UTSouthwestern
Medical Center

Department of Radiation Oncology Clinical Medical Physics Residency Program

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utsouthwestern.edu/education/medical-school/departments/radiation-oncology/education-training/res-medical-physics/

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Program Goal and Objectives: Overview

The Department of Radiation Oncology is part of the NCI-designated Harold C. Simmons Comprehensive Cancer Center, which provides exceptional opportunities for translation of laboratory science into clinical trials and provides an integrated program of medical, radiation, and surgical oncology.

The goal of the University of Texas Southwestern (UTSW) Clinical Medical Physics Residency Training Program is to influence the field of clinical radiation oncology physics by educating thoughtful and informed men and women in the profession. The Medical Physics Residency is a CAMPEP-accredited, three-year program that emphasizes clinical excellence and academic career development in radiation oncology physics. The program integrates two years of full-time clinical training and one year of research in medical physics.

The Residency Program provides comprehensive clinical training and experience in radiation oncology physics to candidates with a Ph.D. degree in medical physics, physics or closely related field. The program includes didactic instruction but emphasizes participation in all clinical services under the supervision of the program faculty. The Residency Program is fully integrated into the day-to-day clinical operations of the Department of Radiation Oncology where residents interact with staff physicists, physicians, nurses, radiation therapists and LINAC engineers on a daily basis to receive instruction for safe, effective patient care. In addition, residents have ample opportunities to interact with medical staff from other clinical services including diagnostic radiology, neurosurgery, urology, and other clinics as they relate to radiation oncology. The successful resident will be able to demonstrate competency in all areas of clinical radiation oncology physics and will be qualified to take the certification examination of the American Board of Radiology in Therapeutic Radiologic Physics once prerequisites of the board are fulfilled.

History of Department and Educational Programs

In September 2003, Dr. Hak Choy was appointed Professor and Chairman of the Department of Radiation Oncology at UT Southwestern and the Moncrief Radiation Oncology Center was opened for patient care. The new leadership and facilities enacted a major revolution in patient care, research, and education at UTSW and after twelve months became the second largest academic radiation oncology department in Texas—just behind MD Anderson Cancer Center.

The Department of Radiation Oncology grew from nine full-time faculty in September 2003 to 70 full-time faculty in fiscal year 2017. Three training programs have been founded since September 2003 including a Medical Residency, a Medical Physics Residency, and a Bachelor of Science degree program in radiation therapy technology.

A Medical Residency Program was pursued in March 2004 and approved by ACGME for six residents initially. The first class of medical residents entered in July 2005. In 2008, the medical residency underwent its first three-year review and was approved for two additional positions (eight positions total).

Currently, the program is approved for 14 positions. UT Southwestern's School of Health Professions submitted a substantive degree request proposal to the Texas Coordinating Board to approve a new Bachelor of Science degree and post-baccalaureate certificate in radiation therapy that was approved in 2007. The program accepted its first students in August 2008. The UT Southwestern School of Health Professions Radiation Therapy Program is currently entering into its ninth year of operation.

In February 2008, the Department of Radiation Oncology initiated the creation of a clinical **Medical Physics Residency Program**. Grant aid was immediately pursued to develop the Residency Program and was awarded in May 2008 by the American Society for Therapeutic Radiation Oncology (ASTRO). A two-year program format was adopted with direction from AAPM Report No.90, "Education and Training of Medical Physics Committee Subcommittee on Residency Training and Promotion." The Residency Program was founded to provide practical and didactic education in clinical radiation oncology physics. In October 2013, Dr. Steve Jiang was recruited as the director of the Medical Physics and Engineering Division. In 2015, the residency's mission statement was modified to include an emphasis on academic career development. Toward this new mission, a "research" year was made mandatory for residents beginning in 2015 and beyond.

Dr. Paul Medin and Dr. Ryan Foster assumed the responsibility of directing the Medical Physics Residency Program and leading it through CAMPEP accreditation. Dr. Medin is a graduate of a CAMPEP-accredited Medical Physics Graduate Program (UCLA, 1998) and a CAMPEP-accredited Residency Program (Univ. of MN, 2000). Dr. Medin was previously the director of a residency program that he led to CAMPEP accreditation in January 2008. Dr. Strahinja Stojadinovic (Virginia Commonwealth University) and Dr. Yang Park (Seoul National University) are the Associate Residency Directors.

Program Structure and Governance

For the two-year clinical component of the program, instruction is currently given within the Radiation Oncology Department by 17 clinical physicists, 20 radiation oncologists, 10 dosimetrists, 20 nurses, 39 radiation therapists, and three LINAC engineers.

The Medical Physics Residency Program is administratively part of the Department of Radiation Oncology at UTSW and is directed by:

- Chairman Dr. Hak Choy
- Division of Medical Physics and Engineering Director Steve Jiang, Ph.D.

And overseen by:

- Residency Director Paul Medin, Ph.D. and Associate Directors Strahinja Stojadinovic, Ph.D and Yang Park, Ph.D.
- Medical Physics Residency Committee

The Department of Radiation Oncology consists of three official divisions: clinical, molecular radiation biology, and medical physics and engineering.

The members of the Residency Committee and the Residency Director are appointed by the Chairman. The Residency Committee membership typically includes representatives from physics, dosimetry, the physicians group, and an administrator. The Residency Committee typically meets two times per year or for special sessions if necessary.

The Residency Committee is charged with the following responsibilities:

- Review/select short list of applicants to be interviewed
- Assess individual resident's progress
- Evaluate the strengths, weaknesses and long-term goals of the program
- Review and approve proposed changes to the programs structure, function or curriculum (clinical or didactic)
- Select the final rank order for recruiting in the event the physics/dosimetry group's selection process results in a tie
- Evaluate cases of censure, disciplinary action, recommended dismissal of residents.

