

Self Study
For
Accreditation by the
Commission on Accreditation of
Medical Physics Education Programs
(CAMPEP, Inc.)
by the
Radiation Oncology
Physics Residency Training Program
Scott & White Hospital and Clinic
Temple, Texas

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I. PROGRAM GOAL AND OBJECTIVES

The Scott & White Hospital Radiation Oncology Physics Residency Training Program is intended to provide training in clinical radiation oncology physics. The targeted applicant will have an appropriate M.S. or a Ph.D. and will be committed to preparing for a clinically oriented career. Major objectives of the program include:

1. Provide a broad based, in depth training that will permit the graduate to contribute immediately and independently to the quality of medical care received by the radiation oncology patient. The residents will be assigned full time to clinical training and educational activities.
2. Provide the graduate of the program with a Certificate of Completion from the Scott & White Memorial Hospital and Scott, Sherwood and Brindley Foundation and The Texas A&M University System Health Science Center College of Medicine certifying that the graduate has satisfactorily completed a 24 months residency in a CAMPEP accredited Radiation Oncology Physics Residency Training Program.
3. Prepare the graduate for certification in the specialty of Therapeutic Radiological Physics by American Board of Radiology.

Training will take place under the close supervision of an Administration Subcommittee of the Medical Physics Education Committee of the Residency Program, comprised of experienced radiation oncology physicists, dosimetrists, and radiation oncologists. The program emphasizes all areas of training and experience that will be needed by a radiation oncology medical physicist in a “state-of-the-art” radiation oncology treatment facility.

II. PROGRAM EVOLUTION AND HISTORY

The Chair of the Radiology Department, Dr. Gill Naul, agreed to fund the initiation of the program when Dr. Boyer joined Scott & White in 2005. On November 29, 2006 Dr. Bruce Gerbi confirmed that CAMPEP would entertain an application from Scott & White for a Physics Residency. The Senior Staff and Staff of the Physics Division began planning the program. It was agreed that both diagnostic and therapy physicists would participate in the program in recognition of the strong imaging emphasis in the current practice of radiation oncology. An initial outline and draft of the Self-Study was initiated. On May 17, 2007, the Scott & White Education Advisory Committee approved the program and on May 22, 2007 the Scott & White Leadership Council and Board of Directors approved the program. An invitation to apply for admission to the Residency Program was listed in the AAPM Placement Service in May 2007. During the summer of 2007 candidates were interviewed for the first Residency position. Rebecca Weinberg was selected by the Residency Review Committee from a pool of twenty applicants. On August 31, 2007, The American Society for Therapeutic Radiology and Oncology

(ASTRO) in conjunction with the American Association for Physicists in Medicine (AAPM) selected the Scott & White Radiation Oncology Physics Residency Program to receive the 2007 Radiation Oncology Physics Residency Training Award. A Program Administrator, Alexandria Smiley, was recruited to Scott & White in September 2007. The Radiation Oncology Physics Residency Training Program at Scott & White began under the direction of Dr. Arthur Boyer in the Fall of 2007. Dr. Weinberg began her residency on October 1, 2007.

III. PROGRAM STRUCTURE AND GOVERNANCE

The Radiation Oncology Physics Residency Training Program is an official program under the auspices of the Texas A&M Health Science Center College of Medicine Graduate Medical Education Program, the Scott & White Foundation entity that is responsible for supervising and administering all residencies at Scott & White Hospital. The Scott & White Director of Education reports to the Vice-Dean of the Texas A&M College of Medicine who resides at Scott & White. At Scott & White, residency training programs, both ACGME and non-ACGME, serve at the pleasure of the Department Chairs. With the support of the Radiology Department Chair, the Physics Division's educational programs have received approval by the Scott & White Educational Advisory Committee (Don Wilson, M.D., Chair). These programs include: (1) the Radiation Oncology Physics Residency Training Program (2 year duration with 2 Scott & White funded positions); and the Radiation Oncology Medical Dosimetry Training Program (2 year duration, one current student). The Education Advisory Committee duly considered and approved the Physics Residency proposal May 17, 2007 and submitted it to the Research & Education Council of the Scott & White Research and Education Department for discussion and approval (see Attachment 2C). The request was approved by the Research and Education Council was forwarded to the Scott & White Clinic Board and Leadership Council where it was approved on March 22, 2007.

A formal letter from the requesting CAMPEP evaluation of the program is the cover letter to this document (included as Attachment 2A).

The Radiation Oncology Physics Residency Program works alongside the Department of Radiology Residency Program. The Radiology Residency Program accepts six new physician residents per year and currently has 30 residents on staff. The Radiation Oncology Physics Resident attends all physics lectures delivered to the Radiology Residents. The Radiation Oncology Physics Resident attends appropriate selected noon-time presentations for the Radiology Residents. There is no Radiation Oncology Residency program at Scott & White. Radiobiology training is provided as distant learning by John Ford, Ph.D. who holds a tenured appointment at the rank of Associate Professor in the Department of Nuclear Engineering, Texas A&M University.

Scott & White began 105 years ago as the care provider for the Santa Fe Railroad. It evolved into a state of the art diagnostic and surgical referral center serving most of Central Texas. The Texas A&M University System College of Medicine became affiliated with Scott & White in 1977, resulting in the excellent clinical training of a

generation of physicians. The Scott & White Health Plan was born in 1981, and has grown to serve over 186,000 members. Scott and White has had a strong Radiation Oncology program throughout its history. It acquired a linear accelerator before the M.D. Anderson Cancer and Tumor Institute. Scott & White Hospital and Clinic's Radiation Oncology Division provides services to patients in Bell County, Texas as well as patients in six surrounding counties (outpatient as well as hospitalized patients). There is a total of 4 staff radiation oncology positions allocated as follows: Temple, Texas (3) and Killeen, Texas (1). Total external beam patient treatments range from 63-75 per day. Brachytherapy and special procedures are provided in Temple. The Radiation Oncology Division participates in national protocols including the Radiation Therapy Oncology Group (RTOG).

The Physics Division includes 6 radiation oncology physicists (3 Ph.D. clinical and 3 M.S.), 3 dosimetrists, 3 diagnostic physicists, a technician, and 2 radiation oncology physics residents. The Physics Division provides support for the Radiation Oncology Division of the Radiology Department as well as support for all diagnostic equipment in the Radiology Department. Services are provided at the main hospital in Temple, Texas as well as in twenty regional clinics spread over a six county area. One of the senior physicists (Philip Bourland, Ph.D.) serves as the Radiation Safety Officer for the Scott & White Hospital as well as the regional clinics. The senior physicist along with three M.S. physicists and the three dosimetrists support the Radiation Oncology Division of the Radiology Department. An additional three M.S. physicists serve the diagnostic divisions of the Radiology Department in Temple as well as in Scott & White hospitals and clinics in surrounding counties. The Physics Division provides radiation oncology clinical, educational and development services for Scott & White Hospital as well as the Killeen regional practice. The physics residents have access to all personnel, equipment and institutional resources, the same as any member of the physics staff. Statements of support for Accreditation of the Scott & White Radiation Oncology Clinical Medical Physics Residency are included (Attachment 2A and 2B).

The Radiation Oncology Physics Residency Program is supervised by a Medical Physics Residency Education Committee composed of members of the Physics Division, the Radiation Oncology Division, and the Radiology Department administration. The Residency Education Committee provides general over-sight of the program. Its members include the chairs of three subcommittees responsible for specific parts of the Program (see further VI program Administration C. Committees and Meetings).

The Certificate of completion for the Residents completing the program is issued by the Radiology Department. The Certificates are signed by the Vice-Dean of the Medical School at Temple, Texas, the Chief Executive Officer of Scott & White Hospitals and Clinics, the Director of the Radiation Oncology Division, and the Director of the CAMPEP-accredited Radiation Oncology Physics Residency Training Program.

The curriculum follows the recommendations presented in AAPM Report Number 90, "Essentials and Guidelines for Hospital-Based Medical Physics Residency Training Programs." The Scott & White curriculum is built around ten competency-based

rotations suggested by the AAPM Guidelines. The rotations focus on clinically relevant processes. How the rotations are structured is described in Section IV. TRAINING REQUIREMENTS: B. Design and Content. The review process for the Program is described in Section IV. TRAINING REQUIREMENTS: D. Evaluation of the Curriculum. The mechanism of recruitment and admissions of the Residents is described in Section V. RESIDENTS: A. Admissions and B. Recruitment Efforts.

The Residents have access to the Scott & White Radiation Oncology Division facilities as well as access to the Scott & White Radiology Department facilities under the supervision of their rotation mentors. The mentors will be responsible for allowing the Residents increased freedom to use clinical equipment, such as linear accelerators and CT scanners, only in proportion to their ability to operate equipment without endangering the equipment, themselves, or patients.

The Scott & White Radiation Oncology Physics Residency Programs is under the supervision of a Program Director. The Program Director is responsible for coordinating the faculty, recruiting and advising the residents and evaluating and promoting the program. A description of the Program Director's duties and role in the program administration is described in Section VI PROGRAM ADMINISTRATION: B. Role of Program Director.

IV. TRAINING REQUIREMENTS

A. Requirements for Successful Program Completion

The clinical training is designed to cover the major training for Radiation Oncology Physics as outlined in AAPM Report No. 90, "Essentials and Guidelines for Hospital-based Medical Physics Residency Training Programs" published in August 2006. The twenty-four month program consists of activities intended to provide the Residents the following training:

1. The Resident is expected to become competent in all areas related to the safe and efficacious use of ionizing radiation for the evaluation, planning, and treatment of human disease; this is accomplished in part through structured and evaluated clinical rotations.
2. The Resident is expected to complete structured rotations that include written summaries/reports quarterly and at the completion of the rotation. Evaluations will occur throughout each rotation in one to one and group settings. The faculty will attest by their signature that the Resident has achieved proficiency in each Radiation Oncology Physics process in the rotations.
- 3 The Resident will present, review and defend his/her knowledge of a given rotation subject in quarterly (i.e., three month intervals) oral based sessions with the residency program faculty.
- 4 Pass or fail grades will be based on the results of ongoing irregularly scheduled informal oral evaluations and formal oral evaluations scheduled every three months. If the Resident obtains an unsatisfactory performance rating in a specific area during a three month oral examination, they will be given the opportunity to be reexamined during the

next three month exam. A “Satisfactory” score will be required from the faculty examiners at the three months formal oral examinations on all rotations. A “Satisfactory” score in the Program Director’s evaluation in all rotations will be required to obtain a Certificate.

5 The Resident is expected to obtain an appropriate mastery of the physical principles (e.g. interactions of radiation with matter, radionuclide decay therapy, etc.) associated with the use of radiation in treatment of human malignancy.

6 The Resident is responsible for obtaining a level of training in anatomy (see description of on-line Dosimetry Training Tool in the Didactics paragraph below), computer technology (see course outline of Diagnostic Radiology lecture series) and diagnostic imaging (see Imaging Rotation) appropriate for a position as a Therapeutic Radiological Physicist. This is primarily accomplished during the clinical dosimetric treatment planning rotation and didactic courses on these topics.

7 The Resident will demonstrate knowledge sufficient to ensure she/he can manage the radiation safety aspects of a Radiation Oncology practice (see Radiation Safety Rotation).

8 The Resident is expected to attend selected Radiology Department conferences, all scheduled Radiation Oncology chart rounds, and all Physics Division meetings.

9 The Resident will understand the potential uses of and hazards associated with ionizing radiation and high voltage electronics as used in the practice of radiation oncology.

10 The Resident will understand radiobiological principles of the use of radiation through both didactic and practical training. An on-line training course will be taken by the Resident that will contain a final examination.

During the first week of orientation, a skills assessment examination will be administered to the resident. The Resident will take the pre-tests in the on-line Dosimetry Training Tool (DTT). The first 22 modules of the DTT cover sufficient material to provide an assessment of the new Resident’s grasp of fundamentals. The DTT program scores the Resident’s responses. The scores are available on-line to the Director. The scores in each area will be used to set the amount of directed reading, web-based training, and one-on-one tutoring for the duration of the residency.

B. Design and Content

Rotations

The elements of the clinical training in the residency are consistent with recommendations presented in AAPM Report Number 90, “essentials and Guidelines for Hospital-Based Medical Physics Residency Training Programs.” The training program structures the twenty-four month experience into ten one-on-one mentored rotations (Attachment 19) that are designed to provide clinical training and produce a series of reference documents that are evaluated by the graduate faculty through oral exams during each rotation.

Rotation Topic	
1	Detectors and Dosimeters
2	Radiation Safety
3	Treatment Equipment

4	Imaging
5	Conventional Simulation
6	CT Simulation
7	Patient Treatment
8	IMRT
9	Brachytherapy
10	Other Duties

In this revision, the fine structure of the rotations is based on clinical procedures and processes carried out routinely at Scott & White. Objectives and sign-off documents for the rotations are provided to the Resident during the Resident Orientation. Throughout the program, the Residents rotate with medical physicists for evaluated clinical experience. As the Resident moves through the structured training in each major category, a number of activities will be occurring in parallel. This is done to best suit the needs of the individual Resident and to coincide with major clinical activities such as machine installation and commissioning and presentation of a tumor at a particular site. For example, a Resident might be working on dosimeters and treatment planning for a specific site, while also getting 1-2 days per week exposure to a special procedure such as HDR or prostate implants. Concomitant rotations lead to some scheduling and evaluation challenges, but provide an opportunity for the Resident to learn skills and process in an incremental and holistic fashion. Material learned in one rotation augments and compliments material in other rotations. The Resident is afforded opportunities for remediation of weaknesses in the acquisition of skill sets throughout the Residency.

Rotation Outline and Structure

There will be three essential phases of mentoring in each rotation:

I) Initial observation, discussion and reading. A bibliography will be provided for the resident to read consisting of book chapters, salient papers, and web-based instruction. At the same time the Resident will observe and receive explicit instruction on why, how, what with attention to making sure the resident understands the fundamental aspects of the current rotation. There will be a meeting with at least one of the Physics Faculty members at the end of Phase I to review/document assessed resident progress. The Resident's rotation log will be signed by the mentor, documenting progress.

II) Engaged in the rotation, but closely supervised, the resident will work hand in hand with the mentor, performing the tasks under direct supervision. This phase develops the confidence in the resident's ability to carry out the process. There will be a meeting with at least one of the Physics Faculty members at the end of Phase II to review/document assessed resident progress and sign the Resident rotation log.

III) During the final phase of each process within a rotation, the resident will perform the duties as an independent medical physicist, using the mentor as a consultant for questions. It is our policy not to allow persons to perform clinically significant duties without some documentation of competence. The three-phase rotations provide a means by which one or more senior physicists examine the candidate with the goal of determining competency to carry out the technical

necessities as well as understanding their basis. The mentor will evaluate the resident on the level of competence developed at this stage of the residency. For many rotations, a deliverable in the form of a written report or document, formatted data, or computer print-outs will be specified. The Resident's rotation log will be signed and annotated as above at the end of Phase III.

