# The Ohio State University Wexner Medical Center

James Cancer Hospital
Department of Radiation Oncology

## Medical Physics Residency Training Program Handbook

July 2022-June 2024

https://cancer.osu.edu/for-cancer-researchers/education-and-training/for-postdoc-residents-and-fellows/clinical-programs/radiation-oncology-residency-for-physicists

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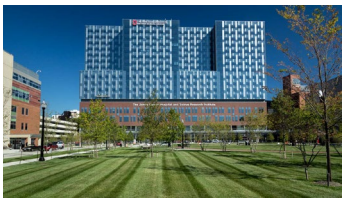
## Program Evolution and History

A formalized medical physics residency program started at The Ohio State University Medical Center's James Cancer Hospital in 2003. The program has since successfully trained and placed eleven medical physicists. However, the program's roots started in 1990, when interested graduate students in related fields starting spending two to three days per week in the clinic.

Prior to 2005, radiation oncology at the James Cancer Hospital was a division of the Department of Radiology. At that time, the physics group in the division consisted of four radiation physics faculty and three dosimetrists. The division also had five attending radiation oncologists, four radiation oncology residents and approximately 18 FTE radiation therapists. In 2005, the division of radiation oncology was converted to an academic department within The Ohio State University, as the Department of Radiation Oncology. Since then, the department has grown considerably. The physics group currently consists of 5 faculty physicists, 15 staff physicists, 4 physics residents and 15 medical dosimetrists. The department also has 24 attending radiation oncologists, 10 radiation oncology residents, 10 research faculty, 6 support IT staff, and over 50 radiation therapists, including 4 brachytherapy therapists.

More than 3,600 new patients per year are seen in consultation within the Department of Radiation Oncology. This provides exposure to a wide variety of pathologies, both adult and pediatric, as well as therapeutic modalities. The James Cancer Hospital is one of 71 NCI-designated Comprehensive Cancer Centers in the United States, drawing challenging cases from multiple states and advancing standards of care. The National Cancer Institute (NCI) has awarded the OSUCCC – James a perfect score of 10 and the institute's highest descriptor, "exceptional," following a 2020 site review that has resulted in Ohio State's re-designation as a comprehensive cancer center—a designation the university has maintained since 1976.



In December 2014 the Department of Radiation Oncology moved in to the new James Cancer Hospital facility. This 100,000 sq. ft. department offers state of the art equipment and facilities and is described in detail later. The first expansion site for OSU Radiation Oncology, The Stephanie Spielman Comprehensive Breast Center opened in summer 2011. In the past year, two other affiliates have been added to the network of Radiation Oncology centers, with several more being planned. The above mentioned growth continues to provide exceptional opportunities for current and future medical physics residents in the department.

Since its inception in 2003, our Medical Physics Residency Program (MPRP) has shown a strong track record of changes and improvements based on feedback received. The program was transitioned from a hospital based program to a University based program under the purview of The Ohio State University Graduate Medical Education (GME) Office in 2011. This is further discussed in **Program Structure and Governance**. The program received five year accreditation in 2012 from the CAMPEP, and 5 year reaccreditation status in 2016. The MPRP is currently funded for four physics resident positions, two first year and two second year. In 2015 the GME signed an agreement with the US Armed Forces to expand the current agreement to host Medical Residents to include Medical Physics Residents from the Armed Services.

## Program Goals and Objectives

The Department of Radiation Oncology at the Arthur G. James Cancer Hospital & Richard J. Solove Research Institute, The Ohio State University, offers a two-year residency program in radiation oncology medical physics. The residency program is designed for individuals with an MS or PhD (DSc) degree who seek training in clinical radiation oncology physics in preparation for a clinically oriented career. The program's objective is to provide clinical training and educational activities in radiation oncology physics that will prepare the graduate for board certification and a professional career in radiation oncology.

The residency program is designed to expose residents to the clinical training outlined in the American Association of Physicists in Medicine's (AAPM) Report #249, "Essentials and Guidelines for Clinical Medical Physics Residency Training Programs." Resident training satisfies all the minimum requirements of Report #249 as well as most recommendations. Training involves full participation of the physics resident in clinical rotations under the supervision of experienced radiation oncology physicists. Comprehensive training and experience are provided in the areas of clinical dosimetry, treatment planning, treatment aid design and fabrication, radiosurgery, brachytherapy, radiation safety, radiation machine calibration and commissioning, quality assurance, shielding, and professional and ethical conduct. During an elective rotation, the resident proposes, performs, and presents a clinical project. These projects typically involve implementation or analysis of a new clinical technology. In addition to teaching the resident how to use the technology present, the supervising physicists also show the resident how to function as a physicist in a busy clinical environment, effectively interacting and communicating with other members of the department and solving problems. This is demonstrated by the resident during their final clinical rotation.

The residency program also offers a didactic component that is designed to supplement the resident's graduate school education in medical physics. It is expected that all future residents will have graduated from a Commission on Accreditation of Medical Physics Education Programs (CAMPEP) or equivalent certificate program. The didactic component of the residency program will build upon this base as well as provide practical clinical instruction.

Training from this program will prepare the graduate for certification in the specialty of Therapeutic Radiological Physics by the American Board of Radiology. Graduates of the program will have received sufficient clinical training to work independently as radiation oncology physicists.

Our training curriculum is designed to provide development for the Residents in the areas of:

- **Understanding of the role of patient safety in the clinical practice of medical physics**
  Residents work with our clinical physicists as we practice in clinic and develop and use procedures and checklists to enhance patient safety. They also review the content of the AAPM Incident Learning Workshop, as well as participate in some of our Safety Subcommittee functions.
- **Technical knowledge, skills and competency required for the safe application of the technologies used in the practice of medical physics**
  For every rotation, our residents experience the safe practices we use every day and the checks and balances we have in place for the safe application of the technologies we use to treat our patients. Our training tracking process also includes key areas of competency within each rotation that the residents have to complete at the appropriate level of Observed, Assisted or Done to allow for tracking the evolution of their learning and competency.
- **Appreciation of the clinical purpose and applications of sophisticated technologies**
  We have several workgroups that operate within our department for deployment and continual monitoring of some of our technologies and complex treatment modalities. Our residents participate in several of these workgroups and develop a better appreciation for the purpose and rationale of use of complex technologies.

Our case review and peer review conferences that the Residents attend also frequently discuss different options for using different techniques and technologies for treating complex cases.

- **Understanding of the protocols and practices essential to the employment of technologies to detect, diagnose and treat various illnesses and injuries**
  Residents go through a series of competencies for each rotation that systematically train them on how to employ different technologies to diagnose and treat patients. They also attend clinical chart rounds, case conferences, review departmental guidelines, and complete assigned readings during their rotations to develop better understanding of how our treatment technologies are best used to treat different diseases.
- **Ability to use analytical and research methods to solve problems arising in the clinical environment**
  Residents develop and learn to use their analytical and research methods to solve clinical problems during their clinical rotations by sometimes holding the Physicist of the Day phone and getting called for any issues that may arise in the treatment hallway. Residents also are routinely involved in working with their primary or secondary preceptors to investigate and research new treatment modalities or techniques and implement them in clinical practice.
- **Ability to deploy new strategies within the clinical environment**
  With a large clinic, we are constantly deploying new equipment or treatment modalities that require systematic investigations, measurements, training and dry runs. Our residents participate in all these activities with the physics team, and sometimes help lead such projects. Our residents also get a one-month elective rotation, where they can choose a focused research topic or use this time to choose a clinically relevant topic to research for potential deployment in clinic. Our Commissioning Rotation requires our residents to independently commission a linac beam energy and work on developing a treatment planning model and commission that, or some other commissioning project of similar rigor to allow them to independently perform such activities with a primary preceptor providing them guidance and feedback.
- **Ability to critically evaluate research and scholarship in medical physics**
  Our residency curriculum includes several opportunities to critically evaluate research and scholarship in medical physics. These include our Journal Club, which the residents pick recent and relevant publications in our field and provide a critical review and their recommendations, as well as discuss questions regarding such work. Our elective rotation also involves residents completing a literature review of relevant literature in the topic they have chosen for their project.
- **Communication and interpersonal skills that are necessary to function in a collaborative, multidisciplinary environment**
  Our residents are completely integrated into all our clinical activities and as part of that communicate with other physicists and other members of the Radiation Oncology team. Residents are also given feedback on their communication and interpersonal skills as it pertains to multidisciplinary interactions.
- **Professional attributes and the ethical conduct and actions that are required of medical physicists**
  Throughout their training, the residents are mentored and periodically evaluated on professional attributes and ethical conduct and actions during the residency and their future career. The residents also undergo a one month administrative and professional rotation, where they go through readings, complete several online modules like the RSNA professionalism and ethics modules, and go through a series of presentations and discussions to provide them with structured learning in these areas as well.
- **Valuing of career-long continuing education to keep professional knowledge and skills current**
  Our program structure includes a Physics Education Conference (PEC) once a week that is mandatory for the residents to attend and expected that all physicists would attend as their schedule permits. The PEC includes several sessions where we as a group provide educational presentations or watch Webinars or AAPM or ASTRO presentations as a group, along with follow-up discussions. This, along with different projects that the residents undertake with our physicist faculty and staff, emphasizes by example the value of career long continuing education.

## Program Structure and Governance

The Ohio State University Wexner Medical Center and The James Cancer Hospital are both accredited by The Joint Commission. The Radiation Oncology Department participated in practice accreditation through ASTRO's APEX program, and was completed in 2021. The James Cancer Hospital website has a complete list of other Awards and Accreditations that are maintained by the Cancer Program at Cancer Care Awards and Accreditations | OSUCCC – James.

The Medical Physics Residency Program is operated under the auspices of The Ohio State University College of Medicine and the Graduate Medical Education (GME) office. It is an approved non-ACGME program under the GME. The James Cancer Hospital and the Radiation Oncology Department has a long history of supporting education and training programs and all staff positions include teaching and supporting training as part of their job description and expectations. The Department of Radiation Oncology also offers an accredited radiation oncology residency program for radiation oncologists as well as an accredited radiation therapy training program, which is an undergraduate degree program under the School of Health and Rehabilitation Sciences. The medical physics residency program is integrated with these programs in many of the supplementary didactic areas. Conferences, lectures, journal clubs and courses are shared between the three programs, based on the didactic background and interest of the residents and students. All training programs benefit from a department that treats a large volume of patients in every disease site of Radiation Oncology, and uses the latest equipment available, with an emphasis toward teaching and training at all levels.

Department has invested in a very unique on-site Training Center which includes a non-clinical LINAC (Truebeam), and a non-clinical Treatment Planning System (Eclipse/Aria) to allow better opportunities for teaching and training. Our medical physics residents utilize this environment for learning and practice, and it is integrated into our rotations and competencies.

The MPRP is a program completely based within the Arthur G. James Cancer Hospital & Richard J. Solove Research Institute's Department of Radiation Oncology. Information regarding our program is disseminated using the Department of Radiation Oncology website at http://go.osu.edu/therapyphysicsresidency. Information regarding the MPRP is available within the "Residency" portion of the website. The MPRP information on the website consists of general program information, information on our curriculum, our application process, information on our current residents and program admission and graduation statistics. A copy of our current handbooks (updated for each incoming class) are also posted for interested applicants to review.

Additional program information is available to prospective trainees via the OSU GME Website.
https://medicine.osu.edu/education/gme/prospective-trainees

### Medical Physics Residency Education Committee (MPREC)

Resident education is overseen and monitored by the Medical Physics Residency Education Committee (MPREC). Responsibilities of the MPREC include: resident recruitment; admission recommendations; developing and maintaining a new resident orientation program; monitoring the resident's progress through the residency program; developing and maintaining training curriculum; evaluate and discuss training objectives; performing regular program review; granting of completion certificates and review of adverse actions. During these meetings, input from members will be sought to improve the MPRP. Program evaluation forms, completed by each resident (and discussed in the previous section), will also be reviewed. Possible program modifications will be discussed and the impact of the proposed changes on the requirements listed in AAPM's Report #249 will be assessed. A majority vote of the MPREC is required to ratify changes to the MPRP. Should a change be approved, residents will be notified in writing of the alterations prior to its implementation. Minutes from these meetings are available for review.

In order to provide a stable environment for the residents, major modifications of the program will take effect July 1 of the calendar year. Changes in evaluations for resident progress will only take place July 1 and will only be applied to new residents. Minor program changes will only be implemented in between rotations.

The MPREC will meet a minimum of two times each year. Minutes of each meeting will be recorded and retained in accordance with The Ohio State University records retention policies.

This committee is chaired by the Program Director. All current physicists are members of the MPREC. They are full time employees within the Department of Radiation Oncology. They interact regularly with the medical physics residents and the training program, serving as primary or secondary preceptors on resident rotations. Department physicians and non-MPRP Program Directors serve as representatives for collaboration between the MPRP and their respective programs.

The MPRP Associate Director is the ex-officio vice chair of the MPREC and is also appointed by the department chair. Members are appointed by letter/email describing their role in MPREC, and effective from the first day of employment. Meeting notification is sent via email by the Program Director. The sub-committees are appointed ad hoc by the Program Director, from the MPREC Membership. Since our subcommittees perform two of the core functions – admissions and curriculum review and updates, the Steering Committee meetings provides updates from these standing committees among other updates/topics covered for the full committee. All residents are members of the MPREC, and are asked to provide feedback to the committee, as well as complete anonymous surveys that will be reviewed (in summary) during the meeting. Residents are asked to attend the MPREC meetings. Chief residents are included in the MPREC Admissions Committee, and assist with resident recruitment, as well as the MPREC Curriculum Committee, where they plan or make changes to resident orientation, training, and rotation according to annual survey feedback (resident and faculty).

In order to provide a stable environment for the residents, major modifications of the program will take effect July 1 of the calendar year. Changes in evaluations for resident progress will only take place July 1 and will only be applied to new residents. Minor program changes will only be implemented in between rotations.

Meeting Frequency: Twice annually

Membership:
Medical Physics Residency Director
Medical Physics Residency Associate Director
All Medical Physicists in Department
All Primary Preceptors, including Dosimetrists
Current Medical Physics Residents
Department Clinical Director
Medical Residency Program Director(s)
Medical Physics Residency (Imaging Training Program) Director
MPRP Program Manager/Coordinator

Charge:

1. Oversee resident recruitment & make admission recommendations
2. Oversee the development of New Resident Orientation program
3. Monitor the residents' progress through the residency program
4. Develop and maintain training curriculum
5. Evaluate and discuss training objectives
6. Perform regular program review
7. Grant completion certificates
8. Review adverse actions

There are two operating sub-committees within the MPREC responsible for the Admissions process and Curriculum Review. These sub-committees meet more frequently, and activities are summarized and presented to the MPREC during the meetings of the committee.

## Curriculum Sub-Committee

The annual program review function of the MPREC is handled by the Curriculum Sub-committee. This sub-committee is appointed by the Program Director from the MPREC membership, and the typical membership, charge and frequency of meetings are listed below.

Meeting Frequency: Meet annually - as many times as needed to complete annual program review

Membership:
Medical Physics Residency Director
Medical Physics Residency Associate Director
All MPRP Primary Preceptors, including Dosimetrists
One or more additional ad-hoc MPREC members
MPRP Program Manager/Coordinator
Chief Resident(s)

Charge:
1. Developing and maintaining a new resident orientation program
2. Developing and maintaining training curriculum
3. Review Yearly program evaluations by Residents & Faculty and recommend changes
4. Performing regular program review

## Admissions Sub-Committee

The recruitment of Medical Physics Residents is the function of the Admissions Sub-committee of the Medical Physics Residency Education Committee (MPREC). The applications and related material are reviewed by the Medical Physics Admissions Subcommittee. The MPRP application review is a three-step process. In Phase I of the review process the applicant pool is ranked in the top half vs bottom half by the Admissions Sub-committee members, based on a review of applicant CV's. The applications of the top half of the applicants are then reviewed in Phase II, where their applications are scored using a scoring sheet. The Admissions Sub-committee meets to review the tallied scores of all committee members and determines a score cut-off to use to invite candidates for an on-site interview. The top ranked candidates are then contacted to initiate the interview process (Phase III). Candidates are invited to visit the facility for a formal interview by the members of the MPREC. In addition, references are contacted by phone to supplement the recommendation letters, if needed. Interviews are typically conducted in January and February. After completion of all interviews, the Admissions Sub-committee meets to review the interview results and any other pertinent information regarding the applicants. The committee then internally ranks interviewees to come up with the Rank List for the Medical Physics Match. At the end of each phase, both successful and unsuccessful candidates are notified by email to keep them updated on the status of their application.

For the ongoing recruitment cycle, due to the pandemic, we made some changes in our application review process, while maintaining the spirit of the process outlined above. The changes this year involved the Admissions committee members being broken up in smaller teams and reviewing a subset of applications and scoring them. In phase II we conducted brief zoom-based screening interviews with the same sub-groups that reviewed the applications for about half the applicants. This was followed by a select group of candidates undergoing full Zoom interviews with all admissions committee members (Phase III). Based on the feedback we receive from candidates, we may evolve our application review process in future years as well to incorporate online interviews instead of in-person interviews.

Meeting Frequency: Ad-hoc during Residency Recruitment process

Membership:
Medical Physics Residency Director
Medical Physics Associate Director
Two or more additional ad-hoc MPREC members
Chief Resident(s)

MPRP Program Manager/Coordinator

Charge:
1. Monitor and run Resident recruitment/selection process per program guidelines
2. Make admission recommendations

## Admissions

The Ohio State University Therapy Residency Program admits residents with a strong foundation in basic physics. This is typically demonstrated either by an undergraduate or graduate degree in physics, or by a degree in an engineering discipline or another of the physical sciences and with coursework that is the equivalent of a minor in physics (i.e., one that includes at least three upper-level undergraduate physics courses that would be required for a physics major).

In addition, applicants must either have graduated from a CAMPEP-accredited graduate program, or possess a PhD in physics or related discipline and have completed a CAMPEP-accredited certificate program to be eligible for admissions.

