

SITMAN CANCER CENTER

Building, Maintaining and Improving a Physics Residency Program

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Washington University, St. Louis, MO
AAPM Annual Meeting
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Importance of Residencies

- In light of the New York Times articles and subsequent Congressional Hearings, it is clear that well-trained physicists are vital to Radiotherapy.
- Physicians were recently encouraged to hire only well-trained physicists, as evidenced by graduation from an accredited residency program. (ASTRONews Spring 2011)

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NYT Series Included Medical Physicist Fraud

THE RADIATION BOOM

They Check the Medical Equipment, but Who Is Checking Up on Them

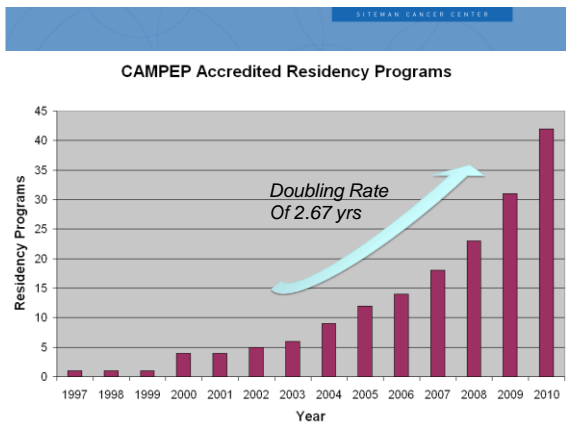
By [WALT BOGDANICH](#) and [KRISTINA REBELO](#)

Published: January 26, 2010

In the eyes of those who hired him, Norman Fenton was a model medical physicist — diligently protecting patients from the hazards of too much medical radiation or too little.

***Patients Deserve the Best
Trained Physicists = Residents***

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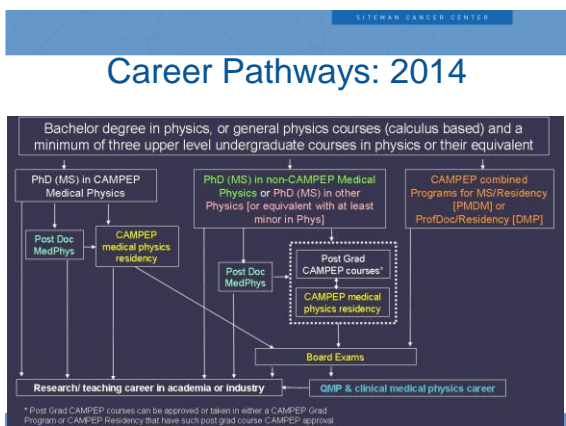


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Recent CAMPEP Numbers

	Therapy	Imaging
Accredited Programs	78	11
Programs in CAMPEP vote	4	2
Programs in active review	2	3
Programs <i>awaiting review</i>	3	3
Total	87	19
Projected by 2016	96	22
Projected yearly graduates	144	26

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Projected Demand/Supply

- Currently ~150 Graduating Residents per Year
- Currently ~250 Graduating Medical Physics Students
- Most Programs have **not/will not** Reduce
- Of the 250, 175 are MS Students

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Initial Momentum

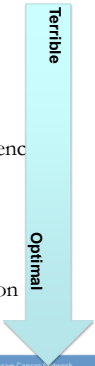
- **Secure commitment of**
 - Program director;
 - Physics faculty
 - Physicians
 - Key technical personnel
 - Administration,
- **Ultimate goal to build a strong clinical physicist.**
- **Find right balance of training, empowerment, and effort they contribute back to the clinic.**
- **This may also be part of the equation in obtaining finances.**

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Funding Options

Don't Pay Them
 Pay Two for the Price of One
 Trade in Physics Position for Two Residents
 Negotiate for a Hospital **Residency** Slot
 Use Grants to Fund Research + 2 years of Residency
 Use T-32 Training Grant
 Increase Clinical Contract to Include Resident(s)

Establish CMS Funding via Paramedical Education
 Establish CMS Funding via GME Route



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CMS Funding

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- An assured way to obtain funding is to obtain proper ACGME classification to allow for CMS reimbursement.
- Fortunately, the ASTRO Board recognizes this need and issued an important statement to SCAROP, supporting CMS reimbursement and asked Department Chairs to “lobby for sustained funding for physics residency programs within their institution.”

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Our Therapy Physics Program

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- First accredited in 1997
- Re-Accredited in 2003, 2008, and 2014
- For the 47 individuals that have entered our program, 14 had been post-doctoral fellows, 18 had graduated non-CAMPEP programs (4 Certificate graduates), 11 graduated from CAMPEP accredited programs, and 4 had established careers.
- Thirty-nine physicists have graduated (30 PhD, 9 MS), 3 failed to complete the program, and one departed due to medical issues.

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Residency Program Requirements

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- **Director with ≥ 7 yr experience**
- **Faculty/Training ratio of $\geq 2:1$**
- **Delivery/Imaging Equipment Up to Date**
- **Organized Rotation Schedule**
- **Evaluation Methodology – Remediation**
- **\$\$, Space, and Resources for residents**
- **Reading Lists**
- **etc.**

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Resident Requirements

- \geq Minor in Physics
- CAMPEP Accredited Degree, or
- 6 minimum classes:
 - Anatomy & Physiology
 - Radiation Biology
 - Radiation Physics (or similar)
 - Radiotherapy Physics
 - Imaging Physics
 - Radiation Safety
- Can be obtained in a CAMPEP ‘Certificate Program’

Recruitment of Resident Candidates

Where the residents are coming from:

- Educational background
- Previous Life ?
- (Read Between the Lines) References
- During interviews, how to gauge what makes an ideal resident.