The Residents will be evaluated at three month intervals as described in SECTION V.
RESIDENTS. D. Evaluation of Resident's Progress

The Resident and the Program Director will agree upon an order in which the Resident will carry out each Phase of each Process in each Rotation. In some instances all Phases of a Process may be completed in a given quarter. In other instances, a separate Phase may be carried out in separate quarters. For example, the Resident will study the Scott & White Radiation Safety Regulations and take an exam on them in the first quarter. On the other hand, since the annual linac QA process only occurs one a year on each machine, the Resident will not be scheduled to perform Phase III of that process (carrying out an annual QA on their own) until about the sixth quarter, depending on the scheduling of the annual linac QA procedures. In general Radiation Safety, Detectors and Dosimeters, Brachytherapy, and Treatment Equipment Processes are scheduled toward the first half of the Residency, and Patient Treatment, IMRT, and Other processes are loaded toward that latter half of the Residency. Imaging and Simulation processes tend to be evenly distributed. The schedule is reviewed each week by the Program Director and the Resident. The Program Director adjusts the schedule in response to the Resident's progress, opportunities to engage in Processes, and other factors such as availability of the Faculty, illnesses, annual meetings, and unanticipated difficulties the Resident may be having.

The program requires teaching and seminar presentation. These include teaching 3-4 lectures per year in the medical dosimetrist training program, teaching 5 lectures per year in the diagnostic radiology medical resident physics program and the preparation of web-based training material.

Didactic Education

The one-on-one mentoring structure offers an excellent opportunity for "tutoring" with the faculty of the Physics Division. Additional didactic opportunities include:

1) Anatomy for Treatment Planning – Offered on-line through the Medical Dosimetrists' Training Tool. The Resident will take a set of pre-quizzes before working through the anatomy material on-line. When the Resident has completed the material, they will take a post-quiz. If the resident scores less than 75% correct answers on the post-quiz, they must repeat working through the material and take the post-quiz until they score a post-quiz grade of greater than 75%.

2) Radiation Biology – offered annually as distant learning provided by the Department of Nuclear Engineering of the Texas A&M University. The Residents must receive a Pass score. Residents failing to pass the radiobiology test will be given oral exams until the examiners are satisfied with their performance.

3) Radiation Oncology Physics for residents – a two-year long course taught to physics residents by the Physics Division staff. One lecture is given each week. Each lecture is scheduled for one hour. This course consists of a series of approximately 100 lectures (Attachment 12). At present, the Program Director is the primary lecturer. Other faculty give lectures on specialty areas. The lectures follow the *Review of Radiation Oncology Physics: A Handbook for Teachers and Students*, developed by Ervin Podgorsak for the International Atomic Energy Agency. The lectures amplify and augment the material in the IAEA curriculum. Comprehension on this material will be tested during the oral exams. The Program Director will pose questions to the Resident that come directly from the lectures.

7) Oncology Core curriculum – Offered on-line through the Medical Dosimetrists' Training Tool. A post-quiz score of 75% will be required.

8) Imaging physics for Radiology residents. A series of 46 lectures on basic physics for each imaging modality based on “The Essential Physics of Medical Imaging” by Bushberg et. al. taught by the Physics Division staff. The Resident will take the same post-lecture quizzes as are taken by the Diagnostic Radiology Residents. An average post-quiz score of 70% will be required. If Residents fail to achieve this goal, they will be required to review the material before taking a remedial test. If the Resident cannot pass the diagnostic radiology test, an oral examination group composed of Program faculty will test the Resident and make recommendations for further study. After a second oral exam the group will make a recommendation to the Program Director on the Resident's suitability for certification.

Each resident will be given an external disk drive with which to build their own library of documents and computer programs. File on the Scott & White intranet dedicated to the Residency Program contains material to be used to prepare for the lectures and rotations. At the end of the Residency Program each Resident's disk drive is expected to provide the Resident with a set of tools for their professional careers and a foundation for life-long learning continuing education.

The Residents are required to acquire Khan's “Physics of Radiation Oncology” and Van Dyk (Editor) “The Modern Technology of Radiation Oncology”.

Scott & White provides oncology management through Tumor Boards. These Boards meet weekly. The Residents will be scheduled to attend these conferences as part of the “Patient Treatment” rotation, and to author written reports to their advisors on cases discussed and terminology used.

The departments engaged in cancer management have available regularly scheduled seminars and conferences which the residents attend. These include:

- Journal clubs. The residents will attend journal clubs in Radiology, Medical Oncology, and Radiation Oncology a minimum of 8 times per year. Once every six months, under the mentorship of the medical physics faculty, a physics resident will present an article in journal club.
- Physics Division meetings – 2 meetings per month scheduled depending on holidays.

C. Sample Training Plans

The rotation descriptions and sign-off forms are included in Attachment 19 for all ten rotations. In addition, a typical schedule for a two year rotations is included in Attachment 10.

D. Evaluation of the Curriculum

The initial structure and content of the residency at Scott & White was developed using the CAMPEP “Guidelines for Accreditation of Residency Education Programs in Medical Physics” Revised: November 2006 and AAPM Report Number 90, “Essentials and Guidelines for Hospital-Based Medical Physics Residency Training Programs.” After each set of two oral exams at the end of the three month intervals, the Program Director will review the exam reports prepared by the Faculty and the Residents. The Program Director will prepare a report for the Administration Sub-Committee in which he will summarize the stated strengths and weaknesses of the program contained in the comments in the oral exam reports. The Administration Sub-Committee will convene to review the Program Director’s report. The Program Director will propose modifications to the residency Program with the intent to improve the Program. After appropriate discussion and consideration, the Program Director and the Administration Sub-Committee will chose feasible modifications. These modifications will be implemented in the next three month period and/or documented for other periods of the Program. Current Residents will be informed of any changes in the completion requirements. Any changes in the completion requirements will be put in the description of the Program provided for incoming Residents.

V. RESIDENTS

A. Admissions

The Radiation Oncology Physics Residency Program applicants must demonstrate having have acquired a strong foundation in basic physics. This shall be documented by a Master’s or Doctoral degree in medical physics, physics, engineering, mathematics, or other science with physics training equivalent to a minor in physics (upper level courses in electricity and magnetism, quantum mechanics, atomic structure, statistical mechanics and mechanics). Recruiting will begin in the first calendar quarter (see C.2. Recruitment Efforts). Following a response to recruiting advertisements, the Program Director will contact applicants and discuss the program, their interests and what information they might need. Subsequent to this conversation, the resident applicant will receive the following (Attachment 5).

1. Prospective Candidate Program Description (see below)
2. Application Form (see below).
3. The AAPM document “The Medical Physicist”
4. The AAPM document “The Roles, Responsibilities, and Status of the Clinical Medical Physicist”

5. The AAPM Report No. 90 “Essentials and Guidelines for Hospital-Based Medical Physics Training Programs”

The application and supporting materials are returned to the Radiation Oncology Physics Residency Program Administrator for gathering of all support information. When an application is considered complete (including letters of recommendations and transcripts of graduate school work) by the Radiation Oncology Physics Residency program Administrator, it is forwarded to the Radiation Oncology Physics Residency Director and members of the Candidate Selection Sub-Committee (Attachment 1) for review. The Candidate Selection Sub-Committee meets to select a short list of three to four candidates. These selected candidates are invited to come to Temple, Texas with Scott & White Clinic providing one nights lodging.

The Candidate interviews with key members of the Radiation Oncology Division and the Physics Division (Attachment 6A). The Program Director will spend 60 minutes reviewing the Scott & White Program. The interviewers will each spend a minimum one-half hour to interview and to rank the candidates. Evaluation is done using a standardized form (Attachment 6B) filled out by each of the interviewers. Each candidate has lunch with current and/or past residents and junior staff (Attachment 6A) if possible. At the completion of the interview process (in the second calendar quarter), the Program Administrator distributes packets to the Candidate Selection Sub-Committee containing the information on the Candidates on the short list and the Candidate’s evaluation forms. The Candidate Selection Sub-Committee meets to rank the candidates. Resident selection is done consistent with the Scott & White Graduate School of Medicine stated policy, i.e., “Programs must select from among eligible applicants on the basis of their preparedness, ability, aptitude, academic credentials, communication skills, and personal qualities such as motivation and integrity. Programs must not discriminate with regard to sex, race, age, religion, color, national origin, disability, or veteran status”. The Program Director contacts the highest ranked candidate to make a verbal offer. If the Candidate makes a verbal commitment to accept the offer, the recommendation is forwarded to the Scott & White Graduate School of Medicine who reviews the material and issues the official offer letter (Attachment 7). The Candidate is given an “acceptance by” date. When the position is filled, the remaining candidates are notified. Our policy is to answer forthrightly inquiries from the non-top candidates if they need to know their status. The new resident is expected to report at Scott & White in near the end of June.

Should a Candidate be selected whose background does not meet the requirements in medical physics, they would be notified that they would be required to engage in a course of remedial didactic training during an initial six months probationary period of the residency. The Candidate would be required to read The Physics of Radiation Therapy by Kahn. In addition the candidate would be required to review Radiation Oncology Physics: A Handbook for Teachers and Students that can be accessed over the internet at:

<http://www-naweb.iaea.org/nahu/dmrp/slides.shtm>

At the end of the probationary period, the Program Director will administer a written examination on the material in these sources. Should the Candidate score below 75% on this examination, they would not be admitted into the Residency Program and their employment at Scott & White would be terminated.

The Radiation Oncology Physics Residency program at Scott & White was initiated with a single student in October 2007. As of the date of this self-study, no students have finished the program.

B. Recruitment Efforts

Recruitment is utilizes an ad in the AAPM Placement Bulletin (Attachment 4A). This is accessible from the AAPM website and is e-mailed to AAPM members. The Scott & White Graduate School of Medicine website has the Radiation Oncology Physics Residency listed (Attachment 4B). A third way of publicizing the Program has been to write letters to Medical Physics Graduate Program Directors and chairs of physics departments at selected universities.

C. Enrollment

The Radiation Oncology Physics Residency has two Scott & White positions funded for the academic years 2007-2008 and 2008-2009 by the Radiology Department. The intent is to have overlapping two year residencies. The current status of our residency positions are:

- Position 1: Rebecca Weinberg, Ph.D. began October 1, 2007. She completed her Ph.D. at the Graduate School of Biomedical Science at the M.D. Anderson Cancer Center. Dr. Weinberg has begun the rotations of the Physics Residency under the supervision of mentors listed in the rotation documents.
- Position 2: Junfang Gao, Ph.D., began July 1, 2008. Dr Gao completed a Ph.D. in Physics at the University of Missouri in Rolla and a Post-doctoral Fellowship at the M.D. Anderson Cancer Center before entering the Residency program. Dr. Gao has begun the rotations of the Physics Residency under the supervision of mentors listed in the rotation documents.

D. Evaluation of Resident's Progress

Irregularly Scheduled Oral Examinations

Residents are evaluated in a number of ways. The Program Director and rotation mentors meet one-on-one at least twice per month to help the resident focus and evaluate their progress. These are informal one-hour meetings that are very useful in providing guidance (at the beginning) and praise/criticism as the residency progresses. The mentor attests to the Resident's progress by initialing a completion status for the Phase I, Phase II, and Phase III parts of each process in a given rotation (see Section IV. TRAINING REQUIREMENTS. B. Design and Content).

Report Structure and Oral Evaluation

Major written evaluations occur once every three months. Each resident will maintain a resident log, where activities for each process in a rotation will be logged. These will be discussed and reviewed with the primary mentor during day-to-day or weekly meetings. Once every three months (eight times in the Residency), the Resident and faculty will hold oral exams on the areas covered during the previous three months of the rotation. Throughout the three month period the Resident will be preparing a digital document summarizing and documenting the material covered in each rotation. Since the rotations are concurrent rather than sequential, the Resident could be preparing digital documents on as many as 10 topics at once. The digital documents will contain a variable amount of material depending on the rotation. For example, the document may contain copies of the results of monthly machine checks, the results of IMRT QA measurements, and copies of selected print-outs of practice external beam treatment plans. The Program Administrator will schedule oral exams with the examiners and the Resident. At least one week before the scheduled examinations, the Resident and the Program Administrator will distribute copies of the Resident's digital documents to assigned oral examiners. The Resident will take two oral exams during last two weeks of each three month period. Each of the two exams will deal with roughly one-half of the rotation topics covered during the previous three months. In the oral exams the resident will orally summarize what they accomplished during the last three months of the rotations. The presentation will be followed by a 1.5 hour - 2 hour oral exam attended by at least 3 of the Physics Faculty members. The examiners will include faculty that mentored the Resident during the rotations as well as faculty that did not. At the conclusion of the examination the examiners will complete a Resident Oral Evaluation Form (Attachment 14A) and the Residents will complete a Resident Clinical Rotation Evaluation Form (Attachment 14B) and a Resident Evaluation of Faculty (Attachment 16). These evaluations provide an opportunity for the Resident to critique the form and content of the rotation as well as the mentorship of the faculty. The forms completed by the Faculty and the Resident are kept on file by the Residency Program Administrator in a secure and confidential location. The Evaluations will be reviewed by the Program Director who will prepare a three months summary of the Residents' progress (Attachment 15). During the course of the two-year program, a Resident will prepare eight digital documents each containing as many as 10 topic sections. In practice the number of topics in each document will be lower since some rotations will be dormant in a given six month period.

Should a Resident receive "Unsatisfactory" scores on two consecutive oral examinations, the Program Director would call a meeting of the Residency Administration Sub-Committee to review and discuss the Resident's performance. The Administration Sub-Committee would determine whether remedial actions would be undertaken or whether termination of the Resident should be considered. Should a majority of the Administration Sub-Committee elect to terminate the Resident, Scott & White institutional disciplinary procedures for failing residents would be followed that are given in Attachment 9A.

From its inception, the program has implemented a reverse evaluation process whereby the resident can evaluate both the form and content of the Physics Residency (Attachment

14B) and the Resident's mentors (Attachment 16). These evaluations are reviewed and integrated into the Program Directors three months progress report. Revisions of the Residency form and content proceed from discussions of these reports by the Administration Sub-Committee.

E. New Resident Orientation

Orientation for a new Resident covers three days. It would be inappropriate for Radiation Oncology Physics Residents to participate in the Scott & White Graduate Medical Education orientations for physician residents. Instead, the Physics Residents attend a day-long orientation for non-medical staff provided by the Scott & White Human Resources department. The orientation covers such areas as Healthy Back, Risk Management & Basic Patient Rights, Corporate Compliance, Identifying Victims of Abuse, Employee Handbook Overview, Health Benefits, and Employee Health Services, and Infection Control. Also, a series of operational aspects (library card, Employee ID, film badges, access cards) are simultaneously carried out. The Program Director spends two hours briefing the Resident on program's requirements, Resident administrative procedures, all training expectations, and all behavioral expectations. A written test is administered to the resident to assess their knowledge of medical physics going into the Residency. The Resident spends time with each of the mentors responsible for the ten rotation subjects. Additional administrative actions are taken such as initiation of the Resident's account on the Scott & White network and integration of the Resident's security profile into the network user groups.

