Coffee Break/ Vendor Exhibits</td>
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<tr>
<td>11:20 am</td>
<td>S4: How V100 Can Be Used for Quality Assurance of HDR Treatment Plans</td>
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<td>Allan Wilkinson, Ph.D.</td>
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<td>Cleveland Clinic, Cleveland, OH</td>
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<td>11:40 am</td>
<td>S5: Comparison of Dosimetric Characteristics Between Elekta Synergy Linear Accelerators with MLCi2 and Beam Modulator Treatment Heads</td>
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<td>Adrian Anton, M.S., Physics Resident</td>
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<td></td>
<td>University Hospitals of Cleveland, Cleveland, OH</td>
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<tr>
<td>12:00 pm</td>
<td>S6: Status of Ohio Radiation Therapy Rules: Chapter 67</td>
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<td>Chuck Wissuchek, M.S.</td>
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<td>Western Reserve Medical Physics, Hubbard, OH</td>
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<td>12:30 pm to 1:00 pm</td>
<td>Box Lunch Provided / Visit the Vendors</td>
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<tr>
<td>1:00 pm</td>
<td>Discussion of Minimum Practice Standards</td>
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<td>Conference Group</td>
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<tr>
<td>1:20 pm</td>
<td>Concluding Remarks and Penn-Ohio Business</td>
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<td></td>
<td>Penn-Ohio Chapter Officers</td>
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<tr>
<td>1:35 pm</td>
<td>Door Prize Drawing: iPad 2 Giveaway (Courtesy of Hitachi Medical Systems)</td>
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<tr>
<td>1:40 pm</td>
<td>Vendor Tear Down</td>
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Presentation Outlines and Educational Objectives

**F1:**
Comparison of Intensity Modulated Radiation Therapy (IMRT) and Volumetric Modulated Arc Therapy (RapidArc®) Treatment Plans for Intracranial and Extra-cranial Stereotactic Cases for Selected Anatomical Sites

**Speaker:**
Ravi Bhatnagar, Ph.D., The Regional Cancer Center – In Affiliation with UPMC Cancer Centers

**Educational Objectives:**
Participant should be able to:
1. Understand similarities and differences in treatment plans generated by IMRT and RapidArc® Techniques
2. Understand which technique may be better suited for a particular clinical situation.

**Outline**
I. General description of the two techniques will be presented
II. Discussion of challenges in introducing advanced technology in a Community hospital and importance of adequate training, support and proper understanding of new technology by everyone in Radiation Therapy will be discussed
III. Comparative treatment plans for several treatment sites will be discussed
IV. Potential benefits of shorter treatment delivery time for RapidArc® will be discussed

**F2:**
Daily Prostate Rotation should be Compensated in Translational Correction and not to be Ignored

**Speaker:**
Grace Shang, Ph.D., Post Doctoral Research Fellow, Cleveland Clinic

**Educational Objectives:**
Participant should be able to:
1. Quantify magnitude of prostate rotation during daily treatment
2. Discuss strategies to compensate prostate rotation if a six-degree table is not available

**Outline**
V. Introduction to prostate rotation during RT
VI. Review image registration methods
VII. Evaluate the geometric and dosimetric impacts of different registration approaches on the treatment plan

**F3:** Direct Measurement of Tumor Deformation

**Speaker:**
Dariusz Michalski, Ph.D., UPMC Department of Radiation Oncology

**Educational Objectives:**
Participant should be able to:

1. Recognize the impact of lung kinematics on patient model in TP
2. Discuss how to accommodate tumor dynamics in RT

**Outline**

I. Introduction to patient model in TP
II. Review the role of elastic image registration (EIR) in TP
III. EIR-derived scalar and tensorial characteristics of lung tissue and relevant metrics for their comparisons
IV. Intra thoracic tumor deformation evaluation

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**F4:** Ionization chamber array for patient specific VMAT, Tomotherapy and IMRT QA

**Speaker:**
Sotiri Stathakis, PhD, DABR, CTRC@UTHSCSA

**Educational Objectives:**
Participant should be able to:

1. Understand RapidArc, Tomotherapy, and IMRT, deliveries and their complexity
2. Understand the need of patient specific QA
3. Understand the characteristics of the ionization chamber arrays
4. Understand the use of ionization chamber arrays for patient specific QA

**Outline**

I. Introduction to the Octavius System
II. Characterization of the ionization chamber array
III. Patient specific measurements for various IMRT QA deliveries
IV. Results and Conclusions

**F5:**
Quality Assurance Tool for Radiation Therapy Patients: Peer Review System Design and Implementation

**Speaker:**
Anh H. Le, Ph.D., University of Pittsburgh Medical Center

**Educational Objectives:**
Participant should be able to:

1. Rationale of the Peer Review System (PRS) for radiotherapy
2. Discuss on how to use PRS for reviewing treatment plan

**Outline**

I. Introduction & Rationale of the PRS
II. PRS Design and Implementation
III. System Usage and Demonstration

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**F6:**
The Linear Quadratic Model for Normal Tissue Tolerances in Hypofractionated Radiation Therapy

**Speaker:**
Jeffrey M. Fabien, M.S., University Hospitals Case Medical Center

**Educational Objectives:**
Participant should be able to:

1. Understand the Linear Quadratic model of cell survival
2. Show how the LQ model could be used to compare biological effective doses from different fractionation schemes
3. Apply the method to optimize treatment planning of fraction sizes for which dose limits are not discussed in literature.

