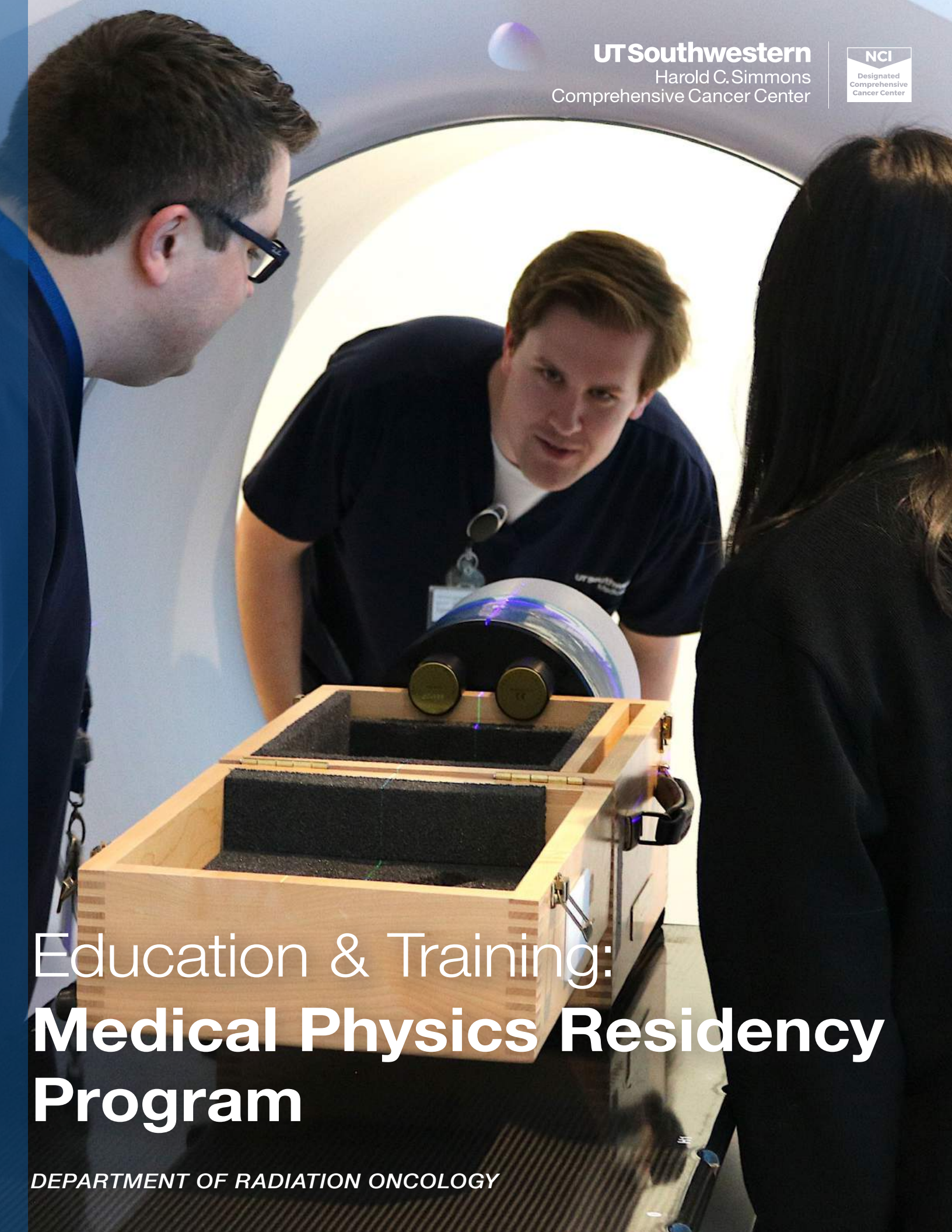


UT Southwestern
Harold C. Simmons
Comprehensive Cancer Center

NCI Designated Comprehensive Cancer Center

Education & Training:
Medical Physics Residency Program

DEPARTMENT OF RADIATION ONCOLOGY

In UT Southwestern's Department of Radiation Oncology, state-of-the-art radiation technology meets human caring, compassion, and personalization.