F. Safety

As part of their orientation, Residents are issued a personal radiation exposure monitor. The personal monitor issuance includes a radiation safety overview. Extensive radiation safety issues are covered during the Radiation Safety Rotation. During orientation, Residents are required to read the basic safety warnings provided by the medical linear accelerator vendor. Residents are required to read the Clinac Safety Manual (Varian Medical Systems P/N: 01104957-01) and review its contents with a mentor. Working with high voltages, hazardous materials, and basic safety are covered in this training. The Residents are introduced to the emergency exit maps during orientation and participate in routine fire drills.

VI. PROGRAM ADMINISTRATION

A. Structure within Scott & White

The Radiation Oncology Physics Residency Training Program is an official program under the auspices of the Texas A&M Health Science Center College of Medicine Graduate Medical Education Program, the Scott & White Foundation entity that is responsible for supervising and administering all residencies at Scott & White Hospital. The Radiation Oncology Physics Residency Program has been approved by the Scott & White Educational Advisory Committee. The Education Advisory Committee reports

program requests that it has considered and approved to the Graduate Medical Education Committee. A duly considered and approved proposal is submitted to the Research & Education Council of the Scott & White Research and Education Department for discussion and approval (see Attachment 2C). The request approved by the Research & Education Council was forwarded to the Scott & White Clinic Board and Leadership Council that approved the Program on March 22, 2007.

The Radiation Oncology Physics Program Director reports to the Director of Graduate Medical Education who in turn reports to the Vice Dean of the Texas A&M College of Medicine and who also serves as Chief Academic Officer for Scott and White. The Scott & White Graduate School of Medicine routinely conducts audits of all their accredited programs at a point halfway through the period for which accreditation was granted. This is conducted by an experienced group of internal examiners and will meet the very high standards used to audit world-renowned medicine residencies.

Residents' stipends, benefits and absences are identical to that of medical residencies. They are officially listed as Ph.D. Fellows in the Scott & White Graduate School of Medicine. However, this is a bookkeeping terminology and is due to the distinction from having one-on-one responsibility for patient care decisions. For all intents and purposes, Physics Residents are treated as "Residents".

The Physics Division is a division of the Radiology Department. The Physics Division bears clinical responsibilities to all the Divisions of the Radiology Department including the Radiation Oncology Division. The faculty of the Radiation Oncology Physics Residency Program is drawn from the entire Physics Division. Approval to invest time in teaching the Radiation Oncology Physics Residents is at the pleasure of the Radiology Department Chair and has been granted. Members of the Physics Division involved in teaching in the Residency Program have access to all the equipment in the Radiation Oncology Division as well as access to the diagnostic imaging equipment as part of their routine clinical responsibilities.

B.1. Role of Program Director

The Program Director is responsible to all reporting entities to conduct the program in accordance with all Scott & White Graduate Medical Education Program expectations. The Radiation Oncology Physics Residency Training Program Director is the Physics Division Director, Arthur L. Boyer, Ph.D. The Program Director is responsible to the Chair of the Radiology Department who bears ultimate fiscal responsibility for the Program. Furthermore, the Residency Director is responsible for ensuring that all locally established guidelines are adhered to. The Resident's experience must conform to the training plan and it is the Program Director's responsibility to ensure that all aspects of training are given and that the resident achieves the expected level of competencies by the completion of the Program. Future Residency Program Directors will be selected by the Steering Sub-Committee with approval by the Radiology Department Chair.

The current Residency Program Director is Arthur L. Boyer, Ph.D. Dr. Boyer has held appointments in Radiation Oncology Departments at major academic medical centers since 1971. He has been an active participant in physician Radiation Oncology Residency Programs at every appointment. Between 1992 and 2007 Dr. Boyer directly supervised or served on the advisory or supervisory committees of 13 M.S. and Ph.D. students, and supervised twelve Post-Doctoral Fellows. Dr. Boyer served as PI for NCI grant R25 - CA 89178 to development a web-based tool for Medical Dosimetrist mentors. Twenty-four modules were developed. Each module contains between 3 and 26 sessions. Over 1100 users, including over 800 students have been registered with the dosimetry training tool, with a steady increase in the number of users throughout the program development.

B.2. Role of Program Co-Director. A Co-Director will be appointed by the Program Director with the assent of the Steering Sub-Committee and approval by the Radiology Department Chair. The duties of the Co-Director will include chairing subcommittee meetings, signing Time Capture Forms for Medical Physics Residency, and resolving Resident rotation scheduling problems in the absence of the Director. The Co-Director will serve as a review editor for the Self-Study document. The Program Co-Director will be a board-certified medical physicist with at least five years of experience. In order to facilitate the strong diagnostic component of the Scott & White Radiation Oncology Physics Residency Program, it would be desirable for the Co-Director to have experience in diagnostic radiology.

C. Committees and Meetings

Program administration is the responsibility of the Program Director (Arthur Boyer, Ph.D.) chairing an executive program committee that oversees three subcommittees, the Physics Residency Steering Sub-Committee, the Candidate Selection Sub-Committee, and the Residency Administration Sub-Committee.

The Steering Sub-Committee for the Radiation Oncology Physics Residency provides oversight for strategic and fiscal aspects of the Program. The Steering Sub-Committee is chaired by the Executive Director of Imaging. Members of the subcommittee are the Program Director, the Director of the Radiation Oncology Division, the Scott & White Hospital Radiation Safety Officer, the Assistant Executive Director of Finance Administration of Scott and White Hospital, and an Associate Radiological Physicist in the Physics Division. The Steering Sub-Committee meets twice a year to review the program and the progress of the Residents with the Physics Residency Program Administrator keeping minutes. The Steering Sub-Committee reviews the financial structure of the Program and sets the number of Residents the program can accept each year. If needed the Steering committee will act as a conflict resolution body. All personnel issues are confidential.

The Candidate Selection Sub-Committee acts as an admissions committee to interview and evaluate prospective applicants. It meets annually to administer advertising, evaluation of applications, selection of a short list, interviewers of candidates on the short

list, and final selection of new residents. The number of new positions it will fill is determined by the Steering Sub-Committee. The Program Administrative Director records minutes of all meetings. All discussions of candidates are confidential.

Residency Administration Sub-Committee is chaired by the Program Director. Members are the Physics Residency Administrative Director, and managers of the ten competency-based rotations: Detectors and Dosimeters, Radiation Safety, Treatment Equipment, Imaging, Conventional Simulation, CT Simulation, Patient Treatment, IMRT, Brachytherapy, and Other Duties. The Sub-Committee meets informally on an irregular basis to administer the Program. The Program Director meets with the Rotation Managers sitting as the Residency Administration Sub-Committee each quarter following formal oral examinations to review the progress of the students and the results of oral examinations. The Program Administrative Director records minutes. These minutes are transmitted to the Steering Sub-Committee. All evaluations and discussions of students are considered confidential information.

D. Records Available for Review

The following records will be kept by the Resident Program Administrator in locked file cabinets in the Physics Division office (paper copies). Digital records will be stored on a secure disk associated with the Program Administrator's Scott & White personal computer. Copies of the digital documents will be made as needed on the secure disk under the control of the Program Director. Paper copies of documents will occasionally be distributed to the Program Director and (during the Resident selection process) to members of the Candidate Selection Committee.

- (1) Radiation Oncology Physics sub-committee minutes including
 - i. administrative activities of the Steering Sub-Committee
 - ii. applicant selection activities of the Candidate Selection Sub-Committee
 - iii. residency program development reviewed by the Administration Sub-Committee
- (2) Resident Applications
 - i. application forms
 - ii. transcripts
 - iii. candidate interview evaluations
- (3) Residents
 - i. rotation objectives and expectations
 - ii. rotation procedure schedules
 - iii. rotation procedure completion signature sheets
 - iv. oral examination evaluations
 - v. didactic training grades

All permanent records are kept in the office of the Program Administrative Director. A copy of the Self-Study will be accessible through a server on the Scott & White intranet. The rotation descriptions as well as ancillary documents used during the rotations will be

accessible to the Residents on the same server. Each Resident will keep a personal copy of their rotation schedule and their rotation process signature documents.

VII. RESOURCES

A. Staff

The Radiation Physics Division members are deeply committed to this program. The Residency Administration Committee Members all have appointments at the Scott & White Hospital and the three senior members (Boyer, Bourland and Mistry) have appointments at Texas A&M University (MSc and PhD programs) and Texas A&M University School of Medicine. Most members of the Radiation Physics Division staff and the Radiation Oncology Division staff are expected to participate in the education of the Physics Residents. The Residency is organized around Competency-Based Rotations. Each Rotation is administered by a member of the Residency Administration Committee. The administrative commitments are as follows:

Chair: Art Boyer, Ph.D., Program Director
Alexandria Smiley, Administrative Director
Vithalbhair Mistry, Ph.D., Detectors and Dosimeters Rotation
Philip Bourland, Ph.D., Radiation Safety Rotation
Jason Shoales, M.S., Treatment Equipment Rotation
David Jones, M.S., Imaging Rotation
TBN, M.S., Conventional Simulation Rotation
Wei Tang, M.S., CT, Simulation Rotation
Karen Stumph, CMD, Patient Treatment Rotation
Art Boyer, Ph.D., IMRT Rotation
Pasquale Montanaro, M.S., Brachytherapy Rotation
Art Boyer, Ph.D., Other Duties

Resident offices are proximal to the clinical physics staff offices. Attachment 17 lists the faculty which includes Ph.D. Faculty, clinical Medical Physics staff and Dosimetry staff. Attachment 18 contains individual Biographies of the associated faculty. All members of the Division contribute in significant ways to the cumulative education of the Resident. This is especially true in the horizontal work group atmosphere here at Scott & White. Physics Division staff members are always accessible and available to discuss issues with the Resident. In general, there is a faculty-to-resident ratio of about 6:1.

B. Finances

The Scott & White's Radiation Oncology Physics Residency Training Program is funded for its first two years of operation by the Radiology Department. When the program becomes eligible for CMS funding by virtue of accreditation by CAMPEP, it will be funded by CMS by direct requests from the Finance and Operations Department of Scott & White Hospital. We do not anticipate any problems with continuing indefinitely with at least two positions as long as the program can attract qualified candidates. Although the program is approved by the Research and Education Department of Scott & White, the

R&E Department takes no fiscal responsibility for the program. The current stipend for Residents is: Training Level – 1 \$ 41,601.48; Training Level – 2 \$ 42,749.52. In addition to direct compensation, the Physics Residents are afforded benefits and absences identical to the medical residents (See Attachment 9C). The Radiology Department policy is to provide travel and per diem for a professional trip during the residency if the Resident has had an abstract accepted for oral presentation. The Physics Division pays for a junior membership in AAPM. The Institution has a variety of other support services available.

Typical Financial Support / Burden for Medical Physics Residents:

Support: Over \$40,000/year

Burden: Over \$11,000/year

C. Facility

Resident Offices, Class Rooms and Conference Rooms

Each resident has an office area located within the Physics Division. They are provided with a computer (with Microsoft Office Suite) with network connections, a Scott & White email account, storage, telephone, pager and office supplies. The Residents have access to departmental copying machines and document scanners. The Radiation Oncology Physics Residency Administrative Director is available to assist them in any way possible including submitting paperwork for absences and trips. The Resident's offices are new, clean, quiet and equipped with modern office furniture. The Division has access to three areas for conferences and teaching in the Radiology Department. Both of these are equipped for data projection from networked computers.

Clinical Facilities, Laboratories and Shops

The Radiation Oncology Division Facilities:

Three Clinac 2100 class linacs (6MV/18MV) with millennium multi-leaf collimators and IMRT interfaces (Varian Medical Systems) Provides IMRT and stereotactic radiosurgery.

Two Ximatron simulators (Varian Medical Systems).

Two Computerized Radiography Readers (Kodak). Provide digital port films and patient position verification with Acculoc software.

HiSpeed FX/I spiral CT scanner (General Electric Medical Systems). Network interfaces to PACS system and Eclipse servers.

Maximar superficial x-ray unit (General Electric Medical Systems)

Multi-ACCESS information management system accessible through 25 floating licenses (IMPAC Medical Systems). Provides support for IMRT including patient-specific QA.

Eclipse Treatment Planning Systems supported on 6 planning workstations, 4 physician workstations, and 2 servers (Varian Medical Systems). Provides treatment planning for IMRT and brachytherapy.

Plato Brachytherapy workstation and HDR after-loader (Version 14.3.3) (Nucletron Corporation). Provides treatment planning for HDR.

X-knife RT and Image Fusion workstation (Integra Radionics, Inc.). Provides treatment planning for stereotactic radiosurgery.

Variseed seed implant workstation (Varian Medical Systems). Provides treatment planning for prostate seed implants.

Small dedicated instrument workbench with tools.

The Radiology Department:

CT Scanners:

Siemens Definition Dual Energy CT
Siemens Somatom Definition Dual Source 128
Siemens Sensation Cardiac 64 Siemens Sensation 64
Siemens Sensation 16

MRI Scanners

Siemens Magnetom Trio, 3.0T with TIM Technology
Siemens Magnetom 1.5T Avanto
Siemens 1.5T Espree System

Nuclear Medicine

Phillips PRISM 3000
Phillips PRISM 2000(2)
Phillips AXIS(3)
Phillips Meridian
Siemens Biograph 16 PET/CT

R&F

four general purpose R/F rooms,
three Phillips Digital Easy Diagnost Systems
one Siemens Digital Multipurpose Systems

Mammography

Siemens Mammomat 3000 Nova (x3)
Lorad M IV
Lorad Stereoguide DSM Biopsy
Siemens Sequoia 512 Ultrasound

PACS

General Electric Centricity V.1.0
Siemens Kinet-dx Ultrasound PACS V2.8.3

The Division has a small physics “lab” for dosimetry equipment storage and use (150 sq. ft.) and a small cerrobend block shop (500 sq. ft.). Scott & White support is highly centralized so machine maintenance and IT technical support is done outside the footprint of the Department. The Division has state-of-the-art dosimetric equipment, phantoms, etc. (see Attachment 13). The Physics Division contracts for maintenance support on instrumentation used for clinical services. Residents have access to all equipment and are expected not to use the equipment unless properly trained. They are also expected to leave all equipment in a clinical ready mode when done.

Publication/Presentation Support

Scott & White Clinic has had a long record of encouraging publication. The Section of Publications offers services in support of manuscript preparation. Additionally, the Section of Visual Communications offers graphic support as well as poster design, integration and fabrication. Posters are printed from Power Point or PDF files at no charge. The Division of Radiation Oncology will support use of these services as needed and appropriate.

