



Penn-Ohio Chapter

American Association of Physicists in Medicine

2011 FALL SYMPOSIUM

**“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



<http://www.elekta.com/>



<http://www.iba-dosimetry.com/>



<http://www.mevion.com/> (formerly Still River Systems)



<http://www.ptw.de/>



<http://www.varian.com/>

Silver Level



<http://www.accuray.com/>



<http://www.crbard.com/>



<http://www.teambest.com/>



<http://www.hitachimedical.com/>



<http://www.isoaid.com/>



<http://www.lacoonline.com/>



<http://www.lap-laser.com/>



<http://www.scandidos.com/>



<http://www.standardimaging.com/>



<http://www.sunnuclear.com/>



<http://www.superdimension.com/>



<http://www.unfors.com/>

**Penn-Ohio Chapter
American Association of Physicists in Medicine
2011 Officers**

President: Barry W. Wessels, Ph.D.
University Hospitals Case Medical Center
Barry.Wessels@uhhospitals.org

President-Elect: Michael Ohm, MSc
Cleveland Clinic / Fairview
Ohmm@ccf.org

Past President: Greg Bednarz, Ph.D.
University of Pittsburgh Medical Center
Bednarzg@upmc.edu

Secretary: Anthony Combine, MSc
University of Pittsburgh Medical Center
Combinea@upmc.edu

Treasurer: Chris Deibel, Ph.D.
Cleveland Clinic Foundation (retired)
C.Deibel@cox.net

Board Representative: Kevin Fallon, MSc
University of Pittsburgh Medical Center
Fallonk@upmc.edu

Penn-Ohio Chapter 2011 Fall Symposium Friday Program of Events

Friday, October 28 th , 2011	
11:00 am to 12:00pm	Vendor Setup
12:00 pm to 12:50 pm	Check-In / On-Site Registration
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
1:00 pm	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
1:20 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
1:40 pm	F3: Direct Measurement of Tumor Deformation Dariusz Michalski, M.S. University of Pittsburgh Medical Center, Pittsburgh, PA
2:00 pm	F4: Vendor Technical Talk The Octavius System Sotirios Stathakis, Ph.D., CTSC, San Antonio, TX Sponsored by PTW New York
2:30 pm to 3:30 pm	Coffee Break / Vendor Exhibits
3:30 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
3:50 pm	F6: The Linear Quadratic Model Normal Tissue Tolerances in Hypofractionated Radiation Therapy Jeff Fabien, M.S. University Hospitals of Cleveland, Cleveland, OH
4:10 pm	F7: Invited Talk: The Paperless Experience: MOSAIQ Renu Sharma, M.S. West Michigan Cancer Center, Kalamazoo, MI
4:55 pm	F8: Invited Talk: The Paperless Experience: ARIA Teamour (Tim) Nurushev, Ph.D. Henry Ford Health System, Detroit, MI
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)

Penn-Ohio Chapter 2011 Fall Symposium Saturday Program of Events

Saturday, October 29 th , 2011	
7:15 am to 8:00 am	Continental Breakfast
8:00 am	Welcome and Opening Remarks Michael Ohm, M.S. & Barry Wessels, Ph.D.
8:10 am	S1: Invited Talk: Proton Beam Therapy in the 21st Century Omar Zeiden, Ph.D. ProCure Proton Therapy Center, Oklahoma City, OK
8:55 am	S2: Invited Talk: The Physics of Clinical Proton Beam Therapy Charles Bloch, Ph.D. Washington University, St. Louis, MO
9:40 am	S3: Invited Talk: Plan Comparison and Optimization for IMRT and Proton Radiotherapy (IMPT) Matt Palmer, MBA, CMD UT MD Anderson Cancer Center – Proton Therapy Center, Houston, TX
10:25 am	Proton Roundtable - Active vs. Passive Scattering Technique: What is the Future? Conference Group
10:45 am to 11:20 am	Coffee Break/ Vendor Exhibits
11:20 am	S4: How V100 Can Be Used for Quality Assurance of HDR Treatment Plans Allan Wilkinson, Ph.D. Cleveland Clinic, Cleveland, OH
11:40 am	S5: Comparison of Dosimetric Characteristics Between Elekta Synergy Linear Accelerators with MLCi2 and Beam Modulator Treatment Heads Adrian Anton, M.S., Physics Resident University Hospitals of Cleveland, Cleveland, OH
12:00 pm	S6: Status of Ohio Radiation Therapy Rules: Chapter 67 Chuck Wissuchek, M.S. Western Reserve Medical Physics, Hubbard, OH
12:30 pm to 1:00 pm	Box Lunch Provided / Visit the Vendors
1:00 pm	Discussion of Minimum Practice Standards Conference Group
1:20 pm	Concluding Remarks and Penn-Ohio Business Penn-Ohio Chapter Officers
1:35 pm	Door Prize Drawing: iPad 2 Giveaway (Courtesy of Hitachi Medical Systems)
1:40 pm	Vendor Tear Down

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
-

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
-

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
 - II. Process of implementing and choosing an EMR system. Mixed vendor issues.
 - III. Role of the Medical Physicist
 - IV. Physician Perspective
 - V. Therapist and Dosimetrist Perspective
 - VI. Maintenance and continuous improvement of an EMR System
-

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 protons therapy systems and systems under development
 - III. Planning for proton facilities:
 - i. Financial model
 - ii. Facility configuration
 - iii. Reimbursement
-

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
-

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
-

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