



Doctorate of Medical Physics
University of Cincinnati
Department of Radiation Oncology

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Ground Rules

Would like this to be a discussion:

- Raise Questions as you think of them
- Much of this is my opinion
- May be based on fact (or not)

History of Medical Physics Program at UC

- Program Initiated: Early 1960's
- Started by James G. Keriakes, Ph.D.
- Well over 100 graduates

Qualification of Medical Physicist

- United States Nuclear Regulator Commission
 - 10CFR 35.51(a):
 - “pass an examination administered by diplomats of the specialty board...”
 - “or...”

Qualification of Medical Physicist

- State of Ohio
 - 3701:1-66-03(c)
 - “...certified by the American Board of Radiology...”
 - “or...”

Qualification of Medical Physicist

- State of Indiana
 - 410 IAC 5-6.1-118
 - “... an individual must be certified by the ABR ...equivalent qualifications”
 - “or equivalent qualifications...”

Qualification of Medical Physicist

- Commonwealth of Kentucky
 - “...certification from the American Board of Radiology...”
 - “...or...”

American Board of Radiology

- ...certifies diplomates in the practice of diagnostic radiology, radiation oncology and medical physics...

American Board of Radiology Boarding Process for Medical Physicists

Historically:
Graduate Degree &
3 years of Clinical Experience

American Board of Radiology Boarding Process as of 2014

- Graduate Degree
- 2 years of Accredited Supervised Clinical Experience
 - Accredited by the Commission on the Accreditation of Medical Physics Education Programs (CAMPEP)

CAMPEP Statistics 2012

# Programs offering MS/MSc Degrees	39
# Programs offering PhD Degrees	29
# Programs offering DMP Degrees	1
Enrollment MS/MSc	<u>466</u>
Enrollment PhD	<u>534</u>
DMP	20
# Graduates MS/MSc Degrees	<u>198</u>
# Graduates PhD Degrees	<u>80</u>
# Graduates DMP	4
# Entering Residency MS/MSc	<u>44</u>
# Entering Residency PhD	<u>24</u>

CAMPEP Statistics 2014

- 44 CAMPEP Accredited Graduate Programs
 - How many students per program?
 - Distribution of degrees, MS vs. PhD
- 11 CAMPEP Accredited Certificate Programs
 - How many students from non-CAMPEP accredited program entering the pool?

Approved Mechanisms to Gain 2 Years of Accredited Supervised Clinical Experience

- 1.) 2 year Clinical Residency
- 2.) Doctorate of Medical Physics

Clinical Residency

- 77 CAMPEP Accredited Institutions (Therapy)
 - 10 CAMPEP Accredited Institutions (Imaging)
-
- How many spots per year?
 - Is the number stable?
 - From where does the money come to support residencies?
 - Is there a local influence stability of the residencies?
 - Is this sufficient for the need of the field?
 - Does this process satisfy the needs of the students?

Student's Dilemma

- Should I complete a MS in medical physics to initiate a career?
- Should I complete a PhD in medical physics to initiate a career?
- Should I complete a graduate degree in another field and complete a Certification Program to initiate a career in medical physics?
- Should I complete an alternate degree to initiate a career in medical physics?

Dilemma for Medical Physics

- Is the MS degree an appropriate degree to train medical physicists?
- Who will make this decision?
 - Directors of Graduate Programs
 - CAMPEP
 - Directors of Residency Programs

Dilemma for Medical Physics (cont)

POINT/COUNTERPOINT

Suggestions for topics suitable for these Point/Counterpoint debates should be addressed to Colin G. Orton, Professor Emeritus, Wayne State University, Detroit: ortonc@comcast.net. Persons participating in Point/Counterpoint discussions are selected for their knowledge and communicative skill. Their positions for or against a proposition may or may not reflect their personal opinions or the positions of their employers.

The terminal M.S. degree is no longer appropriate for students interested in a career in clinical medical physics in the United States

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Our Institution's Dilemma

Do we start a residency program?

- If so, how many residents can we accommodate?
- If the number is significantly less than the number of graduate students, what happens to the leftovers?

Do we convert to a PhD program?

Do we close the MS program?