The Residency Director works with the Director of Medical Physics, the Chairman of the Department, the Residency Committee and the Department Administrator to ensure that residents' training is within established guidelines. The Residency Director is charged with the following responsibilities:

- Coordinating the initial and ongoing accreditation process
- Coordinating meetings of the Residency Committee
- Coordinating the scheduling of oral examinations
- Hearing concerns regarding resident's progress/performance and coordinating a response with the Director of Medical Physics.

The Associate Residency Directors are charged with the following responsibilities:

- Coordinating the resident/faculty pairing schedule
- Coordinating the schedule of assessments and oral exams
- Coordinating resident/equipment assignments for monthly and annual QA
- Resident time management

- Updating the curriculum
- Coordinating LINAC and IMRT QA training
- Evaluating quarterly surveys of the program from residents/faculty, and d) coordinating the annual Program Evaluation Committee and Annual Program Evaluation as required by the Graduate Medical Education (GME) office at UTSW.

Although residents are trainees in the Department of Radiation Oncology, they receive the same benefits as full-time employees of UTSW; therefore, common human resource issues are dictated by university policy and not by the Residency Program. The Residency Director works with the department administrator to follow university policy and procedures related to human resources. The director must be board-certified in therapeutic radiologic physics, have at least seven years' clinical experience, and have an academic appointment in the UTSW School of Medicine with a minimum rank of Assistant Professor.

Funding

Hospital funds pay for residents who are in their clinical training years and research grant funds pay for residents in their research year.

Eligibility and Application

Applicants to the Medical Physics Residency Program are required to have a strong foundation in physics. Prerequisites to apply for this program are: a) a Ph.D. degree in medical physics, physics, or closely related field, b) must meet the eligibility requirements of the Texas Medical Board for a temporary medical physics license, and c) must have completed a minimum of four (of six) core graduate-level didactic courses in medical physics described in AAPM Report 197S and demonstrate CAMPEP equivalence of each course. Residents must hold a valid license from the Texas Medical Board (TMB) to be trained in Texas. A full set of requirements to attain a license in Texas can be found at http://www.tmb.state.tx.us/page/licensing. The TMB currently requires a minimum of 20 semester hours of graduate level physics coursework be completed to attain a temporary medical physics license. CAMPEP equivalence of graduate medical physics courses is demonstrated by: a) presenting transcripts from a CAMPEP-accredited graduate program, b) presenting transcripts from a CAMPEP-accredited certificate program, c) acquiring a statement of course equivalence from the CAMPEP Graduate Education Program Review Committee, or d) by taking the course at UT Southwestern.

Applicants that are admitted with fewer than the six required medical physics courses must complete the missing courses while they are residents before they can graduate. Instructions for review of coursework can be found on the CAMPEP website. Application materials are accepted only via the AAPM's MP-RAP (Medical Physics Residency Application Program) website between October 15 and December 15 for the position starting the following July. Application materials received prior to or following these dates will not be considered. Incomplete applications will not be considered. We recruit through the Medical Physics Match Service.

To apply, applicants must participate in the match and enter **code number 16611** for our program. The application review process is typically completed by January 15 and the highest ranking candidates are invited for a personal interview planned to take place in February 2018.

Potential applicants are encouraged to familiarize themselves with informational literature regarding the medical physics profession, such as (1) AAPM's "The Medical Physicist," (2) AAPM's "The Roles, Responsibilities, and Status of the Clinical Medical Physicist," and (3) AAPM Report No. 249, "Essentials and Guidelines for Clinical Medical Physics Residency Training Programs." All three documents can be obtained from the American Association of Physicists in Medicine.

Admissions

Applications for admission to the Medical Physics Residency Program are solicited primarily through:

- UTSW Radiation Oncology Department website
- AAPM's placement service
- Word of mouth

All inquiries are directed to the departmental website that contains information essential to the prospective applicant such as: a description of the Residency Program, a link to the AAPM's MP-RAP (Medical Physics Residency Application Program) website, contact information, and references to information explaining the field of medical physics.

Salary and Benefits

The Department of Radiation Oncology's financial commitment is limited to three years from a resident's start date and is contingent on satisfactory progress. The current (2018/2019) stipend for medical physics residents entering the three-year program is $48,432 (Sept 1, 2018). Salary for years two and three are calculated from the Dallas County Parkland Medical Center salary scale for medical residents with an applied offset. For example, for the 2018/2019 year, medical physics resident salaries are $58,122 for PGY2 and $60,570 for PGY3. Residents that enter our two-year program under the exception stated in our self-study document, begin the program at the PGY2 salary level discussed above.

In addition, residents are provided with a discretionary account each year that is intended to pay for professional expenses such as travel costs, Texas state licensure, and society dues. It is intended that each resident will attend at least one national professional meeting (e.g. AAPM, ASTRO, ACMP, RSNA,) during their three-year training program. Meeting travel must be approved by the Director of the Medical Physics Division. Residents may purchase additional books relevant to the practice of medical physics using their discretionary accounts.