Libraries

The resident has access to the Richard D. Haines Medical Library. The Library is located on the third floor of the A&M Health Science Center College of Medicine Education Center at Scott & White. This includes access to electronic versions of many journals through PubMed as well as various searching mechanisms (e.g. Medline). The Physics Section maintains a specialty library containing most major medical physics text books as well as the journals Medical Physics (1974 to present), Physics in Medicine and Biology (1970 to present), and the International Journal of Radiation Oncology, Biology, and Physics (1983 to present). The Radiology Department has an extensive library including Radiology with additional physics reference texts.

VIII Future Plans

A Summary of Strengths and Needs

The Radiation Oncology Physics Residency Program is a new venture for the Physics Division at Scott & White. Because the Physics Division serves both Radiation Oncology and Diagnostic Radiology, the Program can draw heavily upon the participation of diagnostic physicists and can structure rotations in association with diagnostic equipment. The graduates of the program should therefore be in a strong position to participate in the implementation of Image Guided Radiation Therapy. The program is supported by Ph.D. physicists each having over thirty years of experience. The participating MS physicists have between three and ten years of experience, and are bright and promising people with excellent training. Over the next decade Scott & White will need to recruit quality senior staff to replace the Ph.D. physicists as they retire. Scott & White will also need to retain their junior staff. The entire faculty is inexperienced at running a Residency Program, but is eager to obtain the experience. The future development of the Program will depend on the strategy adopted by Scott & White for the development of the Radiation Oncology component of its Cancer Center. If Scott & White invests in additional satellite facilities in surrounding counties, the Residency Program will take on a distributed rotation nature. If Scott & White funds and builds a Cancer Center facility in Temple with state-of-the-art radiation oncology assets, the Residency Program will be less dependent on external rotations to provide residents exposure to technology such as electronic portal imaging devices.

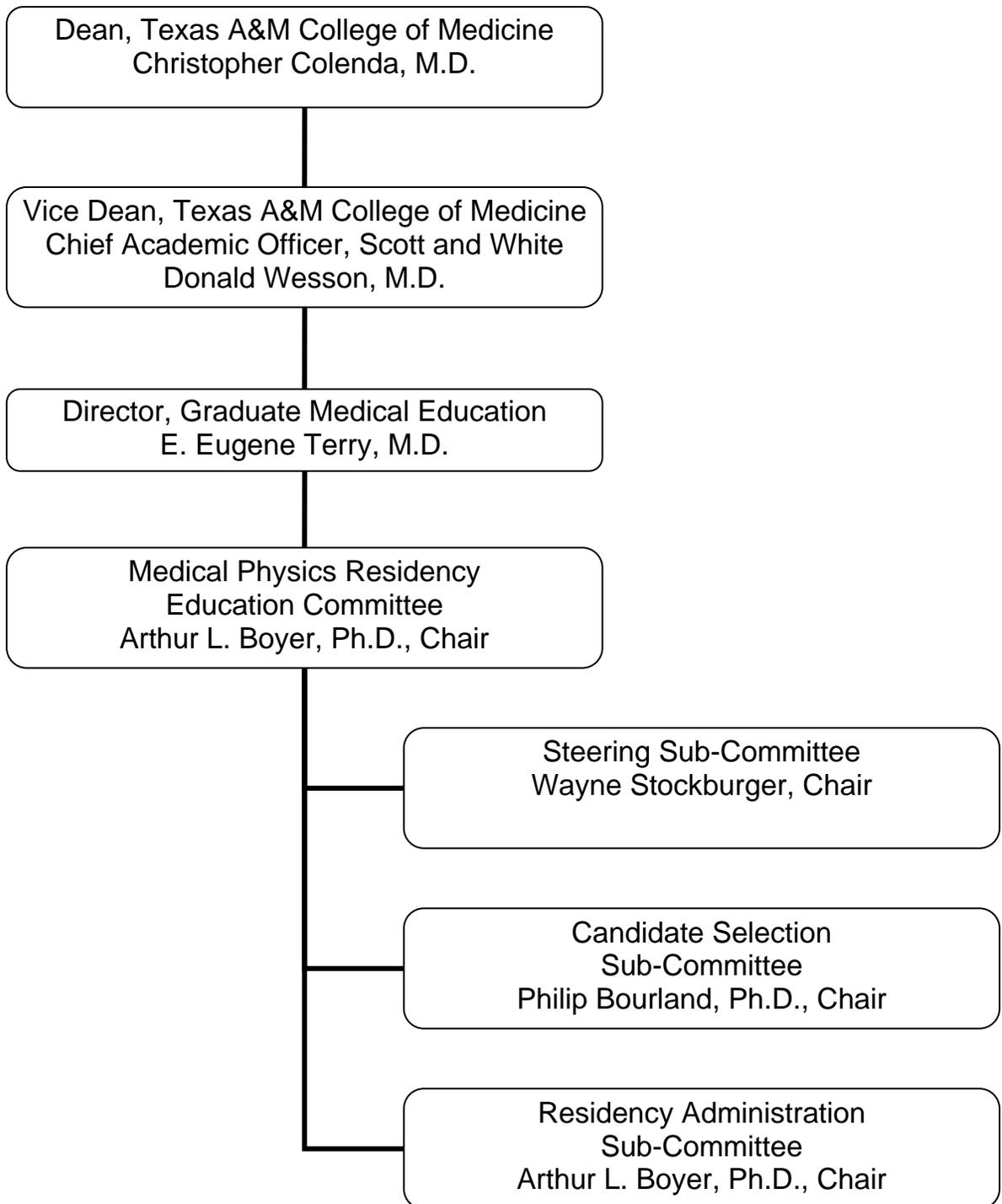
B Further Developments and Improvements

The Radiation Oncology Physics Residency Program is in a position to develop remote learning components of its program. The current Program Director is involved in remote learning activities within the AAPM and through his affiliations with Stanford and Texas A&M. Specifically, the radiobiology distant learning program could become a major asset to the Residency. Other opportunities may develop.

The Program is structured to improve continuous quality improvement of the operation and documentation of the Program. The evaluations of the faculty and students every six months will be assimilated and translated into action items for the Administration Sub-Committee to consider and implement. Issues concerning finance and structure will be submitted to the Steering Sub-Committee for consideration by the Radiology Chair and Administration.

Further ties with Texas A&M University are being discussed. These discussions may lead to a graduate program in Medical Physics in one of the University Departments or in the Medical School. These discussions are still preliminary, but promising.

Attachment 1: Program Supervision and Reporting Structure



Medical Physics Residency
Education Committee
Arthur L. Boyer, Ph.D., Chair

Philip Bourland, Recruitment
Vitthalbhai Mistry, Medical Physicist
Wayne Stockburger, Radiology Administration
Alexandria Smiley, Program Administrator

Medical Physics Residency
Steering Committee
Wayne Stockburger, Chair

Arthur L. Boyer
Philip Bourland
Alan Cheung, MD
Jason Shoales
Linda Burke
Alexandria Smiley

Residency Administration
Sub-Committee
Arthur L. Boyer, Ph.D., Chair

Philip Bourland, PhD
Vitthalbhai Mistry, PhD
Jason Shoales, MS
Karen Stumph, CMD
David Jones, MS
Lute Oas, MD

Candidate Selection
Sub-Committee
Philip Bourland, Ph.D., Chair

Arthur L. Boyer, PhD
Vitthalbhai Mistry, PhD
Bing Fang, MS
Lute Oas, MD
Karen Stumph, CMD



SCOTT & WHITE

Attachment 2A: Letter of Support from Department

February 1, 2008

Bruce Gerbi, Ph.D.
Chair, CAMPEP Residency Education Program
Therapeutic Rad. - Rad. Oncology
University of Minnesota
Mayo Mail Code 494
420 Delaware St SE
Minneapolis , MN 55455

Dear Dr. Gerbi,

The Administrative and Educational Leadership in the Radiology Department and the Division of Radiation Oncology at Scott & White Clinic supports this application for accreditation of our Radiation Oncology Physics Residency. Since its inception we have encouraged its existence and excellence.

We feel this program compliments our education mission and we are highly desirous that it achieve the designation "Accredited by CAMPEP, Inc" as an assurance that the program has achieved the level of excellence we strive for.

Sincerely,

Gil Naul, M.D.
Chair, Department of Radiology

Alan Cheung, M.D.
Director, Radiation Oncology Division

SCOTT & WHITE CLINIC
An Association Affiliated
With Scott and White
Memorial Hospital
and Scott, Sherwood
and Brindle' Foundation

2401 South 31st St.

THE TEXAS A&M UNIVERSITY SYSTEM
HEALTH SCIENCE CENTER
COLLEGE OF MEDICINE,
TEMPLE CAMPUS

Temple, Texas 76508

DEPARTMENT OF
RADIOLOGY

254-724-2412

Fax: 254-724-0502

Internet Home Page: <http://www.sw.org>



SCOTT & WHITE

Attachment 2B: Letter of Support from Institution

February 1, 2008

Bruce Gerbi, Ph.D.
Chair, CAMPEP Residency Education Program
Therapeutic Rad. - Rad. Oncology
University of Minnesota
Mayo Mail Code 494
420 Delaware St SE
Minneapolis , MN 55455

Dear Dr. Gerbi,

We formally invite the Commission on Accreditation of Medical Physics Education Programs (CAMPEP) to visit and review the Scott & White Radiology Department's Radiation Oncology Physics Residency Program. Attached you will find the self-study prepared by Dr. Arthur L. Boyer, the program director. The Scott & White Graduate Medical Education takes responsibility for the creation, implementation, and ongoing quality maintenance of graduate medical education training programs. We require that all of our residency and fellow training programs that are eligible be accredited. We applaud your efforts to set standards for quality training in medical physics programs and are willing to assist you in whatever you need to review the Scott & White Radiation Oncology Physics program. Please let us know if we can help any further.

Sincerely,

Donald E. Wesson, M.D.
Vice-Dean Temple campus
Texas A&M College of Medicine
Chief Academic Officer, Scott & White

E. Eugene Terry, M.D.
Director, Graduate Medical Education

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Memorial Hospital
and Scott, Sherwood
and Brindle' Foundation

2401 South 31st St.
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Temple, Texas 76508

DEPARTMENT OF
RADIOLOGY

254-724-2412

Fax: 254-724-0502



Attachment 2C: EAC Approval

Interoffice Memorandum

Office of the Chairman

DATE: May 21, 2007

TO: Don Wesson, M.D.
Vice Dean, Temple Campus, Chief Academic Officer, Scott & White

FROM: — Don P. Wilson, M.D.
Chairman, Department of Pediatrics

COPY

SUBJECT: Medical Physics Residency Training Program

At the May 17th meeting of the Education Advisory Committee, Dr. Art Boyer requested approval for a new residency training program in medical physics. This program is very unique, since it is not ACGME accredited. Rather accreditation is through the Medical Physics Education Program (CAMPEP).

Dr. Boyer gave a very thoughtful presentation, outlining the scope of the training program, availability of applicants, and the need for additional trainees in medical physics nationally. Following the presentation, the Education Advisory Committee strongly endorsed approval of the program.

Initial funding will be provided by the Department of Radiology, with future funding from CAMPEP. The EAC hopes that you agree to the merit of this worthy program.

Dr. Gene Terry will be bringing this as an informational item to the graduate medical education committee. Should you have any questions in regard to this proposal or the committee's review/approval, please feel free to contact me.

CC: Art Boyer, Ph.D., Radiation Therapy
Gill Naul, M.D., Radiology
Robert Pryor, M.D., CMO, Scott & White
Paul Dieckert, M.D., Chair, Scott & White Board of Directors

DPW Ahg

**Attachment 3: Data on Clinical Medical Physics Residents
Trained/Training to Date**

Name: Rebecca Weinberg, Ph.D.
Start Date: October 2007
Graduation: September 2009 (expected)
Email: rweinberg@swmail.sw.org

Name: Junfang Gao, Ph.D.
Start Date: July 2008
Graduation: June 2010 (expected)
Email: jgao@swmail.sw.org

Attachment 4A: AAPM Placement Service Ad

POSITION: RADIATION ONCOLOGY CLINICAL MEDICAL PHYSICS
RESIDENCY (2 years)

LOCATION: Scott & White Clinic
Temple, Texas

A position is available for Residency training in Radiation Oncology Clinical Medical Physics at Scott & White Clinic, Temple, Texas. The Physics Division of the Radiology Department has a single position open for two years beginning July 1, 2008. The applicant must have an earned Ph.D. in Physics or Medical Physics at the start of the residency. Training will be a mix of didactic course work (as needed and appropriate) and competency-based rotations documented through report generation followed by oral examination by the faculty. The Scott & White Program follows the AAPM Report No. 90 guidelines and includes newer technologies (IMRT, VSIM, SRS/SRT, HDR) as well as extensive diagnostic radiology exposure. The residency program will be applying for CAMPEP accreditation during the tenure of this residency. The candidate's application must include a detailed resume, three letters of reference and a copy of an official transcript detailing Ph.D. and undergraduate work. Applications will be accepted until April 30th when they will be evaluated. An on-site interview (in Temple, Texas) at the applicant's expense (except hotel) is required. For more information on Scott & White, please visit its web site at medphysics.sw.org.

Scott & White is an equal opportunity/affirmative action educator.

CONTACT: Alexandria Smiley. (asmiley@swmail.sw.org)

Division of Physics
Scott & White Clinic
Temple, TX 76508
(254) 724-4051
(254) 724-6061 (FAX)

Attachment 4B: Scott & White Medical Physics Residency Program Web-Site

http://www.sw.org/web/SW/patientsAndVisitors/iwcontent/public/RadiologyPhysics/en_us/html/RadiologyPhysics.html

Find a Doctor | Appointments | Careers | Make a Gift | Contact | Search: SW.org Search >

SCOTT & WHITE

Patients Health Care Professionals Research & Education

Applicants Contacts GME Overview Programs Resident Life

Medical Physics Residency

Applying to the Program
Interview Information
Program Curriculum

Staff

Faculty

Related Topics

Medical Physics
Radiology

Medical Physics Residency Program

The Scott & White Medical Physics Residency program was founded to produce well-rounded medical physicists specially trained to provide technical support for comprehensive management of cancer.

[Apply Now >>](#)

Through our rotation-based regimen of Socratic learning experiences, Scott & White Medical Physics residents incorporate lifelong learning into their practice of medical physics, delivering the highest quality care to the support that radiation oncologists and the staff of a radiation oncology department needs to provide the highest standards of cancer management.

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Applying to the Program

The Medical Physics Residency program applicants must demonstrate a strong foundation in basic physics. This shall be documented by a master's or doctoral degree in medical physics, physics, engineering, mathematics or other science with physics training equivalent to a minor in physics (upper level courses in electricity and magnetism, quantum mechanics, atomic structure, statistical mechanics and mechanics).

Recruiting will begin in the first calendar quarter. Following a response, the program director will contact applicants and discuss the program, their interests and what information they might need. Subsequent to this conversation, the resident applicant will receive the following:

1. Description of the program
2. Material routinely provided by Scott & White Graduate School of Medicine
3. An official application to be filled out

The application and supporting materials are returned to the Medical Physics Residency Program Administrator.