All applications are thoroughly reviewed by the MPRP Admissions Committee. Candidates will not be invited to interview for residency positions unless all CAMPEP requirements and courses are completed. All residents entering the Medical Physics Residency Program (MPRP) are required to have acquired a solid foundation in basic physics as documented by a master's or doctoral degree from a CAMPEP accredited graduate program. Since Non-CAMPEP accredited program graduates are not accepted, no formal evaluation of didactic deficiencies of core courses are conducted.

Our admission standards are clearly stated in our website. We use the MPRAP for accepting applications. Further, our current Residency Handbooks are also posted on our website for any interested applicant to be able to review. The URL for our residency website is: http://go.osu.edu/therapyphysicsresidency

The application process is handled using the Medical Physics Residency Application Program (MP-RAP) administered through the AAPM (https://mprap.aapm.org). The announcement of the open residency position is typically made in October of the year prior to the start of the residency.

The MPRP application currently requires, per MP-RAP:

- Personal information (name, address, contact information)
- ABR certification status
- Disclosure of criminal behavior, academic violations, and/or licensure actions
- Employment history
- Military service history (if applicable)
- Education (undergraduate and graduate)
- Three references (including one from current advisor or department head)
- Personal statement (max 3000 words) indicating why you want to go into medical physics, and anything else you want to communicate to the application reviewers (this is instead of a cover letter).
- Uploaded CV (should include awards, publications and presentations)
- Transcripts and a copy of TOEFL results (if applicable)
    - Can be uploaded, or
    - Official copies can be mailed to Clinical Medical Physics Residency Application, One Physics Ellipse, College Park, MD 20740

Completed applications are typically due by mid-December.

The Ohio State University MPRP currently participates in Medphys Match (http://natmatch.com/medphys/) – the medical physics residency-matching program for graduate students and postgraduate trainees. The internally ranked candidates are entered into the Medphys Match by the published deadline for submitting the Rank List. Upon completion of the Match process, offer letters are sent to successful candidates as required by Medphys Match. A sample offer letter is available in **Appendix I**. The interview and offer process is performed in accordance with the equal opportunity standards of both The Ohio State University and the Arthur G. James Cancer Hospital & Richard J. Solove Research Institute.

All incoming residents must sign a "Limited Staff Agreement" document. This document is provided on an annual basis to all residents and fellows within the graduate medical education training programs sponsored by The Ohio State University Hospital. Residents and fellows are appointed to the medical staff of The Ohio State University Hospitals in the limited staff category. In addition, residents and fellows are appointed to the faculty of The Ohio State University College of Medicine with the special faculty title of Clinical Instructor – House Staff. The renewal of this agreement is contingent upon successful completion of the first year of the residency and a recommendation for promotion given by the program director. The contract is updated annually, approved by the Graduate Medical Education Committee, and distributed each spring to all renewing and incoming trainees for their signature. A signed copy of this agreement is kept on file.

## Program Director

The Program Director is nominated by the Department Chairman, and appointed by the Graduate Medical Education Committee (GMEC). The Program Director will be required to have at least 5 years of full-time post-graduate experience in Medical Physics in the specialization of the residency training program. The Program Director will be certified to practice medical physics by the American Board of Radiology, the Canadian College of Physicists in Medicine, or another appropriate certifying agency. The MPRP holds both academic and clinical appointments in the Department of Radiation Oncology and The Ohio State University Medical Center. The current MPRP Director is the chief of medical physics, who has 26 years of clinical experience in therapeutic radiological medical physics and has been ABR certified in the same area for the past 25 years. The MPRP Director is assisted by the MPRP Associate Director, the Residency Coordinator/Manager, and the physics/dosimetry staff who are primary and secondary preceptors in the residency program.

The MPRP Director is responsible for advising and evaluating residents as well as overall program administration. Program administration tasks include, but are not limited to, the following:

- Correspondence with prospective trainees
- Scheduling of prospective residents' visits
- Recruiting new residents
- Evaluating and ensuring that each incoming resident satisfies the CAMPEP prerequisites for residency education in medical physics (currently ensured by accepting only graduates from CAMPEP accredited graduate programs).
- Advising residents
- Scheduling of classrooms for faculty lectures
- Scheduling of MPREC meetings
- Scheduling of faculty/staff meetings
- Preparation of agenda & minutes of MPREC and faculty/staff meetings
- Preparation for resident orientation
- Administrative support for residents
- Program correspondence
- Preparation of clinical rotation schedule
- Preparation of didactic lecture schedule
- Initiation of physics residency program review
- Promoting the residency program
- Report all student statistics, annual reports, and other information required by CAMPEP in a timely fashion

The MPRP Director is appointed by the Chair of the Department of Radiation Oncology. The MPRP Director is a board certified medical physicist who holds both academic and clinical appointments in the Department of Radiation Oncology and The Ohio State University Medical Center. The MPRP Director is assisted by the MPRP Associate Director, the Residency Coordinator and the physics/dosimetry staff.

### Meetings with the MPRP Director

The MPRP Director will formally meet with each resident at least once per year to discuss the overall progress of the resident through the MPRP. Prior to the meeting, the MPRP Director will review the rotation evaluations for the resident and will provide the resident with a list of performance observations based on these evaluations. The resident reviews these observations and prepares a formal written response. The observations and resident's responses are then discussed at a meeting between the MPRP Director and the resident. They further discuss and document any changes that may be required in the resident's training plan. The document is then signed by both the resident and the director and is kept on file.

The MPRP Director and/or Associate Director meet with residents as a group, as well as individually, periodically throughout the year to provide feedback, program updates, and discuss any concerns regarding the MPRP or resident progress.

The MPRP Director and/or Associate Director and primary preceptor are present during each end-of-rotation meeting with the resident and feedback is provided.

## Program Staff

The process for appointment of program staff is as follows:

- Program Associate Director – The Program Director is nominated by the Department Chairman, and appointed by the Graduate Medical Education Committee (GMEC).
- Program Coordinator/Manager – Hired into position by the Department Chair, Administrator, Radiation Oncology Residency Director, and Medical Physics Residency Program Director
- Primary Preceptors – Appointed by Program Director and Chief Physicist
- All other program staff/faculty – all other program faculty and staff are based on their employment expectations (job descriptions) to be part of the education mission of the department.

The job descriptions for every technical staff position in the department explicitly spells out the teaching expectations for each member for all the teaching programs within the department.

The Department of Radiation Oncology has three accredited training programs that have been in place for many years. These include a radiation therapist undergraduate training program (currently ten students per year), a radiation oncology residency program (currently ten residents) and a therapeutic medical physics residency program (currently four residents). The Arthur G. James Cancer Hospital has committed to adequate staffing to meet the teaching obligations to all these programs at all levels within the department. This includes a framework of didactic courses, teaching conferences, journal clubs, and individualized mentoring. Throughout their training, a resident will interact with many staff members, and they will specifically work with all physicists, dosimetrists, and physicians.

Residents will rotate with all staff members during the course of the program. For each rotation, clinical staff members will provide daily education, guidance, and supervision of the resident. Faculty/Staff preceptors will be responsible for guiding the resident through the rotation and for performing a rotational evaluation.

Our current physicist to resident ratio is 5:1. This ratio is expected to increase as additional faculty and staff physicists are added to the department.

The current physics staff consists of 20 medical physicists, five clinical faculty and 15 clinical staff physicists. Eighteen members have already achieved ABR board certification in therapeutic radiological physics, while the other members are in the ABR board certification process.

## Program Administration

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|---|---|
| Nilendu Gupta, PhD | Chief Medical Physicist and Director of the Medical Physics Residency Program |
| Jeffrey Woollard, PhD | Associate Director of the Medical Physics Residency Program |
| Meg Decker | Education Program Manager |
| Marcie Sparks | Education Program Coordinator |
| Arnab Chakravarti, MD | Chair of the Department of Radiation Oncology |
| Raju Raval, MD, DPhil | Program Director, Radiation Oncology Residency Program |
| Douglas Martin, MD | Clinical Director, Department of Radiation Oncology |

## Current Medical Physics Faculty & Staff

| Name | Degree | Position [title] | Certification/Area | Primary Clinical Responsibilities |
|---|---|---|---|---|
| Ayan, Ahmet | PhD | Associate Professor | Therapy Medical Physics | Primary Preceptor: SRS/SRT/SBRT<br>Secondary Preceptor: all rotations |
| Carlson, Michael | DMP | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Cetnar, Ashley | MS, PhD | Radiation Physicist | Therapy Medical Physics | Primary Preceptor: Journal Club<br>Secondary Preceptor: all rotations |
| Christ, Daniel | DMP | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Cochran, Eric | PhD | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Degnan, Michael | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| DiCostanzo, Dominic | MS | Radiation Physicist | Therapy Medical Physics | Primary Preceptor: Dosimetry; Commissioning; Shielding<br>Secondary Preceptor: all rotations |
| Graeper, Gavin | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Gupta, Nilendu | PhD, FAAPM | Chief of Medical Physics, Professor, MPRP Director | Therapy Medical Physics | Primary Preceptor: Orientation; Administration & Professional; Clinical; QA rotation |
| Hintenlang, Kathleen | PhD, FAAPM | Radiation Physicist | Therapy, Diagnostic and Nuclear Medicine Medical Physics | Secondary Preceptor: all rotations |
| Handschuh, Robyn | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Jain, Sagarika | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Lee, Hyeri | PhD | Radiation Physicist | Therapy Medical Physics | Primary Preceptor: Proton rotation<br>Secondary Preceptor: all rotations |
| Lu, Lanchun | PhD | Associate Professor | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Martin, Douglas | MD | Professor | Physician, ABR Certified | Department Clinic Director |
| Meineke, Matthew | PhD | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Morelli, Samantha | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Pichler, Joseph | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Raval, Raju | MD, DPhil | Associate Professor | Physician, ABR Certified | Medical Residency Program Director |
| Richards, Zachary | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Roesener, David | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Weldon, Michael | MS | Radiation Physicist | Therapy Medical Physics | Secondary Preceptor: all rotations |
| Woollard, Jeffrey | PhD | Assistant Professor, MPRP Associate Director | Therapy Medical Physics | Primary Preceptor: Brachytherapy; External Beam; QA<br>Secondary Preceptor: all rotations |

## Primary Preceptor/Secondary Preceptor Guidelines

### Preceptor Model

- Each rotation will have a fixed primary preceptor irrespective of which physicist is on service
- Physicists on clinical service will be designated as secondary preceptors
- Monitoring resident progress during a rotation is the role of the primary preceptor
- Primary preceptor coordinates:
    - Beginning of Rotation Meeting
    - Weekly progress meetings & mid-rotation meeting (to monitor competency and reading completion to meet requirements)
    - Final Oral Exam
    - Complete all forms and paperwork for the rotation.
- Primary preceptor will coordinate resident progress by:
    - Assigning residents to shadow secondary preceptors for specific competencies as needed
    - Get feedback from the secondary preceptors regarding resident progress
    - Select secondary preceptors for meetings and exams as appropriate.
    - Receive and discuss competency reports from residents to determine the level of completion before signing off
- Secondary preceptors shall:
    - Work with the residents for assigned clinical activities
    - Report back to the Primary preceptor regarding resident progress for assigned activities
    - Be present in various rotation meetings as requested by the Primary Preceptor

### Roles/Responsibilities:

1. Orient the Medical Physics Resident to the work environment for the rotation including safety information and Radiation Safety specifically applicable to the Rotation.
2. Review the expectations of the Resident's role for the rotation and what constitutes completion of different competencies for the rotation. Preceptor needs to complete with the Resident the "Beginning of Rotation Form" and use the Rotation Descriptions as a reference.
3. Provide hands-on learning under direct supervision. It is expected that residents participate in all aspects of clinical physics responsibilities.
4. Facilitate the resident's learning of your specialty by questioning the resident and providing feedback. Challenge the resident to identify areas of insufficient knowledge and to use this as an impetus for additional learning.
5. Share resources with our residents (books, journal articles, etc.) and provide opportunities to enhance professional development.

### General Policies:

1. We ask that if you are not available at any time you are scheduled to precept to let us know immediately so we can reassign the resident(s) to another preceptor.
2. The program should not rely primarily on other residents for didactic or clinical instruction.
3. Residents must not substitute for clinical or administrative staff during supervised clinical practical experiences.

# Institutional Support

## Resident Offices

The Physics Residency Program provides office space for each resident in the program. The Resident Office is currently located in the Physics area in the Department of Radiation Oncology in the James Cancer Hospital. This room is in the same area as the Program Director's office and the other medical physicists' offices. Residents are provided a desk, file cabinet, bookshelves, computer connected to a LAN, telephone access, and standard office supplies. Residents have access to departmental copying equipment. Resident space is approximately 40 sq. ft. per resident.

## Conference or classrooms available for resident teaching

Ample space is available for resident advisory meetings, didactic lectures, exams, seminars, and oral examinations. Didactic lectures are presented in our modern conference room, which is equipped with the latest multimedia equipment and on-line links to information sources. We also offer virtual options to lectures (currently via Zoom and/or Microsoft Teams), and these lectures are recorded and saved in a shared drive for residents to access at any time.
The Department of Radiation Oncology supports the MPRP directly and through its broader education mission. The residency program is under the purview of The Ohio State University GME, and resident salaries and benefits are paid through their GME appointment. Administrative support is available through the residency coordinator and the office associates in the medical physics group that help the MPRP Director and Associate Director and the residents with planning and execution of program activities. There are adequate clinical and educational resources available to the Medical Physics Residents, as well as adequate office space, conference rooms, and other support facilities further discussed in Educational Environment. The institutional commitment to the long-term support of the MPRP is expressed through letters from the GME and the department.

## Financial Support and Benefits

Medical physics residents are appointed through the GME office and have titles of Clinical Housestaff. The funding for the program comes through the Department of Radiation Oncology. In addition to direct compensation, physics residents are afforded benefits consistent with those of OSU's medical residents, including medical and dental insurance, paid vacation and holiday benefits, sick pay benefits, life insurance, and disability insurance. The expense of these benefits varies and is shared between the physics resident and the Arthur G. James Cancer Hospital. Listed below are salaries and benefits as of 2021.

The GME website (https://medicine.osu.edu/education/gme) has all relevant salary and benefits information clearly described for prospective applicants to access.

Salary:

- Set by the GME
- First year residents receive PGY-2 stipends.
- Second year residents receive PGY-3 stipends.
- Current Stipends:

**Ohio State University Wexner Medical Center**
**Graduate Medical Education**
Housestaff Stipends for 2022-2023 (FY23)

| | 2021-2022 (FY 22) | 2022-2023 (FY 23) | Monthly pay over 52 weeks* | Monthly pay over 53 weeks* | Monthly pay over 54 weeks* |
|---|---|---|---|---|---|
| PGY-1 | $ 57,953 | $ 61,141 | $ 5,095.08 | $ 4,991.10 | $ 4,891.28 |
| PGY-2 | $ 59,699 | $ 62,982 | $ 5,248.50 | $ 5,141.39 | $ 5,038.56 |
| PGY-3 | $ 61,608 | $ 64,996 | $ 5,416.33 | $ 5,305.80 | $ 5,199.68 |
| PGY-4 | $ 63,720 | $ 67,224 | $ 5,602.00 | $ 5,487.67 | $ 5,377.92 |
| PGY-5 | $ 65,774 | $ 69,391 | $ 5,782.58 | $ 5,664.57 | $ 5,551.28 |
| PGY-6 | $ 67,825 | $ 71,556 | $ 5,963.00 | $ 5,841.31 | $ 5,724.48 |
| PGY-7 | $ 68,394 | $ 72,156 | $ 6,013.00 | $ 5,890.29 | $ 5,772.48 |
| PGY-8 | $ 72,397 | $ 76,379 | $ 6,364.92 | $ 6,235.02 | $ 6,110.32 |
| PGY-9 | $ 72,994 | $ 77,008 | $ 6,417.33 | $ 6,286.37 | $ 6,160.64 |

* Incoming housestaff should be paid based on the first day they are required to be at Ohio State for either orientation or work (whichever comes first).
For those starting on July 1st, they should be paid monthly according to the 52 week column.
For those starting on or around June 23rd, they should be paid monthly according to the 53 week column with a paycheck in June for 1 week of work. THIS IS ONLY FOR INCOMING HIRES
For those starting on or around June 16th, they should be paid monthly according to the 54 week column with a paycheck in June for 2 weeks of work. THIS IS ONLY FOR INCOMING HIRES

Note: the total stipend for the year does not change based on the start date.

Benefits:

- See “Limited Staff Benefits”

Travel to a national meeting:

- Departmental funds support resident attendance at one National Conference at the end of their first year. They are also allotted funds to attend 2 additional local chapter meetings each year.

Book allowance:

- $500 for length of program.

Academic expenses:

- Tuition for any credit coursework is reimbursable at 100% under OSU employee benefits policy upon successful completion of course.

### New Resident Orientation

At the beginning of their training, new physics residents attend a day long new house staff orientation that is provided by Graduate Medical Education (GME). This formal orientation is required for all incoming medical residents and reviews the various clinical and administrative policies and procedures in place at the OSUMC. In addition, the MPRP Director/Associate Director meets with each new resident to ensure that the incoming resident clearly understands the program's requirements, resident administrative procedures, and any other expectations. At this meeting, the resident is made aware of staff and program resources, including treatment machines, treatment planning facilities, laboratories, libraries, research opportunities, and potential health hazards. The resident then begins a one-month clinical orientation rotation in the clinic and dosimetry areas where they will become familiar with patient workflow, staff, equipment and its operation, as well as the physicists’ role in the clinic. The orientation rotation is further discussed in Residency Curriculum.

### Safety

In order to make incoming residents sufficiently aware of hazards present in the hospital environment, they are required to take and pass a series of Computer Based Learning (CBL) modules. Among other topics, these modules cover chemical/biohazardous material handling and safety, fire safety and radiation safety. In addition to CBLs, The Ohio State University’s Office of Radiation Safety provides a radiation safety short course which all staff and residents are required to attend. All first-year residents are issued a radiation monitor by OSU as part of their new employee procedure.

The resident will be instructed on the safe operation of equipment specific to the Department of Radiation Oncology during their orientation rotation or first clinical rotation in that specific area.

### Professionalism & Ethics

The GME Office requires all residents to complete annual HIPAA training through Computer-Based Learning modules. There are additional safety, compliance, and training modules required both annually and during the residents’ training. Additional training is included in the Administrative & Professional Rotation.