History of Doctorate of Medical Physics

- Concept of Charles Coffey at Vanderbilt University
- Graduating Students for a number of years
- CAMPEP accredited for both the graduate degree requirement and the clinical requirement for the ABR examination

Doctorate of Medical Physics

- Two years of academic instruction
 - Academic Biennium
 - Equivalent to CAMPEP Accredited MS
- Two years of supervised clinical experience
 - Clinical Biennium
 - Equivalent to CAMPEP Accredited Residency

Doctorate of Medical Physics

Advantages to the student

- Assurance at the initiation of program that the two years of clinical experience will be available
 - Student will qualify to sit for the ABR examination
- Earn the title “Doctor”
- Four year program
 - MS + residency (4 years)
 - PhD + residency (how many years?)

Doctorate of Medical Physics

Disadvantages to the Students

- Cost
 - Four years of tuition rather than two for MS
 - Third and fourth years paid tuition rather than a paid residency
- Recognition of the degree
 - Will Docs and Administrators recognize the degree

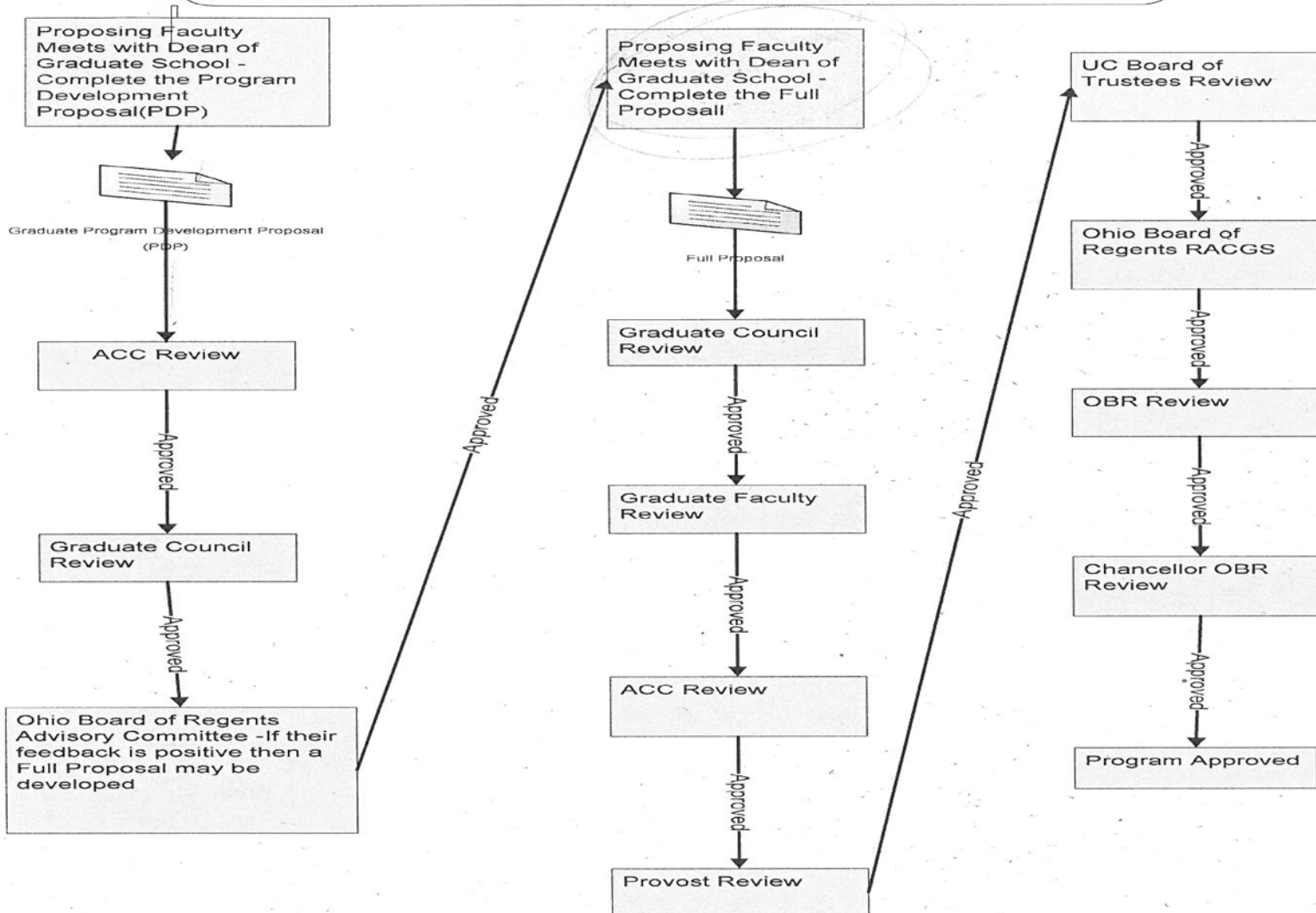
Our Decision

- Our decision was to attempt the ability to grant the DMP or close the MS program.
 - Our decision was encouraged by an external review of the program.

Doctorate of Medical Physics

- Initiate the “simple” 16 step process

Approval Process for New Programs
(typically takes 1 to 2 years)



Doctorate of Medical Physics

- Step 1 of 16
 - Program Development Plan
 - Request to submit a proposal
 - Submitted: August of 2011
 - Granted: March of 2012

Doctorate of Medical Physics

- Full Proposal
 - Step 5 of 16
 - Submitted April of 2012
 - Granted July of 2013

Doctorate of Medical Physics

- University of Cincinnati mechanics of granting new degree
 - Initiated at the permission of the State Board of Regents
 - July of 2013
 - Completed for Fall Semester of 2014

DMP Learning Outcomes

MS - Academic Biennium

1. Graduates will have a fundamental understanding of the scientific basis of medical physics as outlined in the topics listed in the American Association of Physicists in Medicine (AAPM) report entitled *Academic Program Recommendations for Graduate Degrees in Medical Physics*. These topics include radiation biology, radiation physics, imaging physics, instrumentation, quality assurance protocols, and radiation safety.