Resident selection is done consistent with the Scott & White Graduate School of Medicine stated policy, i.e.:

"Programs must select from among eligible applicants on the basis of their preparedness, ability, aptitude, academic credentials, communication skills and personal qualities such as motivation and integrity."

- Admission to the Texas A&M Health Science Center College of Medicine Graduate Medical Education program is granted without regard to race, religion, sex, creed or national origin.
- All new Scott & White employees, house staff and senior medical staff are required to undergo a mandatory substance abuse test as a condition of employment.

Application Assistance

Alexandra Smiley

Program Coordinator
2401 S. 31st St.
Temple, TX 76508

E-mail:

asmiley@swmail.sw.org

Phone:

254-724-4051

Fax:

254-724-6061

Attachment 5: Description/Application Materials Provided Prospective Candidates

Program Description

The two-year Radiation Oncology Physics Residency Training Program at Scott & White is designed for candidates with doctoral degrees in the relevant physical sciences who are interested in careers as clinical medical physicists in radiation oncology. This program concentrates on the medical uses of physics in clinical treatment of cancer patients; it does not focus on training in theoretical physics or basic research. Upon successful completion of the program the Resident will receive a Certificate of Completion from Scott & White and from the Texas A&M University School of Medicine. The program is intended to qualify the Resident to apply for examination by the American Board of Radiology for certification as a Therapeutic Radiological Physicist.

Clinical Training. During the 24 months of the residency, the Resident will take clinical rotations through the following subspecialty areas:

- Detectors and Dosimeters
- Radiation Safety
- Imaging
- Conventional Simulation
- CT Simulation
- Treatment Equipment
- Patient Treatment
- IMRT
- Brachytherapy
- Other Duties

In addition, clinical training will include work on department projects, carried out under the supervision of the medical physics faculty.

Didactic Training

Clinical conferences, seminars, small discussion groups, journal clubs and one-on-one instruction are all an integral part of the program. The Resident will participate in the following:

- Physics Division Meetings
- Tumor Boards
- Diagnostic Radiology Physics Lectures
- Radiation Oncology Physics Didactic Lectures

Clinical competency is evaluated by oral exams and reports generated in association with each of the clinical rotation areas.

Research Experience

During the latter part of the Resident's second year of training and depending upon the Resident's progress in learning the clinical aspects, there may be an opportunity to concentrate on a particular area of interest, and design and execute a research project.

Opportunities exist for collaborative research with staff members from other departments. The Resident would submit the results of their research project for presentation at a scientific meeting and prepare a manuscript for publication in a scientific journal.

Appointments and Applications

To be eligible to apply, the candidate must have a Ph.D. or M.S. (or equivalent degree) in medical physics or in a related physical science or engineering field. If the candidate is considered for entry into the program, they will be asked to visit Scott & White in Temple, Texas for an interview with the Program Director and selected faculty. Attached is an Application Form. To apply, the attached form should be completed with information about the candidate and names and contacts of references, and sent it along with a copy of the candidate's CV by email, regular mail, or both to:

Alexandria Smiley
asmiley@swmail.sw.org
Radiology Department
Scott & White Clinic
2301 South 31st Street
Temple, TX 76508
(254) 724-4051

Inquiries

For more information or to address specific questions, please contact:

Arthur L. Boyer, Ph.D.
Program Director
Radiology Department/Physics Division
Scott & White Clinic
2301 South 31st Street
Temple, TX 76508
aboyer@swmail.sw.org
254 725-7866

Application Form
 Radiation Oncology Physics Residency Program
 Scott & White/ Texas A&M University School of Medicine

Please provide the following information as completely as possible.

Full Name:	
Degree:	
School:	
Department:	
Subject:	
Date Received:	
Current Address:	
City:	
State:	
Zip:	
Country:	
Citizenship:	
Visa Status:	
Email:	
Telephone (W):	
Telephone (H):	
Telephone (Cell):	
Date Available:	

References

Reference 1 Name:	
Institution:	
Department:	
Email:	
Telephone:	
Address:	
City:	
State / Zip:	
Country:	
Reference 2 Name:	
Institution:	
Department:	
Email:	
Telephone:	
Address:	
City:	
State / Zip:	
Country:	
Reference 3 Name:	
Institution:	
Department:	
Email:	
Telephone:	
Address:	
City:	
State / Zip:	
Country:	

Attachment 6A: Example Interview Schedule

Resident Name

Date

7:00 a.m.	Breakfast Dr. Art Boyer
8:00 a.m.	Alan, Cheung, M.D. Director, Radiation Oncology Division Dr. Cheung's Office Ground Floor, Radiation Oncology, Room CO10B
8:30 a.m.	Lisa Zang, RTT Supervisor, Radiation Oncology Ground Floor, Radiation Oncology, Room CO11LL
9:00 a.m.	David Jones, MS Diagnostic Physicist Building 30, Room 109
10:00 a.m.	Vitthalbhai Mistry, Ph.D. Physicist Dr. Mistry's Office Building 30, Room 106
11:00 a.m.	Karen Stumph, CMD Chief Dosimetrist Building 30, Room 109
Noon	Presentation Radiology Conference Room
1:00 p.m.	Lunch Jason Shoales, MS Bing Fang, MS Pasquale Montanaro, MS
2:30 p.m.	Lute Oas, MD. Radiation Oncologist S&W Cancer Center Killeen, Texas
4:00 p.m.	Arthur Boyer, Ph.D. Director, Physics Residency Program

**Attachment 6B: Clinical Medical Physics Residency Candidate
Evaluation Form**

Radiation Oncology Physics Residency Training Program
Candidate Evaluation Form

Name of Candidate: _____

Date of Interview: _____

Scores:

- _____ Interest, reasons for candidacy for this residency
- _____ Knowledge of Radiation Oncology Medical Physics
- _____ Technical skill set including experimental experience
- _____ Application (references, transcripts, etc.)
- _____ Communication and interaction skills
- _____ Initiative and Productivity

Scale

- 1 = outstanding
- 2 = excellent
- 3 = good
- 4 = satisfactory
- 5 = unacceptable

Overall Score: _____

Comments:

Interviewer Name: _____

Interviewer Signature: _____ Date: _____

Attachment 7: Letter of Appointment from Scott & White

Date

Dear **Resident Name**:

It is with great pleasure that we offer you an appointment to our two-year residency program in Radiation Oncology Physics beginning 1 October 2007 in the Department of Radiology, Division of Physics.

We are offering you a salary of \$1,600.05 per pay period (2 week period). Benefits including health insurance coverage and retirement funds are in addition to the base salary. In addition, a moving allowance up to \$1,000 will be provided.

Please note that this offer is contingent upon the successful completion of the placement medical history and evaluation, which includes a drug screen, and continuation and completion of the program are dependant upon satisfactory progress in education, performance of all duties, and compliance with the policies of the Department of Graduate Medical Education, Research and Education Division, Scott and White. In addition, all new employees must furnish proof of their legal right to be employed in the United States. If you have any questions regarding the acceptable proof, please do not hesitate to contact Patricia Balz, Recruitment Manager, at 254-724-1632.

We hope that you will accept this position and continue your career at Scott & White. Please sign below to indicate your acceptance of this offer and return the original to us. Note that this letter does not constitute a contract of employment for a definite period of time.

We look forward to hearing from you soon. Please let me know if there are questions that I may answer for you.

Sincerely,

Arthur Boyer PhD
Director, Division of Radiologic Physics
Department of Radiology
Scott & White Clinic

Accepted: _____
(Name)

_____ Date

Attachment 8: Resident Orientation Schedule

SCOTT & WHITE Radiation Oncology Physics Resident Orientation Schedule

Thursday June 26, 2008	
7:30-8:00	Sign-in, Meet & Greet
8:00-9:00	Welcome, Announcements & Icebreaker
9:00-9:15	“What Makes S&W Unique?”
9:15-9:50	Employee Development
9:50-10:30	Employee Health Services, Infection Control & Nursing Announcements
10:30-10:40	Break
10:40-11:25	Environment of Care & Patient Safety
11:25-11:45	Security Management
11:45-11:50	Break
11:50-12:30	Lunch & A Movie
12:30-1:00	Healthy Back
1:00-1:15	Risk Management & Basic Patient Rights
1:15-1:55	Corporate Compliance
1:55-2:10	Identifying Victims of Abuse
2:10-2:15	Break
2:15-2:30	Employee Recognition
2:30-3:15	Employee Handbook Overview
3:15-3:20	S&W 403(b) Savings Plan
3:20-3:30	Break (PRN Staff are Released)
3:30-4:45	Health Benefits
4:45-4:55	Q&A
4:55-5:00	Conclusion

Tara Moore

TMOORE@swmail.sw.org

(254) 724-0535

Fax: (254) 724-6931

**SCOTT & WHITE
Radiation Oncology Physics Resident
Orientation Schedule**

Friday, June 27, 2008		
8:00 – 10:00	Introduction to the Radiation Oncology Physics Residency documents	Physics Division Program Director Room 116
10:00 – 10:15	Break	
10:15 – 11:45	Resident Entry Assessment Examination	Physics Division
12:00 – 1:00	Lunch Break	
1:00 – 3:00	COMPUTER TRAINING	312 & 313 – Conf Ctr
Monday June 31, 2008		
8:00 – 8:30	Meet with Rotation I Mentor	
8:30 - 9:00	Meet with Rotation II Mentor	
9:00 – 9:30	Meet with Rotation III Mentor	
9:300 - 10:00	Meet with Rotation IV Mentor	
10:00 – 10:30	Meet with Rotation V&VI Mentors	
10:30 – 11:00	Meet with Rotation VII Mentor	
11:00 – 11:30	Meet with Rotation VIII Mentor	
11:30 – 12:00	Meet with Rotation IX Mentor	
12:00 – 1:00	Lunch Break	
1:00 – 2:00 pm	OR Orientation	Mayborn Auditorium

Alexandria Smiley
asmiley@swmail.sw.org
 Radiology Department
 Scott & White Clinic
 2301 South 31st Street
 Temple, TX 76508
 (254) 724-4051

Attachment 9A: Resident Probation and Dismissal Policy

DISCIPLINARY ACTION/DUE PROCESS

1) Process

Residents whose professional competence or conduct is not satisfactory will be subject to disciplinary action initiated by the Program Director and endorsed by the Division Director and/or Department Chairman.

The Resident in question will meet with at least two senior staff members of the department responsible for his/her training. One of the departmental representatives should be the Program Director, unless prohibited by extenuating circumstances. During the meeting, a written document including a detailed, itemized description of the issues regarding professional conduct and any prior evaluations of the Resident will be supplied to the Resident. If the issues of concern predate the last scheduled written evaluation, those issues should be documented in that evaluation. The written material(s) should describe:

- a. Nature of concern about either professional competence or conduct
- b. Disciplinary action taken which could include:
 - Remediation
 - Probation
 - Non-advancement in academic year
 - Suspension
 - Dismissal
- c. The duration of disciplinary action if other than dismissal or effective date if dismissal
- d. Required remediation (see below) by the Resident, if other than suspension or dismissal
- e. Description of methods and conditions of enhanced monitoring of the resident's clinical and/or academic activities if his/her performance suggests inability to render an appropriate level of patient care or and/or exhibit appropriate personal or professional conduct. By definition, "enhanced monitoring" should include (1) specific goals/objectives developed for the Resident and (2) periodic, written assessments of the Resident during the specified time period.

Discussions and written documents pertaining to the issues regarding professional conduct should center on specific behaviors.

A copy of documentation supplied to the Resident shall be marked "CONFIDENTIAL" and forwarded to the Scott & White Chief Academic Officer and the Director of Graduate Medical Education. The Chief Academic Officer and/or the Director of Graduate Medical Education may initiate a review process of the disciplinary action if the action is felt to be inappropriate. For the review, the Chief Academic Officer and/or Director of Graduate Medical Education may appoint a committee that consists of a program director from another program, a department head from a different department, a chief resident from another program, and the GME Ombudsperson to review both the merit and the procedures and make recommendations. The role of the Ombudsperson is to ensure fair treatment for the Resident. The committee may request that the Resident, the program director or others involved in the case meet with the committee to discuss the issues

before a recommendation is made. The decision of the involved program and the committee recommendations will be reported to the Director of GME and the Chief Academic Officer for final approval.

Suspension of the Resident from program activities for the duration of the disciplinary process may be initiated by the Program Director. Suspension may also be reviewed by the committee described above.

If a Resident is dismissed, he/she will not be eligible for unused vacation upon termination.

2) Appeal

At the request of the named Resident, an ad hoc review committee, composed of the membership of the committee described above, will be appointed by the Chief Academic Officer, who will coordinate the appeal process and function as a non-voting member of the various committees or councils involved. The ad hoc committee will be charged with reviewing the circumstances of the disciplinary action to assess both the merits and the procedures (i.e., the extent to which the action followed appropriate procedures and whether the house officer was treated in a fair manner). The review committee may request related documentation and invite testimony from the Resident and Program Director involved. The ad hoc review committee will make recommendations to the Director of Graduate Medical Education who will review the recommendations of the ad hoc committee and with agreement from the Chief Academic Officer to take action if necessary. The Chief Academic Officer will serve as the final authority.

Attachment 9B: Summary of Resident Policies

GRIEVANCE/ PROBLEM-SOLVING PROCEDURE

TAMHSC-COM/Scott & White encourages residents to bring to the attention of Program Directors concerns or complaints about work-related conditions. In order to aid in prompt and constructive problem solving, residents shall be provided with the opportunity to present such information through a formal procedure.

Many problems result from misunderstandings or lack of information and can generally be solved by discussing them with the Program Director. If formal discussion with the Program Director does not result in a satisfactory solution to the issue, the Resident should submit the problem in written form to the Program Director as soon as possible. The Program Director will meet again with the Resident to discuss the issue and will present a written reply to the Resident as soon as possible.

If the Resident is not satisfied after receiving the Program Director's reply, the Resident should request a meeting with the Department Chairman and provide (1) the original description of the issue, (2) the Program Director's reply, and (3) a written explanation as to why the Program Director's reply was not satisfactory. This process must be accomplished within two weeks from the date of the written Program Director's reply. The Chairman will respond in writing after interviewing the Resident. The Chairman may choose to interview other individuals including the Program Director.

If the issue is not satisfactorily resolved at this point, the Resident may pursue further action by providing copies of all written material and a written response to the Chairman's letter to the Director of Graduate Medical Education within two weeks of the Chairman's reply. The Director will further evaluate the complaint and, if he so chooses, forms an ad hoc committee of the GMEC. The committee membership should include the Resident Ombudsperson. The committee shall review all pertinent information and conduct interviews necessary to reach a decision about the grievance. The committee's recommendations will be forwarded to the Director of GME and the Chief Academic Officer for final resolution.

There will be no unfavorable action on the part of Scott & White against any Resident as a result of the submission of a complaint or problem. All information concerning a Resident's problem/complaint should be received in confidence, and the issue should be discussed only with those involved in the process or who can provide necessary information.