Physics residents receive benefits commensurate with medical residents that include:

- Comprehensive group health coverage is available at no cost to the resident. Dependent health coverage, supplemental life insurance, dental, and vision plan insurance are available for both the resident and his/her dependents at a reduced rate
- Low-rate automatic eligibility disability coverage is available
- Malpractice and a basic life insurance policy are provided
- Fifteen working days paid vacation per academic year plus 10-12 paid holidays per year (depends on if holidays fall on weekdays or weekend days)
- Time for professional development
- Sick leave – residents accrue 12 days per year during training
- Two lab coats provided by the university at the beginning of residency (laundering is provided free of charge)

New Resident Orientation

Orientation consists of:

- Residency self-study orientation
- Radiation oncology departmental orientation
- UTSW employee orientation

All orientations are scheduled as soon as possible following the arrival of a resident. The entering resident's first academic responsibility is to read the residency self-study to become familiar with the program expectations and the requirements for completion. This requirement is listed on the first page of the CRSO and the resident's first mentor must sign that it has been completed.

Radiation oncology orientation is directed by the departmental administrator and includes all key topics:

- Mission statement
- Safety
- Employee health
- Tours and introductions
- Organizational structure
- Clinic policies and procedures

Training

Medical physics residents spend one year engaged in medical physics research and two years immersed in the clinical environment. For the research year, a resident is mentored by one of the research-oriented faculty members. For the two-year clinical component of the program, instruction is given within radiation oncology by a team comprised of: 27 physics and engineering faculty, 21 molecular radiation biology faculty and 20 physicians.

The Residency Program is divided into eight quarterly rotations each with specific objectives and assessments. A mentor from the medical physics faculty is assigned to each resident for each rotation. Mentorship rotates throughout the faculty so any faculty member can expect to mentor approximately one resident for one quarter per year.

Safety

Safety training is part of the departmental orientation process. Entering residents are informed of the potential health hazards in the department including:

- Ionizing radiation
- Heavy metals (lead and Cerrobend)
- Sulfur hexafluoride
- High voltage
- Biohazards
- Sharps

The locations of these hazards within the department are shown to residents during the departmental tour and residents are instructed to avoid them until more thorough training is complete. A working knowledge of health hazards is achieved in the resident's first month as they are required to participate in radiation safety training and in the following mini-rotations as described in the CRSO:

1. Introduction to Rad. Onc. Clinic—Radiation Protection
2. Introduction to Rad. Onc. Clinic—Nursing
3. Introduction to Rad. Onc. Clinic—Simulation
4. Introduction to Rad. Onc. Clinic—LINAC

Residents apply for a temporary license to practice medical physics in the state of Texas. This temporary license allows them to perform any medical physics duties a fully licensed medical physicist can do, but under the supervision of a licensed physicist.

Residents attain access to clinical equipment as they demonstrate the maturity and competence necessary for its safe operation. Residents begin by using equipment under direct supervision and gradually advance to become independent users. Residents are not permitted to access radiation-producing equipment independently until approved by the Clinical Director of Medical Physics. Residents are not permitted to access or handle radioactive materials or operate the high-dose rate afterloader or Gamma Knife without supervision by a staff physicist.

PHYSICIST TASK	**EXPECTED TIME TO INDEPENDENCE**
Operate a LINAC	End of month 3
Operate the CT simulator	End of month 3
Perform IMRT quality assurance	End of month 3
Perform monthly LINAC QA	End of month 6
Irregular field treatment planning	End of month 6*
3-D planning	End of month 9*
IMRT treatment planning	End of month 9*
Perform clinical MU calculations	End of month 9*
Perform annual LINAC quality assurance	End of month 12*

Perform regular HDR quality assurance	End of month 12*
Chart checks, planning and MU 2nd check	End of month 21*
HDR treatment planning	End of month 21*
Radiosurgery treatment planning	End of month 21*

Table III.1 Timeline for independent functioning

*Time varies depending on individual resident rotation assignments.

Requirements of Successful Program Completion

Medical physics residents must fulfill eight basic requirements to complete the Residency Program; these requirements are presented to incoming residents during orientation. The eight basic requirements are elaborated below. Failure to maintain satisfactory progress in any of the eight basic requirements is considered a serious breach of the terms of employment and enrollment in the Residency Program and will jeopardize both. Disciplinary action is described in this section.

1. Successfully complete all eight clinical rotations and clinical special procedures as defined in the "Clinical Rotation Schedule and Objectives (CRSO)" (see CRSO document). The CRSO contains explicit direction and assessments regarding clinical training activities. Each assessment includes a list of reading material pertinent to its subject matter. Incoming residents are instructed to use the CRSO as a guide to prioritize their time. The rotation schedule has been defined to include all aspects of clinical training described in the CAMPEP standards in a two-year period. For each rotation, the resident is assigned a mentor from the physics faculty and is responsible to perform clinical tasks under his/her supervision. These tasks are part of the routine clinical service that the Physics Section provides. Clinical duties and responsibilities of the staff physicists are described in our self-study document. A rotation is considered complete when all rotation assessments have been completed through MedHub by the mentor and resident. Residents are expected to participate in as many procedures as possible and minimum requirements are presented in (see our self-study document). The frequency of procedures is unpredictable so residents should participate in any procedure when an opportunity exists. Procedures will occur throughout a resident's time in the Program and may be performed during any rotation. Participation in procedures is documented by the resident in MedHub by initiating a procedure event. Once initiated, MedHub will notify the faculty member identified by the resident in the procedure document and the faculty member will complete the appropriate assessment with the resident. Failure to complete a rotation or unsatisfactory progress in a rotation or the required procedures will be reviewed by the Residency Committee. The resident will be notified in writing of their probationary status and will be given a plan for remediation. The resident will have one month to complete the remediation plan. Failure to complete the remediation plan will be grounds for termination.

2. Complete two full calendar years of clinical training and one full calendar year of research training within the Residency Program. A certificate of training will not be awarded to residents who do not complete the full three years within the program. The only exception to this requirement applies to faculty-level individuals who have been engaged in research for at least one year. In this situation, the research requirement of the Residency Program may be waived; however, the two-year clinical training requirement shall not be waived.