## Educational Environment

In addition to the Medical Physics Residency Program, the Department of Radiation Oncology also offers an accredited medical residency program for radiation oncologists as well as an accredited radiation therapy training program, which is an undergraduate degree program under the School of Health and Rehabilitation Sciences. The medical physics residency program is integrated with these programs in many of the supplementary didactic areas.

Conferences, lectures, journal clubs and courses are shared between the three programs. Physics residents are also provided with many teaching opportunities, including presenting physics lectures to both the medical residents and the therapy students, as well as at weekly physics education conferences. Medical Physics residents also participate in Physics Education Conference (PEC) and Physics Journal Club.

## Meeting, Conference and Seminar Schedule and Attendance

In order to provide professional exposure, it is anticipated that the resident will attend local and an annual AAPM meeting during the course of the residency. Residents are expected to be present for weekly physics meetings, departmental seminars, vendor demonstrations for relevant products, journal reviews, in-service training sessions, guest lectures, mortality/morbidity meeting, and other educational presentations. Physics residents participate in all departmental conferences in which the physics staff is expected to attend. Resident attendance requirements for meetings, conferences and seminars are shown in the table below. Some events, such as annual in-service training sessions, are mandatory. Failure of the resident to meet this attendance criterion will be addressed during evaluation of the resident.

| Conference | Frequency | Required Attendance % |
|---|---|---|
| Chart Rounds | once per week | 25% |
| Mortality and Morbidity Conference | Once per month | 25% |
| Physics Educational Conference | Two per month | 80% |
| Physics Morning Conference | Once per week | 80% |
| Resident Teaching Conference | Once per week | *see below |
| Journal Club | Once per month | 25% |
| In-service training for radioactive materials | Annually | 100% |
| AAPM regional meetings | Two meetings/year | **see below |
| AAPM national meetings | Once/year | **see below |
| Other meetings and seminars available to the resident | | |
| Dosimetry meeting | Once per week | Attendance optional |
| Unit council meeting | One per month | Attendance optional |
| Vendor demonstrations | As available | Attendance optional |
| Vendor training/webinars | As available | Attendance optional |
| Guest lecturers | As available | Attendance optional |

* must attend all body sites within 2 years or attend physician resident disease site specific didactic series
** Residents are strongly encouraged to attend these meetings, but attendance is not required

## Libraries

There are many libraries available to the residents on the OSU campus. The main library of interest to residents is the Prior Health Sciences Library, which is located within the Medical Center complex, and can request books from all other University libraries. The residents have access from their desktop computer to the University's subscription to all electronic journals and research databases. Additionally, residents are given access to reference management software.

## Clinical Equipment

External Beam Treatment Machines

- Varian TrueBeam Linear Accelerator (2.5MV, 6MV, 10MV, 15MV, 5 Electron Energies, SD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT, and Gating)
- Varian TrueBeam Linear Accelerator (2.5MV, 6MV, 10MV, 15MV, 5 Electron Energies, SD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT, Gating, and OSMS)
- Varian TrueBeam Linear Accelerator (2.5MV, 6MV, 10MV, 15MV, 5 Electron Energies, including TSE mode, SD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT and Gating)
- Varian TrueBeam Edge Linear Accelerator (2.5MV, 6MV, 6FFF, 10FFF, HD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT, Gating, OSMS, 6 DoF Couch)
- Varian TrueBeam Edge Linear Accelerator (2.5MV, 6MV, 6FFF, 10FFF, HD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT, Gating and the OSMS Tracking System, 6 DoF Couch)

- Varian TrueBeam Linear Accelerator (2.5MV, 6MV, 10MV, 15MV, 5 Electron Energies, including TSE mode, SD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT, Gating and the OSMS Tracking System)
- Varian TrueBeam Edge Linear Accelerator (2.5MV, 6MV, 6FFF, 10FFF, HD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT, Gating and the OSMS Tracking System, 6 DoF Couch)
- Varian TrueBeam Linear Accelerator (6MV, 6FFF, 10MV, 10FFF, 3 Electron Energies, SD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT, Gating and the VisionRT Tracking System) (SSCBC)
- Varian TrueBeam Linear Accelerator (2.5MV, 10MV, 15MV, 3 Electron Energies, SD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT, Gating and the VisionRT Tracking System, 6 DoF Couch) (SSCBC)
- Varian TrueBeam Linear Accelerator (2.5MV, 6MV, 10MV, 15MV, 3 Electron Energies, SD MLC, with static and dynamic IMRT and RapidArc, MV and kV imaging, including kV CBCT and Gating) (Varian Training Center)
- Mobetron Intraoperative Radiotherapy Electron Linear Accelerator (3 Electron Energies) located in a shielded operating room
- Elekta Gamma Knife ICON
- Xstrahl Small Animal Radiation Research Platform (SARRP)

Simulators

- 2 x GE Large Bore 4DCT with RPM Gating (James)
- GE Large Bore 4DCT with RPM Gating (SSCBC)
- BodyTom Mobile CT Scanner for Brachytherapy Suite
- GE MRI

Treatment Planning Systems/PACS Software/Electronic Medical Record

- Varian Eclipse (version 16.1) Treatment Planning System
- Varian BrachyVision (LDR/HDR) CT-based Brachytherapy Planning System
- Variseed Real-Time Prostate Implant Dose Planning System
- Leksell Gammaplan Gamma Knife Stereotiactic Radiosurgery Planning System
- RaySearch RayStation Treatment Planning System

Brachytherapy

- Varian GammaMed Plus HDR Remote Afterloading Unit
- Ultrasound-guided interstitial implant system
- Eye plaques (I-125 seeds)
- Yttrium-90 microspheres

R&V/PACS

- Varian ARIA (version 16.0) EMR Software
- MIM Maestro PACS
- Visage- hospital wide diagnostic PACS system
- Fuji- Computed Radiography system for Portal Imaging
- EPIC-enterprise EMR

Dosimetry Resources

- NIST-traceable calibrated ion chamber and electrometer dosimetry systems
- Farmer-type ion chamber and electrometer systems
- Various small volume ion chambers
- Parallel-plate ion chambers (Markus)
- Multiple well ionization chambers for assaying brachytherapy sources
- Scanditronix-Wellhoffer Blue Phantom 2 scanning system
- Sun Nuclear 3DS scanning system
- Sun Nuclear 1D scanning system

- Landauer OSLD dosimetry system
- Diode-based in-vivo dosimetry system for photons and electrons with computerized data collection
- RIT and Scanditronix-Wellhoffer film scanning and densitometry systems with Epson 10000XL scanner
- Radiochromic densitometer
- Sensitometry equipment
- Multiple solid water phantoms
- Alderson-RANDO anthropomorphic phantom
- Barometers, thermometers, etc
- Ion-chamber based morning output check devices for each linear accelerator (SNC DQA3)
- Multiple radiation survey meters
- Modus QA QUASAR heavy duty respiratory motion phantom
- IBA Compass & MatriXX Treatment Plan Verification System
- Nuclear Associates CT Density Phantom
- CIRS Dynamic Thorax Respiratory Gating Phantom
- Sun Nuclear IC Profiler and MapCHECK2
- DoseLab QA Software
- Standard Imaging WL Device
- BrainLab WL Device
- Sun Nuclear ArcCHECK Cylindrical Diode Array
- Sun Nuclear 3DVH Plan QA Software
- Varian Portal Dosimetry

One of the linacs listed above is located in our training facility (part of The Ohio State University Radiation Oncology International Training Program). The Training Center also has a non-clinical Aria/Eclipse environment, and is used exclusively for training and research activities. The department offers various clinical courses nationally and internationally, hosts trainees through Varian's Clinical School program, and leases the facility for Varian to use for training. When this facility is not being used for training courses, it is available for use by the residents for various QA activities or beam measurements (i.e., for the commissioning rotation).

Residents access the department using their hospital ID and have a departmental key, which provides access to physics equipment. As part of orientation, each resident goes through a safety and equipment handling review. During this time, residents are instructed in the proper use of the equipment as well as how to leave equipment for the next user. Clinical equipment is available when not in use for patient treatment, and its use requires supervision by a medical physicist until satisfactory knowledge of the use of a particular piece of equipment has been demonstrated. Residents also have access to a machine shop. Residents submit work orders to the machine shop as required and are not allowed to personally use the machines.

In addition to having access to a wide variety of clinical facilities and equipment, the residents will also be exposed to a wide variety of specific patient procedures. Core special procedures performed in the Department of Radiation Oncology include, photon and electron external beam treatments, intracavitary and interstitial brachytherapy (both HDR and LDR), total body irradiation, total skin electron treatment, IMRT, VMAT, SRS (both Gamma Knife and linac-based), SBRT, IORT, radiopharmaceutical therapy and interstitial seed implant procedures.

## Resident Evaluation & Feedback

A program evaluation form is completed annually by each resident (both current and graduating residents). The form allows the resident to anonymously evaluate each clinical rotation they have completed as well as the overall program. The form is completed online via the AHST (Typhon) system.

In addition to the program/curriculum evaluation, at the end of each rotation, the resident also evaluates the performance of their preceptors. This evaluation is performed on-line using the AHST (Typhon) system. Evaluations are anonymous to faculty, and residents can confidently express feedback without fear of unwarranted retribution. GME policies and mechanisms allow residents access to pathways of brining concerns to the program administration, but also bring it to GME leadership if necessary.

As part of the resident evaluation of program, the senior (graduating) residents have the opportunity to provide feedback regarding their residency experience and recommend program changes.

## Residency Curriculum

As part of the Orientation with each resident, they are given a copy of their training schedule and resident handbook. They are also required to review the expectations document that outlines expectations from residents during their residency tenure. Descriptions of the elements of the training program including detailed rotation descriptions, objectives, competencies, and completion metrics are included. Currently the MPRP is using the Allied Health Student Tracking (AHST) system to track and evaluate the resident's progress through the program using consistent and well-defined metrics. The software facilitates the evaluation of the resident's strengths and areas for improvement, as well as keeps track of the resident's accomplishments.

Performance requirements and institutional disciplinary procedures are discussed with the resident at their initial meeting with the MPRP Director. Written documentation detailing these expectations and procedures are also provided to the resident at this time as part of the resident handbook. Evaluation of the resident's progress through the MPRP is performed via rotational evaluations, meetings with the MPRP Director and annual testing. Each of these components is discussed in detail in **Rotation Descriptions**.

### Sample Training Plan

#### First Year Training Plan

The residency is sectioned into rotations, each of which is two months in duration, with the exception of dosimetry, which is 3 months, and the orientation, elective, professional and clinical rotations which are one month each. The first year starts with an orientation rotation, in which the resident spends time throughout the various functional areas of the department. This enables the resident to become more familiar with patient workflow, staff and equipment, as well as the physicist's role in the clinic. By the end of their orientation rotation, the resident is expected to have achieved good communication and rapport with the staff they are in direct contact with.

After the Orientation rotation, the resident will begin the focused clinical rotations. Below is a sample clinical rotation schedule. Each resident's rotation schedule is customized in order to minimize rotation overlap with other physics residents. A detailed summary of each rotation, including the duration of each rotation, rotation objectives, didactic educational objectives, required competencies and requirements for successful rotation completion is provided in this document

Throughout the first year, in all rotations except for the orientation and dosimetry rotation, the resident is expected to observe and assist in all cases. The common expectation is that in the first rotation of each section of external, brachytherapy and radiosurgery, the resident will mainly review literature, observe and assist with procedures. For each rotation, the resident is assigned a primary preceptor. The primary preceptor will guide and track the resident's progress through the rotation. While the resident will work closely with their primary preceptor, they will also work with the other clinical physicists who are responsible for clinical coverage for that functional area (i.e. external, brachytherapy, etc.). Since our clinical physicists' services are not specialized to any particular function, and clinical physics coverage rotates among the clinical physicists, the resident will be exposed to the practice patterns of many physicists, uniform within the guidelines of the department, but individually different enough to provide a real world experience. The dosimetry rotation preceptor(s) will be dosimetry staff, in addition to a physicist preceptor, and will focus on treatment simulation, planning, setup and delivery. For all other rotations, the resident will be under the supervision of a physicist preceptor.

Physics residents also participate in all department conferences in which the physics staff is expected to attend. The resident is expected to attend meetings, conferences and seminars discussed in **Meeting, Conference and Seminar Schedule and Attendance.**

### Second Year Training Plan

The second year of the residency will continue with rotations in dosimetry, external, brachytherapy and radiosurgery, with some additional rotations, one focusing on administrative and professional duties of a medical physicist, one elective rotation, a shielding and commissioning rotation and a final rotation providing clinical coverage. As noted earlier, in order to minimize overlaps or due to specific needs of a resident, the sequence of rotations may need to be changed for individual residents.

The second year is similar to the first year of the residency, except that the resident is expected to have achieved both skill and competency in the duties of a medical physicist, and should be able to perform most duties with minimal supervision. By the end of the second rotations in external, brachytherapy and radiosurgery, the resident is expected to have a strong understanding of the process, clinical rationale, and background of all procedures that happen in a standard radiation oncology department. The second dosimetry rotation entails the resident learning more complicated treatment simulation, planning, setup and delivery. The administrative rotation is designed to expose the resident to the various professional and administrative duties that a career in medical physics presents.

Year 2 rotations will utilize the same primary preceptor structure as year 1 (as described in the previous section). At the end of each rotation, the Resident will be evaluated by their primary preceptor. Resident evaluation and testing is discussed in **Evaluation of Resident Progress**. If the resident has not performed satisfactorily, the program director may counsel, advise, and/or test the Resident. The program director may then declare the rotation as not satisfactorily completed after due discussion with the physicist involved and other physics staff. This action may require additional training and may delay the candidate's admission to the Board examination. The program director meets with each resident to discuss progress, further described in **Meetings with the MPRP Director**.

During year 2, physics residents continue to participate in all department conferences in which the physics staff is expected to attend. The resident is expected to attend meetings, conferences and seminars discussed in **Meeting, Conference and Seminar Schedule and Attendance.**

| Year 1 | | |
|---|---|---|
| **Month#** | **Rotation** | **Dates** |
| 1 | Orientation | July |
| 2 | External Beam A | August |
| 3-4 | Brachytherapy A | September/October |
| 5 | Elective/Research | November |
| 6-7 | SRS/SRT/SBRT A | December/January |
| 8-10 | Dosimetry A | February/March/April |
| 11-12 | Brachytherapy B | May/June |
| **Year 2** | | |
| 13 | External Beam B | July |
| 14-15 | Proton | August/September |
| 16-18 | Dosimetry B | October/November/December |
| 19-20 | Shielding & Commissioning | January/February |
| 21-22 | SRS/SRT/SBRT B | March/April |
| 23 | Administrative & Professional | May |
| 24 | Clinical | June |

## Successful Program Completion

The progress of each resident is reviewed by the MPRP Director and the MPREC regularly. Rotation evaluation criteria, as well as procedures to be followed if a resident does not meet the expected level of performance, have been described in the previous sections. Near the end of the resident's residency tenure, the MPREC meets to evaluate the resident's overall performance, both clinical and didactic, to determine if the resident has successfully completed the program.

The MPRP Director and/or Associate Director and primary preceptor are present during each end-of-rotation meeting (exam) with the resident and feedback is provided. The PD and the APD also schedule individual meetings periodically with each Resident to review ongoing progress, discuss any issues or questions they may have, as well as allow residents an avenue to bringing up any concerns.

The MPRP Director will formally meet with each resident at least once per year to discuss the overall progress of the resident through the MPRP. Prior to the meeting, the MPRP Director will review the rotation evaluations for the resident and will provide the resident with a list of performance observations based on these evaluations. The resident reviews these observations and prepares a formal written response. The observations and resident's responses are then discussed at a meeting between the MPRP Director and the resident. They further discuss and document any changes that may be required in the resident's training plan. The document is then signed by both the resident and the director and is kept on file.

### Meeting, Conference and Seminar Schedule and Attendance

In order to provide professional exposure, it is anticipated that the resident will attend local and an annual AAPM meeting during the course of the residency. Residents are expected to be present for weekly physics meetings, departmental seminars, vendor demonstrations for relevant products, journal reviews, in-service training sessions, guest lectures, mortality/morbidity meeting, and other educational presentations. Physics residents participate in all departmental conferences in which the physics staff is expected to attend. Resident attendance requirements for meetings, conferences and seminars are shown in the table below. Some events, such as annual in-service training sessions, are mandatory. Failure of the resident to meet this attendance criterion will be addressed during evaluation of the resident.

| Conference | Frequency | Required Attendance % |
|---|---|---|
| Chart Rounds | Three per week | 20% |
| Mortality and Morbidity Conference | Once per month | 25% |
| Physics Educational Conference | Two per month | 80% |
| Physics Morning Conference | Once per week | 80% |
| Resident Teaching Conference | Once per month | *see below |
| Journal Club | Once per month | 25% |
| In-service training for radioactive materials | Annually | 100% |
| AAPM regional meetings | Two meetings/year | **see below |
| AAPM national meetings | Once/year | **see below |
| Other meetings and seminars available to the resident | | |
| Dosimetry meeting | Once per week | Attendance optional |
| Unit council meeting | One per month | Attendance optional |
| Vendor demonstrations | As available | Attendance optional |
| Vendor training/webinars | As available | Attendance optional |
| Guest lecturers | As available | Attendance optional |

* must attend all body sites within 2 years or attend physician resident disease site specific didactic series

** Residents are strongly encouraged to attend these meetings, but attendance is not required

### Evaluation of Resident Performance/Examination in Rotations

Throughout the first year, in all rotations except for the orientation and dosimetry rotation, the resident is expected to observe and assist in all cases. The common expectation is that in the first rotation of each section of external, brachytherapy and radiosurgery, the resident will mainly review literature, observe and assist with procedures. For each rotation, the resident is assigned a primary preceptor. The primary preceptor will guide and track the resident's progress through the rotation. While the resident will work closely with their primary preceptor, they will also work with the other clinical physicists who are responsible for clinical coverage for that functional area (i.e. external, brachytherapy, etc.). Since our clinical physicists' services are not specialized to any particular function, and clinical physics coverage rotates among the clinical physicists, the resident will be exposed to the practice patterns of many physicists, uniform within the guidelines of the department, but individually different enough to provide a real-world experience. The dosimetry rotation preceptor(s) will be the dosimetry staff, in addition to a physicist preceptor, and will focus on treatment simulation, planning, setup and delivery. For all other rotations, the resident will be under the supervision of a physicist preceptor.

