

Spectrum Medical Physics (SMP) Residency Orientation Handbook

INTRODUCTION

Spectrum Medical Physics, Inc was incorporated in 2000 to provide radiation oncology physics and dosimetry support to the Allison Radiation Oncology Center located in Lima, OH. The initial corporation consisted of the two incorporating partners Patrick Diltz and Ronald Froehlich. The corporation has since expanded to provide radiation oncology services to the original Lima facility in addition to 3 more radiation oncology centers.

SMP STAFF

1. Patrick Diltz, Ph.D.

B.S., Engineering Science Pennsylvania State University
Ph.D., Biomedical Science, The Medical College of Ohio
DABR, Therapeutic Radiologic Physics and Diagnostic Radiologic Physics

2. Ronald Froelich, M.S.

B.S., Radiation Therapy Technology, Wayne State University
M.S., Biomedical Science, The Medical College of Ohio
DABR, Therapeutic Medical Physics

3. Philip Kallenberg, M.S., Program Director

B.S., Physics, University of Dayton
M.S., Radiological Medical Physics, University of Kentucky
Residency, University of Kentucky
DABR, Therapeutic Medical Physics

4. John Schaub

The Ohio State University / Arthur G. James Cancer Hospital
MDCB, Certified Medical Dosimetrist

5. Daniel Goecke

Associate of Applied Science, University of Cincinnati
MDCB, Certified Medical Dosimetrist

FACILITIES

1. Mercy Health – Lima Radiation Oncology Center (Allison Radiation Oncology Center)

Address

803 W. Market St.
Lima, OH 45805

Procedures

- 4DCT
- SBRT
- SRS
- Prostate Seeds
- HDR

Computed Tomography

- Philip Big Bore

Linear Accelerator

- Varian TrueBeam #1 (4DOF table, OSMS, MPC)
- Varian TrueBeam #2 (MPC)

Treatment Planning Computer

- Philips Pinnacle
- Varian VariSeed
- Varian BrachyVision

Record and Verify System

- Elekta Mosaik

Physics Equipment and Software

- MuCheck
- Wellhofer Water Scanning Tank with Omni Pro Software
- Sun Nuclear Profiler
- Sun Nuclear DQ3
- Sun Nuclear MapCheck3
- Sun Nuclear SRS MapCheck

2. Mercy Health – Springfield Cancer Center

Address

148 W. North St
Springfield, OH 45504

Procedures

- 4DCT
- SBRT
- Prostate Seeds
- HDR

Computed Tomography

- GE Optima 580 RT

Linear Accelerator

- Elekta Versa (4DOF table)
- Elekta Synergy

Treatment Planning Computer

- Philips Pinnacle
- Varian VariSeed
- Varian BrachyVision

Record and Verify System

- Elekta Mosaik

Physics Equipment and Software

- MuCheck
- Wellhofer Water Scanning Tank with Omni Pro Software
- Sun Nuclear Profiler
- Sun Nuclear DQ3
- Sun Nuclear MapCheck3

3. Grand Lake Regional Cancer Center

Address

900 Havemann Rd
Celina, OH 45822

Procedures

- 4DCT

Computed Tomography

- GE Light Speed

Linear Accelerator

- Varian iX

Treatment Planning Computer

- Philips Pinnacle
- Varian VariSeed
- Varian BrachyVision

Record and Verify System

- Elekta Mosaiq

Physics Equipment and Software

- MuCheck
- Sun Nuclear Profiler
- Sun Nuclear DQ3
- Sun Nuclear MapCheck2

4. Community Hospitals and Wellness Centers (CHWC) Radiation Oncology Center

Address

524 W. High St
Bryan, OH 43506

Procedures

- 4DCT
- SBRT

Computed Tomography

- Siemens Somatom Open

Linear Accelerator

- Varian iX

Treatment Planning Computer

- Philips Pinnacle
- MIM

Record and Verify System

- Elekta Mosaiq

Physics Equipment and Software

- RadCalc
- Sun Nuclear MapCheck
- Standard Imaging Beam Checker
- Standard Imaging CrossChecker