3. Write seven quarterly reports (rotations two through eight). Written reports are intended to compel a resident to formally organize and present information on a given subject. These reports should serve as a quick refresher on the respective subject matter when needed for a clinical procedure or in preparation for an examination such as the ABR Board Examination. The report should be concise. Typically three to five pages of single-spaced text are adequate. If a written report is determined to be unsatisfactory, the resident may make edits and resubmit to their mentor. The seven written reports may be completed in any order at the resident's discretion, but it is advised to write the report that most closely mirrors their current rotation. Report topics and expectations are defined below. Written reports are due at least 24 hours prior to the final oral (comprehensive) for the associated rotation. When a written report is not submitted at least 24 hours prior to the final oral, the oral exam will be delayed and rescheduled for a date within two weeks of the rotation end date. If the report is not submitted within two weeks of the rotation end date, the situation will be reviewed by the Residency Committee that will make a recommendation for resolution up to and including termination. Only one delayed report will be considered acceptable during the course of the Residency. If more than one report is submitted after the due date during the course of the Residency, the situation will be reviewed by the Residency

Committee that will make a recommendation for resolution up to and including termination. Mentors indicate successful completion of a report by initialing the bottom of the first page. A copy of the completed report must be available to the Residency Director and the resident through MedHub. A written report template is shown in our self-study document.

- Report 1
  Radiation detectors: (1) air ionization chambers, triax, cable, electrometer, (2) film including Radiochromic and EDR2, (3) TLD, (4) OSLD, (5) diode, (6) MOSFET.
  Write a report on the common clinical radiation detectors listed above. The report should demonstrate that the resident is familiar with detector design and function. The report should describe the strengths and weaknesses of each detector concentrating on: a) energy/modality dependence, b) dose rate dependence, c) dose range, d) associated equipment/software, e) accuracy and precision, f) linearity, and g) cost. The report should identify all documents used for its preparation.

- Report 2
  Calibration of LINAC photon and electron beams and calibration of Orthovoltage X-ray units.
  Write a report on the calibration of LINAC photon and electron beams and calibration of orthovoltage units. The report should: a) describe the history of calibration protocols especially compare/contrast TG-21 to TG-51, b) explain how beam energy is determined and specified for each protocol, c) demonstrate familiarity with TG-61, d) demonstrate an understanding of the calibration equations and the factors that affect each variable in the equations. The report should identify all documents used for its preparation.

- Report 3
  Operation, acceptance testing and commissioning of LINACs: xrays and electrons.
  Write a report on the operation, acceptance and commissioning of a LINAC. The report should: a) describe the functions of the major components of a LINAC, b) describe the acceptance process, c) explain the commissioning process, and d) make note of the necessary measurements. The report should identify all documents used for its preparation.

- Report 4
  Acceptance testing and commissioning of treatment planning systems, explanation of algorithm.
  Write a report on acceptance and commissioning of treatment planning systems. The report should: a) outline the parameters of interest in treatment planning systems, b) outline what measurements/calculations need to be compared, and c) explain the dose calculation algorithm used by the Eclipse planning system at a minimum. The report may exclude IMRT considerations as they are covered in Report 6. The report should identify all documents used for its preparation.

- Report 5
  Room shielding design for simulator, CT, megavoltage LINACs, HDR, isotope storage. Radiation protection surveys of a LINAC vault.
  Write a report on radiation shielding design for simulators, CT, LINACS, HDR and isotope storage. The report should include: a) current allowable dose limits, b) a description of shielding calculation methods for primary, scatter, leakage and neutrons, c) a table of common shielding materials with their density, half value layer and tenth value layer thicknesses and efficacy for neutron shielding, d) a description of how a radiation protection survey is performed, and e) a shielding report for a multi-energy LINAC at UTSW. The report should identify all documents used for its preparation.

- Report 6
  IMRT commissioning, planning, quality assurance, plan verification.
  Write a report on IMRT commissioning, planning, quality assurance and plan verification. The report should include: a) an introduction that defines IMRT and its purpose in treatment planning, b) a short description of common IMRT delivery techniques, c) a description of the IMRT parameters used for planning with one of the treatment planning systems at UTSW, d) an outline of the steps taken to commission an IMRT system, e) a description of ongoing quality

assurance procedures, and f) a description of individual patient QA procedures. The report should identify all documents used for its preparation.

- Report 7
  Acceptance testing and commissioning of HDR brachytherapy apparatus and sources.
  Write a report on the acceptance and commissioning of an HDR system. The report should include: a) a list of parameters evaluated with methods of evaluation, b) decay calculations, c) a discussion of safety concerns and solutions, d) a description of the source, encapsulation and delivery system, e) approximate dose rates from a 10 Curie source at distances of 1cm, 10cm and 100cm, and f) a discussion on the source calibration methods. The report should identify all documents used for its preparation.

4. Complete 24 monthly oral examinations. Oral examinations are intended to be a semi-formal discussion between the faculty and a resident through which an assessment can be made of the resident's familiarity with the subject matter. All faculty members are invited to participate in the oral examinations but a minimum of three members who qualify to score the exam must be present to hold an oral examination. A faculty member must have a minimum rank of Assistant Professor and appropriate clinical experience to give a score for an oral exam. The faculty may question the resident on any aspect of the subject matter and the lead examiner will submit an evaluation of the resident's performance through MedHub. All present qualifying faculty members will score the oral and the average will be the final score (see the oral evaluation sheet in our self-study document). The score should reflect the resident's mastery of the subject and their ability to present answers clearly. The score will be based on a scale of 1 through 5 where 1 is worst and 5 is best. A final score of 3 or greater will be acceptable. A final score less than 3 will require the resident to prepare and deliver a presentation on the subject of the oral. The presentation will be given to the mentor, the Director and/or Associate Director and interested faculty and staff. The presentation will be given within the week following the oral. Areas of weakness and strength must be identified in the comment section of the oral form. If the resident's makeup presentation is considered unsatisfactory, the situation will be reviewed by the Residency Committee. The resident will be notified in writing of their probationary status and will be given a plan for remediation. The resident will have one month to complete the remediation plan. Failure to complete the remediation plan will be grounds for termination. The list of oral topics is presented in Table 8.1.