At the end of each rotation, the resident will be evaluated by their primary preceptor. Resident evaluation and testing are discussed in **Evaluation of Resident Progress**. If the resident has not performed satisfactorily, the program director may counsel, advise, and/or test the resident. The program director may then declare the rotation as not satisfactorily completed after due discussion with the primary preceptor involved and other physics staff. This action may result in additional training requirements which may delay the resident's admission to the board examination. The program director meets with each resident to discuss progress as described in **Meetings with the MPRP Director**.

Physics residents also participate in all department conferences in which the physics staff is expected to attend. The resident is expected to attend meetings, conferences, and seminars.

Residents are monitored through each rotation by the primary preceptor. For each rotation, the primary preceptor will meet with the resident at the start of the rotation to review the rotation objectives, required didactic readings, clinical competencies, and requirements for successful completion of the rotation. During the rotation, the primary preceptor will periodically meet with the resident (typically weekly) to review the residents' progress. The primary preceptor also meets with the resident at the end of the rotation to discuss the residents' performance. At the end of the Dosimetry, External Beam, Brachytherapy and SRS/SRT rotations the resident also takes an oral exam. While it is expected that the resident will perform well on the exams, the exam results will primarily be used to identify strengths and weaknesses in the resident's knowledge of medical physics in that area. Successful completion of the clinical rotations is based on evaluations performed by the primary preceptor at the end of each rotation and are discussed in **Evaluation of Resident Progress**.

## Criteria for Successful Rotation Completion

The requirements for successful completion of a particular rotation are spelled out in the rotation description. At the end of a rotation, the primary preceptor determines if all completion requirements have been met and then evaluates the performance of the resident during their rotation. This evaluation is based on meetings with the resident during the rotation, discussion with the clinical physicists working with the resident and the oral exam results. This evaluation is documented in AHST. In each of these evaluations there is an overall rotation evaluation. It consists of a four-point scale, categorizing the residents' abilities as either 'Excellent', 'Satisfactory', 'Needs Improvement' or 'Unsatisfactory/Fail'.

If the resident receives an "Unsatisfactory/Fail" score for their overall grade for a rotation, the primary preceptor, Program Director, and the resident in question will meet to discuss the progress of the resident in that rotation. Possible conditions for disciplinary action or termination include (but are not limited to): Failure of a rotation, unprofessional or unethical behavior, participation in illegal activities, or overall unsatisfactory progress in the residency. The "Academic and Adverse Action Policy" and the "Due Process Policy" as outlined by The Ohio State Medical Center GME Policy and Procedure govern how unsatisfactory performance of a resident is addressed.
At the end of each rotation, the preceptor evaluates the performance of the resident during the rotation against the expectations and competencies required for that rotation. The scheduled end of rotation oral exam (for the following: Brachytherapy A/B; SRS/SRT/SBRT A/B; Dosimetry A/B; External Beam A/B) is conducted with the MPRP Program Director/Associate Director, the primary preceptor, and at least one secondary preceptor(s) from the rotation and the overall performance during the rotation. For all rotations, a final written evaluation is prepared through a survey via the AHST system. The resident is evaluated on learning and development, clinical knowledge and application, communication skills and work habits, based on the rotation as well as the exam (for required rotations). The overall rotation performance of the resident is then graded on a four-point scale, categorizing the resident's performance as either "Excellent", "Satisfactory", "Needs Improvement" or "Unsatisfactory/Fail".

If the resident receives an "Unsatisfactory/Fail" score for their overall grade for a rotation, the preceptor, MPRP director, and the resident in question will meet to discuss the progress of the resident in that rotation. Possible conditions for disciplinary action or termination include: failure of a rotation, unprofessional or unethical behavior, participation in illegal activities, or overall unsatisfactory progress in the residency. The "Academic and Administrative Adverse Action Policy" and the "Resident Due Process Policy" as outlined by The Ohio State Medical Center GME policies and procedures govern how unsatisfactory performance of a resident is addressed.

Rotation overlap, or extension, is allowed. Due to the nature of clinic, certain competencies will not be available during rotation "A" and can be made up during rotation "B". A rotation is considered "successfully completed" if 80% of the requirements are met. Residents will be asked to attend missed or infrequent procedures as they become available, possibly while on a different rotation, to fulfill these requirements and participate in educational activities.

## Rotation Evaluations

During each clinical rotation, primary preceptors are assigned and available to the resident. The primary preceptors monitor the resident's progress and provide guidance throughout the rotation. In order to monitor the resident's progress, the residents submit weekly progress reports to their primary preceptor. These reports list the clinical, didactic, and professional activities that the resident has observed or performed that week. Weekly progress (case log) reports are completed via the AHST system. The primary preceptor coordinates the activities of the resident on any rotation with secondary preceptors who are on clinical coverage for the rotation area and are responsible for ensuring that the resident gets an opportunity to complete all the required competencies during their rotation.

At the end of each rotation, the resident will be evaluated by their primary preceptor. Resident evaluation and testing is discussed in **Evaluation of Resident Progress**. If the resident has not performed satisfactorily, the program director may counsel, advise, and/or test the resident. The program director may then declare the rotation as not satisfactorily completed after due discussion with the primary preceptor involved and other physics staff. This action may result in additional training requirements which may delay the resident's admission to the board examination. The program director meets with each resident to discuss progress as previously described in **Meetings with the MPRP Director**.

## Evaluation of Resident Progress

Currently the MPRP is using the Allied Health Student Tracking (AHST) system to track and evaluate the resident's progress through the program using consistent and well-defined metrics. The software facilitates the evaluation of the resident's strengths and areas for improvement, as well as keeps track of the resident's accomplishments.

Performance requirements and institutional disciplinary procedures are discussed during GME Orientation or with the resident at their initial meeting with the MPRP Director. Written documentation detailing these expectations and procedures are also provided to the resident at this time as part of the resident handbook. Evaluation of the resident's progress through the MPRP is performed via rotational evaluations, end of rotation oral exam evaluations, meetings with the MPRP Director, and annual testing. Each of these components is discussed in detail in the sections that follow.

## Annual Testing

In addition to end of rotation oral exams, the resident is required to take two exams during their residency. At the end of the first year and second years of their residency, the residents are required to take a written examination. Typically, the RAPHEX Therapy Examination is used for this purpose. An oral exam will be required near the completion of the first year, and again at completion of the second year of the MPRP. To provide valuable oral exam experience to the resident, the oral exam is structured similar to the oral exam given by the ABR. While it is expected that the resident will perform well on these exams, results will primarily be used to identify the strengths and weaknesses of the resident's knowledge of medical physics and are discussed with the resident during one of their meetings with the MPRP Director. If required, modifications to the resident's training plan are made.

## Progress through the Program

The residents' progress through the program is monitored by the Program Director and the MPREC. Periodic meetings between the physics resident and the Program Director are held to discuss problems related to resident training.

Currently the medical physics residency program is using the AHST (http://www.typhongroup.net/osu) to track and evaluate the resident competencies and progress through the program. It facilitates the evaluation of the resident's strengths and areas for improvements, as well as keeping track of the resident's accomplishments for their own records.

## Renewal and Promotion

Per the Limited Staff Agreement:

1. The Agreement may be modified annually and must be approved by the Graduate Medical Education Committee. This Agreement may be renewed annually by OSU, contingent upon the Resident's satisfactory performance as determined by the Program Director, and upon compliance with the terms of the Agreement.

2. The decision to offer renewal and/or promotion to the next level of training at OSU Hospital is the responsibility of the Program Director, who will consult with the Clinical Competency Committee, or other Committees appointed by the Program Director, the Chair of the Department or Director of the Division.

3. A decision for non-renewal of appointment or non-promotion must be given in writing with adequate notice, consistent with institutional policies, along with the reasons for the decision. An adverse decision regarding advancement in the program may be based on the best interests of the overall educational goals and standards of the training program and the care of patients.

## Resident Due Process, GME/Program Policies, and Adverse Actions

The "Resident Due Process Policy" document details the rules for handling any disciplinary actions. These include general guidelines, challenges to a performance/rotation evaluation, and appeals to adverse action. Specifics on adverse action can be found in the "Academic and Adverse Actions Policy." Possible adverse actions include focused-review, probation, suspension, non-promotion, non-renewal, and termination. These are based on policies set forth by OSU GME and are located in OneSource https://onesource.osumc.edu/departments/GME/Pages/GMEPolicies.aspx

ADVERSE ACTIONS (as stated in the Limited Staff Agreement, signed upon employment by OSU)

1. Adverse actions may be taken with regard to a member of the Limited Staff through either an “academic” or a “non-academic” pathway.
    a. Academic adverse actions are handles in accordance with the institutional “Academic and Administrative Adverse Actions Policy” as approved by the GME Committee.
    b. Non-academic adverse action as they relate to the Limited Staff are handled in accordance with the OSU Hospital Medical Staff Bylaws as it pertains to the peer review process and corrective action.
2. Resident is entitled to the rights of the due process and appeal policies and procedure specific for either the academic or non-academic adverse action pathway based on the specific action taken by the program and/or the institution.
    a. The appeal policy for academic adverse actions are outlined in the “Resident Due Process Policy” as approved by the GME Committee.
    b. The appeal process for non-academic adverse action are handled in accordance with the OSU Hospital Medical Staff Bylaws Section 3335-43-06 and other sections as noted.

## Teaching

Teaching formal coursework is not a requirement of the MPRP. However, physics residents may be asked to assist in the training of other departmental personnel through one-on-one interaction and division/departmental meetings. It is also expected that the senior residents will provide guidance to the junior residents for proper equipment operation and departmental policies as well as assist with the radiation therapy classes as needed.

## Elective Research Projects

The residents are required to go through a one-month elective project rotation. The requirements of the elective project are spelled out in detail in the training plan. Briefly, the residents are required to identify a clinically oriented research project ahead of time that they would like to spend a month of focused study on, leading to a required report and an oral presentation in the Medical Physics Education Conference, as well as identify a preceptor for their elective rotation. The expected rigor of work is supposed to be at a level that would result in a submitted report that they can use towards an abstract for the AAPM annual conference and/or prepare a paper for publication in a journal.

To provide ideas to residents for their research projects and give them some areas to choose from, we hold periodic research meetings that review current areas of clinical development and projects that would enhance our ability to deliver better quality patient care, or provide a systematic process of learning a topic, and also identify physicists that would be able to mentor such projects. This list is discussed as a group with our physicists and physics residents so that they can get a good sense of which projects they may be interested in. Most of our recent resident elective projects, as well as additional projects they have been involved with, have come out of such discussions within our group.

## Scholarly Activities

Medical Physics Residents are provided various opportunities to engage in scholarly activities, some of which are required elements of the program. While in the program, the resident may choose to become involved in additional research project(s) outside of the Elective Rotation Project. Given the resources and the wide variety of radiation therapy modalities implemented in the department, ample research opportunities exist for the resident. While not a requirement, participation in additional research project(s) allows the resident to benefit from faculty scholarly experience and to learn the principles of scientific inquiry and critical analysis.

The residents are supported to attend the national AAPM conference closest to their transition from PGY2 to PGY3. The residents are also given the opportunity to attend the two AAPM Ohio River Valley chapter meeting held per year. One of these meetings is geared towards student presentations for all students/residents in our chapter. Residents are strongly encouraged to partake in clinical and other research projects that would lead to them presenting at the National AAPM and chapter meetings during their residency. Some of the required elements of scholarly and other activities within the curriculum are listed below.

## Clinical Problem Solving

The Medical Physics Residents get ample opportunities to get involved in clinical problem solving, both for situations related to patient care as well as linac trouble shooting during the clinical day through some involvements integrated into their curriculum. During the External Beam rotation, our residents are required to carry and respond to the "physicist of the day" phone for certain durations, with adequate supervision and help from primary/secondary preceptors. This experience allows the residents to be directly involved in clinical and linac problem solving situations. This is a new process we have started recently and has received great feedback from the residents as providing them with great opportunities to learn how to deal with such situations and problems. During the SBRT/SRS/SRT rotations, the resident on the rotation in their second year are allowed to cover a case independently, after they have demonstrated competence and knowledge. This allows the second-year residents to gain more confidence, knowing that if they have any questions, they can still call a physicist.

The residents use the AHST system to log any significant clinical troubleshooting activities and their coverage of SBRT/SRS/SRT cases as part of their External Beam and SRS/SBRT rotations so that they have a log of such activities. The Clinical Service rotation also provides opportunity to develop clinical problem-solving skills.

## Commissioning Experience

The Medical Physics Residents get ample opportunities to partake in commissioning of new equipment and technologies. In order to provide our residents with a structured opportunity to commission a linac and a treatment beam in a treatment planning system, the residents have a 2-month concurrent commissioning/shielding rotation. During that rotation they are required to independently collect beam data based on the beam modelling needs in Eclipse, and complete modelling and commissioning their beam model. The residents are required to submit a satisfactory commissioning report as part of the completion of this rotation. The department acquired a non-clinical training linear accelerator and a non-clinical installation of Eclipse. These resources allow our residents a unique opportunity to perform commissioning during working hours and collect uninterrupted beam data or perform other measurements for commissioning activities.

Besides linac and treatment planning commissioning, the residents are involved routinely in commissioning projects for new treatment modalities and other equipment. These opportunities are ad hoc based on what changes or new equipment is being brought into the clinics.

## Medical Physics Resident Expectations

1. The resident is responsible for being proactive regarding their rotation obligations. This includes:
    a. Independently review and monitor clinical schedules for clinical area of rotation
    b. Shadowing physicist during clinical activities
    c. Be the primary point of contact for clinical issues during your rotation

        *While the physicists/clinical staff try their best to include and update the residents on clinical occurrences, it is also up to the resident to proactively inquire and follow-up on any clinical activities they are interested in or should see for their rotation. If the resident has trouble doing so, they should speak with their primary preceptor on how to proceed.

2. The competency list in each rotation description is meant to be a guide for what a resident needs to complete during their rotation. It is expected that a resident will complete each competency multiple times as they encounter clinical cases and improve their level of knowledge. The level of completion will be verified by discussion/questions by the preceptor and if the primary preceptor feels that the level of completion documented is not appropriate, they may ask the resident to change the report accordingly.
    a. Rotation Meetings Expectations:

        The resident is expected to work with the Program Manager and Primary preceptor to pre-schedule the following meetings for each rotation:
        i. Initial Rotation Meeting (within the first couple of days of the beginning of rotation) with completion of initial rotation form.
        ii. Weekly meetings with Primary Preceptor (to be discussed at initial meeting)
        iii. Mid-rotation meeting with completion of mid-rotation form.
        iv. End of Rotation exam within a week of completion of rotation.
    b. Documentation Expectations for Competencies
        i. Weekly progress reports turned in on Monday following the week of the reporting period (AHST System will no longer allow logging competencies after 1 week).
        ii. Competency report filled in the AHST System need to include:
            1. The correct competency completed consistent with activity performed
            2. The appropriate level of completion (to be verified by primary preceptor discussion/questions)
            3. The comments section populated for each competency report including:
                a. Physicist performed with
                b. Any relevant notes pertaining to the competency
    c. Preparation for rotations
        i. Meet reading requirements as outlined in the Handbook
        ii. Ask questions to help bridge any gaps between your assigned readings and the clinical competencies that are performed.
        iii. While on a rotation, requests for participation in other clinical activities by any faculty member need to be coordinated through the rotation primary preceptor. (Participation in developmental projects are discussed below)

3. QA Involvement expectation:

| Orientation | Year 1 (in addition to Orientation) | Year 2 (in addition to Year 1) |
|---|---|---|
| IMRT QA | Full Monthly Linac QA | Weekly Chart Checks |
| Linac Daily QA | Ancillary Monthly QA | Plan 2nd Checks (External Beam B - Longitudinal) |
| Monthly Linac QA w/physicists | Annual QA | Brachy Planning (Brachy B) |
| Mobetron QA w/physicists | | SRS/SRT Checklist (SRS/SRT B) |
| Trajectory log analysis | | Full Annual QA |

a. Daily QA: ideally the daily linac results are reviewed before start of treatment, however this often is before the resident is expected to be in the clinic, and thus the resident is expected to complete daily QA first thing in the morning. If the resident cannot complete within a reasonable time (before 9am or first stereotactic), they are expected to communicate and obtain coverage from fellow residents.
b. Monthly QA: participate/attend with physicist until end of first calendar year (December), or until comfortable to continue independently with appropriate sign off from physicist. Resident shall not tweak absolute dose calibrations on any linear accelerator throughout the residency unless under the supervision of a physicist.
c. Annual QA: Attend/participate every possible annual QA, and in their 2nd year be comfortable to independently perform Annual QA
d. IMRT QA: must complete all IMRT QA scheduled on the resident's assigned day. QA on the schedule should not be moved by the resident unless discussed with relevant clinical staff. For any QA moved, the resident is expected to follow-up or communicate with the next resident on the schedule. The resident is responsible for any portal dosimetry or Mapcheck work that needs to be done or re-done after patient treatment hours on their day
e. Trajectory log: analysis should be completed on the resident's assigned IMRT QA day. Timeline for completion of this task is consistent with Daily QA review. If the resident is unable to complete this on their day, communicate with the next resident on the schedule. Any apparent issues with the trajectory log should be reported

*Note: the resident is responsible for fully understanding the QA requirements and procedures before accepting independent work. If the resident needs further clarification or does not feel ready to perform any of the above independently then they are expected to communicate with the senior residents or the physicists to become fully comfortable with the tasks

4. Attendance:
    a. The resident needs to meet meeting/conference/seminar attendance requirements as outlined in the Handbook
        i. Meetings must not interfere with rotation activities and should be cleared with the preceptor
5. Participation and preparation for Development Projects:
    a. Elective Rotation Projects
        i. For elective rotation projects, it is expected that each Resident will initiate a development project with a faculty member of their choosing (with approval from the Residency Director) well before their Elective rotation and get the rotation proposal approved as articulated in the Elective Rotation documentation.
        ii. The project needs to be developed with appropriate scientific rigor with a one-page idea proposal to be approved by the residency director.
        iii. The resident is expected to see the project as stated in the elective proposal through its completion
            1. A report of completion/progress is due at the end of the elective rotation month.
            2. Additional project activities beyond the elective month must not interfere with other rotations
        iv. The development project results will be presented by the resident at an education conference, or

v. The resident is encouraged to submit the project results to the AAPM national conference.

b. Other developmental projects:
   i. If approached by faculty members to participate in additional development projects, the residents are encouraged to consider these based on their interest and time, but with the following stipulations:
      1. The participation in additional projects should not interfere with other rotation obligations for the resident
      2. Participation and time commitments during any other rotation during clinic hours shall be coordinated through the primary preceptors

If a resident commits to a project, they are expected to see the project through completion or appropriately hand it off to the faculty member

## Medical Physics Senior Resident Expectations

The Senior Medical Physics Resident(s) (referred to as Senior Resident in the rest of the document) is a leadership role with the primary goal of being a liaison between the Medical Physics Residents and the Residency Director/Associate Director, and other Faculty members. This also serves as a way for Medical Physics Residents to develop administrative and leadership skills that they need for their future careers. Due to the 2-year duration of the Medical Physics Residency Program (MPRP), the senior resident(s) transition to the role as Senior Resident for the second academic year beginning July 1st and ending June 30th.