PROGRAM OUTLINE

The SMP residency program in medical physics is a two-year program in multiple radiation oncology clinical facilities offering a diverse range of equipment and procedures. An optional third year may be offered to the resident if the resident desires to remain in the program while sitting for the ABR board exam. The program incorporates the standards approved by the Commission on Accreditation of Medical Physics Educational Programs (CAMPEP) and the elements as described in the AAPM Report No. 249 (Essentials and Guidelines for Clinical Medical Physics Residency Training Programs). The two-year program consists of 9 modules covering a wide range of clinical practices. Each module is led by a staff member who will be responsible for ensuring the resident stays on task and completes

Requirements of the Residency Training Program

The specific requirements necessitate that an individual applying to this program must have a formal undergraduate education in physics or a related science, followed by advanced studies in an appropriate graduate program. To ensure the safety of our patients and the quality of the care we offer, it is essential that the knowledge and competence of individuals applying to our program be of high standards. Because our working base is in the Community Hospital setting without an affiliated academic institution to formally supplement didactic training, incoming residents must have graduated from a CAMPEP accredited MS, DMP, or PhD program in Medical Physics. All residents must complete the curricula of the residency program.

The resident must maintain an up-to-date, detailed list of all procedures in which he/she participates. All procedures must be logged into the residency program spreadsheet. The procedure log must be minimally submitted to the Program Director at the end of each four month block (additionally upon request). Residents are required to fulfill all requirements for each rotation. Residents are further required to adhere to all Mercy Health conduct policies as outlined in this policy manual.

- Residents not achieving satisfactory performance will be counseled and placed on a 3 month probationary period. Documented areas of substandard performance and goals for acceptable improvement will be given to the resident. The resident may be terminated if the resident's performance has not significantly improved after the 3 month probation period.
- All representatives of Spectrum Medical Physics, Inc shall act in full accordance with Mercy Health's rules and policies. These rules and policies include a commitment to comply with all applicable laws and to conduct business in accordance with the highest ethical standards. Additionally, representatives have a legal and ethical responsibility to maintain the privacy and confidentiality of patient health care information and to protect the privacy of patients. Therefore, residents must agree to comply with the Corporate Responsibility Program Provisions of Mercy Health and fully understand the requirements set forth.
- The program director may discipline physics residents for failure to comply with Spectrum Medical Physics (SMP) and Mercy Health (MH) policies. For initial actions, the program

director in conjunction with SMP leadership will meet with the resident to discuss the problem and review expectations of the program. Written documentation will be provided. For repeat second actions, the program director will again meet with the resident to review the expectations of the program and provide a documented warning regarding failure to comply. A third occurrence of the same issue will be referred to the Residency Steering Committee who will provide a corrective action that may include termination. Please note that any conduct that presents an immediate threat to the safety of patients or staff may result in immediate termination.

Resident Supervision

In order to ensure patient safety and quality patient care while providing the opportunity for maximizing the educational experience of the physics resident in the hospital setting, it is expected that a physics staff member will be available for supervision either in person or via zoom/facetime etc. during clinic hours.

Program Structure

Because the role of medical physics includes balancing many different types of activities at once, several rotations are operated in parallel to help achieve the overall goals of the program. The Residency Program is loosely structured into two halves, each with three “blocks”. A “block” relative to a time period while a “Rotation” is relative to a type of work.

Year 1 will Cover: “The Patient Experience”, Radiation Safety, Machine QA, Clinical Integration, Dosimetry Systems/Treatment Aids, and Basic Treatment Planning. (TG249 Chapter 4 section 5.1, half of 5.2, 5.3, 5.5, 5.6.1, 5.6.2 and 5.7).

Year 1 is aimed at answering the question: How can I, in a “Culture of Safety,” Set-up, Sim, plan, and treat Complex/3D treatments on Equipment that is properly calibrated and shielded?

Year 2 will cover the remaining rotations: Advanced Treatment Planning, Brachytherapy, Research/Clinical Improvement project, Information Management Systems, and Special Procedures. (TG249 Chapter 4 sections 5.2, 5.4, 5.6.3-7, 5.8, 5.9).

Evaluation tools

A) Read and discuss/present:

- a. Twice per month (such as the First and Third Friday of the week) you are to read an article with a staff member and present it to the Journal Club in a formal presentation followed by a Q&A session on the article.
- b. Additionally, each week or two a document from the rotation reading list (such as a Task Group Report) will be assigned to read and demonstrate understanding of the document (Knowledge Factors).