Number	Subject
1	Simulation and patient setup, CT-simulator QA (TG-66)
2	In-vivo or patient-specific dosimetry (IMRT/SBRT QA)
3	Rotation 1 comprehensive
4	Normal tissue tolerance and dose response models
5	Monitor unit calculations
6	Rotation 2 comprehensive
7	LINAC design and function
8	AAPM task groups-40/142 QA
9	Rotation 3 comprehensive, emph. AAPM task group-51 calibration
10	Radioactive isotopes: TG43 + addendum
11	Radioactive isotopes: regulations and brachytherapy QA
12	Rotation 4 comprehensive, emph. treatment planning for brachytherapy
13	AAPM task groups-25/70, electrons
14	Total body irradiation (TBI) and total skin electrons (TSE)
15	Rotation 5 comprehensive
16	MV photon/electron shielding design and accepted dose limits
17	kV photon and isotopes shielding design
18	Rotation 6 comprehensive, emph. stereotactic radiosurgery/Gamma Knife
19	CyberKnife planning and QA
20	kV,MV other position verification technologies
21	Rotation 7 comprehensive, emph. stereotactic body radiotherapy
22	Pregnant patients/pacemakers/hip replacements
23	Imaging modality - MRI/PET
24	All residency comprehensive

*Note: Orals are not necessarily taken in this order.

Table 8.1. List of oral examination topics.

5. Residents should participate in educational conferences, lectures and meetings that take place regularly within the Department of Radiation Oncology unless exempted by their mentor or prevented by clinical responsibility. Medical physics residents are required to attend all clinical physics meetings, four Radiation Oncology chart rounds, and four specialty oncology conferences (tumor boards) per quarter. Assessments for chart rounds and tumor boards are distributed to residents through MedHub at the beginning of each rotation. Residents document attendance by completing these assessments. A schedule of tumor boards is presented in Table 8.2. Failure to attend required conferences is considered a breach of the terms of employment and enrollment in the Residency Program. Conferences presently within the Department of Radiation Oncology consist of:

- Patient Case Review. Medical residents present case reviews with attending physicians and physicists. Medical histories, pathology and laboratory results, and diagnostic images are reviewed, along with a discussion of the best course of treatment.
- Chart Rounds and Mortality & Morbidity. Department discusses status of patients under treatment. Treatment plans, verification images, and other relevant treatment information are presented and medical histories, pathology and laboratory results, and diagnostic images are reviewed. Chart rounds are attended by radiation oncologists, medical residents, medical physicists, physics residents, dosimetrists, one or more therapists, and one or more nurses. Additionally, unexpected morbidities and/or mortalities are discussed for patients under treatment or for whom treatment has been completed.
- Special Lectures. Additional clinical or research lectures, organized by the medical residents.
- Clinical Physics Meeting. The physics division reviews existing clinical physics programs and projects, develops/plans new technology implementation, reviews patient and machines QA issues, discusses upcoming special procedures, and allocates resources for clinical physics activities.
- Physics Research Meeting. The physics division discusses ongoing research projects.
- ASTRO-ARRO Journal Club (approximately monthly). Webinars sponsored by ASTRO-ARRO. Attended by physicians and physicists.