1. Senior Resident(s)'s primary responsibility is to ensure that the resident component of the clinical operation of Medical Physics and the educational activities of the residency are optimized and effective on a daily basis.
2. Senior Resident(s) is responsible to and will meet regularly with the Director and Associate Director of the MPRP.
3. Senior Resident(s) will serve Medical Physics committees including but not limited to:
   a. Medical Physics Residency Education Committee
   b. Medical Physics Curriculum Subcommittee
   c. Medical Physics Residency Admissions Subcommittee
   d. Any other ad hoc committee as appointed by the MPRP Director
4. Senior Resident(s) will assist the Director/Associate Director of MPRP, core faculty, and Residency Coordinator in:
   a. Coordinate resident participation in new resident recruitment activities
   b. Curriculum development and evaluation for residents.
   c. Assisting in creating and maintaining the Physics Education Conference schedule, identify topics of presentation, and ensuring that the Physics Education Conferences are held as planned.
   d. Designing and implementing an educational program for the upcoming calendar year.
   e. Orientation of the incoming Residents into the Medical Physics Residency Program, and help them during their orientation rotation month.
   f. Host visiting students, potential applicants, and other visitors. Prepare and coordinate schedules for such visitors.
   g. Create and maintain clinical schedules, specifically:
      i. IMRT QA schedule
      ii. Linac Daily QA review schedules
      iii. Resident coverage of Monthly QA's
5. Senior Resident(s) will schedule and coordinate attendance in shared educational activities including, but not restricted to:
   a. Weekly Chart Rounds

b. M&M conference
c. Radiation Oncology Resident Teaching Conference
d. Radiation Oncology Clinical Didactic Conferences
e. Radiation Oncology Radiobiology Didactic Course
f. Radiation Oncology Physics & Dosimetry Didactic Course
g. Journal club
h. Radiation Safety & Other In-service presentations

6. Senior Resident(s) will alert the Residency Director to any potential issues regarding resident or faculty performance and will assist the Residency Director (or his/her designee) in individual counseling sessions as necessary.
7. The Senior Resident(s) will serve as the resident advocate, and when needed, act as intermediary between resident and faculty, voicing residents' questions, concerns, suggestions, and complaints to faculty and vice versa.
8. Senior Resident(s) will facilitate team spirit and cohesiveness.
9. Senior Resident(s) will hold resident meetings as needed when issues/concerns arise.
10. Senior Resident(s) will participate in the training of his/her successor(s).
11. Senior Resident(s) will seek to enhance his/her credentials through additional training, committee work continuing medical education, self-study, and participation in professional development seminars.
12. Senior Resident(s) will be responsible for other duties as assigned by the Director of Medical Physics Residency (or his/her designee).

## Chief Medical Physics Resident

- A Senior Resident may be nominated as Chief Medical Physics Resident by the MPREC.
- If there are two senior residents, both may be nominated as Chief Residents.
- The title will be an honorary award to recognize an exceptional resident that has demonstrated clinical excellence, and leadership throughout their residency.
- The decision for Chief Resident will be made by the MPREC.

## Resident Signoff/ Independent Work

The following items may be signed/approved/billed by the resident once they have demonstrated a level of competency to the primary preceptor within the noted rotation.

- Weekly Chart Checks – Year 2
- Physics Plan Second Checks –External Beam B - Longitudinal
- Brachytherapy Plans – Brachytherapy B (Note: AMP check and signoff required)
- External Beam Plans – Dosimetry B (Note: Dosimetry/Physics check and signoff required)
- SRS/SRT/SBRT Checklist and standing for procedure – SRS/SRT/SBRT B
- IMRT QA – With a clear pass

# Rotation Descriptions

## Medical Physics Rotation Description-Orientation

Rotation: Orientation
Timeframe: 1 Month
Preceptor: Nilendu Gupta

Overview
In this rotation residents are introduced to staff, resources, and procedures at the Department of Radiation Oncology. During this rotation, the resident will meet with the MPRP Director to develop a clinical/didactic training plan, perform all required hospital orientation training and spend time observing clinical activities at each of the clinical areas in the department. In addition, several didactic readings are also required. Each week daily records from the AHST system will be provided to the preceptor. At the end of this rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- Develop a specific training plan - The resident will meet with the MPRP Director and/or Associate Program Director (APD) to develop a clinical rotation schedule. The MPRP Director/APD will also discuss what is expected of the resident during their time in the program.
- Perform Hospital orientation training - The resident will complete all required hospital orientation training. This includes attending resident orientation and the radiation safety short course, as well as completing any assigned Computer Based Learning (CBL) modules through BuckeyeLearn.
- Complete an introductory training module on the Allied Health Student Tracking (AHST) System by the Typhon Group.
- Rotation through Department - Residents will spend time at each treatment and simulation unit to gain an appreciation of departmental organization and procedures. Time will also be spent with dosimetry, radiation safety, and block room to introduce the resident to staff.
- Aria and Eclipse Training – A training course will be offered at the Radiation Oncology Training Center for Aria and Eclipse Training. All incoming residents are required to attend this as part of their orientation/onboarding.
- Daily Linac QA Review - The resident will observe the daily Linac QA checks performed by the therapists. After observing/assisting the physics staff, the resident will become responsible for reviewing that the daily Linac QA was performed and documented and that the results are acceptable.
- Perform IMRT QA and electron cutout measurements- After observing/assisting the physics staff with several IMRT QAs and electron cutout measurements, the resident will become responsible for performing these measurements. All measurement results will be reviewed by the preceptor.

Didactic Readings

- AAPM TG249: Essentials and Guidelines for Hospital-Based Medical Physics Residency Training Programs
- ASTRO QA Whitepaper “Safety is no Accident”
- Review relevant Departmental Policies in Department Sharepoint Site
- Review QA Procedures for the Department in Medical Physics Sharepoint Site
- AAPM Medical Physics Practice Guideline 3: Levels of supervision for medical physicists in clinical training
- Medical Physics Practice Guideline 4: Development, implementation, use and maintenance of safety checklists
- AAPM Medical Physics Practice Guideline 10: Scope of practice for clinical medical physics

Competency List

- Attend MU Calculations Class
  - Electron Calculations

    - Electron Calculations Extended SSD
    - Photon Calculations SSD
    - Photon Calculations Extended SSD
    - Photon Calculations SSD Off Axis
    - Photon Calculations SAD
    - Photon Calculations SAD Off Axis
    - Manual Calculations of Computer Plans
- Complete: Review of Electrical, Ozone, Cerrobend Hazards
- Complete: Typhon Group Overview
- Complete: Expectations with Residency Director
- Complete: CT Sim Introduction
- Complete: LINAC V1 Introduction
- Complete: LINAC V2 Introduction
- Complete: LINAC V3 Introduction
- Complete: LINAC V4 Introduction
- Complete: LINAC V5 Introduction
- Complete: LINAC V6 Introduction
- Complete: LINAC V7 Introduction
- Complete: TrueB1/TrueB2 Introduction
- Complete: Dosimetry Introduction
- Complete: Brachy Introduction
- Complete: Gamma Knife SRS/SRT Introduction
- Complete: Physician Introduction
- Complete: Physicist of the Day Introduction
- Complete: Physics LINAC Stereotactic Coverage Introduction
- Complete: Aria and Eclipse Training
- Observe/Assist: IMRT QA with MapCheck
- Observe/Assist: IMRT QA with Portal Dosimetry
- Observe/Assist: Electron Cutout Measurements
- Observe/Assist: Daily LINAC Checks
- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. At the end of the rotation the resident will submit a short report to the MPRP Director. The report should address the following topics:
    - Describe the simulation process and immobilization devices used by the department for each disease site.
    - Describe the treatment techniques and field arrangements used in the department to treat different disease sites.
    - Describe the different brachytherapy and SRS/SRT/SBRT procedures used in the department
2. Completion of a <u>minimum</u> of 80% of required competencies and approval by preceptor.

# Medical Physics Rotation Description – Dosimetry A

Rotation: Dosimetry A
Timeframe: 3 Months
Preceptor: Dominic DiCostanzo, Danny Eiler

Overview
In this rotation, residents are introduced to dosimetry. The rotation is three months in length and includes familiarization with patient immobilization/set-up, 3D planning, inverse planning and related quality assurance tasks. In addition to assigned patient planning, didactic readings are also required. Each week daily records from the AHST system will be provided to the preceptor. At the midpoint of the rotation, as well as at the end of the rotation, residents will be evaluated by the preceptor and results documented in the AHST system.

Clinical Objectives

- Planning Techniques - Residents will be provided with an education on treatment planning techniques that will cover a range from 3D conformal, IMRT, and VMAT planning.
- Patient setup/immobilization- Residents will gain an understanding of the range of available immobilization equipment and the impact on reproducible patient setup. Residents will also contribute in the planning of immobilization for patient treatments.
- Image Fusion/Contouring- Residents will observe, assist, and perform image fusion and contouring of normal tissues.
- 3D planning- Residents will observe, assist, and perform patient planning for a variety of 3D plans.
- IMRT/VMAT planning- Residents will observe, assist, and perform patient planning for a variety of IMRT plans.
- Record and Verify system- The transfer of plan information to the record and verify system will be observed and performed by the resident.
- Quality Assurance for Treatment Planning System- Residents will observe/assist and then perform monthly quality assurance for the external beam treatment planning system.

Didactic Readings
Reading list provided by dosimetry staff

- AAPM TG65: Tissue Inhomogeneity Corrections for Megavoltage Beams
- AAPM TG329: Reference dose specification for dose calculations: Dose-to-water or dose-to-muscle?
- AAPM Virtual Library: Inhomogeneity Correction and the Analytic Anisotropic Algorithm https://aapm.onlinelibrary.wiley.com/doi/10.1002/mp.13995
- AAPM Virtual Library: Developments in Clinical Reference Dosimetry https://www.aapm.org/education/VL/vl.asp?id=12225
- AAPM Virtual Library: Monte Carlo for Photon Treatment Planning; CV/SP and other Modern Algorithms; Monte Carlo for Electron Planning https://www.aapm.org/education/VL/vl.asp?id=3190
- AAPM Virtual Library: FUNdamentals – the black box in your TPS: Algorithms https://www.aapm.org/education/VL/vl.asp?id=13270
- AAPM Virtual Library: IMRT Optimization Algorithms and QA https://www.aapm.org/education/VL/vl.asp?id=1986
- AAPM Virtual Library: Dose Calculation & Optimization Algorithms and QA (Clinical Perspective) https://www.aapm.org/education/VL/vl.asp?id=1984
- Quantec Report
- A recent scientific publication of your choice related to dosimetry/patient simulation

Competency List
Initial Eclipse Training

- Complete: Eclipse Training during orientation

3D Planning

- Complete: 3D Plan Whole Brain
- Complete: 3D Cranial Spinal
- Complete: 3D Plan Abdomen
- Complete: 3D Plan AP/PA
- Complete: 3D Lung
- Complete: 3D Plan Pelvis 4 Field
- Complete: 3D Plan Pelvis Prone
- Complete: 3D Plan Spine Single Field

Breast

- Complete: Supine Conformal
- Complete: Prone Breast
- Complete: Prone Breast and Low Axilla
- Complete: Electron Planning
- Complete: Chest Wall & Nodes

Algorithms

- Observe/Assist/Complete: IMRT Beam Arrangements, Optimization Algorithms
- Observe/Assist/Complete: VMAT Optimization Algorithm and Basic Beam Limitations
- Observe/Assist/Complete: Final Dose Calculation Algorithms

IMRT/VMAT

- Complete: IMRT/VMAT Brain
- Complete: IMRT/VMAT Prostate
- Complete: IMRT/VMAT Abdomen
- Complete: IMRT/VMAT Prostate and Nodes
- Complete: IMRT/VMAT Rectum

Craniospinal Radiation

- Complete: CSI-3D (discuss/review with Dosimetry or Physics)
- Complete: CSI-IMRT (discuss/review with Dosimetry or Physics)

Other Competencies

- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Dosimetry B

Rotation: Dosimetry B
Timeframe: 3 Months
Preceptor: Dominic DiCostanzo, Danny Eiler

Overview
In this rotation, residents are introduced to more complicated aspects of dosimetry. This rotation is three months in length and includes familiarization with complex patient immobilization/set-up, inverse planning for intensity modulated techniques, inverse planning for stereotactic techniques and related quality assurance tasks. In addition to assigned patient planning, didactic readings are also required. Each week daily records from the AHST system will be provided to the preceptor. At the midpoint of the rotation, as well as at the end of the rotation, residents will be evaluated by the preceptor and results documented in the AHST system.

Clinical Objectives

- Planning Techniques - Residents will be provided with an education on treatment planning techniques for various disease sites.
- Patient setup/immobilization- Residents will contribute in the planning of immobilization for patient treatments.
- Image fusion/Contouring- Residents will perform image fusion and contouring of normal tissues.
- IMRT/VMAT planning- Residents will observe, assist, and perform patient planning for IMRT and VMAT cases.
- Record and Verify system - The transfer of plan information to the record and verify system will be performed by the resident.
- Second MU checks - The resident will transfer plans to second MU check dosimetry software and perform second MU checks for approved plans.

Didactic Readings

- AAPM TG53: Quality assurance for clinical radiotherapy treatment planning
- AAPM Medical Physics Practice Guideline 5.a.: Commissioning and QA of Treatment Planning Dose Calculations — Megavoltage Photon and Electron Beams
- AAPM Report No. 166: The use and QA of biologically related models for treatment planning
- AAPM TG263: Standardizing nomenclatures in radiation oncology
- A recent scientific publication of your choice related to dosimetry/patient simulation

Competency List
Pelvis

- Complete: IMRT/VMAT Prostate (and Nodes)
- Complete: SBRT Prostate
- Complete: IMRT/VMAT Gyn

Abdomen

- Complete: SBRT Liver

Thorax

- Complete: IMRT/VMAT Lung
- Complete: SBRT Lung
- Complete: IMRT/VMAT Chest

Head & Neck

- Complete: IMRT/VMAT SIB Head/Neck

Brain

- Complete: IMRT/VMAT Brain
- Complete: SRS/SRT Brain

Spine

- SBRT Spine

R&V System
- Complete: Prepare plan documentation after approval (x5)

Other Competencies
- Complete: Faculty Preceptor Evaluation
- Observe: Re-Simulation (x5)

Optional Competencies
- Timmerman SBRT technique
- 2D Breast
- 4 Field Breast

Expectations for Successful Completion of Rotation
1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Annual/Longitudinal QA A

Rotation: Annual/Longitudinal QA, Rotation A
Timeframe: 12 Months
Preceptor: Nilendu Gupta/Jeff Woollard

Overview
In this rotation, residents are introduced to, and assist with, the various physics tasks associated with external beam treatment delivery. The external beam rotation includes quality assurance procedures for both equipment and patient charts, as well as special procedures. In addition to clinical training, didactic readings are also required. Unique opportunities, such as commissioning of new equipment, may also be required but will not be burdensome to the completion of rotational clinical objectives. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- Linear accelerator quality assurance- Machine specification and testing/calibration will be covered with consideration of proper equipment operation and task group reports. The resident will observe/assist with all linear accelerator quality assurance activities.
- Intraoperative linear accelerator quality assurance- Machine specification and testing/calibration will be covered with consideration of proper equipment operation and task group reports. The resident will observe/assist with all intraoperative linear accelerator quality assurance activities.
- CT Simulator quality assurance- Machine specification and testing/calibration will be covered with consideration of proper equipment operation and task group reports. The resident will observe/assist with all CT Simulator quality assurance activities.
- Special Procedures – The resident will observe/assist with setup, calculation and delivery of special procedures. Special procedures include total body irradiation, total skin electron treatment.
- Patient chart checks- Residents will observe and assist in the proper procedure to ensure that patients are receiving the correct daily dose and that this is properly documented.

