

Building, Maintaining and Improving an Imaging Physics Residency Program

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Imaging	
Columbia University	2013
Cross Cancer Institute - University of Alberta*	2005
Emory University	2014
Henry Ford Health System*	2009
Mayo Clinic***	2010
Stony Brook University Medical Center	2009
University of Chicago	2014
University of Florida College of Medicine	2013
University of Texas M. D. Anderson Cancer Center*	2002
Upstate Medical Physics***	2010
West Physics***	2013

The number has doubled since 2013

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Background

- The accreditation process for advanced imaging devices (CT, MRI, US, NM, PET) has highlighted the role of qualified medical physicists (QMP) in radiology.
- Healthcare enterprise policies on QMP certification
- Issues with standardization in training have been raised.

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Issues Identified by ABR Physics Trustees

- Candidates often showed extensive knowledge in narrow areas but lacked of knowledge in other areas (e.g., ultrasound, MRI).
- Candidates often showed an inability to relate medical physics activities to the broad clinical care of the patient.

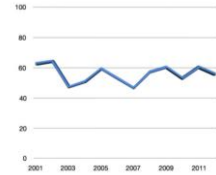


Figure 1. The passing rate on the oral exam has averaged 55 to 60 percent for many years.

RL Morin and JD Allison, ABR Physics Trustee Report, AAPM Newsletter, Jan & Feb 2013

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Background

- ABR “2012 initiative” was announced in 2002: CAMPEP-accredited education program → Part I eligibility
- ABR “2014 initiative”: CAMPEP-accredited residency program → Part II eligibility
- The number of accredited imaging physics residency programs then was inadequate (6 in North American and none in nuclear medicine in 2011).

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RSNA/AAPM/SNMMI recognize the shortage of imaging/nuclear medicine physics residency

RSNA, AAPM Help Fill Urgent Need for Medical Physics Residency Programs

December 01, 2014

As the date when medical physicists must comply with new board certification requirements quickly approaches, RSNA and the American Association of Physicists in Medicine (AAPM) are offering incentives to establish much-needed accredited diagnostic imaging medical physics residency training programs.

Beginning in 2014, the American Board of Radiology (ABR) will require medical physicists to complete an accredited two-year residency program in order to take board exams and achieve the Qualified Medical Physicist (QMP) designation.



Steven

Donaldson

Jonathon A. Nye

• AAPM Support for Clinical Residency in Imaging Medical Physics
AAPM and RSNA are partnering to provide matching support for new imaging physics residencies, either diagnostic or nuclear medicine. The recipients are:

- University of Chicago – Zhongfeng Lu
- Duke University – Brian Somel
- Emory University – Jonathon A. Nye
- Indiana University School of Medicine – Yun Liang
- University of Oklahoma – Jagadeesh Sommad

2014-2015 ERF-SNMMI Nuclear Medicine Physics Residency Training Grant (\$75,000 over two years)

-University Hospitals Case Medical Center
David Jordan, PhD, DABR, DABMP

2015-2016 ERF-SNMMI Nuclear Medicine Physics Residency Training Grant (\$75,000 over two years)

-Emory University
Jonathon A. Nye, PhD, Assistant Professor, Radiology and Imaging Services

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Available Training Guides

- AAPM Report 36 (1990) Essentials and guidelines for hospital based medical physics residency training programs
- AAPM Report 90 (2006) (revision of No. 36) contains a broad outline of residency structures and training
- AAPM Report 133 (2008) describes educational pathways for residents and includes a model of academic/industry training
- AAPM Report 249 (2013) (revision of No. 90)
- IAEA TCS-47 (2010) and IAEA TCS-50 (2011) has very detailed descriptions of training modules
- CAMPEP Standards (updated 3-2015)

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Starting a Residency Program

• Initial Assessment

To determine if the necessary elements for training imaging physicists are present

Institutional support?
Clinical physics faculty?
Curriculum coverage?

Program goals and objectives?
What would the graduates be like?

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S.W.O.T – Emory Program and U of Chicago Program

Strength

- Strong faculty with nationally recognized expertise
- New hospital facilities with expanding clinical imaging physics responsibility

Weakness

- Older equipment/not state-of-the-art
- Limited FTE in clinical imaging physics

Opportunities

- Local graduate university with CAMPEP program
- Strong CAMPEP PhD Program and Certificate Program
- Strong radiation therapy residency program

Threats

- Decrease in clinical volume, consolidation of equipment
- Limited long-term funding

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C A M P E P

Commission on Accreditation of Medical Physics Educational Programs, Inc.