Radiation Oncology and Multi-Disciplinary Conferences
2017-2018 AY

Monday	Tuesday	Wednesday	Thursday	Friday
8:00 - Resident Case Conference, EC3.130 **12:30** - Melanoma (DOT), NC8.212 **1:30** - Sarcoma (DOT), NC8.212 *4:00 - Resident Physics Course, EC3.130, AUG-JAN* *4:00 - Resident RadBio Course, EC3.130, JAN-JUN* **5:30** - Renal Cell Conference, J8.102, 1st Mon	**7:15** - Breast Multi-D Conf, ND3.218 **4:00** - Peds (TB), CMC B6-403	**7:00** - Urology (GR), J8.108 **7:00** - Skull Based (TB), M1.119, 1st Mon **8:00** - Gyn Onc (TB), G6.200 **Noon** - GI (TB), ND3.218 *4:00 - Chart Rounds, EC3.120 (H/N and GU)* *4:00 - Chart Rounds, EC3.130 (non H/N and GU)*	**7:30** - Lymphoma (TB), ND3.218 *8:00 - Resident Case Conference, EC3.130* **8:00** - Peds Neuro-Onc (TB), CMC C10-201	*8:00 - Resident Physics Course, EC3.130 AUG-JAN* *8:00 - Resident RadBio Course, EC3.130, JAN-JUN* **12:15** - Cancer Center Lecture Series, NL3.120, 1st Fri **Noon** - GI /Hep Malignancy, CUH2.109 **Noon** - Peds MSK Sarcoma, CMC B6-403, Alternating Fri **1:00** - Neuro-Onc (TB), Zale PDR **1:00** - Thoracic Malignancy (TB), ND3.218
8:00 - Resident Case Conference, EC3.130 **12:30** - Melanoma (DOT), NC8.212 **1:30** - Sarcoma (DOT), NC8.212 *4:00 - Resident Physics Course, EC3.130, AUG-JAN* *4:00 - Resident RadBio Course, EC3.130, JAN-JUN*	**7:15** - Breast Multi-D Conf, ND3.218 **4:00** - Peds (TB), CMC B6-403	**7:00** - Urology (GR), J8.108 **7:00** - H/N (TB), M1.119 **8:00** - Gyn Onc (TB), G6.200 **Noon** - GI (TB), ND3.218 *4:00 - Chart Rounds, EC3.120 (H/N and GU)* *4:00 - Chart Rounds, EC3.130 (non H/N and GU)*	*8:00 - Resident Case Conference, EC3.130* **8:00** - Peds Neuro-Onc (TB), CMC C10-201	*8:00 - Resident Physics Course, EC3.130 AUG-JAN* *8:00 - Resident RadBio Course, EC3.130, JAN-JUN* **Noon** - GI /Hep Malignancy, CUH2.109 **Noon** - Peds MSK Sarcoma, CMC B6-403, Alternating Fri **1:00** - Neuro-Onc (TB), Zale PDR **1:00** - Thoracic Malignancy (TB), ND3.218 **3:00** - Thyroid (TB), Y6.224. 2nd Fri/Odd Months
8:00 - Resident Case Conference, EC3.130 **12:30** - Melanoma (DOT), NC8.212 **1:30** - Sarcoma (DOT), NC8.212 *4:00 - Resident Physics Course, EC3.130, AUG-JAN* *4:00 - Resident RadBio Course, EC3.130, JAN-JUN*	**7:15** - Breast Multi-D Conf, ND3.218 **4:00** - Peds (TB), CMC B6-403	**7:00** - Urology (GR), J8.108 **7:00** - H/N (TB), M1.119 **8:00** - Gyn Onc (TB), G6.200 **Noon** - GI (TB), ND3.218 *4:00 - Chart Rounds, EC3.120 (H/N and GU)* *4:00 - Chart Rounds, EC3.130 (non H/N and GU)*	*8:00 - Resident Case Conference, EC3.130* **8:00** - Peds Neuro-Onc (TB), CMC C10-201	*8:00 - Resident Physics Course, EC3.130 AUG-JAN* *8:00 - Resident RadBio Course, EC3.130, JAN-JUN* **Noon** - GI /Hep Malignancy, CUH2.109 **Noon** - Peds MSK Sarcoma, CMC B6-403, Alternating Fri **1:00** - Neuro-Onc (TB), Zale PDR **1:00** - Thoracic Malignancy (TB), ND3.218
8:00 - Resident Case Conference, EC3.130 **12:30** - Melanoma (DOT), NC8.212 **1:30** - Sarcoma (DOT), NC8.212 *4:00 - Resident Physics Course, EC3.130, AUG-JAN* *4:00 - Resident RadBio Course, EC3.130, JAN-JUN*	**7:15** - Breast Multi-D Conf, ND3.218 **4:00** - Peds (TB), CMC B6-403	**7:00** - Urology (GR), J8.108 **7:00** - H/N (TB), M1.119 **8:00** - Gyn Onc (TB), G6.200 **Noon** - GI (TB), ND3.218 *4:00 - Chart Rounds, EC3.120 (H/N and GU)* *4:00 - Chart Rounds, EC3.130 (non H/N and GU)*	*8:00 - Resident Case Conference, EC3.130* **8:00** - Peds Neuro-Onc (TB), CMC C10-201	*8:00 - Resident Physics Course, EC3.130 AUG-JAN* *8:00 - Resident RadBio Course, EC3.130, JAN-JUN* **Noon** - GI /Hep Malignancy, CUH2.109 **Noon** - Peds MSK Sarcoma, CMC B6-403, Alternating Fri **1:00** - Neuro-Onc (TB), Zale PDR **1:00** - Thoracic Malignancy (TB), ND3.218 **3:00** - Thyroid (TB), Y6.224. 2nd Fri/Odd Months
8:00 - Resident Case Conference, EC3.130 **12:30** - Melanoma (DOT), NC8.212 **1:30** - Sarcoma (DOT), NC8.212 *4:00 - Resident Physics Course, EC3.130, AUG-JAN* *4:00 - Resident RadBio Course, EC3.130, JAN-JUN*	**7:15** - Breast Multi-D Conf, ND3.218 **4:00** - Peds (TB), CMC B6-403	**7:00** - Urology (GR), J8.108 **7:00** - H/N (TB), M1.119 **8:00** - Gyn Onc (TB), G6.200 **Noon** - GI (TB), ND3.218 *4:00 - Chart Rounds, EC3.120 (H/N and GU)* *4:00 - Chart Rounds, EC3.130 (non H/N and GU)*	*8:00 - Resident Case Conference, EC3.130* **8:00** - Peds Neuro-Onc (TB), CMC C10-201	*8:00 - Resident Physics Course, EC3.130 AUG-JAN* *8:00 - Resident RadBio Course, EC3.130, JAN-JUN* **Noon** - GI /Hep Malignancy, CUH2.109 **Noon** - Peds MSK Sarcoma, CMC B6-403, Alternating Fri **1:00** - Neuro-Onc (TB), Zale PDR **1:00** - Thoracic Malignancy (TB), ND3.218 **2:00** - Combined Pituitary (TB), Y6.224, 5th Fri/Qtrly

Table 8.2. UTSW conference and tumor board schedule.

6. Residents must complete 11 ethics/professionalism modules and view one presentation regarding leadership offered online through the AAPM website. A list of the required modules and the presentation is presented in Table 8.2. Note that the courses offered online by the AAPM are subject to change. Please discuss with the Residency Director if listed courses are no longer offered and substitute courses will be identified. Modules may be completed at the resident's leisure but they must be completed before a certificate of graduation will be issued.

