

Academic Programs in Medical Physics

Justin Cantley, Ph.D.

David Hintenlang, Ph.D.

University of Florida Medical Physics Program



Graduate Programs in Medical Physics

- Educate graduates to succeed in research and/or clinical careers
- Interface with credentialing organizations and residency programs
- Most current graduates seek individual certification through the American Board of Radiology (ABR)



Terminology

- Certification: Individual physicists are certified in a specialty area of medical physics through an exam by process by the American Board of Radiology (ABR)
- Licensure: Individuals are licensed to practice in specific States by the State
- Accreditation: Educational programs in Medical Physics are accredited by CAMPEP (Commision for Accreditation of Medical Physics Educational Programs)



Pathways to Professional Practice of Medical Physics

- Overview of Recent Changes
 - Required 2 year clinical residency for eligibility to complete Board exam process
 - Effective for 2014 exams (effectively in place now)
 - Residencies must be CAMPEP Accredited
 - Residency Applicants should have a CAMPEP accredited graduate degree



Motivation for Board Certification

- Board Certification is generally accepted as the standard of practice
- Defines a Qualified Medical Physicist (QMP)
- Required for State License to practice MP
 - a regulatory requirement to independently practice medical physics in licensure states
 - Florida, Hawaii, New York, Texas (others in progress)



Types of Programs Accredited by CAMPEP

- *Graduate Programs*
 - Certificates
 - MS
 - PhD
- *Clinical Residency Programs (Imaging or Therapy)*
 - May also grant Certificates
- *Doctorate of Medical Physics (DMP)*
 - A professional degree integrating a 2 yr didactic and 2 yr residency programs.



Pathway to Professional Practice

BS in Physics or Engineering (must include the equivalent of a minor in Physics)

CAMPEP Graduate Degree in Medical Physics
(MS or PhD)

CAMPEP Residency
Specialization in Diagnostic Imaging or Radiation
Therapy

Alternate Pathway

Earned PhD in related Field
(i.e. Physics)

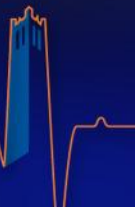
Earn CAMPEP Certificate in Medical Physics

CAMPEP Residency
Specialization in Diagnostic Imaging or Radiation
Therapy

Source of Requirements?

American Board of Medical Specialties (ABMS)

- Parent organization to the ABR
- Certifies all Physician Specialties and Physicists
 - Medical Physicists are one of two non-physician groups certified under the ABMS
- Uniform standards drive physics training to parallel physician training
 - i.e. the requirement for residency training
- Dictates Maintenance of Certification requirements



American Board of Radiology (ABR)

- Adopts the ABMS requirements
- Tailors these to Radiologist, Radiation Oncologists, and Medical Physicists
- Conducts the Certification Process through Board Exam
- Implements the Maintenance of Certification Process



CAMPEP

- Accredits educational programs in MP
- Ensures ABR requirements are integrated into educational programs.
- Reviews programs annually



ABR Board Exam Process

- *Part I (Written: General and Clinical)*
 - May be taken while enrolled in CAMPEP Graduate Program
- *Part II (Written in specialization area)*
 - Diagnostic Radiological Physics
 - Therapeutic Radiological Physics
 - Medical Nuclear Physics
 - Taken following completion of corresponding residency program.
- *Part III (Oral)*
 - In specialization area
 - Taken after passing Part II written



CAMPEP Residency Programs

- Located in the US, Canada, Ireland
- 66 Programs in Radiation Therapy Physics
- 8 Programs in Imaging Physics

- Approximate Number of Graduates:
 - 90 per year in Radiation Therapy
 - 8 per year in Imaging



CAMPEP Graduate Programs

- Located in the US, Canada, Korea
- 44 graduate programs
- Approximate number of graduates
 - 300 per year



Observations:

- Not enough residency positions to accommodate all graduate program graduates
- Residency programs can be selective and preferentially accept PhD graduates
- Not enough residency programs to satisfy expected MP workforce needs
- Few imaging residency programs
- No dedicated Nuclear Medicine residency programs (integrated into Imaging programs)



Medical Physics Graduate Programs

- Subject matter to be covered by curriculum is describe by AAPM Task Group Report 197
- Typically ~ 2 years in length for MS
- Program sizes range from approximately 5-80 students (Average ~ 20 students)
- Some programs accredited only for the MS degree



CAMPEP Accreditation

- Accreditation includes
 - Initial review of program's Self Study
 - Site Visit
- Accreditation Period
 - 3 year initial accreditation
 - 5 year subsequent accreditation
 - Annual review



UF Medical Physics Program Offerings

BS in Biomedical Engineering- Medical Physics Track
(incorporates equivalent of Physics Minor)