<http://www.campep.org/ResidencyStandards.pdf>

Standards for Accreditation of Residency Educational Programs in Medical Physics

Revised March 2015

- 1. Program Goal and Objectives 2
- 2. Program Structure and Governance 2
- 3. Program Director 3
- 4. Program Staff 4
- 5. Institutional Support 4
- 6. Educational Environment 5
- 7. Scholarly Activities 5
- 8. Residency Curriculum 5
 - Ethics and Professionalism Curriculum 6
 - a) Imaging Physics Residency Curriculum 7
 - b) Nuclear Medicine Physics Residency Curriculum 8
 - c) Radiation Oncology Physics Residency Curriculum 10

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Program Structure and Governance (CAMPEP Standards)

- The clinical facilities for training must be accredited
- A medical physics residency shall require at least 2 years of clinical training
- Remedial education shall be well-defined
- Steering committee
- Procedure for performance evaluation and progress review
- Program website available and updated at least annually
- A program may consist of a single institution or multiple affiliated institution (Hub-and-Spoke Model).

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Hub and Spoke Model - Leveraging areas of weakness

Academic Partner	Industry Partner
Faculty Practice as specialists - Modality specific - Experts in their research fields	Faculty practice as generalists - Broad knowledge base - Experts in equipment assessment
Experts in applied clinical medical physics	Experts in regulatory compliance and safety
Exposure to an academic hospital	Exposure to a large number of regional or satellite hospitals and clinics
Facilities include newer generation equipment	Facilities include a wide range of equipment generations, mobiles, analogue detectors, etc.
Support of a large administrative infrastructure and resources	Small staff, provider of efficient consulting services
Low percentage of board certified physicists	High percentage of board certified physicists

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How to Implement – Emory Program

- Funding and Conflicts of Interest
 - Sharing training
 - Sharing financial resources
- Affiliation agreement
 - Describes standards of mentorship, training, technology transfer, liability, indemnification, communications/public acknowledgements, venue disputes, etc. between academic/industry partners
- Emory will submit single accreditation document to CAMPEP and be responsible for its administration and maintenance.

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Program Director and Program Staff (CAMPEP Standards)

- The program director must be certified by an appropriate certifying agency in the field of the residency program
- The program director should have at least 5 years of full-time experience beyond clinical certification
- At least 2 certified physicists shall be engaged in the residency program and the ratio shall be at least 1:1.

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Commission on Accreditation of Medical Physics Educational Programs, Inc.

Rotation schedule Accreditation of Residency Educational Programs in
Rotation objectives
Didactic education expectations Medical Physics
Optional research opportunities Medical Physics

Revised March 2015

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C A M P E P

Commission on Accreditation of Medical Physics Educational Programs, Inc.

radiography
Fluoroscopy
Interventional/angiography
Mammography Accreditation of Residency Educational Programs in
Stereotactic Breast Biopsy Medical Physics

Revised March 2015

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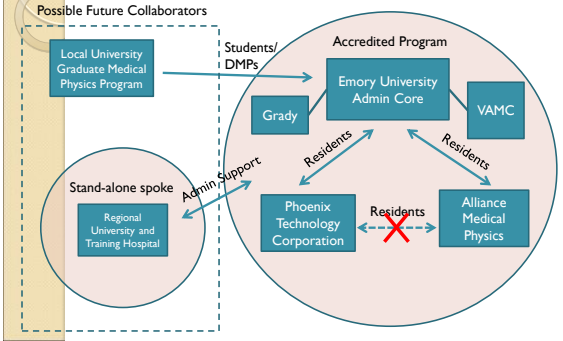
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University of Chicago – Imaging Residency

- 40 Clinical Faculty and 13 Physics Faculty Members
- 3.5 FTE in Clinical Physics; 4 ABR certified physicists
- Mitchell Hospital, a 395-bed adult hospital
3 CT scanners; 3 RAD rooms; 3 R/F room; 1 Dental room; 4 Portable; 3 MRI scanners;
3 nuclear medicine scanners; 1 SPECT/CT; 4 ultrasound scanners
- Comer Children’s Hospital, a 155-bed pediatric hospital
1 CT scanner; 3 RAD rooms; 2 R/F room; 2 Portable; 1 MRI scanner; 3 ultrasound
scanners
- DCAM, a 525,000 square foot outpatient clinic and surgery
facility
2 CT scanners; 7 RAD rooms; 3 R/F room; 2 Portable; 4 digital mammography units; 1
SBB; 1 Breast Tomosynthesis unit; 4 MRI scanners; 3 nuclear medicine scanners; 1
PET/CT; 2 ultrasound scanners
- Center of Care and Discovery, a 1.2 million square foot
hospital
4 CT scanners; 3 RAD rooms; 1 R/F room; 1 Dental room; 4 Portable; 3 MRI scanners;
3 nuclear medicine scanners; 1 SPECT/CT; 4 ultrasound scanners
- Affiliation with Lurie Children’s Hospital