B) Core Competencies:

- a. these are sign-offs of what the Resident should be able to demonstrate ability to do. It combines verbal explanation (Knowledge Factors) with hands on Practical Applications (procedural skills)
 - b. The rotation mentor is responsible for ensuring that all core competencies for a given rotation are complete prior to the rotation “Oral Exam”
- C) Reports:
- a. These are either for things that need to be researched and learned about and reported back that are not in our clinical environment (Something like a report on Gamma Knife or on IORT etc) or are submit-able reports (Such as a mock submission of a Vault Shielding design). Currently the Residency calls for eight written reports (approximately 3-5 pages in length).
- D) Oral Exams:
- a. Two Comprehensive exams, one at the end of each year to demonstrate overall competency for graduation (with or without conditions)
 - i. Residents are required to pass both annual exams in order to graduate. Following the first exam, remedial work and instruction in the area of weakness will be assigned to be completed in the second year to ensure the resident’s success.
 - b. Nine “Rotation Exams” That demonstrate knowledge in each of the eight specific rotations (two in Machine QA).
 - c. Oral Exams are to be held on Mondays
 - d. All Oral Exams are “Panel Style” with all three physicists acting as examiners
 - e.

Weekly Structure:

Monday- Meet with either the Program Director or a Rotation Mentor to discuss the upcoming week’s challenges and assignments

1st and 3rd Friday: Journal Club

2nd and 4th Friday: Physics Group Meeting (ongoing Quality Improvement and clinical discussion)

Friday after Journal Club or Group Meeting: Q&A about the week's reading assignment.

Clinical Involvement

- Department Meetings: Participate in monthly to quarterly department meetings as invited by the Radiation Oncology Department Director
- CQI: Participate with a staff physicist in Quarterly Continuous Quality Improvement Meetings
 - Morbidity and mortality case review are performed quarterly as a part of the CQI meeting, and is part of the confidential departmental quality assurance program. The physician will submit cases of morbidity or mortality that directly result from their radiation treatment. The physics resident will review all dosimetry aspects pertaining to the case and present their findings to their mentor.
- Chart Rounds / Peer Review

- During treatment planning rotation, participate in weekly Chart Rounds and New Case Peer Review. When Treatment Planning Rotation is not active, participation in chart rounds and peer review will be as availability allows.

Resident Ongoing Responsibilities

The resident will participate in all activities as indicated by the curriculum and all assigned physics clinical activities (such as weekly chart review) for which he/she has passed competency. All activities will be performed according with hospital, departmental, state and federal regulations.

Machine QA

After completing Monthly QA competency the resident is responsible for carrying out all machine routine QA procedures according with departmental policies under a physicist's supervision. It is the resident's responsibility to inform a physicist within 24 hours of any deviation within 3%, and immediately about any deviation over 5%, unless indicated otherwise by the departmental policy.

Physics and Clinical implementation projects

All residents will participate in Physics and Clinical implementation projects as requested by their mentor or program director.

Sample Residency Outline:

While the Residency follows a rough structure, the timeline is not set in stone. Presented here is a sampling of what a Resident's program pathway could look.

1. Orientation – Week 1
 - a. Orientation to the SMP Residency
 - b. Ethics and Professionalism
 - i. AAPM/RSNA Modules
 1. Historical Evolution and Principles of Medical Professionalism
 2. Ethics in Graduate and Resident Education
 3. Personal Behavior, Peer Review, and Negotiations with Employers
 4. Conflict of Interest
 - ii. AAPM Code of Ethics Policy
 1. <https://www.aapm.org/org/policies/details.asp?id=519&type=PP>
 - c. Orientation to Allison Radiation Oncology Center
 - d. Orientation to Springfield Regional Cancer Center
 - e. Introduction to Radiation Oncology, Linear Accelerators and CT Simulators
 - f. Radiation Safety Training
 - g. Occupational Safety Training (Electrical, Hazmat, Heavy Objects/Collision etc.)
 - h. Introduction to MPLA and MedPhys 3.0