Complaints of discrimination or harassment may be addressed through this procedure or by contacting the Director of Employee Relations section of Human Resources.

CONFIDENTIAL GRIEVANCE PROCEDURE

At times, the Resident may have concerns that are outside the Program Director's jurisdiction or for which the Resident wishes to not include the Program Director or Department Chairperson. The Resident may communicate these concerns to the Ombudsperson who may take the problem directly to the Director of GME. The Director of GME may follow the aforementioned procedure of choosing an ad hoc committee to review the concerns and reach a solution.

NON-DISCRIMINATION AND SEXUAL HARASSMENT

Staff members and their work environment should be free from all forms of unlawful harassment and intimidation. Scott & White does not and will not permit staff members to engage in unlawful discriminatory practices, sexual harassment, or harassment based on race, color, religion, sex (gender), national origin, age, disability or status as a veteran. Unlawful harassment by any staff member, supervisor, department head or person doing business with Scott & White is strictly prohibited.

Harassment is verbal or physical conduct that denigrates or shows hostility toward an individual because of their race, color, religion, gender, national origin, age, disability, or status as a veteran. Sexual harassment consists of unwelcome sexual advances, requests for sexual favors and other verbal or physical conduct of a sexual nature that creates an offensive or hostile work atmosphere.

Staff members who believe that they are being sexually harassed, or harassed on the basis of race, color, religion, gender, national origin, age, disability, or status as a veteran should immediately report their concerns to their Program Director, the Director of Graduate Medical Education, the Vice Dean, Temple Campus, TAMHSC-COM Scott & White, or the Assistant Administrator of Human Resources at Scott & White. The complaint will be promptly investigated and, if it is determined that harassment has occurred, Scott & White will take appropriate disciplinary action, up to and including discharge of the offending staff member. No staff member will suffer retaliation for filing a complaint. All complaints will be handled in confidence.

PHYSICIAN IMPAIRMENT/SUBSTANCE ABUSE

The abuse of controlled substances by physicians and especially residents in training looms as a major concern for Graduate Medical Education Programs as this problem leads to the destruction of professional careers, personal and family life and even to the loss of life itself.

It is the responsibility of TAMHSC-COM/Scott & White Graduate Medical Education programs to inform house staff:

- about the facts and problems associated with chemical dependency,
- about programs of intervention, support and treatment for the individual and their families suffering from this problem
- about follow-up support after the acute treatment program has been completed.

Chemical dependency is a disease that can be treated and from which the chemically dependent professional can recover.

Re-entry of these highly trained medical professionals into the active practice of medicine may be in the best interest of the physicians as well as society as a whole.

Scott & White perform routine drug screening at the beginning of residency training. As part of the orientation process at the beginning of training, information about the Scott & White substance abuse policy and the Employee Assistance Program is presented to residents.

A resident with a substance abuse problem who wants help can contact his/her Program Director, Department Chairman, Coordinator or the GME office. The individual who is contacted will notify both the Program Director and Department Chairman and will also directly notify the Employee Assistance Coordinator. An appropriate referral for examination and treatment will be made according to Scott & White procedures.

Alternatively, a resident may be identified as or suspected of performing professional duties under the influence of legally or illegally obtained stimulant or sedative or other

psychoactive drugs through the gathering and submission of evidence to the Program Director. The Program Director may then consult the Employee Assistance Coordinator and the Director of Human Resources regarding the best plan of action. If sufficient evidence has been obtained to justify an intervention, the Program Director, Department Chairman, representative from Human Resources and the Employee Assistance Coordinator will determine the evaluations that should take place according to guidelines outlined in the Scott & White Supervisory Guide. Should a substance abuse problem be proven, the resident may be referred to the most appropriate level of treatment.

After the acute treatment program is completed, depending upon the recommendations of the treating clinician, the resident may or may not be reinstated as an active member in the residency program. Should a decision be made to reinstate the resident, reintroduction into the clinical work place will be done in a controlled fashion. It is recognized that the greatest chance for successful treatment and rehabilitation occurs when the recovering resident returns to a warm and supportive environment. The Employee Assistance Program will assist in the continuing care and follow-up with a specific rehabilitative discharge plan. This process will be specified by a written agreement involving the resident, the treating clinician, the involved GME Program Director and the Director of GME. The contract will include such details as access to controlled substances, random drug testing and regular attendance at self-help programs such as Alcoholics Anonymous. Any failure on the part of the resident to adhere to the contract may result in disciplinary action up to and including discharge.

Any GME Program's specific policy on substance abuse or the impaired professional will be more relevant to the unique program and will supersede this policy. Also the Americans with Disabilities Act (<http://www.usdoj.gov/crt/ada>) may be applicable if specific requirements are met.

Additional references: Scott & White Employee Handbook (2004) Drug Free Workplace (pg. 36).

COUNSELING SUPPORT SERVICES

Scott & White recognizes that increasing responsibilities of residents require sustained intellectual and physical effort. On occasion, these responsibilities result in stresses on the individual or family requiring extra support. This support is provided through multiple resources. The Health Plan Psychiatric coverage includes acute and situational evaluation and therapy, as well as long-term care by psychiatrists, psychologists and social workers. Comprehensive medical care is provided by the Scott & White Health Plan. Referral for services not connected with Scott & White (for confidentiality reasons) can be obtained through the Designated Institutional Official in the Graduate Medical Education Administrative Office. Neuropsychological testing can be offered when professional conduct or academic performance has resulted in consideration of Disciplinary Action. The Physician Impairment Policy deals specifically with support for physicians who are identified as being compromised due to substance abuse.

VISA STATEMENT

Institutional Policy regarding visas: Texas A&M Health Science Center College of Medicine/Scott & White accepts J-1 visas only.

Attachment 9C: Compensation and Benefits

STIPENDS/PAYROLL

Residents are paid by Scott & White Memorial Hospital, Scott, Sherwood, and Brindley Foundation at two-week intervals. The gross amount of each biweekly paycheck is calculated by dividing the annual stipend stated in a resident's appointment letter into 26 pay periods.

There is an increase for each additional level of training. Any increase in base rate granted by the hospital during an academic year will be allocated to residents on the effective date regardless of stipend quoted in his/her current appointment letter.

Pay levels are determined by the following guidelines:

1. Resident or Fellow stipends are defined by the level of training in their current program (their functional level of their current training).
2. Benefits and privileges are defined by the stipend level.
3. An exception of up to one year's credit is possible for service performed as chief resident in the TAMHSC-COM/Scott & White graduate education training system.
4. The pay schedule increases to a PGY-7 level. Any training beyond PGY-7 is paid at the PGY-7 level.
5. Pay scales are reviewed annually by the Educational Advisory Committee and GMEC by way of its Benefits Committee.

Direct deposit is utilized for distribution of payroll. Direct deposit is implemented upon employment and terminated with employment termination. Payroll information may be accessed electronically on the Scott & White Intranet ("BUZZ"). NOTE: For IRS purposes, the remuneration to a Resident is considered salary.

LEAVE POLICIES

LEAVE

All leave must be documented with a completed Absence Request Form. Absence Request forms is available from the Program. For completion, Absence Request Forms require signatures of the Program Director to provide verification of approval of leave.

Absence request forms are used for preparation of payroll and are maintained by the Administrative Director of the Medical Physics Residency as part of the resident personnel file.

Prolonged leave from the graduate medical education program may result in inadequate time in the program to fulfill education requirements. Absence from the program for more than 21 days must be reported to the TMB (171.6). These issues must be discussed and approved by the individual Program Director. When additional time is needed to fulfill Board requirements, a new appointment letter must be issued with the new dates.

Other insurance premiums may not continue during intervals of leave without pay. Consultation with Human Resources is necessary to delineate these issues and address other benefits.

VACATION

All leave must be approved by the resident's Program Director. All leave must be supported by a completed Absence Request Form.

Three weeks (15 week days) per academic year are granted to all residents and fellows. Vacation allotments on external rotations at institutions other than Scott & White are included.

Paid vacation leave for residents is available from the start date of a training program. Vacation unused during one year may be carried forward to the next year upon approval of the Program Director. The number of days carried forward may not exceed the number of days allotted for the academic year. Paid vacation leave may not be “borrowed” from subsequent years. Residents are not eligible for the PTO (Paid Time Off) Cash-In program or pay for unused vacation upon termination.

SICK LEAVE

All leave must be approved by the resident’s Program Director. All leave must be supported by a completed Absence Request Form.

Residents are granted 13 days paid sick leave per year for personal illness, illness of immediate family members (spouse, children, and parent), non-employment related injuries, pregnancy or other disabilities. Justification from a health care provider may be required in these circumstances. During an approved absence to care for an immediate family member, sick leave hours may be used for five (5) consecutive workdays. If additional time off beyond five (5) consecutive workdays is required, residents must use PTO hours.

Paid sick leave may not be “borrowed” from subsequent years. Residents that are ill and/or cannot work due to circumstances described above are to notify their Program Coordinator and the service on which they are scheduled as soon as possible.

Upon exhausting available paid leave, sick and vacation, residents needing additional leave time will be placed on leave without pay and may be required to make up training time lost at the end of the medical training program if so determined by his/her Program Director. Unused sick leave will automatically be carried over to subsequent training years. Residents will not be compensated for unused sick leave upon termination.

MATERNITY LEAVE

All leave must be approved by the house officer’s Program Director. All leave must be supported by a completed Absence Request Form.

Maternity leave is to be arranged with the Program Director and the GME office. Paid maternity leave will be a combination of accrued sick and vacation leave. All available sick leave and vacation benefits must be used before a resident takes leave without pay.

Leave without pay may necessitate payment by the Resident for medical insurance coverage during the stipulated period of leave. Arrangements should be made with the Human Resources Benefits office prior to beginning the leave, if necessary, for the resident to pay premiums.

The Family Medical Leave Act may be applicable if specific requirements are met. Prolonged leave from the program may result in inadequate time in the program to fulfill Education requirements. These issues must be discussed and approved by the individual Program Director.

PATERNITY LEAVE

All leave must be approved by the house officer’s Program Director. All leave must be supported by a completed Absence Request Form.

After childbirth or adoption, it is anticipated that residents may request up to three days of sick leave. Further sick leave days may be approved by a Program Director for medical

complications requiring the presence of the resident (up to the maximal annual sick leave of 13 days). Vacation days may also be used. Should additional time off be needed or requested, the Family Medical Leave Act, may be applicable if specific requirements are met.

FAMILY MEDICAL LEAVE ACT

All leave must be approved by the house officer's Program Director. All leave must be supported by a completed Absence Request Form.

According to the Family Medical Leave Act of 1993, employees who have worked at least 12 months and have completed at least 1250 hours of work during the 12 months preceding the effective leave of absence date are entitled to 12 weeks of "job protected" leave per year for qualified medical leave (birth/adoption of a child; spouse, child or parent with serious health condition; or serious health condition of employee). Notice should be provided to employer in writing 30 days in advance for foreseeable leave to avoid undue disruption of operations and as soon as practical for unforeseeable leave. The written notice includes the Absence Request Form and the Scott & White FMLA Medical Certification Form. Married employees with both husband and wife working for Scott & White, are eligible for a combined total of 12 weeks of FMLA leave for Parental Leave. An employee must use all available sick leave and vacation benefits before being placed on unpaid leave status. Vacation (PTO) and sick leave do not accrue during leave of absence.

Health insurance benefits remain in effect if employee pays his/her share of premium; if employee fails to return to work, premiums paid by employer during the leave of absence may be charged to the employee for reimbursement to Scott & White.

The employee is entitled to the same or an equivalent position when returning from leave. Residents should, however, be aware that leave in excess of that allowed by their training program may result in extension of training time beyond the projected completion date.

BEREAVEMENT LEAVE

In the event of a death in the immediate family, up to three (3) days leave may be paid from a resident's sick leave balance.

Immediate family members for bereavement purposes include: spouse, parent, child(ren), brother, sister, stepchild(ren), stepparent, father-in-law, mother-in-law, grandparent, grandparent-in-law, and grandchild(ren) . Time off for bereavement of other family members and friends granted by the Program Director or time off in excess of three (3) days for immediate family will be paid from vacation leave or will be leave without pay.

INTERVIEW LEAVE

All leave must be approved by the resident's Program Director. All leave must be supported by a completed Absence Request Form.

Each upper level resident is allowed ten (10) total days of leave with pay during the course of training at Scott & White for the purpose of interviewing for fellowships or practice opportunities. Interview leave is available only during the second year of training and must have prior approval of the Program Director. Additional interview leave may be granted at the discretion of the program director.

This leave is expressly intended for only fellowship or job interviews. Other related activities are not applicable to this leave.

EDUCATIONAL LEAVE

All leave must be approved by the resident's Program Director. All leave must be supported by a completed Absence Request Form.

Five (5) days of educational leave are granted to all residents annually to attend educational conferences or meetings of their choice. Additional time may be granted by program director for attendance at meetings of professional organizations in which residents occupy official positions as officers or representatives.(i.e. official representative to the TMA resident section). Attendance must have prior approval of the Program Director and be supported by documentation describing the meeting/conference, i.e., brochure, registration, etc.

Unused educational leave may not be carried forward to the next year except by special request from the Program Director

MISCELLANEOUS TIME

All leave must be approved by the resident's Program Director. All leave must be supported by a completed Absence Request Form.

Absences for the following types of requests are not charged to vacation or educational leave but must be requested on the Absence Request Form for appropriate approval:

- Presenting papers at professional conferences/meetings
- Presenting poster exhibits at professional conferences/meetings
- Time off to take a licensure examination
- Participation in non-required conferences provided at Scott & White
- Attendance at courses required by training program
- Attendance at meetings of professional organizations in which residents occupy official positions as officers or representatives (e.g. official representative to the TMA resident section).

Such leave must have documentation of acceptance of presentation and date(s) of required attendance. Leave granted a maximum of two times total for the presentation of the same paper at different meetings. Travel funding for research papers should be requested at the time of the RFP when applicable.

PERSONAL LEAVE OF ABSENCE

All leave must be approved by the resident's Program Director. All leave must be supported by a completed Absence Request Form.

Requests for leaves of absence will be evaluated on the merits of the request and will be granted or denied in accordance with applicable state and federal laws and accreditation requirements. A leave of absence may be comprised of paid leave and/or leave without pay. When the leave of absence is requested for medical reasons (including pregnancy), the leave must be compliant with FMLA, as applicable. Paid sick leave may be utilized only if the leave is for medical reasons.

The total length of a leave of absence must be consistent with satisfactory completion of training (credit toward specialty board qualification) which will be determined by the individual programs. Leave without pay may necessitate payment by the resident for medical insurance coverage during the stipulated period of leave. Arrangements should be made with the Human Resources Benefits office prior to beginning the leave, if necessary, for the Resident to pay premiums.

PROFESSIONAL LEAVE OF ABSENCE

All leave must be approved by the resident's Program Director. All leave must be supported by a completed Absence Request Form.