**Outline**

I. Introduction to the Linear Quadratic model
II. Method for extrapolating normal tissue tolerances into BED space for use in large fraction sizes
III. Using the LQ model to optimize Cyberknife treatments
IV. Results of patient toxicity as a result of optimized Cyberknife planning with the LQ model

**F7:**
The Paperless Experience: MOSAIQ

**Speaker:**
Renu Sharma, M.S., DABR
West Michigan Cancer Center, Kalamazoo MI

**Educational Objectives:**
Participant should be able to:

1. Understand importance and rationale of an EMR System

2. Understand the process of implementing an EMR system in Radiation Oncology.

3. Understand the tools available within MOSAIQ

**Outline**

I. Overview
III. Role of the Medical Physicist
IV. Physician Perspective
V. Therapist and Dosimetrist Perspective
VI. Maintenance and continuous improvement of an EMR System

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**F8:**
The Paperless Experience: ARIA

**Speaker:**
Teamour (Tim) Nurushev, Ph.D., DABR
Director, Clinical Physics, Henry Ford Health System

**Educational Objectives:**
Participant should be able to:

1. Understand documentation requirements for the clinical flow in a Radiation Oncology Department

2. Understand tools available within the vendor provided electronic patient record keeping system

3. Understand the need to modify and adjust the clinical flow when switching from paper-based to paperless, to increase efficiency and convenience of accessing evidence data.

**Outline**

I. Brief overview of Henry Ford Health System, IT infrastructure, Aria/Eclipse/Citrix servers
II. Paperless Champions/ Approach to switching from paper to paperless
III. Clinical flow and information recording/retrieval needs
IV. Tools available in Aria/Eclipse to address the needs / case studies
**S1:** Proton Beam Therapy in the 21st Century

**Speaker:**
Omar Zeidan, Ph.D., DABR  
Director, Medical Physics and Dosimetry  
ProCure Proton Therapy Center, Oklahoma City, OK

**Educational Objectives:**  
Participants should be able to:

1. Understand clinical advantages of proton therapy  
2. Learn about existing proton facilities and ones under development  
3. Get an overview of finances and reimbursement

**Outline**

I. Clinical advantages of proton therapy  
II. Existing proton therapy systems and systems under development  
III. Planning for proton facilities:  
   i. Financial model  
   ii. Facility configuration  
   iii. Reimbursement

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**S2:** The Physics of Proton Therapy

**Speaker:**
Charles Bloch, Ph.D., Washington University School of Medicine

**Educational Objectives:**  
Participant should be able to:

1. Understand dosimetric properties of proton beams  
2. Be familiar with current proton therapy equipment options  
3. Identify current technical limitations or proton therapy

**Outline**

I. Introduction to proton therapy  
II. Physical advantage of Bragg peak  
III. Current challenges and technical limitations
IV. Predictions for the future

**S3:**
Plan Comparison and Optimization for IMRT and Proton Radiotherapy (IMPT)

**Speaker:**
Matthew Palmer, MBA, CMD, UT MD Anderson Cancer Center- Proton Therapy Center

**Educational Objectives:**
Participant should be able to:

1. Understand the concepts behind proton plan optimization
2. Understand the benefits and drawbacks of IMPT vs. IMRT

**Outline**

I. Introduction to IMPT optimization
II. IMPT optimization considerations challenges
III. IMPT Robustness and Validation
IV. IMPT vs. IMRT optimization comparisons

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**S4:**
How V100 can be used for quality assurance of HDR treatment plans

**Speaker:**
D. Allan Wilkinson, Ph.D., Cleveland Clinic

**Educational Objectives:**
Participant should be able to:

1. Attendees should be able to apply these techniques at their own institutions.

**Outline**

I. Source strength, treatment time, dose, and treatment volume are related (e.g. Manchester system)
II. Two and three dimensional planning from Plato and Oncentra systems used.
III. Several hundred sets of patient data from 1, 2, 3, and multicatheter implants used for the analysis.
IV. Role of implant imaging in this process.
V. Linearization of the data into a simple form.
**S5:**
Comparison of dosimetric characteristics between Elekta Synergy linear accelerators with MLCi2 and Beam Modulator treatment heads

**Speaker:**
Adrian Anton, M.S., University Hospitals – Case Medical Center

**Educational Objectives:**
Participant should be able to:

1. Identify the critical dosimetric characteristics of external photon beam data
2. Compare the characteristics of the two different treatment heads offered by the manufacturer

**Outline**

I. Introduction to Elekta treatment head design
II. Methods of beam data collection, and analysis
III. Result – Beam data output for two collimator assemblies
IV. Critical discussion of Beam Data Comparison

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**S6:**
Status of Ohio Therapy Rules: Chapter 67

**Speaker:**
Chuck Wissuchek, M.S., Western Reserve Medical Physics

**Educational Objectives:**
Participants should be able to:

1. To discuss the concept of minimum tolerance.
2. To review necessary QC tests versus tests that are redundant.

**Outline**

I. Modifications to Parts 5, 6, 8, and 9
II. Guidance Document for Minimum Guidelines for a QA Program
III. Joint Committee on Ohio Regulatory Affairs
IV. AAPM BBS – Ohio General Discussion