2. Graduates will have mastered basic laboratory techniques and the use of instrumentation in clinical medical physics. They should be knowledgeable of and competent in using radiation planning devices, radiation delivery equipment, radiation detectors and instrumentation, imaging devices, and they should be able to perform basic quality assurance (QA) techniques.
3. Graduates will be knowledgeable of state and federal radiation regulatory issues and the safe administration of radiation.
4. Graduates will have engaged in a radiation science research project to develop a systematic analytical approach to problem solving and to gain familiarity with the scientific method.
5. Graduates will have developed effective skills in written and oral communication of technical information.
6. Graduates will be exposed to professional aspects of medical physics such as career planning, the role of a medical physicist in a hospital, lifetime learning, board certification and maintenance of certification, and ethical issues in medical physics.

Doctorate of Medical Physics

Year 1		
Course Number	Course Title	Credit hours
Fall		
BE7022	Introduction to Biostatistics	3
MP9001	Professional Aspects of Medical Physics	2
MP9005	Introduction to Clinical Oncology I	1
MP9041	Radiobiology I	2
MP9044	Radiation Physics and Dosimetry I	3
MP9050	Diagnostic Radiological Imaging Physics I	3
MP9092	Seminar: Current Research Topics in Radiological Sciences	1
	Total Credit Hours	15
Spring		
MP9006	Introduction to Clinical Oncology II	1
MP9041	Radiobiology II	2
MP9045	Radiation Physics and Dosimetry II	3
MP9051	Diagnostic Radiological Imaging Physics II	3
MP9095	Anatomy & Physiology for Radiotherapy Treatment Planning	2
MP9011	Clinical Radiation Dosimetry I	3
MP9092	Seminar: Current Research Topics in Radiological Sciences	1
	Total Credit Hours	15



Doctorate of Medical Physics

Year 2		
Fall		
MP9013	Hospital Radiation Protection	3
MP9015	Clinical Radiation Oncology	1
MP9053	IT in Radiation Therapy	1
MP9072	Radiological Sciences Lab I	2
MP9096	Radiotherapy Treatment Planning I	2
MP9091	Research in Radiological Sciences	4
MP9092	Seminar: Current Research Topics in Radiological Sciences	1
	Total Credit Hours	14
Spring		
MP9012	Clinical Radiation Dosimetry II	3
MP9015	Clinical Radiation Oncology	1
MP9073	Radiological Sciences Lab II	2
MP9097	Radiotherapy Treatment Planning II	2
MP9091	Research in Radiological Sciences	4
MP9092	Seminar: Current Research Topics in Radiological Sciences	1
	Total Credit Hours	13