2. Year 1 Block 1 (August – November) [1 Oral Exam, Reports, Readings]
 - a. Patient Safety
 - i. Safety is No Accident
 - b. **Clinical Integration**
 - i. Patient Safety: Safety is No Accident
 - ii. Observe CT Simulations and discuss what goes into “good setup” of a particular patient. Understand why each piece of Setup Equipment (Treatment Aid) is chosen. What Task does it perform?
 - iii. Observe KV-KV Matching and CBCT Matching to reference CT.
 1. COMP: Demonstrate understanding of 6DOF Matching
 - iv. Fundamentals of weekly chart reviews
 - v. TG-100
 - vi. ORAL EXAM 1: The Simulation and Setup of a Patient
 - c. **Machine QA**
 - i. Learn the fundamentals of Linac Daily QA and Linac Monthly QA
 - ii. ORAL EXAM: Components of a Linac (Design and Function)
 - iii. Learn the CT Daily QA and CT Monthly QA
 1. TG-66
 - iv. COMP: Operation of a Linac

- d. Radiation Safety
 - i. OAC 3701:1-67
 - ii. Begin becoming Familiar with NCRP 147 and 151
 - e. Dosimetry Systems and Treatment Aids
 - i. Learn Patient Specific Delivery QA (IMRT QA)
 - 1. TG218
 - 2. COMP: IMRT QA: Perform, evaluate, diagnose
 - ii. Observe CT Simulations and discuss what goes into “good setup” of a particular patient. Understand why each piece of Setup Equipment (Treatment Aid) is chosen. What Task does it perform?
 - f. Treatment Planning
 - i.
3. Year 1 Block 2 (December – March) [1 Oral Exam, Reports, Readings]
- a. Clinical Integration
 - i. MPLA, MedPhys 3.0
 - ii. TG-275 (Plan Check and Chart Check)
 - iii. COMP: Weekly Chart Check
 - iv. COMP: Initial Physics Plan Check
 - b. Machine QA
 - i. COMP: CT QA (TG-66)
 - ii. TG51
 - iii. REPORT 1: Linear Accelerator Calibration
 - iv. TG40/TG142
 - v. ORAL EXAM TG40 and 142
 - vi. MPPG 8: Compare and contrast with TG142
 - c. Treatment Planning
 - i. Definitions / Terms
 - ii. TG258 (Hand Calc Formalism)
 - iii. COMP: MU Hand Calculation
 - d. Dosimetry Systems and Treatment Aids
 - i. REPORT 2: Compare and Contrast Radiation Detector systems
 - e. Radiation Safety
 - i. COMP: Linear Accelerator Room Shielding Scenario (NCRP 151)
 - ii. COMP: Linear Accelerator Vault Survey
 - iii. COMP CT Sim Room Shielding Scenario (NCRP 147)
 - iv. Use NCRP 147 and NCRP 151
4. Year 1 Block 3 (April – July) [3 Oral Exam, 1 Reports, Readings]
- a. Clinical Integration
 - i. MPLA, MedPhys 3.0
 - ii. Clinical Integration Rotation ORAL EXAM
 - b. Machine QA

- i. Annual QA
 - ii. REPORT 3: Operation, Acceptance and Commissioning a Linac
 - iii. Machine QA Rotation ORAL EXAM
 - c. Treatment Planning
 - i. QUANTEC2010, Mobius
 - ii. COMP: Dose Limits of Organs at Risk
 - iii. Begin Competencies of Complex/3D/Electron Treatment plans
 - d. Dosimetry Systems and Treatment Aids
 - i. Pour Cerrobend Block
 - ii. COMP: Pour and Measure Electron Cutout
 - e. COMPREHENSIVE YEAR 1 ORAL EXAM
5. Year 2 Block 1 (August – November) [1 Oral Exam, 3 Reports, ? Readings]
- a. Clinical Integration
 - i. MPLA, MedPhys 3.0
 - b. Treatment Planning
 - i. MPPG5
 - ii. COMP and REPORT 4: Acceptance Testing and Commissioning of a TPS
 - iii. Continue Competencies on Planning
 - c. Dosimetry Systems and Treatment Aids
 - i. REPORT 6: IMRT Commissioning, Planning and QA (TG119, TG120, TG218)
 - ii. Dosimetry Systems and Treatment Aids Rotation ORAL EXAM
 - d. Radiation Safety
 - i. COMP: HDR Emergency and Safety Training
 - ii. COMP HDR Room Shielding Scenario
 - iii. REPORT 5: Mock Submission to ODH for Shielding design of Linac Vault (Or CT Room or HDR Room as Assigned)
 - iv. Attend a Radiation Safety Meeting
 - v. COMP: Participate in ODH Survey
 - e. Brachytherapy
 - i. TG-56: Code of Practice For Brachytherapy Physics
 - ii. 10CFR20 & 10CFR35
 - iii. TG-43
 - iv. COMP: HDR Warmup/Daily QA Procedures
 - v. HDR Hand Calculations
 - f. Special Procedures
 - i. TG-101, MPPG9
 - ii. RTOG 0813, 0915
 - iii. ACR Practice Parameters on SRS and SBRT
 - iv. COMP: Demonstrate Understanding of SRS and SBRT
 - v. SRS and SBRT Treatment plans