Occasionally unique educational opportunities arise for which a Resident may wish to interrupt the usual course of training; for example, a year of research training. Although this concept is supported by The TAMHSC-COM/Scott & White Graduate Medical Education in general, the decision to grant extended leave from a training program rests with the individual program and department with which the resident or fellow is associated.

Program Directors should consider the long-range effects of such leave on educational and budgetary planning. Professional leave of absence may be comprised of vacation and/or leave without pay. Before any leave without pay may begin, all accumulated vacation leave must be exhausted.

The total length of a leave of absence must be consistent with satisfactory completion of training. Leave without pay may necessitate payment by the resident for medical insurance coverage during the stipulated period of leave. Arrangements should be made with the Human Resources Benefits office prior to beginning the leave, if necessary, for the resident to pay premiums.

MILITARY LEAVE

All leave must be approved by the resident's Program Director. All leave must be supported by a completed Absence Request Form.

Participation in the National Guard or military reserve activities is allowed but must be coordinated with and approved by the resident's Program Director. Absences for participation in this activity are charged to leave without pay or may be charged to vacation leave, if desired. When benefit time is depleted, they will be placed in a leave without pay status.

A resident inducted, ordered, or enlisted into active service will be placed on leave of absence status effective the date of written orders to report. When released from military obligations, resident has 90 days to notify program director to request reinstatement into training program.

During the leave of absence, medical and dental coverage may be continued. When in an unpaid status, resident is responsible for full payment of premium.

INSURANCE POLICIES/EMPLOYEE BENEFITS

HEALTH AND DENTAL INSURANCE

Health insurance coverage is provided for the residents at no cost to the resident. The plan is a self-insured, comprehensive, medical plan called the Scott & White Employees Medical Plan (SWEMP) administered through the Scott & White Health Plan, Inc. Dependent coverage (parent/child(ren)), couple, family) is available at reduced rates. An opportunity to enroll in the SWEMP is available during New Resident Orientation. Coverage commences the first day of employment; there is no waiting period. In addition, coverage for resident has no 'pre-existing conditions' clause.

Eligibility for enrollment extends through the first thirty (30) days of employment. If a resident does not enroll during the first thirty (30) days of employment, the resident may be a late enrollee and the coverage would not commence until the first day of the month following 90 days from the date the application/enrollment form was received in

Human Resources. Otherwise, enrollment will not be allowed until the open enrollment period in the fall each year. No coverage is provided before that enrollment period.

New dependents (spouses and/or children, step-children, etc) may be added to Health Plan coverage by notifying the Employee Benefits office in the Scott & White Human Resource department no later than 30 days after the legal date of the event (marriage, adoption, etc.). Coverage will begin on the first day of the next month. Sixty (60) days are allowed to add newborn children to your Health Plan coverage.

Group Accident Income Plan coverage is provided to residents covered by the SWEMP through Scott & White at no additional cost. Coverage is for the resident employee only. Claim is filed with the Scott & White Health Plan after discharge from the inpatient stay. A Prescription Drug benefit is included in the SWEMP coverage.

Dental insurance is an optional benefit in which you may enroll. In-Network and Out-of-Network benefits are available.

Detailed information on health benefits coverage and premium rates is available through the Scott & White Human Resources Department.

ACCIDENTAL DEATH AND DISMEMBERMENT

Optional ACCIDENTAL DEATH AND DISMEMBERMENT (AD&D) coverage may be purchased on a voluntary basis with amounts of coverage ranging from \$25,000 to a maximum of \$400,000. Coverage may include spouse and children. Amounts in excess of \$150,000 cannot exceed ten times annual salary. Details on AD&D benefits coverage and premium rates are available through Human Resources.

TERM LIFE

Term life insurance coverage through Texas Medical Association Insurance Trust (TMAIT) in the amount of their annual salary is provided for all non-physician residents. Coverage is effective on the start date of a training program. Benefits are described in certificates/policies provided to insured individuals by TMAIT. Additional term life coverage up to \$500,000, as well as spouse and dependent coverage up to \$50,000, is available through TMAIT. Benefits may be continued or increased upon completion of training, without evidence of insurability, as long as membership in the TMA and Texas licensure are maintained.

PAYFLEX

The Scott & White Pay Flex Plan is an employee benefit that allows payment of health and dental insurance premiums, out of-pocket medical/dental care, and dependent child care expenses with tax-free dollars, i.e., these expenses are deducted from gross pay before federal income and Social Security taxes are paid. Participation is voluntary. An opportunity to enroll in the plan is initially presented at orientation. Pre-tax deductions for health and dental premiums are automatic after the initial year of enrollment, however, enrollment in the medical/dental and child care reimbursement account must be renewed annually. Elections made at the time of enrollment cannot be changed during the year except in the event of change in employment or family status. Additional information is available from Human Resources.

LONG-TERM DISABILITY

Long-term disability insurance is provided by Scott & White to non-physician residents at no cost through Texas Medical Association Insurance Trust (TMAIT). The benefit will pay \$3,000 per month maximum in the event of total disability with a 180-day waiting period. Scott & White provides salary continuation for disabled resident for 150 days,

reducing the Resident encumbrance to 30 days. Residents must enroll within 60 days from date of employment or be required to submit evidence of insurability. Benefits are described more fully in certificates/policies provided to insured individuals by TMAIT.

PROFESSIONAL ORGANIZATION MEMBERSHIPS

Scott & White provides membership in American Medical Association for residents. Resident membership in the Texas Medical Association and the Bell County Medical Society is paid in conjunction with TMAIT disability and life insurance coverage. A membership application must be completed at orientation for TMAIT coverage.

PROFESSIONAL LIABILITY

Scott & White fully provides professional liability insurance for resident which covers their activities at Scott & White and when on educational assignment in affiliated hospitals and clinics. The program of self-insurance covers up to \$1,000,000 for each occurrence/\$3,000,000 aggregate per annum.

Coverage for training activities will continue upon program completion on condition that the physician shall cooperate fully, return to Temple for conferences, depositions and trial, and be available in Temple as needed in the judgment of Scott & White defense counsel. Failure to cooperate as set forth above shall be grounds for denying defense and for denying coverage on the claim, at the sole options of Scott & White.

TUITION REIMBURSEMENT

Scott & White established the tuition assistance program to provide staff members a means to broaden their knowledge through approved educational programs.

Full-time residents in good standing are eligible for tuition reimbursement up to a maximum of \$900 per semester. Tuition assistance (tuition and required fees only) is granted for successful completion of approved course work with a grade of “B” or better for undergraduate and/or graduate programs.

All courses must be pre-approved by the Designated Institutional Office and the Program Director. A completed tuition assistance request form (available through Scott & White Human Resources) must be submitted to Human Resources **prior to** registration. After pre-approved course work has been completed, a copy of the registration receipt and grade report should be submitted to the Human Resources Department. Reimbursements are processed every pay period; payment is received on resident’s paycheck.

Attachment 10: Typical Radiation Oncology Physics Resident Rotation Schedule

Rotation Calendar for		NNNNNNNNNN					
Task Color Legend:		Blue= Complete		Red= In Progress		Black= Scheduled	
		200X	200X	200Y	200Y	200Y	200Y
		Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec
		Q1	Q2	Q3	Q4	Q5	Q6
Processes	1. <u>Detectors and Dosimeters</u>						
10	1 Calibrate an ionization chamber and electrometer through an ADCL				1,2	3	
	2 Perform and report constancy checks between standard and field instruments	1,2,3					
	3 Disassemble and assemble an ionization chamber	1,2,3					
	4 Compute parameters for TG-51 calibration procedures				1,2	3	
	5 Perform and report TLD exposures for RPC checks		1,2,3				
	6 Measure and report in vivo dose with MOSFETs	1			2	3	
	7 Measure and report relative dose with diodes			1,2		3	
	8 Characterize film a for quantitative measurements						
	9 Measure and report GM measurements before an HDR treatment				1,2,3		
	10 Measure and report x-ray and neutron dose levels around a linear accelerator		1,2			3	
<hr/>							
	2. <u>Radiation Safety</u>	Q1	Q2	Q3	Q4	Q5	Q6
9	1 Take Scott & White Radiation Regulation Exam	1,2,3					
	2 Radioactive Materials On-line training			1,2,3			
	3 Establish and maintain a mock personnel monitoring process						1,2,3
	4 Establish and maintain mock radiation safety training for staff					1,2,3	
	5 Perform linac vault survey		1,2,3				
	6 Mock survey instrument calibration report				1		
	7 Report primary calibration and QA checks of a GM system						1,2,3
	8 Write mock incident report						2,3
	9 Write mock Radioactive Materials License				1,2,3		
<hr/>							
7	3. <u>Imaging</u>	Q1	Q2	Q3	Q4	Q5	Q6
	1 Radiographic Imaging (CR system)	1	2,3				
	2 Fluoroscopy		1	2	3		
	3 Perform and report calibration of CT		1	2	3		
	4 Perform and report calibration of MRI				1	2,3	
	5 Perform and report calibration of PET					1	2
	6 Perform and report calibration of US						1
	7 Measure and report MTF						1
<hr/>							
3	4. <u>Conventional Simulation</u>	Q1	Q2	Q3	Q4	Q5	Q6
	1 Design and document a conventional simulator room					1,2,3	
	2 Perform and report a conventional simulator acceptance test					1,2,3	
	3 Perform and report monthly conventional simulator QA	1	2,3				
<hr/>							
4	5. <u>CT Simulation</u>	Q1	Q2	Q3	Q4	Q5	Q6
	1 Design and document a CT simulator room					1,2,3	
	2 Perform and report a CT simulator acceptance test						1,2,3
	3 Perform and report monthly CT simulator QA					1	2
	4 Acquire data set with radiation oncology protocols						1
<hr/>							
8	6. <u>Treatment Equipment</u>	Q1	Q2	Q3	Q4	Q5	Q6
	1 Daily linac output check system	1,2,3					
	2 Perform and report Monthly QA.	1	2	3			
	3 Perform and report Annual QA.	1	2,3				
	4 Design and Document a Linear Accelerator Vault	1	2	3			
	5 Linac Acceptance/Commissioning	1			2	3	
	6 Calibration of Dose/MU				1,2,3		
	7 Write a mock license application to register a linear accelerator				1,2,3		

		Q1	Q2	Q3	Q4	Q5	Q6	
24	7. <u>Patient Treatment</u> For a typical set of treatment sites (e.g. lung, breast, GYN, ...)							
	1 Compute mock treatment plan for Breast	CT Simulation					1	
	2 Compute mock treatment plan for Prostate			1,2,3				
	3 Compute mock treatment plan for Thoracic					1,2,3		
	4 Compute mock treatment plan for Head & Neck - Larynx						1,2,3	
	5 Compute mock treatment plan for Head & Neck - Base of Tongue							
	6 Compute mock treatment plan for Head & Neck - Paranasal Sinus							
	7 Compute mock treatment plan for Pancreas							
	8 Compute mock treatment plan for GYN						1,2,3	
	9 Compute mock treatment plan for Esophagus							
	10 Compute mock treatment plan for Lymphoma					1,2,3		
	11 Compute mock treatment plan for CNS			1,2,3				
	12 Compute mock treatment plan for Cranial-Spinal Axis - Pediatrics							
	13 Compute mock treatment plan for Rectum						1,2,3	
	14 Compute mock treatment plan for Bladder				1,2,3			
	15 Physics Check of Treatment Plan		1,2,3					
	16 Chart Checking			1	2	3		
	17 Portal Imaging			1,2,3				
	18 Electron cut-out calibration		1	2	3			
	19 TBI, IORT, electron arc, and Respiratory Gating		1	2	3			
	20 Compute mock treatment plan for stereotactic radiosurgery			1	2	3		
	21 Tissue Compensation and Bolus					1	2	
	22 Perform and report QA of treatment planning system							
	23 Commission a Treatment Planning System					1	2	
	24 Linac and cerrobend safety		1,2,3					
<hr/>								
5	8. <u>IMRT</u> For a typical set of treatment sites (e.g. prostate, head & neck, ...)	Q1	Q2	Q3	Q4	Q5	Q6	
	1 Commission dummy linac for IMRT		1,2,3					
	2 Verify the commissioned linac			1,2,3				
	3 Compute mock IMRT inverse plan for Prostate				1,2,3			
	4 Compute mock IMRT inverse plan for Head & Neck					1	2,3	
	5 Compute mock IMRT inverse plan for Mesothelioma							
<hr/>								
8	9. <u>Brachytherapy</u>	Q1	Q2	Q3	Q4	Q5	Q6	
	1 Calibrate Ir-192 source		1,2,3					
	2 Leak test Cs-137 sources		1	2	3			
	3 Discharge patient with implanted radioactive material		1,2,3					
	4 Shipping and receiving RAM and survey		1,2,3					
	5 Compute mock LDR Cs-137 treatment plan							
	6 Compute HDR mammosite breast treatment		1	2	3			
	7 Perform and report monthly HDR QA		1	2	3			
	8 Perform and report prostate seed implant.	1	2	3				
<hr/>								
6	10. <u>Other Duties</u>	Q1	Q2	Q3	Q4	Q5	Q6	
	1 Teach classes to physician Residents				1,2,3			
	2 Make journal club style presentation							
	3 Review and revise CPT billing profiles for specific clinical procedures						1,2,3	
	4 Prepare to maintain certification							
	5 Review and revise Policy and Procedure documents for ACR compliance							
	6 Time permitting, carry out and report on a small research project.						1	
<hr/>								
Total Processes								
84	processes phases scheduled:	252	29	33	32	37	38	31
	processes completed:	0	0	0	0	0	0	0

Attachment 11: Radiological Physics Lecture Series Schedule.