Didactic Readings

- AAPM TG72: Intraoperative Radiation Therapy Using Mobile Electron Linear Accelerators
- AAPM TG29: The Physical Aspects of Total and Half Body Photon Irradiation
- A Primer on Theory and Operation of Linear Accelerators in Radiation Therapy, Karzmark and Morton (1981)
- AAPM TG104: The Role of In-Room kV X-Ray Imaging for Patient Setup and Target Localization

Competency List
Linear Accelerator QA

- Observe/Assist: Linac Monthly QA
- Observe/Assist: Linac Annual QA
- Observe/Assist: Linac Troubleshooting
- Observe/Assist: Constancy Checks Monthly QA for IC's
- Observe/Assist: TG-51 Electron Calibration
- Observe/Assist: TG-51 Photon Calibration
- Observe/Assist: Film Handling, Processing, Scanning & Software
- Observe/Assist: Dosimetry Software Operation
- Observe/Assist: Dosimetry Equipment Troubleshooting

Gamma Knife QA

- Observe/Assist: Gamma Knife Annual QA

Intraoperative Linear Accelerator QA

- Observe/Assist: Intra-Op Linac Weekly QA
- Observe/Assist: Intra-Op Linac Annual QA

CT Simulator QA

- Observe/Assist: CT Simulator Monthly QA
- Observe/Assist: CT Simulator Annual QA
- Complete: CT Simulator Operation & Safety
- Observe/Assist: CT Simulator Troubleshooting

Special Procedures

- Observe/Assist: TBI Photon Diode Calibration
- Observe/Assist: TBI Treatment
- Observe/Assist: TSE Electron Diode Calibration
- Observe/Assist: TSE Treatment
- Observe/Assist: In Vivo Patient Dosimetry
- Observe/Assist: Pacemaker Dosimetric Calculations

Patient Chart Checks

- Observe/Assist: Weekly Chart Check
- Observe/Assist: Plan 2nd Checks

Other Competencies

- Observe/Assist: TG-21 Photon Calibration
- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Annual/Longitudinal QA B

Rotation: Annual/Longitudinal QA, Rotation B
Timeframe: 12 Months
Preceptor: Nilendu Gupta/Jeff Woollard

Overview
In this rotation, residents assist with and perform the various physics tasks associated with external beam treatment delivery. The external beam rotation includes quality assurance procedures for both equipment and patient charts as well as special procedures. In addition to clinical training, didactic readings are also required. Unique opportunities, such as commissioning new equipment, may also be required but will not be burdensome to the completion of rotational clinical objectives. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- Linear accelerator quality assurance- The resident will assist with/perform all linear accelerator quality assurance activities.
- Intraoperative accelerator quality assurance- The resident will assist with/perform all intraoperative linear accelerator quality assurance activities.
- CT Simulator quality assurance- The resident will assist with/perform all CT simulator quality assurance activities.
- Special Procedures – The resident will assist with/perform setup, calculation and delivery of special procedures. Special procedures include total body irradiation, total skin electron treatment, and in-vivo dosimetric measurements.
- Patient chart checks- Residents will perform chart checks to ensure that patients are receiving the correct daily dose and that this is properly documented.

Didactic Readings

- AAPM TG21: A protocol for the determination of absorbed dose from high energy photon and electron beams
- AAPM TG148: QA for Helical Tomotherapy
- AAPM TG58: Clinical use of Electronic Portal Imaging
- AAPM TG235: Update to TG55 (2020)
- AAPM TG50: Basic Applications of Multileaf Collimators
- AAPM TG203: Management of Radiotherapy Patients with Implanted Cardiac Pacemakers and Defibrillators
- MPPG 11.a: Chart/Plan Checks for EBRT
- Virtual library presentation on TG-21

Competency List

Linear Accelerator QA

- Assist/Complete: Linac Monthly QA
- Assist/Complete: Linac Annual QA
- Assist/Complete: Linac Troubleshooting
- Assist/Complete: Constancy Checks Monthly QA for IC's
- Assist/Complete: TG-51 Electron Calibration
- Assist/Complete: TG-51 Photon Calibration
- Assist/Complete: Film Handling, Processing, Scanning & Software
- Assist/Complete: Dosimetry Software Operation
- Assist/Complete: Dosimetry Equipment Troubleshooting

Gamma Knife QA

- Assist/Complete: Gamma Knife Annual QA

Intraoperative Linear Accelerator QA

- Assist/Complete: Intra-Op Linac Weekly QA
- Assist/Complete: Intra-Op Linac Annual QA
- Complete: Intra-Op Linac Selection/Performance Specifications

CT Simulator QA

- Assist/Complete: CT Simulator Monthly QA
- Assist/Complete: CT Simulator Annual QA
- Assist/Complete: CT Simulator Troubleshooting

Special Procedures

- Assist/Complete: TBI Photon Diode Calibration
- Assist/Complete: TBI Treatment
- Assist/Complete: TSE Electron Diode Calibration
- Assist/Complete: TSE Treatment
- Assist/Complete: In Vivo Patient Dosimetry
- Assist/Complete: Pacemaker Dosimetric Calculations

Patient Chart Checks

- Assist/Complete: Weekly Chart Check
- Assist/Complete: Plan 2$^{nd}$ Checks

Other Competencies

- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-External Beam A

Rotation: External Beam, Rotation A
Timeframe: 1 Month
Preceptor: Jeff Woollard

Overview
In this rotation, residents are introduced to, and assist with, the various physics tasks associated with external beam treatment delivery. The external beam rotation includes quality assurance procedures for both equipment and patient charts, as well as special procedures. In addition to clinical training, didactic readings are also required. Unique opportunities, such as commissioning of new equipment, may also be required but will not be burdensome to the completion of rotational clinical objectives. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- Linear accelerator quality assurance- Machine specification and testing/calibration will be covered with consideration of proper equipment operation and task group reports. The resident will observe/assist with all linear accelerator quality assurance activities.
- CT Simulator quality assurance- Machine specification and testing/calibration will be covered with consideration of proper equipment operation and task group reports. The resident will observe/assist with all CT Simulator quality assurance activities.

Didactic Readings

- AAPM TG142: Quality Assurance of Medical Accelerators
- AAPM TG40: Comprehensive QA for Radiation Oncology
- AAPM TG66: Quality assurance for computed-tomography simulators and the computed tomography-simulation process
- AAPM TG51: Protocol for Clinical Dosimetry of High-Energy Photon and Electron Beams
- AAPM TG71: Monitor Unit Calculations for External Photon and Electron Beams
- AAPM Medical Physics Practice Guideline 2: Commissioning and quality assurance of X-ray–based image-guided radiotherapy systems
- AAPM Medical Physics Practice Guideline 8: Linear accelerator performance tests

Competency List
Linear Accelerator QA

- Observe/Assist: Linac Daily QA
- Complete: Linac Operation & Safety
- Complete: Ion Chamber/Electrometer Operations & Safety

CT Simulator QA

- Observe/Assist: CT Simulator Daily QA

Other Competencies

- Complete: Review Reporting Procedure for Medical Events
- Observe/Assist/Complete: Calculating Dose for Incorrect Treatment
- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-External Beam B

Rotation: External Beam, Rotation B
Timeframe: 1 Month
Preceptor: Jeff Woollard

Overview
In this rotation, residents assist with and perform the various physics tasks associated with external beam treatment delivery. The external beam rotation includes quality assurance procedures for both equipment and patient charts as well as special procedures. In addition to clinical training, didactic readings are also required. Unique opportunities, such as commissioning new equipment, may also be required but will not be burdensome to the completion of rotational clinical objectives. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- Linear accelerator quality assurance- The resident will assist with/perform all linear accelerator quality assurance activities.
- CT Simulator quality assurance- The resident will assist with/perform all CT simulator quality assurance activities.

Didactic Readings

- AAPM TG36: Fetal Dose from Radiotherapy with Photon Beams
- AAPM TG62: Diode in Vivo Dosimetry for Patients Receiving External Beam Radiation Therapy
- AAPM TG25: Clinical Electron Beam Dosimetry
- AAPM TG70: Recommendations for Clinical Electron Beam Dosimetry Supplement to the Recommendations of Task Group 25

Competency List
Linear Accelerator QA

- Assist/Complete: Linac Daily QA
- Complete: Linac Selection/Performance Specifications

CT Simulator QA

- Assist/Complete: CT Simulator Daily QA

Other Competencies

- Complete: Faculty Preceptor Evaluation
- Observe: QA procedures with Diagnostic Physics (CT, PET/CT, etc.)

Expectations for Successful Completion of Rotation

1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Proton

Rotation: Proton
Timeframe: 2 Months
Preceptor: Hyeri Lee

Overview

In this rotation, residents are introduced to proton physics. The rotation includes the various physics tasks associated with proton beam treatment delivery. Didactic readings and observations are required. Residents are required to write a short summary of the readings for each week before discussion. Throughout the rotation, residents will receive feedback and be evaluated by the preceptor.

Clinical Objectives

- **Proton therapy physics-** The residents will be provided with an education on proton therapy, various types of machines/delivery systems/techniques and its biology.
- **Imaging-** Residents will gain knowledge related to imaging for proton therapy including CT to Stopping power ratio conversion, its uncertainty to dose calculation and treatment verification methods.
- **Planning-** Residents will observe and perform patient planning for proton plans.
- **Quality assurance-** Residents will learn/observe proton therapy quality assurance activities.
- **Safety and Shielding-** Residents will review proton shielding documents and gain knowledge about neutron detection/monitoring.
- **Future development-** Residents will become familiar with ever-growing proton therapy techniques (example: Real-time position verification using the prompt gamma ray, Adaptive planning)
- **Proton Flash**

Didactic Readings

- "Proton Therapy Physics" by Harald Paganetti
- "Proton and Charged Particle Radiotherapy" by DeLaney, Thomas F. and Kooy, Hanne M.
- "Khan's the Physics of Radiation Therapy" by Faiz M Khan: chapter 27 (Proton Beam Therapy)
- ICRU 59 Clinical Proton Dosimetry
- ICRU 78 Prescribing, Recording, and Reporting Proton-Beam Therapy
- IAEA TRS 398: Absorbed Dose Determination in External Beam Radiotherapy: An International Code of Practice for Dosimetry based on Standards of Absorbed Dose to Water (Chapter 10 and 11)
- TG 224: Comprehensive Proton therapy machine quality assurance Med Phys. 46 (8), August 2019 0094-2405/2019/46(8)/e678/
- Harald Paganetti ***et al*** 2021 ***Phys. Med. Biol.*** **66** 05RM01

Additional Readings

Reading 1: Basic physics

- Mandatory Reading: Khan chapter 27.1-27.2
- Optional Reading: Paganetti chapter 2 and 19 and DeLaney/Kooy chapter 2

Reading 2: Proton Accelerator and Beam delivery system

- Mandatory Reading: Khan chapter 27.3-4
- Optional Reading: Paganetti chapter 3, 5 and 6 and Delaney/Kooy chapter 4-5

Reading 3: Dosimetry and Quality Assurance

- Mandatory Reading: Khan 27.5 and 27.7, TG 224
- Optional Reading: TRS 398 chapter 10, ICRU 59/78 and Paganetti chapter 8

Reading 4: Treatment planning

- Mandatory Reading: Khan chapter 27.6 and DeLaney chapter 8-9
- Optional Reading: Paganetti chapter 13-14

Reading 5: Safety/Shielding and Future Development

- Mandatory Reading: OSU proton center shielding report
- Optional Reading: Paganetti chapter 17, Harald Paganetti ***et al*** 2021 ***Phys. Med. Biol.*** **66** 05RM01

Competency List

- Observe: Patient treatment at vaults

Proton QA

- Assist/Complete: Proton Daily QA
- Assist/Complete: Proton Monthly QA
- Assist/Complete: Proton Annual QA (optional)

Proton Planning

- Observe/Assist: Prostate
- Observe/Assist: Brain

Expectations for Successful Completion of Rotation

1. Proton physics report including the basic physics, delivery techniques, quality assurance procedures, and treatment planning report of a prostate case.
2. An overall passing grade on the end of rotation preceptor evaluation
3. Clinical project

## Medical Physics Rotation Description-Brachytherapy A

Rotation: Brachytherapy, Rotation A
Timeframe: 2 Months
Preceptor: Jeff Woollard

Overview
In this rotation, residents are introduced to, and assist with, the various physics tasks associated with brachytherapy. The brachytherapy rotation includes quality assurance procedures for both equipment and patient charts, brachytherapy treatment planning, and brachytherapy delivery. In addition to clinical training, didactic readings are also required. Unique opportunities, such as commissioning of new equipment, may also be required but will not be burdensome to the completion of rotational clinical objectives. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- HDR treatment planning and delivery- Residents will observe and assist with treatment planning and delivery for the majority of patients who receive HDR treatments.
- LDR treatment planning and delivery- Residents will observe and assist with treatment planning and delivery for the majority of patients who receive LDR treatments.
- HDR quality assurance- Machine specification and testing/calibration will be covered with consideration of proper equipment operation and task group reports. The resident will observe/assist with daily, monthly and quarterly HDR quality assurance activities.
- LDR quality assurance- Source handling and testing/calibration will be covered with consideration of radiation safety procedures and task group reports. The resident will observe/assist with LDR quality assurance activities.
- Patient chart audits- Residents will observe proper procedure to ensure that brachytherapy patients are receiving the correct daily dose and assist in proper documentation.

Didactic Readings

- AAPM TG43: A Revised AAPM Protocol for Brachytherapy Dose Calculation
- AAPM TG56: Code of Practice for Brachytherapy Physics
- AAPM TG59: High Dose-Rate Brachytherapy Treatment Delivery
- The American Brachytherapy Society Recommendations for High-Dose-Rate Brachytherapy for Carcinoma of the Cervix
- The American Brachytherapy Society Recommendations for High-Dose-Rate Brachytherapy for Carcinoma of the Endometrium
- AAPM TG64: Permanent Prostate Seed Implant Brachytherapy
- AAPM TG128: Quality Assurance Tests for Prostate Brachytherapy Ultrasound Systems
- AAPM TG129: Dosimetry of 125I and 103Pd COMS eye plaques for intraocular tumors: Report of Task Group 129 by the AAPM and ABS
- A recent scientific publication of your choice related to brachytherapy

Competency List
HDR Treatment Planning and Delivery

- Observe/Assist: HDR Bronchial Tx Plan
- Observe/Assist: HDR Interstitial Tx Plan
- Observe/Assist: HDR Intra-Op Tx Plan
- Observe/Assist: HDR Ring & Tandem
- Observe/Assist: HDR Tandem and Ovoids
- Observe/Assist: HDR Vaginal Cylinder

- Observe/Assist: HDR 'Y' Tandem
- Observe/Assist: HDR Hand Calculation
- Complete: HDR Emergency Training

LDR Treatment Planning and Delivery

- Observe/Assist: LDR Eye PlaqueTx Plan
- Observe/Assist: LDR Prostate Pre-Plan
- Observe/Assist: LDR Prostate Intra-Op
- Observe/Assist: LDR Prostate Post Plan
- Observe/Assist: LDR Y-90 Calculation
- Observe/Assist: Ordering Radioactive Seeds
- Observe/Assist: Release Calc with Radioactive Patient
- Observe/Assist: Returning Radioactive Seeds

HDR QA

- Observe/Assist: HDR Daily QA
- Observe/Assist: HDR Monthly QA
- Observe/Assist: HDR Source Exchange

LDR QA

- Observe/Assist: Well Chamber Constancy QA
- Observe/Assist: Source Receipt Process
- Observe/Assist: Source Handling
- Observe/Assist: Assay of Radioactive Seeds
- Observe/Assist: Source Leak Check with Radiation Safety
- Observe/Assist: LDR Source Inventory with Radiation Safety
- Observe/Assist: Hot Lab Survey
- Observe/Assist: U/S QA

Other Competencies

- Observe/Assist: Intra-Op Electron Tx Calculation
- Observe/Assist: Intra-Op Linac Treatment Setup
- Observe/Assist/Complete: BrachVision Monthly QA
- Observe/Assist/Complete: VariSeed Monthly QA
- Complete: Review of Brachytherapy Protocols
- Complete: Review of HDR/LDR Applicators
- Observe/Assist: Brachytherapy Planning System Operations
- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Brachytherapy B

Rotation: Brachytherapy, Rotation B
Timeframe: 2 Months
Preceptor: Jeff Woollard

Overview
In this rotation, residents assist with and perform the various physics tasks associated with brachytherapy. The brachytherapy rotation includes quality assurance procedures for both equipment and patient charts, brachytherapy treatment planning and brachytherapy delivery. In addition to clinical training, didactic readings are also required. Unique opportunities, such as commissioning of new equipment, may also be required but will not be burdensome to the completion of rotational clinical objectives. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- HDR treatment planning and delivery- Residents will assist and perform treatment planning and delivery for the majority of patients who receive HDR treatments.
- LDR treatment planning and delivery- Residents will assist and perform treatment planning and delivery for the majority of patients who receive LDR treatments.
- HDR quality assurance- The resident will assist with/perform daily, monthly, and quarterly HDR quality assurance activities.
- LDR quality assurance- The resident will assist with/perform LDR quality assurance activities.
- Patient chart checks/audits- Residents will perform brachytherapy chart checks and audits to ensure that brachytherapy patients are receiving the correct daily dose and that this is properly documented.

