

Educational Council Symposium on Residency Programs

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Residency Program at Washington University

- Minimum requirements for entry: M.S. in medical physics, physics, or other relevant physical science or engineering discipline (ABR board requirement)
- 1st year: intensive training in the following areas, *i.e.* "concentrations"
 - Treatment Planning
 - IMRT
 - Stereotactic Radiosurgery/Gamma Knife
 - Brachytherapy
- 2nd year: Continued training with more leadership-type responsibilities, mixed in with clinical support, and mentoring of incoming 1st year residents
- Includes assignments to QA of various equipment throughout 2 years

Residency Program at Washington University

- **Training Essentials** developed and documented for each area:
 - Hands-on experience: to master concepts and skills under the guidance of responsible physicist/dosimetrist/therapist
 - Didactic training: recommended reading (TG reports, articles), attendance of clinical teaching/QA conferences, physics course, radiation biology course:
 - Teaching experience: prepares and presents lectures for physics/physician/dosimetrist/therapist personnel
- **Competency Evaluation Forms:**
 - Treatment Planning, commissioning/AT, machine calibration and dosimetry, special procedures, brachytherapy, radiation safety and regulatory compliance
- **Oral exam** at end of first and second years:
 - Treatment machines/QA, calibration and radiation measurements/detectors, photon and electron beams, treatment planning and treatment planning systems, brachytherapy and radiation safety, and IMRT and special procedures

Hands-on Experience: First Year Concentrations

Time Period	Wienmeyer: Primary Rotation	Zhang: Primary Rotation	Assigned Readings	Assigned Reports
July-September	Orientation and Team 1 Treatment Planning (7/1-9/7)	Orientation and Team 1 Treatment Planning (8/30-11/19)	TG-40 TG-51.21 TG-53, Van Dyke ICRU-62 TG-66 TG-2570 TG-71 Treatment Policies	8 Treatment Site Specific Reports Derivation from TG-21 to TG-51 Derivation of MPR MU from TPR formalism
October-December	Team 2: (8/20-11/19) Team 1: (11/22-12/31)	Team 2: (11/22-2/14)		
January-mid March	Brachytherapy	Special Procedures incl. IMRT Planning (2/15-3/4/0)	TG-56 TG-59 TG-43 ICRU-38&58 Brachy Procedures	Brachytherapy Site Reports (2) for GYN and Prostate
mid-March-May	Special Procedures incl. IMRT Planning	Brachytherapy (3/5/01-3/7/5)	NCI IMRT Email AA7PM paper, Dept. Procedures, TG-17, TG-54	TSET Electron Arc TBI
June (with updates if needed)	CT-Simulation, & Plan, Calculation, and Chart Checking (7/15-8/26)	CT-Simulation, & Plan, Calculation, and Chart Checking (7/15-8/26)	Chart Check Procedures	Linear Shielding Assignment

Hands-on Experience: Second Year Concentrations

Month	Cornell Hampton (PR-Yr2)	Roy Wood (PR-Yr2)
July	External Beam Concentration	External Beam Concentration
August	"	"
Sept.	"	"
Oct.	External Beam & IMRT Concentration	External Beam & Brachytherapy Concentration
Nov.	" (This includes US systems)	"
Dec.	"	"
Jan.	External Beam & Radiosurgery Concentration	External Beam & IMRT Concentration
Feb.	" (This includes ESEB and EPID)	" (This includes US systems)
Mar.	External Beam & Brachytherapy Concentration	"
Apr.	"	External Beam & Radiosurgery Concentration
May	"	" (This includes ESEB and EPID)
June	Elective Concentration	Elective Concentration

"External beam concentration" refers to 2nd year resident's responsibilities to provide clinical support, *i.e.*, chart checks

Didactic Training: Coursework

- Physics course meets twice a week from September to March
- Physics course topics include
 - radiologic physics
 - radiation dosimetry and measurement
 - external beam clinical physics
 - brachytherapy physics
 - radiation safety and QA
 - special topics including IMRT, imaging for RT, stereotactic, proton therapy, etc.
- Followed by a 2 month radiation biology course