6. Year 2 Block 2 (December – March) [1 Oral Exam, Reports, Readings]
 - a. **Clinical Integration**
 - i. MPLA, MedPhys 3.0
 - b. **Radiation Safety**
 - i. COMP: Write an Annual Safety Review
 - ii. COMP/Training Others: Prepare and disseminate (Teach) “Instruction to Workers” to staff and document compliance
 - iii. Radiation Safety: ROTATION ORAL EXAM
 - c. **Brachytherapy**
 - i. REPORT 7: Acceptance Testing and Commissioning of an HDR System, Applicator and Sources
 - ii. Treatment Planning COMP
 1. Tandem and Ovoid
 2. Vaginal Cylinder
 3. Breast Balloon / Savi
 - iii. Source Exchange and Quarterly QA
 - iv. Annual HDR TPS QA
 - v. LDR Prostate Volume Study
 - vi. LDR Prostate Pre-Plan Case
 - vii. LDR Prostate Intra-op / Real Time Case
 - viii. Radiation Safety Elements of a PSI
 - ix. Annual QA of Ultrasound Unit
 - x. Annual QA OF VariSeed System
 - d. **Special Procedures**
 - i. TG72 (IORT)
 - ii. TG23 (TSE)
 - iii. TG17 (TBI)
 - iv. REPORT 8: Read and Report on 2 special procedures that your Residency doesn't perform that are of interest to you
 - e. **Treatment Planning**
 - i. Treatment Planning Rotation ORAL Exam
 - f. **Information Management Systems (Informatics)**
 - i. Mosaiq
 1. Clinical Usage
 2. Mosaiq Set Up
 3. Store and retrieve Patient information
 - ii. Pinnacle
 1. COMP: Archive and Restore Patients (TAR Files and/or DICOM)
 2. COMP: Basic Unix Commands
 3. COMP Basics of Scripting
 - iii. Data Transfer, Storage and security
 1. PACS, HL7, DICOM, IHE, IHE-RO

- iv. COMP Microsoft Excel and/or Access Database Creation
- v. **IMS Rotation ORAL EXAM**

7. Year 2 Block 3 (April – July) [3 Oral Exam, 1 Report, ? Readings]

- a. **Clinical Integration**
 - i. MPLA, MedPhys 3.0
- b. **Special Procedures**
 - i. TG45 and TG203 (Pacemakers)
 - ii. AAPM Report 50 (Fetal Dose)
 - iii. COMP: Write a Special Medical Physics consultation report for a patient who has a pacemaker near the treatment fields
 - iv. COMP: Understanding the management of Patients requiring re-irradiation
 - v. COMP: Understanding the management of pregnant patients
 - vi. **Special Procedures Rotation ORAL EXAM**
 - vii.
- c. **Brachytherapy**
 - i. **Brachytherapy Rotation ORAL EXAM**
- d. Research/ Clinical Improvement Project
 - i. REPORT 8: Write-up of Project for implementation or for submission, or for continuation of work.
- e. **COMPREHENSIVE RESIDENCY ORAL EXAM**

SMP BENEFITS

The following is intended to be a summary of the fringe benefits offered by the Spectrum Medical Physics, Inc. The corporation reserves the right from time to time to change or discontinue any one or more of the fringe benefits which it offers.