Didactic Readings

- AAPM TG186: Report of the Task Group 186 on model-based dose calculation methods in brachytherapy beyond the TG-43 formalism: Current status and recommendations for clinical implementation
- AAPM TG137: AAPM Recommendations on Dose Prescription and Reporting Methods for Permanent Interstitial Brachytherapy for Prostate Cancer
- AAPM TG144: Recommendations of the American Association of Physicists in Medicine on dosimetry, imaging, and quality assurance procedures for 90Y microsphere brachytherapy in the treatment of hepatic malignancies
- ACR–AAPM Technical Standard for the Performance of Low-Dose-Rate Brachytherapy Physics
- ACR–AAPM Technical Standard for the Performance of High-Dose-Rate Brachytherapy Physics
- ESTRO TG-167: Clinical recommendations for innovative brachytherapy devices and applications
- A recent scientific publication of your choice related to brachytherapy

Competency List
HDR Treatment Planning and Delivery

- Assist/Complete: HDR Bronchial Tx Plan
- Assist/Complete: HDR Interstitial Tx Plan
- Assist/Complete: HDR Intra-Op Tx Plan
- Assist/Complete: HDR Ring & Tandem
- Assist/Complete: HDR Tandem and Ovoids
- Assist/Complete: HDR Vaginal Cylinder
- Assist/Complete: HDR 'Y' Tandem
- Assist/Complete: HDR Hand Calculation

LDR Treatment Planning and Delivery

- Assist/Complete: LDR Eye PlaqueTx Plan
- Assist/Complete: LDR Prostate Pre-Plan
- Assist/Complete: LDR Prostate Intra-Op Plan
- Assist/Complete: LDR Prostate Post Plan
- Assist/Complete: LDR Y-90 Calculation
- Assist/Complete: Ordering Radioactive Seeds
- Assist/Complete: Returning Radioactive Seeds
- Assist/Complete: Release Calc with Radioactive Patients

HDR QA

- Assist/Complete: HDR Daily QA
- Assist/Complete: HDR Monthly QA
- Assist/Complete: HDR Source Exchange

LDR QA

- Assist/Complete: Well Chamber Constancy QA
- Assist/Complete: Source Receipt Process
- Assist/Complete: Source Handling
- Assist/Complete: Assay of Radioactive Seeds
- Assist/Complete: Source Leak Check with Radiation Safety
- Assist/Complete: LDR Source Inventory with Radiation Safety
- Assist/Complete: Hot Lab Survey
- Assist/Complete: U/S QA

Other Competencies

- Observe: Cases with Radiation Safety (posting, release instructions, etc.)
- Assist/Complete: Intra-Op Electron Tx Calculation
- Assist/Complete: Intra-Op Linac Treatment Setup
- Assist/Complete: BrachVision Monthly QA
- Assist/Complete: VariSeed Monthly QA
- Complete: Review of Materials License and Radiation Safety
- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-SRS/SRT/SBRT A

Rotation: Stereotactic Radiosurgery and Radiotherapy, Rotation A
Timeframe: 2 Months
Preceptor: Ahmet Ayan

Overview

In this rotation, residents are introduced to, and assist with, the various physics tasks associated with stereotactic radiosurgery and radiotherapy. This rotation includes quality assurance procedures for image guidance and delivery systems (both Linac and gamma knife), treatment planning/delivery of stereotactic treatments, and checks of stereotactic patient charts. In addition to clinical training, didactic readings are also required. Unique opportunities, such as commissioning of new equipment, may also be required but will not be burdensome to the completion of rotational clinical objectives. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- Gamma Knife quality assurance- Machine specification and testing/calibration will be covered with consideration of proper equipment operation and task group reports. The resident will observe/assist with all Gamma Knife quality assurance procedures.
- Linac-based SRS/SRT quality assurance- Machine specification and testing/calibration will be covered with consideration of proper equipment operation and task group reports. The resident will observe/assist with all Linac-based SRS/SRT quality assurance procedures.
- Patient management quality assurance- QA for image guidance systems, gating systems, and similar devices will be reviewed. The resident will observe/assist with all quality assurance procedures associated with this equipment.
- Gamma Knife treatment and planning and delivery – Patient planning, as well as proper immobilization and setup, for various stereotactic procedures will be covered. The resident will observe/assist with Gamma Knife treatment planning and delivery.
- Linac-based SRS/SRT/SBRT setup and delivery- Patient immobilization, setup and delivery for various stereotactic procedures will be covered. The resident will observe/assist with linac-based SRS/SRT/SBRT setup and delivery.
- Patient chart checks- Residents will observe proper procedure to ensure that patients are receiving the correct daily dose and that this is properly documented.

Didactic Readings

- “Modern Technology of Radiation Oncology”: Chapter 16: Stereotactic Irradiation
- AAPM TG42: Stereotactic Radiosurgery
- AAPM TG101: Stereotactic Body Radiation Therapy
- AAPM TG76: The Management of Respiratory Motion in Radiation Oncology
- Quality and Safety Considerations in Stereotactic Radiosurgery and Stereotactic Body Radiation Therapy (ASTRO white paper)
- AAPM-RSS Medical Physics Practice Guideline 9 for SRS-SBRT
- IAEA TRS-398: CODE OF PRACTICE FOR COBALT-60 GAMMA RAY BEAMS
- "A Story of Hypofractionation and the Table on the Wall", Robert Timmerman, Int J Radiation Oncol Biol Phys, Vol. 112, No. 1, pp. 4−21, 2022
- A recent scientific publication of your choice related to stereotactic radiotherapy

Competency List

Gamma Knife QA
- Observe/Assist: Gamma Knife Daily QA
- Observe/Assist: Gamma Knife Monthly QA
- Complete: Gamma Knife Operation & Safety
- Observe/Assist: Gamma Knife Troubleshooting

Linac-based SRS/SRT QA
- Observe/Assist: Linac based SRS/SRT Daily QA
- Observe/Assist: Linac based SRS/SRT Monthly QA
- Observe/Assist: Linac based SRS/SRT Troubleshooting

Patient Management QA
- Observe/Assist: Gating Daily QA
- Observe/Assist: Gating Monthly QA
- Complete: Gating Operation & Safety
- Observe/Assist: Gating Troubleshooting
- Observe/Assist: In-Room Imaging Daily QA
- Observe/Assist: In-Room Imaging Monthly QA
- Complete: In-Room Imaging Operation & Safety
- Observe/Assist: In-Room Imaging Troubleshooting

Gamma Knife Treatment Planning and Delivery
- Observe/Assist: GK Trigeminal Neuralgia Plan and Delivery
- Observe/Assist: GK Brain Metastasis Plan and Delivery
- Observe/Assist: GK Arteriovenous Malformation Plan and Delivery
- Observe/Assist: GK Other Plan and Delivery if Applicable

Linac-Based SRS/SRT/SBRT Treatment Setup and Delivery
- Observe/Assist: Complex Immobilization
- Observe/Assist: Respiratory Gating
- Observe/Assist/Complete: Gating – 4D Contouring/Planning

Patient Motion Management
- Observe/Assist: 4DCT Acquisition
- Observe/Assist: Respiratory Gating Techniques
- Observe/Assist: Realtime Motion Tracking: Optical: Surface Imaging
- Observe/Assist: Realtime Motion Tracking: X-ray: Intrafraction Motion Review (IMR)

SRS/SRT Intracranial Treatment Setup and Delivery
- Observe/Assist: SBRT Lung Treatment Setup and Delivery
- Observe/Assist: SRS/SRT Other Plan and Delivery if applicable
- Observe/Assist: SBRT Spine Treatment Setup and Delivery
- Observe/Assist: SBRT Liver Treatment Setup and Delivery
- Observe/Assist: SBRT Other Treatment Setup and Delivery
- Observe/Assist: Deformable image registration

Patient Chart Checks
- Observe/Assist: Audit of Gamma Knife Charts

Other Competencies
- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation
1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description- SRS/SRT/SBRT B

Rotation: Stereotactic Radiosurgery and Radiotherapy, Rotation B
Timeframe: 2 Months
Preceptor: Ahmet Ayan

Overview
In this rotation, residents assist with and perform the various physics tasks associated with stereotactic radiosurgery and radiotherapy. This rotation includes quality assurance procedures for image guidance and delivery systems (both Linac and gamma knife), treatment planning/delivery of stereotactic treatments, and checks of stereotactic patient charts. In addition to clinical training, didactic readings are also required. Unique opportunities, such as commissioning of new equipment, may also be required but will not be burdensome to the completion of rotational objectives. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- Gamma Knife quality assurance- The resident will assist with/perform all Gamma Knife quality assurance procedures.
- Linac-based SRS/SRT quality assurance- The resident will assist with/perform all Linac-based SRS/SRT quality assurance procedures.
- Patient management quality assurance- The resident will assist with/perform all quality assurance procedures associated with this equipment.
- Gamma Knife treatment planning/delivery- Patient planning, as well as proper immobilization and setup, for
- various stereotactic procedures will be covered. The resident will assist with/perform SRS/SRT treatment planning and delivery.
- Linac-based SRS/SRT/SBRT setup and delivery – Patient immobilization, setup and delivery for various stereotactic procedures will be covered. The resident will assist with/perform linac-based SRS/SRT/SBRT setup and delivery.
- Patient chart checks- Residents will check patient's charts to ensure that patients are receiving the correct dose and that this is properly documented.

Didactic Readings

- AAPM TG75: The Management of Imaging Dose During Image-Guided Radiotherapy
- AAPM TG132: Use of image registration and fusion algorithms and techniques in radiotherapy: Report of the AAPM Radiation Therapy Committee Task Group No. 132
- AAPM TG180: Image guidance doses delivered during radiotherapy?
- ICRU REPORT 91 Prescribing, Recording, and Reporting of Stereotactic Treatments with Small Photon Beams
- TRS483: Dosimetry of Small Static Fields Used in External Beam Radiotherapy
- A recent scientific publication of your choice related to stereotactic radiotherapy

Competency List
Gamma Knife QA

- Assist/Complete: Gamma Knife Daily QA
- Assist/Complete: Gamma Knife Monthly QA
- Assist/Complete: Gamma Knife Troubleshooting
- Complete: Gamma Knife Performance Specification

Linac-based SRS/SRT QA

- Assist/Complete: Linac based SRS/SRT Daily QA
- Assist/Complete: Linac based SRS/SRT Monthly QA
- Assist/Complete: Linac based SRS/SRT Troubleshooting
- Complete: Linac based SRS/SRT Selection/Performance Specification

Patient Management QA

- Assist/Complete: Gating Daily QA
- Assist/Complete: Gating Monthly QA
- Assist/Complete: Gating Troubleshooting
- Assist/Complete: In-Room Imaging Daily QA
- Assist/Complete: In-Room Imaging Monthly QA
- Assist/Complete: In-Room Imaging Troubleshooting
- Complete: In-Room Imaging Performance Specification

SRS/SRT Treatment Planning and Delivery

- Assist/Complete: GK Trigeminal Neuralgia Plan and Delivery
- Assist/Complete: GK Brain Metastasis Plan and Delivery
- Assist/Complete: GK Arteriovenous Malformation Plan and Delivery
- Assist/Complete: GK Other Plan and Delivery if applicable

Patient Motion Management

- Observe/Complete: 4DCT Acquisition
- Observe/ Complete: Respiratory Gating Techniques
- Observe/ Complete: Realtime Motion Tracking: Optical: Surface Imaging
- Observe/ Complete: Realtime Motion Tracking: X-ray: Intrafraction Motion Review (IMR)

Linac-Based SRS/SRT/SBRT Treatment Setup and Delivery

- Assist/Complete: Complex Immobilization
- Assist/Complete: Respiratory Gating
- Assist/Complete: SRS/SRT Intracranial Treatment Setup and Delivery
- Assist/Complete: SBRT Lung Setup and Delivery
- Assist/Complete: SBRT Spine Setup and Delivery
- Assist/Complete: SBRT Liver Setup and Delivery
- Assist/Complete: SBRT Other Setup and Delivery
- Assist/Complete: Deformable image registration

Patient Chart Checks

- Assist/Complete: Audit of Gamma Knife Charts

Other Competencies

- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. Completion of a <u>minimum</u> of 80% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Commissioning Rotation

Rotation: Commissioning
Timeframe: 2 Months concurrent with Shielding
Preceptor: Dominic DiCostanzo

Overview
In this rotation, residents are introduced to linear accelerator acceptance testing, beam commissioning, and treatment planning system calculation algorithms. In addition to clinical objectives, didactic readings are also required. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives
Linear accelerator acceptance procedures - Residents will participate in, or review, linear accelerator acceptance testing procedures.

- Beam commissioning - Residents will be given the opportunity to commission a linac beam in a treatment planning system.
- Calculation Algorithms – The resident will become familiar with the calculation algorithms used in various treatment planning systems.
- Knowledge of commissioning software of the treatment planning system not related to dose calculation algorithm.

Didactic Readings

- *(*this should be the first thing you watch before starting rotation*)
  AAPM Virtual Library: Roadmap for Installing New Equipment
  https://www.aapm.org/education/VL/vl.asp?id=2404
- AAPM TG106: Accelerator Beam Data Commissioning Equipment and Procedures
- AAPM TG53: Quality Assurance for Treatment Planning Systems/TRS 430: Quality Assurance for Treatment Planning Systems
- AAPM TG119: IMRT Commissioning Tests Instructions for Planning, Measurement, and Analysis
- AAPM Virtual Library: SRS/SBRT https://www.aapm.org/education/VL/vl.asp?id=13328
- AAPM Virtual Library: Building a New Radiation Therapy Clinic: Wait, Where Do I Start?
  https://www.aapm.org/education/VL/vl.asp?id=11814
- Photon Beam Dose Computations, Mackie et al, AAPM Summer School Proceedings
- Electron Beam Dose Computation, Hogstrom et al, AAPM Summer School Proceedings
- Fundamentals of Conv/Super and Others: https://www.aapm.org/education/VL/vl.asp?id=3190
- AxB vs MC: https://www.aapm.org/education/VL/vl.asp?id=13270

Expectations for Successful Completion of Rotation

1. Completion of a project related to commissioning. The topic and content of the project will be mutually agreed upon by the resident and the preceptor at the start of the rotation. The project will be presented at the Physics Education Conference.
2. Modeling of one photon beam in treatment planning system of choice and at minimum development of validation plan for the model developed.
3. Commissioning Report
4. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Shielding Rotation

Rotation: Shielding
Timeframe: 2 Months concurrent with Commissioning
Preceptor: Dominic DiCostanzo

Overview
In this rotation, residents are introduced to shielding techniques. In addition to clinical objectives, didactic readings are also required. Each week daily records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- Shielding Techniques – The resident will review current shielding documents
- Shielding Evaluations – The resident will independently perform a limited shielding evaluation for an existing linac unit.

Didactic Readings

- NCRP151 Structural Shielding Design and Evaluation from Megavoltage X- and Gamma Ray Radiotherapy Facilities
- Shielding Techniques for Radiation Oncology Facilities, by Patton H. McGinley
- AAPM Virtual Library: Uncertainties in Primary Barriers https://aapm.onlinelibrary.wiley.com/doi/epdf/10.1002/acm2.13574
- AAPM Virtual Library: Therapy: Radiation Therapy Shielding https://www.aapm.org/education/VL/vl.asp?id=227
- AAPM Virtual Library: Linac Shielding https://www.aapm.org/education/VL/vl.asp?id=12639
- AAPM Virtual Library: Neutron Shielding https://www.aapm.org/education/VL/vl.asp?id=3104

Expectations for Successful Completion of Rotation

1. Shielding Report including calculation, measurements, and evaluation report.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Elective Rotation

Rotation: Elective
Timeframe: 1 Month
Preceptor: Resident Selects

Overview
In this rotation, residents are given the opportunity to get introduced to a variety of topics, based on the specific interests of the resident. Possible topics include Radiation Physics, Clinical Radiation Oncology, Radiation Safety, Nuclear Medicine, Imaging, or other related Radiation Oncology topics. Each resident is expected to decide on the topic of their Elective Rotation, the preceptor who they wish to work with, and write up a one-page proposal regarding their chosen topic, along with completion milestones and metrics of successful completion of the rotation. This elective proposal is presented to the Preceptor, Residency Program Director, and Associate Director a month before the elective rotation is to start, and a signed approval from all is needed. The resident is expected to discuss their proposed topic and choice of preceptor with the residency director well before their assigned rotation month. This will allow the residency director to approve the concept prior to engaging a preceptor and writing the rotation proposal.

The rotation proposal should address the following:

- Elective Rotation Overview
- Clinical and other Learning Objectives
- Didactic Readings
- Competencies that will be completed
- Rotation completion milestones
- Expectations for successful completion and evaluation metrics proposed
- Format of Elective Report and presentation of findings in Education Conference or other approved venue

Clinical Objectives
As defined in Rotation Proposal.

Didactic Readings
As defined in Rotation Proposal.

Competency List
No defined competencies, but Rotation Proposal is expected to propose any competencies that are relevant.

Expectations for Successful Completion of Rotation

1. Evaluation metrics defined in rotation proposal
2. An overall passing grade on the end of rotation preceptor evaluation

## Medical Physics Rotation Description-Administrative and Professional Rotation

Rotation: Professional
Timeframe: 1 Month
Preceptor: Nilendu Gupta

Overview

In this rotation residents are introduced to the professional and administrative aspects of a medical physicist's job. This rotation also allows time for the resident to learn about the job search process, medical physics workforce and staffing models, become familiar with professional publications/societies, and study for the ABR exam, which is viewed as a professional activity. In addition to clinical training, didactic readings are also required. During this rotation, residents are also required to acquire some understanding of Radiation Oncology Incident Learning processes. Each week daily records from AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in AHST system.

Clinical Objectives

- Residents will become familiar with various professional and administrative aspects of the medical physics profession.
- Residents may use this time to perform or learn about the job search process.
- Residents may use this time to study for the American Board of Radiology certification exam.

Didactic Readings

- Complete the AAPM/ABR Online Modules on Ethics and Professionalism (available on the AAPM website)
- AAPM Report 109: Code of Ethics for the American Association of Physicists in Medicine
- AAPM Report 80: The Solo Practice of Medical Physics in Radiation Oncology
- AAPM TG160: Radiation Safety Officer Qualifications for Medical Facilities
- The ABT Study of Medical Physicist Work Values for Radiation Oncology Physics Services
- ACR Accreditation Requirements 2015
- ASTRO Safety is no Accident Report
- Review Departmental QMP Program Policies and relevant NRC Regulations and ODH Administrative Code
- Point/Counterpoint: Medical Physicists Should Position Themselves as Institutional Resources in Expanding Areas such as Healthcare Informatics and Information Networking
- Point/Counterpoint: Medical Physicists Need Professional Malpractice Insurance
- Point/Counterpoint: The Future Will Not Need Clinical Therapy Physicists
- AAPM's most recent "Medicare Hospital Outpatient Final Rule Summary" (available on the AAPM website)
- RO-ILS: Radiation Oncology Incident Learning System: A report from the first year of experience, Practical Radiation Oncology (2015) 5, 312-318.
- Complete AAPM Incident Learning Workshop Virtual Library Modules (other than Hands-on session)
- Four modules on Leadership Development from MindTools website:
    - Introduction to Leadership
    - General Leadership
    - Becoming a Leader
    - Young and Future Leaders

Competency List

- Complete: Billing Procedures
- Complete: Job Search and contract negotiations
- Complete: Malpractice and Legal Issues
- Complete: Professional Organizations, Certification and Licensure
- Complete: Review of Planning Workstations
- Complete: Workforce and the Future of Medical Physics – Staffing Calculations
- Complete: Oncology Information System Operation
- Complete: Review of Radiation Safety Regulations/Regulations
- Complete: FDA Clearance/510(k) Process
- Complete: RSNA/AAPM Ethics Modules
- Complete: Leadership Training Modules
- Complete: Review of Budgeting process for Medical Physics
- Complete: Review of Equipment Acquisition Process
- Complete: AAPM Incident Learning Workshop Modules
- Complete: Radiation Oncology IT overview for Medical Physicists – Lecture
- Complete: Faculty Preceptor Evaluation

Expectations for Successful Completion of Rotation

1. Completion of a minimum of 80% of required competencies and approval by preceptor.
2. Provide documentation of completion of all AAMP/RSNA modules assigned.
3. Medical Physics Staffing Report – Recommended staffing for assumptions provided during rotation
4. An overall passing grade on the end of rotation preceptor evaluation.