Certificate in Medical Physics

May be completed via distance education

MS

PhD

Diagnostic Imaging Physics Residency

Radiation Therapy Physics Residency

UF offerings include all CAMPEP programs except the DMP



UF Medical Physics Graduate Program

- One of the oldest and largest programs
- Established 1961 in Department of Radiology
- CAMPEP Accredited in 2001
- Joint Program between College of Engineering and College of Medicine
- Departments: Biomedical Engineering, Neurosurgery, Radiology, Radiation Oncology



Graduate Students

- Steady state student enrollment ~ 42
- 75% of admitted students will pursue PhD
- 25% earn MS degree
- 50/50 male/female student population
- ~ 220 graduates since 1980



MS Curriculum Summary

First Fall

Radiological Physics,
Measurement & Dosimetry

Medical Physics

Radiological Anatomy

First Spring

Therapy Physics I

Diagnostic Physics

Radiation Biology

Summer

Diagnostic Practicum

Therapy Physics II

Elective: Research

Second Fall

Imaging System Analysis

BME Seminar

Elective: Diagnostic or
Rad Therapy III or Research

Second Spring

Shielding & Rad Protection

Nuclear Medicine

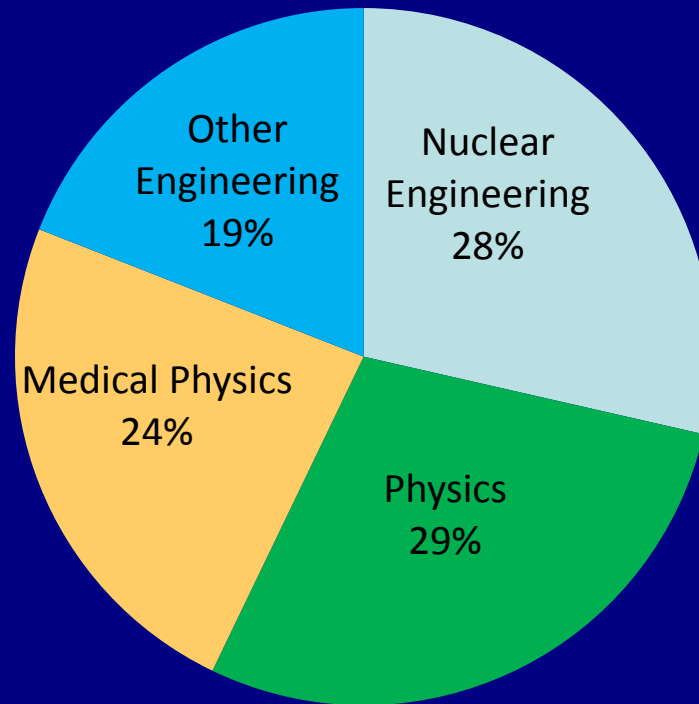
BME Seminar

Elective: Rad Dosimetry or
Research

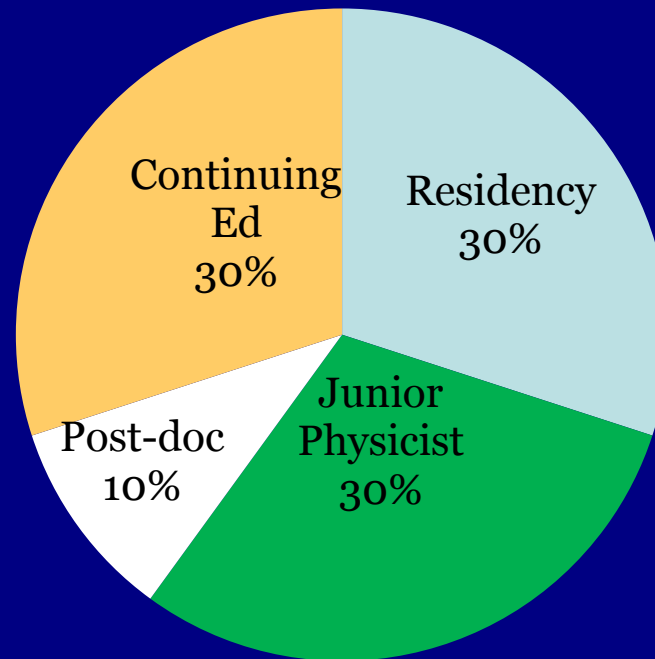
Summer

Optional :
Research

Academic Backgrounds of entering students



Initial Career Paths of Graduates



Conclusions

- UF has had near 100% placement of students in positions in past years
- Challenges ahead as competition for limited Residency positions increases
- Medical Physics Profession opportunities are uncertain:
 - Currently not enough residency requirements to satisfy work force requirements
 - Employment of MS graduates?
 - May see opportunities for non-certified physicists in states that do not require licensure?
 - Or continued increase in residency programs?



References for more details:

- ABR : <http://www.theabr.org/>
- CAMPEP: <http://www.campep.org/>
- UF Programs: <https://www.bme.ufl.edu/>
- Task Group 197 Report on Graduate Programs:
http://www.aapm.org/pubs/reports/RPT_197.pdf
- State Licensure:
http://www.aapm.org/government_affairs/licensure/default.asp