1. Salary

First year and second year residents will receive annual salaries of \$58,000 and \$62,000 respectively. Additional money may be provided depending on the resident's skill set.

2. Retirement

A Simplified Employee IRA (SEP-IRA) has been established with The Vanguard Group for all employees as defined in the plan. Contributions consisting of 5% of an employee's salary are paid strictly by the Corporation. An additional year-end Corporate contribution (0%-15%) may be made depending on the profitability of the Corporation and other factors

3. Health Insurance

The Corporation pays for United HealthCare insurance for each full-time employee who applies to and is accepted. This provides major medical insurance under that group policy. Each resident employee shall pay for their dependents cost of insurance at the rate of 50%.

Description	Network Single / Family	Non-Network Single / Family
Deductible	\$6,400 / \$12,800	\$7,500 / \$15,000
Out of Pocket Max	\$7,000 / \$14,000	\$15,000 / \$30,000
Office Copays	NA / NA	NA / NA
Coinsurance	80%	50%
Medical / Rx Deductible Combined	Yes	
Pharmacy (Spec; Non-Spec)	\$10 / \$50 / \$125 / \$300E	

4. Vision / Dental

The Corporation is enrolled in BizPlan and shall reimburse each full-time employee to a maximum of **\$2,000** per year (total for employee and dependents) for any of following medical expenses:

- 1) Eye care including corrective lenses prescribed by a licensed practitioner
- 2) Dental care provided by a licensed practitioner

Such payment will be made only upon submission of proper documentation (e.g., dental or eye receipt for services paid). Money not reimbursed to the employee by the end of each calendar year will be paid in the year's final paycheck at the rate of 80%.

5. Meetings

Maximum meeting / professional association reimbursement is **\$2,000** for each professional employee. No travel arrangements should be made before approval by the program director. Any expenses associated with family members (spouse and children) will not be reimbursed unless said person is an officer of the corporation. This includes meals and any extra costs associated with lodging. Reimbursement is for the single rate of the hotel. Unanticipated and unusual expenses for purposes not described herein shall be evaluated on an individual basis.

All reimbursable expenses must be documented with a receipt. Automobile mileage will be reimbursed according to the current IRS standards. No meeting will be paid for without prior approval of the meeting by the Corporation. Corporate directed travel or seminars will not be deducted from your meeting benefits.

Travel to additional meetings may be supported for participating residents (e.g., poster) at the discretion of the Program Director.

6. Professional Associations / Books / Journals

In keeping with the philosophy that residents are expected to keep current in the field, all resident employees are expected to maintain membership in the American Association of Physicists in Medicine (AAPM) at the national level.

Reimbursement of books and/or journals may be reimbursed based upon prior approval by the Corporation.

7. Vacation

Vacation is set at 2 weeks per year for residents. Vacation is available immediately but should not be used at a rate to exceed 1 week per calendar quarter. Each period of vacation is subject to approval by the Corporation depending on availability of coverage. No vacation may be rolled into the following year and any excess vacation time at the end of a calendar year will be forfeited.

SPECTRUM MEDICAL PHYSICS, INC.

Resident Benefits Summary

BENEFIT	SUMMARY
Medical	
Type	High Deductible / Health Savings Account
Resident Responsibility	Self – 0% of cost Dependents – 50% of cost
Eligibility	1 st day of employment
Calendar Year Deductible (individual/family)	Network - \$6,400 / \$12,800 Non-Network - \$7,500 / \$15,000
Annual Out of Packet Max (individual/family)	Network - \$7,000 / \$14,000 Non-Network - \$15,000 / \$30,000
Bizplan	
Uninsured medical expenses (eye, dental, etc.)	\$2,000 reimbursement by corporation
Eligibility	January following date of hire
SEP-IRA Retirement	
Employee Contribution	Not applicable
Company Contribution	5% of total compensation
Vesting	Immediate
Vacation	2 weeks
Sick Time	As necessary, not to exceed 5 days annually without corporation approval
Malpractice Insurance	\$1,000,000/\$3,000,000
Professional Meeting	1 national meeting (\$2,000 max) every 2 years 1 regional meeting every 2 years