Administrative and Professional Rotation Topic Checklist and completion method:

| **Competency** | **Method of Covering** |
|---|---|
| Billing Procedures and Rules | Overview lecture by Technical Director |
| FDA Clearance/510(k) Process | Find a review document to go over - **NG** |
| Job Search including contract negotiations | AAPM/RSNA Module – Supplemental discussion with **Matt** |
| Malpractice and Legal Issues | Review AAPM Prof Insurance write-ups<br><br>Self-study |
| Oncology Information System Operation | Aria Admin - **Dominic** |
| Professional Organizations and Certification | **Matt** to review MOC and certification process |
| Review of Planning Workstations | Eclipse Admin and Machine setups - **Dominic** |
| Review of Radiation Safety Regulations/Regulations | Quality Management Program Review and setup for External Beam and Radioactive Materials - **NG** |
| Workforce and the Future of Medical Physics | Abt and ASTRO "Safety Is No Accident" Whitepaper, ACR staffing guidelines<br><br>*Resident to develop staffing spreadsheet and propose staffing plan for our department based on ACR and ASTRO recommendations.* **-NG** |
| Ethics Modules | AAPM/RSNA Modules – Self Study & provide proof of completion |
| Professionalism in Everyday Practice: A Physician Charter | |
| Physician-Physician and Physician-Patient Interactions | |
| Personal Behavior, Peer Review, and Negotiations with Employers | |
| Conflicts of Interest | |
| Ethics of Research | |
| Human Subjects Research | |
| Vertebrate Animal Research | |
| Relationships with Vendors | |
| Publication Ethics | |
| Ethics in Graduate and Resident Education | |
| Equipment Selection, etc. | Review Bid and Scorecard development –**NG** |
| Annual budget preparation | Capital and Operating Budget preparation – **NG** |
| Radiation Oncology IT Overview | Lecture |
| RO-ILS AAPM | Self-Study |
| AAPM Incident learning workshop Virtual Library- AAPM | Self-Study |
| Medicare Hospital Outpatient Final Rule Summary – AAPM's most recent version | Self-Study |
| Leadership: Mindtools Website | *Use Mindtools through BuckeyeLearn* |
| ▪ Vision and charisma | 5 Modules in "General Leadership"<br><br>- Ulrich's Leadership Capital Index<br>- Core Leadership Theories<br>- Ethical Leadership |

| | |
|---|---|
| | - Dunham & Pierce's Leadership Process Model<br>- Authentic Leadership |
| ▪ Qualities of leaders | 4 Modules in "Start Here"<br><br>- What Is Leadership?<br>- How Good Are Your Leadership Skills?<br>- The Leadership Motivation Assessment<br>- Leadership Motivation Tools |
| ▪ Rules of leadership | 7 Modules on "Becoming a Leader"<br><br>- 10 Common Leadership and Management Mistakes<br>- Leading Peers<br>- Now You're the Boss…<br>- What a Real Leader Knows<br>- Level 5 Leadership<br>- The Four Factor Theory of Leadership<br>- Taking Responsibility in a New Leadership Role |
| ▪ Young leaders | 3 Modules on "Young and Future Leaders"<br><br>- Leadership by the New Generation<br>- Building Tomorrow's Leaders<br>- The Leadership Pipeline Model |
| End of Rotation exam | |
| Faculty Preceptor Evaluation | |

## Medical Physics Rotation Description-Journal Club

Rotation: Journal Club, competencies stored in Administration
Timeframe: Over the course of the residency (longitudinal)
Preceptor: Ashley Cetnar

Overview
The goal of medical physics journal club is to allow the resident to gain scientific literacy by selecting a manuscript to read, digest, interact with, and present to a group. After participating in journal club, you will be able to read a technical document, think about it critically, and share technical information to colleagues in a formal setting.

In order to help gain the literacy skills that you will need as a medical physicist, you will complete four different projects over the course of the residency.

1. Review a research article using an outline for key aspects
2. Learn how to search for and select a good journal article
3. Compare and contrast a strong and weak article on the same topic
4. Research and defend one side of an argument in a point/counterpoint

The resident will lead the topic for the paper in the one-hour time slot of the Physics Education Conference (PEC) involving presentation and discussion. The other residents are expected to read and understand the paper. There will be a set schedule where you can plan in advance the article and when you will be presenting. The selected article will be sent out at the beginning of the month to the physicists and physics residents. At least one week prior to the presentation, a small group discussion will take place between the resident and preceptor for the content and understanding of the article and answer/discuss questions.
Over the course of the residency, records from the AHST system will be provided to the preceptor. At the end of the rotation, residents will be evaluated by the preceptor and the results documented in the AHST system.

Clinical Objectives

- **Review a research article using an outline for key aspects.** The resident will complete assigned readings reviewing journal club and review video on writing good scientific papers. The resident will identify a topic of interest and mentors will help identify a good paper on the topic. The resident will fill out a worksheet to help guide the understanding of the structure and purpose of the article. Schedule meeting with preceptor for review and date for presentation.
- **Learn how to search for and select a good journal article.** The resident will be introduced to scientific journals within medical physics and radiation oncology by reviewing videos on differences between journals in medical physics. They will be introduced to impact factor and the process of publication and review. The resident will also be exposed to citation management software and select one for download. The resident will select a topic of interest and propose three articles within a topic of interest. One final article will be selected after discussion with mentors for presentation to the group during the journal club meeting.
- **Compare and contrast a strong and weak article on the same topics.** The resident will review videos on what journal article reviewers are looking for in a manuscript. The resident will select a topic of interest and review several articles within a topic of interest. The resident will rank the articles and select an example of a strong article and weak article and defend why they believe so. The resident will schedule a meeting with mentors to review and justify. The two final articles will be compared and contrasted for presentation to the group during journal club meeting.
- **Research and defend one side of an argument in a point/counterpoint.** Resident will coordinate with another co-resident to select a topic for a point/counterpoint discussion that will be held during the journal club. Any topic of interest may be selected, but topics are encouraged from the AAPM list of past articles which can be found in either of the two volumes of “Controversies in Medical Physics: a Compendium of Point/Counterpoint Debates.”

Didactic Readings

- A Problem-Based Journal Club. Bahman Joorabchi. *Journal of Medical Education.* 1984. Vol. 59. Pg. 755.
- Journal Club for Faculty or Residents: A Model for Lifelong Learning and Maintenance of Certification. Michele T. Pato, Robert T. Cobb, Shari I. Lusskin, and Connie Schardt. *International Review of Psychiatry.* 2013; 25(3), 276-283.
- A Journal Club Workshop that Teaches Undergraduates a Systematic Method for Reading, Interpreting, and Presenting Primary Literature. Katerine Roberson. *Journal of College Science Teaching.* 2012. 41(6), 25-31.
- A New Approach to Teaching and Learning in Journal Club. Khalid S. Khan and Harry Gee. 1999. *Medical Teacher.* 21(3), 289-292.
- Writing a Research Paper. Theodore S. Lawrence. *International Journal of Radiation Oncology*. 2020. Volume 106, Number 4, pages 674-676.
- Revising a Research Paper. Theodore S. Lawrence. *International Journal of Radiation Oncology*. 2021. Volume 109, Number 2, pages 332-334.
- https://www.elsevier.com/reviewers

Competency List

Meeting to review readings/assignments

- Complete - Part 1
- Complete - Part 2
- Complete - Part 3
- Complete - Part 4

Meeting to review selected article(s) and outline for presentation

- Complete - Part 1
- Complete - Part 2
- Complete - Part 3
- Complete - Part 4

Presentation during Journal Club

- Complete - Part 1
- Complete - Part 2
- Complete - Part 3
- Complete - Part 4

Expectations for Successful Completion of Rotation

1. Completion of a 100% of required competencies and approval by preceptor.
2. An overall passing grade on the end of rotation preceptor evaluation.

## Medical Physics Rotation Description-Clinical Service Rotation

Rotation: Clinical Service
Timeframe: 1 Month
Preceptor: Nilendu Gupta

Overview
In this rotation (designed to be the last rotation before graduation) the resident is expected to function as a clinical medical physicist and cover all services within the radiation oncology clinic. The resident will work with a rotation preceptor and create a clinic coverage schedule for the month and make it available to the residency director. This rotation also allows a physics resident to complete any competencies from any other rotation that remained incomplete or needed additional work or repeating for any reason. Based on the clinic coverage plan or clinic needs the resident will be assigned clinical coverage for different coverage areas for the duration of this rotation.

At the end of the rotation, residents will be evaluated by the preceptor and the results documented in AHST system.

Clinical Objectives

- Residents will become proficient in providing clinical coverage to different clinical areas within the department.
- Residents may use this time to perform a job search.
- Residents may use this time to study for the American Board of Radiology certification exam.

Didactic Readings

- No Assigned Didactic Readings

Competency List

- No assigned competency
- Any competency from other rotations that are completed during this time need to be completed and signed by the preceptor

Expectations for Successful Completion of Rotation

1. End-of-Year/Residency Evaluation with Program Director(s).

**The Ohio State University Medical Center**
**Medical Physics Residency Program**
**Initial Rotation Checklist**

Rotation _____ Date _____

Resident _____ Preceptor _____

1. Clinical objectives for this rotation were reviewed and discussed.

Comments:_____
_____
_____

2. Didactic readings required for this rotation were reviewed and discussed.

Comments:_____
_____
_____

3. Clinical competencies were explained and discussed. It is clear what is expected for observe, assist and done levels of completion for each competency.

Comments:_____
_____
_____

4. Overall clinical preparation and participation expectations were explained and discussed. The resident understands the level and type of participation required for successful completion of this rotation.

Comments:_____
_____
_____

Resident Signature _____Date _____

Preceptor Signature _____ Date _____

**The Ohio State University Medical Center**
**Medical Physics Residency Program**
**Mid-Rotation Evaluation Checklist**

Rotation _____ Date _____

Resident _____ Preceptors _____

1. Approximate completion status of rotation competencies _____
2. Approximate completion status of didactic reading _____
3. Additional items discussed: _____

4. Proposed plan for completion of competencies and required reading: _____

Resident Signature _____ Date _____

Preceptor Signature _____ Date _____

**The Ohio State University Medical Center**
**Medical Physics Residency Program**
**Final Rotation Checklist**

Rotation _____ Date _____

Resident _____ Preceptor _____

1. Oral Exam

Examiners: _____

1a Notes: _____

1b Notes: _____

2 Notes: _____

3a Notes: _____

3b Notes: _____

3c Notes: _____

4a Notes: _____

4b Notes:

5a Notes:

5b Notes:

6 Notes:

2. Exam performance was reviewed and discussed._____

Comments:

3. Rotation performance was reviewed and discussed.
   Rotation Competencies completion _____%
   Didactic reading completion _____
   Clinical preparation and participation_____

Comments:

4. Reviews scheduled:

| | | Sent |
|---|---|---|
| Resident review of Primary Preceptor | _____ | _____ |
| Resident review of Secondary Preceptor | _____ | _____ |
| Primary Preceptor review of Resident (rotation & exam) | _____ | _____ |
| Secondary Preceptor review of Resident (rotation only) | _____ | _____ |
| Examiner review of Resident (exam only) | _____ | _____ |

*please include competency report with checklist submission*

## GME Policies and Adverse Actions

The following GME Policy and Procedure Documents (and more) can be found on the Graduate Medical Education Website.

https://onesource.osumc.edu/departments/GME/Pages/GMEPolicies.aspx

- Academic and Administrative Adverse Actions
- Charge of the Graduate Medical Education Committee (GMEC)
- Resident Due Process Policy
- Program Education Committee & Housestaff Competency Committee
- Internal Review Policy for Non-ACGME Accredited Training Programs
- Statement of Institutional Commitment to Graduate Medical Education

## Limited Staff Benefits

In addition to those listed in the Limited Staff Agreement, GME offers the following benefits to trainees:

| **Limited Staff Benefits Information** | |
|---|---|
| Medical physics residents are entitled to the same benefits as Limited Medical Staff, which includes all residents and clinical fellows. For Limited Medical Staff, The Ohio State University routinely provides the following benefits. A Limited Medical Staff Agreement is provided for residents and fellows each academic year. The below is concurrent as of 2022-2023. | |
| Health Care: | Limited medical staff are eligible for enrollment in one of several University-sponsored health insurance plans including single and dependent coverage. Prescription drug coverage is included in all plans. Coverage, deductibles, and co-payments vary by plan. |
| Dental: | Dental coverage for residents and dependents is available upon employment. |
| Vision: | Vision benefits for residents and dependents are available upon employment. |
| Worker's Compensation: | Worker's Compensation is prepaid providing 100% of all medical expenses and for a percentage of wage-loss, which results from job-related injuries or occupational diseases. |
| Disability Insurance: | Limited medical staff receives prepaid long term disability income insurance with benefits of $2000 per month in case of total and/or residual disability lasting beyond 90 days. The contract has portability features upon completion of training. |
| Life Insurance: | Limited medical staff are automatically entitled to prepaid term life insurance in the amount of 2 times their annual stipend, plus accidental death and dismemberment benefits. Dependents are eligible for enrollment in optional dependent group life plans. A variety of plans with varying premiums and limits of coverage are available. |
| Malpractice Insurance: | The University administers a self-indemnification insurance program. All residents are covered for their activities within the scope of the duties and responsibilities for the training program. It is an occurrence policy. Coverage is at least $1 million per occurrence and $3 million annual aggregate. |
| Electronic Device Reimbursement: | Residents in their first year at OSU will receive $200 reimbursement for the purchase of an electronic device to use for work purposes. Approve list is housed in GME office, and device must be accepting of OSU software. |
| Maternity/ Paternity Leave: | For the birth of a child, birth mothers are provided with 6 weeks (240 hours) of maternity leave to be paid prior to use of accumulated sick leave and/or accumulated vacation. Birth fathers or domestic partners (as defined in University Policies) are provided with three weeks (120 hours) of paternity leave to be paid prior to use of accumulated sick leave and/or accumulated vacation. For the adoption or foster care placement of a child, adoptive mothers, fathers, and domestic partners (as defined in University Policies) are provided with three weeks (120 hours) of paid leave to be paid prior to use of accumulated sick leave and/or accumulated vacation. Paid parental leave is available for one year from birth or adoption of a child. It runs concurrently with FML (but not limited by this). Leave may be used one continuous time or intermittently prior to and during the first 12 weeks following birth or adoption, and intermittently with advanced notice and departmental approval.<br>Notice of pregnancy should occur in the first trimester to ensure proper scheduling and receipt of benefits. Because the length of the maternity leave may affect the amount of time allowed away from a training program by a certifying board, the program director may use vacation, sick leave, personal days, or conference leave to accomplish completion of the training requirements within the standard training period. No moonlighting is permitted during maternity leave. Additional information regarding paid leave programs can be found on OSU HR website, **Paid Parental Leave Policy 02-44** |
| Vacation: | Limited medical staff receives up to two weeks (10 working days) paid vacation time per academic year. A maximum of one week (5 working days) vacation may be taken per rotation. |
| Job Interview Leave: | Residents in their second year of residency are given an additional 5 days in order to travel to/attend job interviews. Additional days in excess of this may be granted at the Program Directors discretion. |
| Sick Leave: | Limited medical staff begins accruing sick leave benefit hours upon employment. This benefit gives the resident full pay for up to the total number of hours accrued. Full-time employees accrue 10 hours per month of service. Appointments of less than 100% accrue at a pro-rated amount according to the time actually worked. |

| | |
|---|---|
| Retirement Benefits: | Retirement benefits are provided through the State of Ohio Teachers Retirement System (STRS) or through one of the Alternative Retirement Program (ARP) plans available. Contribution rates can vary from year to year based on program policies. For more information on the STRS and/or the Alternative Retirement Program, contact Human Resources at (614) 292-1050 to speak to a benefits consultant. Information is also available at www.hr.osu.edu under OSU faculty and staff. |
| Lab Coats & Laundry: | Two white lab coats with the OSU insignia (or one lab coat and one gray fleece) per year and scrubs are provided free of charge by the Medical Center. There is free laundry service for all work-related clothing. |
| Notary Service: | Free notary service is provided through the GME office. Educational loan deferment documents are processed through the GME office. |
| Parking: | Limited Staff have the right to purchase faculty "A" parking permits. Some departments may purchase parking passes for their housestaff. |
| Recreation: | Discounted fitness club memberships are available through the OSU Center for Wellness and Prevention. In addition, many athletic facilities and individual, team, and tournament sports are available on campus. Also, many other activities and cultural events are available at the University and throughout the city and the central Ohio area. |
| Resident Fund: | Residents are eligible to receive reimbursement for books and exam review materials up to $500 total over the course of their 2-year residency. |
| Meetings: | Residents are afforded the opportunity of going to national meetings at departmental expense. The Medical Director's office supports attendance at national meetings for those residents who demonstrate significant involvement in institutionally-based efforts. This benefit is designed to train/educate residents and enhance their participation. |
| Library & Learning Resources: | The Prior Health Sciences Library is located next to the Hospital. Overall, the Ohio State University has 27 libraries. The Medical Center houses a learning center for residents with PCs, laser printers, and free access to the Internet and online journals. |
| Counseling & Support: | The OSU Medical Center provides opportunities for counseling and consultation referral related to personal problems arising out of the trainee's participation in the program. As a benefits-eligible Ohio State faculty or staff member, trainees have access to the Ohio State Employee Assistance Program (EAP) that offers tools and resources to help address complex issues that can be affecting mental and emotional well-being. EAP services are also available to benefits-eligible faculty and staff's immediate families, members of their household and parents and parents-in-law. The Employee Assistance Program provides a confidential avenue for the discussion and resolution of personal problems. Further information can be found by visiting the EAP at https://hr.osu.edu/benefits/eap/ |

(Additional information on many OSU benefits noted in this section is available from the OSU Office of Human Resources website at http://hr.osu.edu/benefits/).