Professionalism and Ethics	**How Covered**	**Comments**
Professionalism		
Definition of a profession and professionalism	Historical Evolution and Principles of Medical Professionalism (2015)	RSNA Online Learning Center through

Elements of a profession	Historical Evolution and Principles of Medical Professionalism (2015)	*AAPM>Education>Online Ethics & Professionalism Modules*
Definition of a professional	Historical Evolution and Principles of Medical Professionalism (2015)	
Elements of professionalism	Historical Evolution and Principles of Medical Professionalism (2015)	
How is professionalism judged?	Historical Evolution and Principles of Medical Professionalism (2015)	
Do's and don'ts of professionalism	Historical Evolution and Principles of Medical Professionalism (2015)	
Physician's charter and applicability to physicists	Professionalism in Everyday Practice; The Physician Charter (2015)	
Leadership		
Vision and charisma	Transitions from Trainee to Leader, presented by Todd Pawlicki, Ph.D. (2017)	AAPM Virtual Library: 2017 AAPM Annual Meeting
Qualities of leaders		
Rules of leadership		
Causes of leadership failure		
Ethics		
Ethics of a profession	Historical Evolution and Principles of Medical Professionalism (2015)	RSNA Online Learning Center through *AAPM>Education>Online Ethics & Professionalism Modules*
Ethics of an individual	Historical Evolution and Principles of Medical Professionalism (2015)	
Interactions with colleagues and co-workers	Historical Evolution and Principles of Medical Professionalism (2015)	
Interactions with patients and the public	Historical Evolution and Principles of Medical Professionalism (2015) Professionalism in Everyday Practice; The Physician Charter (2015)	
Confidentiality	Professionalism in Everyday Practice; The Physician Charter (2015)	
Peer review	Personal Behavior, Peer Review, and Negotiations with Employers (2018)	
Negotiation skills	Personal Behavior, Peer Review, and Negotiations with Employers (2018)	
Relationships with employers	Personal Behavior, Peer Review, and Negotiations with Employers (2018)	
Conflicts of interest	Conflict of Interest (2018)	
Ethics in research	Ethics of Research (2018)	
Use of animals in research	Vertebrate Animal Research (2018)	
Use of humans in research	Ethics of Research (2018) Human Subjects Research (2018)	
Relationships with vendors	Relationships with Vendors (2018)	
Publication ethics	Publication Ethics (2018)	
Ethics in graduate and resident education	Ethics in graduate and resident education (2018)	
Selected case studies	Historical Evolution and Principles of Medical Professionalism (2015)	

Table 8.2 Ethics/Professionalism/Leadership Training

7. Residents are required to teach a minimum of three lectures per year. Examples of acceptable lecture formats are: clinical in-service session, lectures to M.D. residents, laboratory instruction for RT students, journal clubs, invited talks, and presentations at professional meetings. The resident's mentor (or substitute) should be present for educational presentations and to complete the presentation evaluation form (see our self-study document). A presentation is considered complete once it has been initiated by the resident and signed off by the mentor in MedHub. Subject matter for in-service presentations is determined by the resident after discussion with the mentor or Residency Program director. Examples of presentation topics are: a) LINAC Emergency Procedures--Elekta, b) LINAC Emergency Procedures--Varian, c) HDR Emergency Procedures, d) Image-Guidance Calibration and Operation, e) LINAC Quality Assurance Lab, f) IMRT QA Procedures, g) Journal Club, and h) Research Projects. The intended audience for educational presentations is radiation therapists, radiation therapy students, clinical physicists, medical residents, and physicians.

8. Residents must complete didactic coursework only in the exceptional case that they have not completed the coursework required by CAMPEP prior to admission into the Program. An individual cannot be admitted to the residency unless a minimum of 4 (of 6) required courses have been completed. Course titles for the 6 courses are presented on CAMPEP's website (campep.org) and are currently (2018): 1) Radiological Physics and Dosimetry, 2) Radiation Protection and Safety, 3) Fundamentals of Medical Imaging, 4) Radiobiology, 5) Anatomy and Physiology, 6) Radiation Therapy Physics. All 6 required courses must be completed before a resident can graduate from the residency program. All required courses are offered at UTSW and all are CAMPEP accredited as of October 2018. CAMPEP-accredited courses available at UTSW are listed in Table 8.3. It is recommended that residents complete any required coursework at UTSW but residents may also complete required coursework through CAMPEP-approved programs offered online. Residents are required to submit a copy of their grades to the Residency Director at the end of each semester. Residents that require didactic coursework must complete courses with grades no lower than "B-" or "pass," when appropriate. Course grades are part of the ongoing assessment of resident progress. Failure to complete a didactic course with a minimum of the required grade will be reviewed by the residency committee and will move the resident into probationary status. The resident will be notified in writing of their probationary status. Residents will be required to retake courses when the minimum grade (above) is not achieved. A certificate of graduation from the residency program will not be issued until all coursework has been successfully completed.

01. Radiological Physics and Dosimetry
02. Radiation Protection and Radiation Safety
03. Fundamentals of Imaging in Medicine
04. Radiation Therapy Physics
05. Radiation Biology
06. Anatomy and Physiology for Radiation Oncology

Table 8.3. CAMPEP-accredited coursework available to UTSW Medical Physics Residents (as of 2018).