Text:

The Essential Physics of Medical Imaging

Bushberg, Siebert, Leidholdt, Boone

Lippincott Williams & Wilkins

2nd Edition

Section I: Basic Concepts

Chapter 1: Introduction to Medical Imaging

1.1 The Modalities

1.2 Image Properties

Chapter 2: Radiation and the Atom

2.1 Radiation

2.2 Structure of the Atom

Chapter 3: Interaction of Radiation with Matter

3.1 Particle Interactions

3.2 X- and Gamma Ray Interactions

3.3 Attenuation of X- and Gamma Rays

3.4 Absorption of Energy from X- and Gamma Rays

3.5 Imparted Energy, Equivalent Dose, and Effective Dose

Chapter 4: Computers in Medical Imaging

4.1 Storage and Transfer of Data in Computers

4.2 Analog Data and Conversion between Analog and Digital Forms

4.3 Components and Operation of Computers

4.4 Performance of Computer Systems

4.5 Computer Software

4.6 Storage, Processing, and Display of Digital Images

Section II: Diagnostic Radiology

Chapter 5: X-ray Production, X-ray Tubes & Generators

5.1 Production of X-rays

5.2 X-ray Tubes

5.3 X-ray Tube Insert, Tube Housing, Filtration, and Collimation

5.4 X-ray Generator Function and Components

5.5 X-ray Generator Circuit Designs

5.6 Timing the X-ray Exposure in Radiography

5.7 Factors Affecting X-ray Emission

5.8 Power Ratings and Heat Loading

5.9 X-ray Exposure Rating Charts

Chapter 6: Screen-Film Radiography

6.1 Projection Radiography

6.2 Basic Geometric Principles

6.3 The Screen-Film Cassette

6.4 Characteristics of Screens

6.5 Characteristics of Film

6.6 The Screen-Film System

6.7 Contrast and Dose in Radiography

6.8 Scattered Radiation in Projection Radiography

Chapter 7: Film Processing

- 7.1 Film Exposure
- 7.2 The Film Processor
- 7.3 Processor Artifacts
- 7.4 Other Considerations
- 7.5 Laser Cameras
- 7.6 Dry Processing
- 7.7 Processor Quality Assurance

Chapter 8: Mammography

- 8.1 X-ray Tube Design
- 8.2 X-ray Generator and Phototimer System
- 8.3 Compression, Scattered Radiation, and Magnification
- 8.4 Screen-Film Cassettes and Film Processing
- 8.5 Ancillary Procedures
- 8.6 Radiation Dosimetry
- 8.7 Regulatory Requirement

Chapter 9: Fluoroscopy

- 9.1 Functionality
- 9.2 Fluoroscopic Imaging Chain Components
- 9.3 Peripheral Equipment
- 9.4 Fluoroscopy Modes of Operation
- 9.5 Automatic Brightness Control (ABC)
- 9.6 Imaging Quality
- 9.7 Fluoroscopy Suites
- 9.8 Radiation Dose

Chapter 10: Image Quality

- 10.1 Contrast
- 10.2 Spatial Resolution
- 10.3 Noise
- 10.4 Detective Quantum Efficiency (DQE)
- 10.5 Sampling and Aliasing in Digital Images
- 10.6 Contrast-Detail Curves
- 10.7 Receiver Operating Characteristics Curves

Chapter 11: Digital Radiography

- 11.1 Computed Radiography
- 11.2 Charged-Coupled Devices (CCDs)
- 11.3 Flat Panel Detectors
- 11.4 Digital mammography
- 11.5 Digital versus Analog Processes
- 11.6 Implementation
- 11.7 Patient Dose Considerations
- 11.8 Hard Copy versus Soft Copy Display
- 11.9 Digital Image Processing
- 11.10 Contrast versus Spatial Resolution in Digital Imaging

Chapter 12: Adjuncts to Radiology

- 12.1 Geometric Tomography
- 12.2 Digital Tomosynthesis
- 12.3 Temporal Subtraction
- 12.4 Dual-Energy Subtraction

Chapter 13: Computed Tomography

- 13.1 Basic Principles
- 13.2 Geometry and Historical Development
- 13.3 Detectors and Detector Arrays
- 13.4 Details of Acquisition
- 13.5 Tomographic Reconstruction
- 13.6 Digital Image Display
- 13.7 Radiation Dose
- 13.8 Image Quality
- 13.9 Artifacts

Chapter 14: Nuclear Magnetic Resonance

- 14.1 Magnetization Properties
- 14.2 Generation and Detection of the Magnetic Resonance Signal
- 14.3 Pulse Sequences
- 14.4 Spin Echo
- 14.5 Inversion Recovery
- 14.6 Gradient Recalled Echo
- 14.7 Signal from Flow
- 14.8 Perfusion and Diffusion Contrast
- 14.9 Magnetization Transfer Contrast

Chapter 15: Magnetic Resonance Imaging (MRI)

- 15.1 Localization of the MR Signal
- 15.2 k-space Data Acquisition and Image Reconstruction
- 15.3 Three-Dimensional Fourier Transform Image Acquisition
- 15.4 Image Characteristics
- 15.5 Angiography and Magnetization Transfer Contrast
- 15.6 Artifacts
- 15.7 Instrumentation
- 15.8 Safety and Bioeffects

Chapter 16: Ultrasound

- 16.1 Characteristics of Sound
- 16.2 Interactions of Ultrasound with Matter
- 16.3 Transducers
- 16.4 Beam Properties
- 16.5 Image Data Acquisition
- 16.6 Two-Dimensional Image Display and Storage
- 16.7 Miscellaneous Issues
- 16.8 Image Quality and Artifacts
- 16.9 Doppler Ultrasound
- 16.10 System Performance and Quality Assurance
- 16.11 Acoustic Power and Bioeffects

Chapter 17: Computer Networks, PACS & Teleradiology

- 17.1 Computer Networks
- 17.2 PACS and Teleradiology

Section III: Nuclear Medicine

Chapter 18: Radioactivity and Nuclear Transformation

- 18.1 Radionuclide Decay Terms and Relationships
- 18.2 Nuclear Transformation

Chapter 19: Radionuclide Production and Radiopharmaceuticals

- 19.1 Radionuclide Production
- 19.2 Radiopharmaceuticals
- 19.3 Regulatory Issues

Chapter 20: Radiation Detection and Measurement

- 20.1 Types of Detectors
- 20.2 Gas-Filled Detectors
- 20.3 Scintillation Detectors
- 20.4 Semiconductor Detectors
- 20.5 Pulse height spectroscopy
- 20.6 Non-Imaging Detector Applications
- 20.7 Counting Statistics

Chapter 21: Nuclear Imaging – The Scintillation Camera

- 21.1 Planar Nuclear Imaging: The Anger Scintillation Camera
- 21.2 Computers in Nuclear Imaging

Chapter 22: Nuclear Imaging – Emission Tomography

- 22.1 Single Photon Emission Computed Tomography (SPECT)
- 22.2 Positron Emission Tomography (PET)

Section IV: Radiation Protection, Dosimetry, and Biology

Chapter 23: Radiation Protection

- 23.1 Sources of Exposure to Ionizing Radiation
- 23.2 Personnel Dosimetry
- 23.3 Radiation Detection Equipment in Radiation Safety
- 23.4 Radiation Protection and Exposure Control
- 23.5 Regulatory agencies and Radiation Exposure Limits

Chapter 24: Radiation Dosimetry of the Patient

- 24.1 X-ray Dosimetry
- 24.2 Radiopharmaceutical Dosimetry: The MIRD Method

Chapter 25: Radiation Biology

- 25.1 Interaction of Radiation with Tissue
- 25.2 Cellular Radiobiology
- 25.3 Response of Organ Systems to Radiation
- 25.4 Acute Radiation Syndrome
- 25.5 Radiation-Induced Carcinogenesis
- 25.6 Hereditary effects of Radiation Exposure
- 25.7 Radiation Effects in Utero

Attachment 12: Medical Physics Didactic Lecture Series

Scott & White Radiation Oncology Physics Residency Didactic Lecture Series

Year 1

- Chapter 1. BASIC RADIATION PHYSICS**
- Chapter 2. DOSIMETRIC PRINCIPLES, QUANTITIES AND UNITS**
 - I. Basic Physics**
- Chapter 3. RADIATION DOSIMETERS**
- Chapter 4. RADIATION MONITORING INSTRUMENTS**
- Chapter 5. MACHINES FOR EXTERNAL BEAM RADIOTHERAPY**
 - II. Linear Accelerators**
- Chapter 6. EXTERNAL PHOTON BEAMS: PHYSICAL ASPECTS**
 - III. Anatomy**
- Chapter 7. CLINICAL TREATMENT PLANNING IN EXTERNAL PHOTON BEAM RADIOTHERAPY**
- Chapter 8. ELECTRON BEAMS: PHYSICAL AND CLINICAL ASPECTS**

Year 2

- Chapter 9. CALIBRATION OF PHOTON AND ELECTRON BEAMS**
 - IV. Ionization Chambers**
- Chapter 10. ACCEPTANCE TESTS AND COMMISSIONING**
 - VI. Image Quality**
- Chapter 11. COMPUTERIZED TREATMENT PLANNING SYSTEMS FOR EXTERNAL BEAM RADIOTHERAPY**
- Chapter 12. QUALITY ASSURANCE OF EXTERNAL BEAM RADIOTHERAPY**
- Chapter 13. BRACHYTHERAPY: PHYSICAL AND CLINICAL ASPECTS**
 - IX. HDR**
- Chapter 14. BASIC RADIOBIOLOGY**
- Chapter 15. SPECIAL PROCEDURES AND TECHNIQUES IN RADIOTHERAPY**
 - VII. IMRT**
 - VIII. IGRT**
- Chapter 16. RADIATION PROTECTION AND SAFETY IN RADIOTHERAPY**
 - V. High Energy Shielding**

Note: “Chapter 1, ...” refers to lectures from the IAEA “Radiation Oncology Physics: A Handbook for Teachers and Students”

Roman Numeral “I, II, ...” refers to original lectures

Attachment 13: Physics Instruments

Ion Chambers – Ion chambers are used to measure the magnitude of ionization created by ionizing radiation. The charge is collected by the chamber and then measured by an electrometer.

0.2cc NEL 2503/3 s/n 1875 – Used for IMRT QA

0.6cc NEL 2505/3A s/n 1874 – Used for monthly QA, electron cutouts

0.125cc - PTW233643 S/N 083 - Used for annual machine QA

0.125cc – PTW 233643 S/N 084 - Used for annual machine QA

0.2cc PTW N30002 s/n 2320

0.6cc PTW N23333 Farmer Chamber s/n 1715

Parallel plate Ionization chamber – PTW N23343 s/n 369

Welhoeffler Chambers

0.03cc – WD IC-04 s/n 3465

0.03cc – WD IC-04 s/n 3463

0.125cc – WD IC-15 s/n 3688

0.125cc – WD IC-15 s/n 3577

Backup Ion Chambers

PTW N30012 - 0.6cc – s/n 0186

PTW N30010.2 - 0.2cc– s/n 0555

Killeen

PTW 0.2cc N30002 s/n 2320 – Used for IMRT QA

PTW 0.6cc N23333 s/n A-214 – Used for monthly QA

Electrometers – In radiation oncology, an electrometer is used for measuring electric charge originating from the creation of ions caused by radiation originating in an ion chamber.

Keithley Model 35614 s/n 13250 – Used for monthly QA

Keithley Model 35614 s/n 54109 – Used for IMRT QA

Standard Imaging Max 4000 – s/n E073315

Victoreen Model 530 S/N 98191 – Standard Electrometer, used for HDR monthly

Killeen

Inovision 135040 s/n 99218 – Used for monthly and IMRT QA (CIII)

Survey Meters – Survey meters are used to measure exposure in an area where radioactive materials are or may be present. They can also be used to survey a general area where radiation is being produced.

Nuclear Associates Minimonitor III – Model 05-575, s/n 000555

Nuclear Associates Minimonitor 125 – Model 05-572, s/n C 495

Victoreen – Model 407A – s/n 1205

Standard Imaging – Seed Finder – Ref. 90065, s/n G001041

Phantoms – media for providing mass for buildup and attenuation when taking ion chamber measurements.

Wellhoffer Blue Water Tank s/n 157 – Used for commissioning data

Wellhoffer Lift Table s/n 234

Med Tec Water Tank – Used for annual QA

Plastic Water – Used for monthly and annual QA

Polystyrene – Used for backscatter and electron cut out measurements

Killeen

Med Tec Water Tank – Used for annual QA

Small Wellhoffer Water Tank

Well Counters - Well counters are used to assess the radioactivity of radioactive isotopes for HDR and LDR Brachytherapy procedures.

Precision Radiological Measurements – Model WC-2 – Used for assessing seed activity for LDR procedures

Standard Imaging HDR 1000+, S/N A032029 – Used for HDR monthly

Detector Arrays – A series of multiple detectors to measure a change across an axis or plane.

Mapcheck – Model 1175, s/n 3844850 – Used for IMRT QA and monthly flatness and symmetry checks

Tracker (2) – Used for daily constancy measurements for specified tests.

CI – Display s/n 107431

CII – Display s/n 107584, Array s/n 105255

Killeen

Profiler

Tracker

Other

Field size, Laser and coincidence tool – Med Tec MT-IAD-V, s/n 505

Killeen

Field size, Laser and coincidence tool – Med Tec MT-IAD-V

Attachment 14A: Faculty Oral Examination Evaluation Form

Resident _____ Date _____

Oral Examiner _____

Comments On Resident

1. Rotation Topic: _____

Satisfactory Unsatisfactory

2. Rotation Topic: _____

Satisfactory Unsatisfactory

3. Rotation Topic: _____

Satisfactory Unsatisfactory

4. Rotation Topics: _____

Satisfactory Unsatisfactory

5. Rotation Topics: _____

Satisfactory Unsatisfactory

Comments on Program

Faculty Signature

Attachment 14B: Resident Clinical Rotation Evaluation Form

Rotation Topics:

1. _____
2. _____
3. _____
4. _____
5. _____

Resident _____ Date _____

Oral Examiners _____

Comments On Faculty

Comments on Program

Resident Signature

_____ Date: __/__/__

Attachment 15: Program Director's Resident Evaluation Form

****Confidential Report on Resident for Current Quarter****

RESIDENT NAME: _____ **Quarter/Year:** _____

RESULTS OF ROTATION ORAL EXAMS

	Rotation Topic	Pass	Comments
1	Detectors and Dosimeters		
2	Radiation Safety		
3	Treatment Equipment		
4	Imaging		
5	Conventional Simulation		
6	CT Simulation		
7	Patient Treatment		
8	IMRT		
9	Brachytherapy		
10	Other Duties		

GENERAL GRADE FOR QUARTER

<u>DIDACTIC</u>	<u>DATES</u>	Satisfactory	Unsatisfactory
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>
_____	_____	<input type="checkbox"/>	<input type="checkbox"/>

COMMENTS (OPTIONAL):

DATE: _____ **SIGNED:** _____

**PRINTED: Arthur Boyer, Ph.D.
Program Director**

**Attachment 17: Key Divisional Faculty
Radiation Oncology Clinical Medical Physics Residency**

<u>Physics Faculty</u>	<u>Board Certification</u>	<u>Year Appointed</u>
Philip D. Bourland, Ph.D.	ABR - 1978	1971
Arthur L. Boyer, Ph.D.	ABR - 1978	2005
Vitthalhbai Mistry, Ph.D.	ABR - 1979 ABMP - 1991	1998
David M. Jones, M.S.	ABR – 1998 ABHP - 1995	1990
Wei Tang, M.S.	ABMP - Passed Part I 2004	2005
Audra Coker, M.S.		2005
TBN, M.S.		
Jason Shoales, M.S.	ABR- expected 2009	2005
Pasquale J. Montanaro, M.S.	ABMP – 2006	2007
Sandra Suter, A.A.S.	n/a	1992
Karen Stumph, CMD	CMD - 1988	1986

Radiation Oncology Physician (M.D.) Faculty

	Board Certification	Year Appointed
Alan Cheung, M.D.	ABR – 1981	1987
Teresa Boyle, M.D.	ABR – 1996	2001
Lute Oas, M.D.	ABR	2001