




**Reflections on AAPM 2008  
Workshop “Becoming a Better  
Teacher of Medical Physics”**

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“A Young Medical Physicist”

 

## Outline

- What did I learn?
  - To appreciate and define different learning and teaching styles
  - The importance of defining projects, like SDEP
- How did I implement it at home?
  - View my course as a “work in progress”: continue to edit content and keep it current.
  - Become more involved in departmental curriculum review and AAPM (especially important in light of recent developments including DMP, new residency creations, 2012/2014 ABR rules)
- Advantages/challenges of being junior faculty.

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## My course: “Treatment Planning Systems”

- Graduate Medical Physics course (second year)
- Unique course that I would have liked as a grad student and thought about during my 3 years as a clinical physicist before returning to University.
- First year: Fall 2006. It’s been very well received, but even going into my 4<sup>th</sup> year of teaching, it must remain a “work in progress” to continue to be effective and relevant.
- Topics: Physics of TP (2D, 3D, 4D, IMRT), commissioning, dose algorithms, imaging for TP, fusion. Lab component with Pinnacle, Tomo, Eclipse.

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## Improvements to my course

- Changed the order/format: Site based with commissioning last (based on student comments)
- Identify learning objectives for each lecture
- Supplement each section with a lab and reading assignment (treatment commissioning or planning exercise) – addresses different learning styles.
- Recognize the breadth and complexity of TP topics, and that students may be particularly interested in some ancillary topic that I don’t know anything about... developed the “Advances in RT Project” (more on that on next slide)
- To do:
  - Increase online content
  - Incorporate existing on-line teaching tools (RSNA modules?)

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## Advanced Topics Project

- Assignment – after AAPM 2008, realized I could not possibly cover all the new advanced RT topic...so I handed this assignment off to the (very competent, motivated) students.
- Provided students a template for a 2-3 page summary that we compiled at the end of the semester to share with students.
- Accomplished:
  - Adds another learning style to course in addition to the didactic lectures, lab & readings.

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Advanced Technology Topics in Treatment Planning Systems  
Medical Physics Course #71, University of Wisconsin, Madison, December 2008

### Treatment Planning for Carbon Ion Therapy

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#### Abstract

Carbon ion therapy treatment planning is based on a 2D Gaussian pencil beam dose calculation algorithm in which the depth dose is modeled from a stopping power function related to the interaction cross sections for both atomic electron ionization events, as well nuclear interaction cross-sections for inelastic collisions that result in projectile target fragmentation. Optimization of particle fluence, beam energy, and spot size is achieved with an iterative linear least squares algorithm for physical objective functions, contrasted by simulated annealing algorithms for biological objective functions. Dose delivery is accomplished by magnetically scanning proton pencil beams in a raster pattern across the target volume, beginning with the deepest PTV plane and consequently highest proton energies. Treatment planning studies have shown that treatment time can be decreased using distal edge delivery techniques at the cost of increasing the uncertainty in the Bragg peak positions, which ultimately is confined by the uncertainty due to inter- and intra-fraction motion. Ultimately, the clinical implementation of carbon ion therapy and associated treatment planning software rests on the eventual diminishment of overhead costs in facility design, as well as its applicability to relevant disease sites where conventional IMRT or even IMPT would fail.

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## 2. At workshop, I identified a SDEP (Self Directed Education Project)

- Part of the ABR MOC
- *Project*: Review and update UW MP curriculum
- *Significance*: Provide our students with a thorough and very high quality graduate didactic experience.
- *Approach*:
  - Meet with colleagues FIRST
  - Collect syllabi
  - Review department coursework with TG 79
  - Make suggestions for change

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## Curriculum Development

- Review TG 79 and UW MP didactic curriculum (track system – General, Diagnostic and Health Physics)
- Aligning the two (daunting task of combing through syllabi)
- Repetition is OK....but there are competing objectives:
  - + Presenting information multiple times for different applications and with different teaching styles
  - Limited time! (total 4 semesters only)
- As MP develops, there is more to teach, what do we take out or condense, if anything?

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## Example of Curriculum Review

TG 79 Section/topic		UW MP course
3.3.2 External Beam Radiation Therapy	Clinical photon beams, parameters, hand calcs	566
	Electrons beams	566, TFS, 571
	Brachy	566, 570
3.3.4 treatment planning	Vol definitions	TFS: 566,
	Photons - dose model	Moved to 571
	Photons planning	566 intro, 571, TFS
	Tomo planning, IMRT	TFS
3.3.5 RT Devices	Co, linacs, cyclic accel	566, 571
	Tomo, cyberknife	571
	Machine acquisition (biking...)	missing
	QA/QC	566
	RT information systems	missing

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## Advantages of being Junior Faculty

- Improving quality teaching is becoming a more common objective (2008 AAPM Workshop, 2010 Summer school... last one was 1978 AAPM Summer School in UC Santa Cruz)
- Faculty have access to workshops on how to become a better teacher (AAPM and at their own University)
- Good teaching is expected and valued by:
  - Students (online teaching rating sites)
  - Department chairs
  - Hopefully tenure committees!

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## UW School of Medicine and Public Health MEDAL Program

- Medical Education Development and Leadership (MEDAL)
- PURPOSE. The purpose of MEDAL programs is to enhance the teaching and educational leadership skills of basic science and clinical science faculty in the School of Medicine and Public Health and to better prepare future educational leaders for the institution. The depth of material is appropriate for someone who wishes to become the leader of an educational program.
- One day/month, Sept – June.

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## Challenges

- “No one likes change. Everyone likes improvement. Improvement requires change.” (Dr. Bruce Gerbi, 7/27/09)
- Mantra of my clinical experience (think EMR!), but is also very applicable to academics.
- While junior faculty may bring new excitement to a department, they lack the experience and knowledge base of senior faculty.
- Senior teachers don't want “young” teachers recommending/dictating what/how to teach, so all change needs to be a group project with input from Jr and Sr faculty.

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## Thank you

- Dr. Bill Hendee for organizing workshops and emphasizing the importance of education.
- Drs. Bhudatt Paliwal and James Zagzebski – my department chairs for strongly supporting academic development and quality teaching at UW!
- All my colleagues at UW – academic and clinical!
- All the instructors and participants at the 2008 Education Workshop!