Evaluation of Resident Progress

Resident progress is evaluated by:

- Monthly oral examinations
- Quarterly clinical rotation assessments
- Semester graded didactic courses (if applicable)

The Residency Director meets with each resident monthly and mentors meet with each resident every two weeks to discuss overall progress and concerns. Although residents are trainees in the program, they also have employee status at the UT Southwestern Medical Center; therefore, they must comply with the policies and procedures of the university. Unsatisfactory academic progress will be reviewed by the Residency Committee and recommendations for action forwarded to the resident as well as a notice of probationary status. Review of the resident's performance will be completed one month after probationary notification. If the recommendations are not met, the Residency Committee will decide the future status of the resident. The university's financial commitment expires three years after a resident's start date (or two years for residents that enter under the exception stated in section IV.B.2) and is contingent on satisfactory progress. Exceptions to the funding time limit may be made by the Residency Committee for

situations such as pregnancy or health-related events that may require extension of the training period. Non-curricular performance issues will be evaluated and responded to within the purview of the university's policies and procedures. Notice of termination will be given if the resident cannot fulfill the required criteria as set by the Residency Committee or if they are in violation of UTSW rules and regulations. Review disciplinary policies for UTSW.

Our Facility and Equipment

The clinical education of residents in the UTSW residency program takes place in four facilities. All facilities are on one campus and are described here:

1. UTSW East Radiation Oncology Center (EROC), 2280 Inwood Road, Dallas, TX 75390-9303. In April 2017, the Department opened a new 63,000-square-foot clinical/teaching/research facility that houses the Clinical, Medical Physics and Engineering Divisions, including academic offices and educational space. The following equipment/technologies are located at EROC: six multi-energy linear accelerators equipped with MLC and on-board kV 2D and 3D image guidance (two Truebeam and two Vitalbeam by Varian, and two Versa HD by Elekta); one robotic accelerator dedicated for stereotactic body radiation therapy, with in-room kV image guidance and real-time tracking (CyberKnife M6 - Accuray); one multislice wide-bore CT simulator capable of 4D CT (Philips Brilliance); one mobile CT scanner (Brainlab Airo); one superficial treatment unit (Xstrahl 150); and one ^{60}Co gamma unit dedicated to breast cancer therapy (GammaPod); two real-time optic patient tracking systems (Align RT, Vision RT).
2. UTSW Moncrief Radiation Oncology Center (MROC), 5801 Forest Park Road, Dallas, TX 75390-8542. MROC includes approximately 5,000 square feet on the first floor of the NF building on the North campus (opened in 2003). The following equipment/technologies are located at MROC: two dual energy linear accelerators equipped with MLC (Varian); one dual energy linear accelerator equipped with MLC and on-board kV 2D and 3D image guidance (Trilogy - Varian); one dual energy linear accelerator, with on-board kV 3D image guidance (Agility - Elekta); one multislice wide bore CT simulator capable of 4D CT (Philips Brilliance); one mobile C-arm radiography unit (GE); one HDR unit (VarisSource – Varian); two real-time tumor tracking systems (Calypso); two real-time optical patient tracking systems (Vision RT).
3. UTSW Annette Simmons Stereotactic Treatment Center, University Zale Lipshy Hospital, 5151 Harry Hines Boulevard, Dallas, TX 75390. This facility houses an Elekta Icon, a ^{60}Co gamma unit dedicated to cranial radiosurgery/radiotherapy.
4. UTSW Clements University Hospital, 6201 Harry Hines Boulevard, Dallas, TX 75235. This facility opened in 2014 and contains a radiation-shielded operating room that houses one HDR unit (VarisSource – Varian). This operating room is also used for low-dose-rate trans-perineal, ultrasound-guided prostate seed implant brachytherapy, high-dose-rate trans-perineal, ultrasound-guided prostate brachytherapy, and intraoperative HDR brachytherapy.

Several clinical treatment planning systems are in place for 2D/3D, IMRT, VMAT, SRS, SBRT, HDR and LDR brachytherapy planning (Elekta Leksell GammaPlan, Accuray MultiPlan, Varian Eclipse, Varian BrachyVision, Varian Variseed, Varian Vitesse). The Division of Medical Physics has extensive basic dosimetry equipment available for resident use and training.

UT Southwestern

UT Southwestern Medical Center, located approximately five miles from downtown Dallas, ranks among the top medical schools in the country. Our physicians provide patients with the highest quality of care throughout the medical center's outpatient clinics and affiliated hospitals.

The excellence of any educational institution is determined by the caliber of its faculty. At UT Southwestern, we have some of the best. Our faculty includes nationally known educators, clinicians, and scientists. Among our approximately 2,400 full-time and 260 part-time faculty:

- Six members of our faculty have been awarded Nobel Prizes since 1985
- 19 members of the National Academy of Sciences currently in faculty, one of the highest honors attainable by an American scientist
- Members of the Institute of Medicine, the Association of American Physicians and the American Society of Clinical Investigation

The passion for excellence is pervasive and is reflected in many ways at UT Southwestern:

- The success of faculty in competing for research dollars with more than $417 million awarded each year
- A close and beneficial relationship exists between basic science and clinical departments
- Ranks among top academic medical centers in the world
- Ongoing support from federal agencies, private foundations, individuals and corporations provides more than $417 million per year to fund over 3,500 research projects

City of Dallas

The city of Dallas is the most populous city in the Dallas-Fort Worth metroplex and fourth in the United States. A thriving economy, low cost of living, no state income tax and central location make it attractive to individuals, families and companies looking to relocate. The metroplex is consistently ranked as one of the top areas for growth in industry headquarters and statistically adds one new local resident every five minutes. Rich in the arts and cultural attractions, we are also home to many renowned sports teams, including the Dallas Cowboys, Dallas Mavericks and Texas Rangers. Visit the Dallas City Hall.