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Emory Univ. - Hub and Spoke



Overall Program: Univ of Chicago

Rotation	Time Allotment (weeks)	Total Duration
1. Hospital and Department Orientation and Safety Training & Annual Oral Evaluation	1-4	4 weeks
2. Primary Rotations Radiography Fluoroscopy Interventional Radiography Mammography Computed Tomography Magnetic Resonance Imaging Nuclear Medicine and PET Ultrasound Radiology Informatics	5-93	88 weeks (6-20 weeks/rot.)
3. Attendance of Department Seminars and Journal Clubs	Minimum once per week	
4. Clinical-oriented Research Project	Minimum one presentation at a national conference per year	
5. Two national conferences	94-97	4 weeks

Overall Program: Emory Univ

Rotation	Time Allotment (weeks)	Total Duration
1. Institution and Affiliate Orientation and Safety Training	0-4	4 weeks
2. Introduction to Medical Physics	0-8	8 weeks
3. Primary Rotations General Radiography Fluoro/Interventional Radiography Mammography Computed Tomography Magnetic Resonance Imaging Nuclear Medicine Radiology Informatics Dosimetry and Radiation Safety Ultrasound	9-99	90 weeks (10 weeks/rotation)
4. Attendance of Department Seminars	Evaluated throughout the program	
5. Independent Research Project	Evaluated by the resident's program mentor	
6. Advanced Topics in Clinical Imaging /Or Remediation	100-104	4 weeks

Training Record and Assessment

Logbook of Activities and Progress

Document tested equipment, seminars and journal clubs, clinical observations, safety trainings, teaching activities, shielding design and protection survey, assigned readings, research projects, time-away and monthly meeting notes.

Resident Progress Evaluation

- a. Self-directed study - evaluated by the rotation mentor.
- b. Annual written examination
- c. Annual oral examination by the entire panel of the rotation mentors
- e. End of Rotation Evaluation in the Second Year (Competency level checklist)

Continuing Education Activities

- a. Seminars, Journal Clubs and National Conferences.

Independent Research Project

- a. Minimum one abstract submission to a national conference per year ²²

Recruitment

- Medical Physics Match and AAPM MP-RAP

<https://natmatch.com/medphys/>

<http://www.aapm.org/CAP/>

- Admission criteria
- Selection process
- Good practices in recruitment for diversity
 - Training the admission committee to recognize unconscious biases
 - Enlarge the candidate pool with outreach
 - Use rubric evaluation form instead of premature numerical ranking

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CAMPEP Initial Accreditation

Accreditation Steps

- Prepare and submit a self-study using the CAMPEP template giving evidence of consistency with the CAMPEP standards
- The self-study is reviewed by the CAMPEP Residency Education Program Review Committee (REPRC). The program needs to respond to the questions and concerns raised by the reviewers.
- A site visit is conducted to validate the assessment for all first-time applicant programs. (For reaccreditation, a site visit is done at least once every ten years.)

<http://www.campep.org/res.asp>

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CAMPEP Site Visit

- It requires 1.5 days.
- The purpose of the site visit:
 - To meet and talk face to face with faculty/staff, residents, and administrative officials of the program
 - To observe the adequacy of facilities
 - To assess the aptitude and commitment of residents and faculty/staff
 - To observe the general educational and clinical environment at the institution
 - To examine selected areas identified in the self-study review and to obtain additional information required for evaluation

<http://www.campep.org/res.asp>

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CAMPEP Site Visit Agenda - Sample

- Meet with Program Director
- Meet with Program Faculty
- Meet with Residents
- Review Program Records
- Meet with Department Leaders
- Tour Training Facilities
- Preparation for Exit Interview
- Exit Interview with Program Director

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CAMPEP Site Visit - Tips

- Respond thoroughly to the CAMPEP team's review on your self-study prior to the site visit
- Get everyone involved in preparation: *(department leaders, steering committee, department faculty/staff, current residents, training facilities, affiliated sites)*
 - Does everyone read the full self-study?*
 - Do you do a mock site visit?*
 - Do you prepare a Q&A?*
 - Are all the records in order? and readily available?*
- Make it easy on the site visit day
 - Have a designate person to escort the team?*
 - Have one conference room reserved for the day?*
 - Have boxed lunch ordered to the conference room?*

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KEEP CALM
IT'S
ALMOST EASY

CAMPEP Accreditation

Initial Accreditation:

- Initial period of 3 years.
- Annual report
- May be extended to 5 years

Provisional Accreditation:

- For a program that has not yet admitted its first resident.
- For a period until the first resident has completed the first year of study, at which time a full site visit will be conducted and accreditation will be extended for a full 5 years.

Accreditation Deferred:

- This action is for programs found to be non-compliant with CAMPEP standards for accreditation to allow an adequate period of time for the institution to implement planned or suggested improvements.

Accreditation Withheld:

- This action is for programs found to be non-compliant with CAMPEP standards for accreditation, nor does it appear that program changes could be achieved within a reasonable period of time to qualify for accreditation.

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Improvement of the Program

Internal Periodic Reviews

- Rotation evaluations and program evaluations from residents
- Quarterly steering committee meetings
- Annual self-evaluation

External Periodic Reviews

- Program advisors: institutional and external

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Questions?

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