DMP Learning Outcomes

DMP - Clinical Biennium

7. Graduates will be competent in all the topics listed in the American Association of Physicists in Medicine (AAPM) report entitled *Essentials and Guidelines for Clinical Medical Physics Residency Training Programs in Radiation Oncology Physics*. These topics include all aspects of patient treatments, treatment planning, treatment equipment, radiation detectors and instrumentation, imaging devices, acceptance testing and commissioning of equipment, quality assurance, and radiation safety.
8. Graduates will have completed a clinical research project to further develop their skills in scientific problem solving and the application of the scientific method to a clinically relevant problem.
9. Graduates will have been introduced to the literature of medical physics and will have developed skills in critically reviewing and presenting results from the literature.
10. Graduates will have performed the duties of a junior medical physicist for two years and will be ready to assume the duties and responsibilities of a clinical medical physicist.
11. Graduates will be prepared to complete the American Board of Radiology certification exam in Therapeutic Medical Physics.

Doctorate of Medical Physics

Year 3		
Course Number	Course Title	Credit hours
Fall		
MP9015	Clinical Radiation Oncology	1
MP9061	Clinical Practicum – 3D-CRT	5
MP9081	QA in Radiation Therapy – Treatment Planning Devices	5
MP9092	Seminar: Current Research Topics in Radiological Sciences	1
MP9094	Journal Club	1
MP9098	Clinical Research in Medical Physics	2
	Total Credit Hours	15
Spring		
MP9015	Clinical Radiation Oncology	1
MP9062	Clinical Practicum – IMRT	5
MP9082	QA in Radiation Therapy – Treatment Delivery Devices	5
MP9092	Seminar: Current Research Topics in Radiological Sciences	1
MP9094	Journal Club	1
MP9098	Clinical Research in Medical Physics	2
	Total Credit Hours	15

Doctorate of Medical Physics

Year 4		
Fall		
MP9015	Clinical Radiation Oncology	1
MP9063	Clinical Practicum – SRS and SBRT	5
MP9083	QA in Radiation Therapy – Imaging Devices	5
MP9092	Seminar: Current Research Topics in Radiological Sciences	1
MP9094	Journal Club	1
MP9098	Clinical Research in Medical Physics	2
MP9099	Special Topics in Medical Physics (Elective)	0-2
	Total Credit Hours	15-17
Spring		
MP9015	Clinical Radiation Oncology	1
MP9064	Clinical Practicum – Brachytherapy	5
MP9084	QA in Radiation Therapy – Patient Specific Dosimetry	5
MP9092	Seminar: Current Research Topics in Radiological Sciences	1
MP9094	Journal Club	1
MP9098	Clinical Research in Medical Physics	2
MP9099	Special Topics in Medical Physics (Elective)	0-2
	Total Credit Hours	15-17

Doctorate of Medical Physics

- Approved to grant the degree, State of Ohio (July 2013)
- Completed Program Mechanics, University of Cincinnati (Fall 2014)
- What value is the degree? At present?
 - CAMPEP self-study
 - In-progress

CAMPEP DMP Template

University Name

- **Self Study**
- **Professional Doctorate Program in Medical Physics (DMP)**
- **Date**

- **Program Director**
- **Name**
- Address
- Telephone Number
- Email Address
- Program Website URL

- Template Revised January 2014

Present Status of DMP

- CAMPEP application in process
- Student enrollment
 - 3 students for the fall of 2014
 - The DMP is not CAMPEP accredited

Questions

- Is our DMP going to gain accreditation?
- What if the DMP students gain a residency after the completion of the first academic biennium?
- Can newly graduated students apply for the third and fourth years?
- Will the field come to learn and love the DMP degree?

Questions (cont)

- Is the DMP the model of the future?
- Should all MS programs convert to the DMP?
- How can a practicing physicist (boarded) gain the DMP?

Questions (cont)

- Is the program going to expand to more than 3 students per year?
 - wheel and spoke