Applicant Background (2008-2013): 777 applicants

Post Doctoral Fellows	Recent Graduates from non-CAMPEP accredited programs	Accredited CAMPEP Program Graduates	Established in Physics Related Career	Outside North America
213	310	141	67	46

Maintenance of Program

- To not allow stagnation
- Constantly update
- Evolution of didactic and clinical rotational components.
- How to allocate resident developmental work, whether it be clinical or benchmark, without disrupting training.

Maintenance of Program

- CAMPEP 5-Year re-Accreditation cycle is ideal to ensure internal scrutiny
- Twice yearly meetings with involved Review Committee vital
- Annual self-evaluation including reports to AAPM/CAMPEP
- Resident Evaluations: How to keep anonymous ?

Rotation Changes:

Some changes we've made over the years include; more customized and advanced rotations (i.e. IMRT, IGRT, Protons, ViewRay), and increase in testing frequency.

Month	1999 1 st Year Rotation	2007 1 st Year Rotation	2013 1 st Year Rotation
July	Treatment Planning & Dosimetry	Imaging for Planning & Conventional Treatment Planning	Orientation + Imaging
Aug.	"	"	External Beam Rotation
Sept.	"	IMRT Planning	IMRT Rotation
Nov.	"	"	"
Dec.	"	"	"
Jan.	Brachytherapy	"	Brachytherapy Rotation
Feb.	"	Brachytherapy	"
Mar.	"	"	"
Apr.	3D TP and Virtual Simulation	"	Specials/IGRT/ESRT
May	"	Specials & Patient QA	Patient QA
June	"	"	"

Resident Evaluation Form

- Faculty you found the most helpful:
- Faculty who did **not** make themselves available, or did not participate during assigned concentrations/Rotations and Comprehensions:
- Suggested Improvements for the Program:
- Teaching Opportunities/Research:
- Other:

Faculty Involvement

- Evaluate faculty on the ownership they take regarding resident training
 - Part of Yearly Evaluations
 - Resident Evaluation of Mentors
 - All Faculty should Be Aware of Self Study
 - All Faculty should Interview Candidates

Track Residents Post-Graduation

- Type of Position Held (Academic vs. Hospital)
- Board Certification
 - You can help them (Skype mock orals)
 - Success
- Achievements
- Help Answer Questions
- Hire them !

ABR Oral Pass Rates

- Typical pass rate is 60% Pass Rate
- ABR just starting to track Residents vs. others
- Pass Rates for Residents (~20% of takers) ranges from 85 to 100%
- Therefore non-Resident Graduates pass at ~50%

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POSITION: Faculty Radiation Oncology Physicists

LOCATION: Division of Physics
Department of Radiation Oncology
Washington University School of Medicine
Barnes-Jewish Hospital
Mallinckrodt Institute of Radiology
St. Louis, Missouri

We are seeking applications for clinically-oriented radiation oncology physicists. The position requires an M.S. or Ph.D. with a minimum of three years of clinical experience. The candidate should have Board certification in radiation oncology physics or be in the certification process.

Responsibilities include

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POSITION: Faculty Radiation Oncology Physicists

LOCATION: Division of Physics
Department of Radiation Oncology
Washington University School of Medicine
Siteman Cancer Center
Barnes-Jewish Hospital
St. Louis, Missouri

*We are seeking applications from
Graduating Physics Residents.*

Responsibilities include

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Is Medical Physics Course work so necessary for a Physics Resident?

- A Berkeley doctoral graduate in Physics, who was published and referenced as best student ever, applied to our program in 2007.
 - No Medical Physics Coursework
 - Received in-house coursework on Radiotherapy Physics and Radiation Biology
- Has since passed the Boards
- Assistant Director
- Received Commercial Grant

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Does a Physicist have to be Board Certified to Perform Clinically Translatable Research?

- A Nuclear Chemistry Graduate performed a Post-Doctoral Fellowship in Radiotherapy
- WU Physics Residency
- Associate Professor @ UoFlorida including Board Certification
- Inventor, Founder, Member of Board of Directors, Secretary, & Chief Scientific Officer, **ViewRay** Incorporated.

Who entered the program and where did they go?

Breakdown of individuals who've entered program (47):

Post Doctoral Fellows	Recent Graduates from non-CAMPEP accredited programs	Accredited CAMPEP Graduates	Established in Physics Related Career
14	15 (3 MS)	14 (7 MS)	4 (1 MS)

Graduate Current Positions (41):

Of the graduates, 31 are at academic facilities and 10 are in clinical practice. The majority of graduates at academic facilities were post-doctoral fellows before residency.

Lessons Learned

- Look for **Red** Flags during interviews.
 - **Small things matter.**
- Short lectures during interviews help
- No such thing as being over organized
- Routine testing is vital
- Ensure all faculty are engaged and annually evaluated for effort.

Lessons Learned

- A Residency Program is only as good as it's worst Resident.
- We must keep the door open for non-Medical Physics Graduates.
- A strong Resident makes a Strong Clinical Faculty Physicist.

This is what its all about