Teaching Experience: Resident Lectures

DATE	PRESENTER / ADVISOR	TOPIC
July 15	Cornell Hampton, Ph.D./ Jaqueline Esthappen, Ph.D.	Electronic Portal Imagers: AT and Dosimetry
August 19	Roy Wood, Ph.D./ Sasa Mutic, M.S.	Commissioning of a Multi-Slice Scanner
September 30	Mark Weismeyer, Ph.D./ Todd Steinberg, M.S.	TG-51 and TG-39
October 28	Lisha Zhang, Ph.D./ Eric Klein, M.S.	Conventional Treatment Planning for H&N
November 18	Cornell Hampton, Ph.D./ Zong-feng Li, D.Sc.	Dosimetry Standards (NIST, ADCL)
December 9*	Mark Weismeyer, Ph.D./ S. Murty Goddu, Ph.D.	Breast Treatment Planning
January 20	Lisha Zhang, Ph.D./ Daniel Low, Ph.D.	Film and TLD Dosimetry

One lecture per month, assigned physicist serves as an advisor

Evaluation Forms: Treatment Planning Concentration

Barnes Jewish Hospital – Mallinckrodt Institute of Radiology Radiation Oncology Physics Residency Program <i>Resident Competency Evaluation: Treatment Planning and Delivery</i>			
Resident: _____	Entrance Date: _____	Expected Graduation Date: _____	
Skill Description	To be completed by*:	Physics Faculty Advisor	Date
Patient positioning and immobilization techniques	6 months		
Patient data acquisition (distances and separations, contours, CT, MR)	6 months		
Conventional patient simulation	6 months		
Virtual patient simulation	6 months		
Treatment aid design and fabrication	6 months		
Treatment planning, single field arrangements	6 months		
Treatment planning, complex field arrangements	6 months		
Field matching and gapping	6 months		
MU/Target/Patient-Dose calculations for linear accelerators, superficial and contact therapy units	6 months		
Data entry into paper chart and electronic chart systems	6 months		

Evaluation Forms: Brachytherapy Concentration

Barnes Jewish Hospital – Mallinckrodt Institute of Radiology
Radiation Oncology Physics Residency Program
Resident Competency Evaluation: Brachytherapy Therapy Treatment Planning and Delivery

Resident: _____ Entrance Date: _____ Expected Graduation Date: _____

Description	To be completed by*:	Physics Faculty Advisor	Date
Brachytherapy source characteristics	12 months		
LDR source strength specification and calibration	12 months		
HDR source change and calibration	12 months		
LDR and HDR RAL periodic quality assurance tests	12 months		
Ir-192 LDR intracavitary treatment planning and delivery	12 months		
Cs-137 intracavitary treatment planning and delivery	12 months		
Intracavitary HDR treatment planning and delivery	12 months		
Permanent prostate implant treatment planning and delivery	12 months		

Residency Program: Obtaining Certification

- Eligibility for taking the ABR certification exam includes “*at least three years of active association with an approved department or division of the subfield in which certification is sought*”
- Graduate study in a medical physics program → up to half year of credit for Masters and one year of credit for Ph.D.
- Complete 2-year residency program → two years of credit
- Part I Physics and Clinical exams can be taken in the midst of satisfying experience requirement
- Experience requirement must be satisfied before taking Part II Therapy Written exam
- Must pass Part II written before taking Part II Oral exam, offered the next year

Residency Program and Beyond (For Me)

- Completed residency program at Washington University in August 2002
- Appointed to Instructor of Radiation Oncology at WUSM in August 2002
- ABR certified by June 2003
- Promoted to Assistant Professor of Radiation Oncology at WUSM in January 2005
- Responsibilities include
 - clinical support in various areas, especially in IMRT, brachytherapy, and portal/CR imaging
 - teaching responsibilities associated with various programs: physics and physician residency, dosimetry training program, and radiation therapist training program,
 - academic pursuits, thus far including film dosimetry, IMRT treatment planning, breast brachytherapy, and portal imaging

Residency Program and Beyond (In Total)

Since 1991:

- 17 people have completed the medical physics residency program at WU, and have continued on in the profession as...
- Hospital physicists (6)
 - Academic clinical physicists (10, of which 2 are chiefs)
 - Chief imaging physicist (1)