Led by Robert Timmerman, M.D., FASTRO, FACR, Professor and Chair, the Department of Radiation Oncology provides world-class care to approximately 200 patients each day while conducting groundbreaking research in clinical radiation oncology, medical physics, and molecular radiation biology. As an integral part of its mission, the department offers cutting-edge research opportunities and robust educational programs to train the next generation of medical practitioners and scientists.

The mission of our department is three-fold: to deliver a radiation oncology care plan individualized to each patient's specific cancer and personal needs; to discover and improve understanding, foster collaboration, and ultimately, contribute to improving personalized clinical care; and to devise educational programs that fit the individual needs of the learner and will create professionals who see each patient as a unique person.

Our doctors, physicists, and researchers have devoted their lives to better understanding cancer and its treatment. Noted for groundbreaking research by our internationally recognized team, we deliver exceptional care to patients with all types and all stages of cancer. We are the only National Cancer Institute-designated comprehensive cancer center in North Texas and one of only 52 NCI-designated comprehensive care centers in the nation. As such, we are held to the highest of standards and are recognized for excellence in clinical care, as well as scientific research and leadership. In addition, we are one of the largest practices in the Southwest.

Our physicists and physicians are organized into disease-oriented teams that specialize in treating a particular type of cancer. Every member of these teams contributes their focused expertise toward building personalized treatment plans that leverage the powerful technology at our facilities for our patients.

2005

Launch of Medical Residency Program

2009

Launch of Medical Physics Residency Program

2015

Harold C. Simmons Comprehensive Cancer Center receives National Cancer Institute (NCI) designation, becoming the first and only in North Texas.

2016

SBRT/SAbR Training Program established, becoming the first advanced training program in the department. Developed to help oncology professionals learn about the proper implementation of a viable and effective SBRT/SAbR treatment practice.

2017

The new William P. Clements Jr. University Hospital Radiation Oncology Building opens, consolidating services at a 63,000-square-foot facility located at East Campus. It is the largest individual facility for radiation oncology in North Texas.

2019

First patient is treated on the GammaPod, which is the first stereotactic body radiation therapy (SBRT) system optimized for treating breast cancer, focused on reducing treatment time and potentially lowering toxicity. UTSW is the first center in Texas and second in the world to offer this technology.

2020

The 12-story third
furthering UTSW's
opportunities to in
state-of-the-art Ga

We perform a broad range of radiation oncology procedures including MR-guided RT, adaptive RT, biologically guided RT, MRI, IMRT, SBRT, TBI, TSE, and HDR brachytherapy. Our department has a collection of the most sophisticated treatment machines and planning systems capable of treating all types of cancer, including:

- Two Varian Ethos systems
- Two Varian Halcyon systems
- Two Elekta Gamma Knife Icons
- Two Elekta Unity MR-linac systems
- RefleXion PET-linac
- Phillps 1.5 Ingenia Ambition MRI simulator
- Two Philips 16-slice Brilliance 4D CT simulators
- Operating room Varian VariSource iX HDR afterloader
- Varian VariSource HDR brachytherapy suite
- Two Varian TrueBeams
- Two Varian VitalBeams
- Xcision GammaPod
- Two Elekta Versa HDs
- Accuray CyberKnife M6
- Xstrahl superficial unit
- Six Vision RT systems
- Varian Eclipse
- Elekta Monaco

tower at William P. Clements Jr. University Hospital opens, position as a leading provider of health care and broadening tegrate research and education with clinical care. It includes a amma Knife suite, equipped with two Gamma Knife Icon.

2021

Completed 71,000-square-foot expansion of Radiation Oncology services, heralding a new avenue of treatment to patients of adaptive therapy. Our first adaptive patient was treated in June 2021; our first adaptive MR-linac patient was treated in August 2021.

2022

First patient treated on RefleXion, a treatment machine which incorporates PET imaging with radiotherapy.

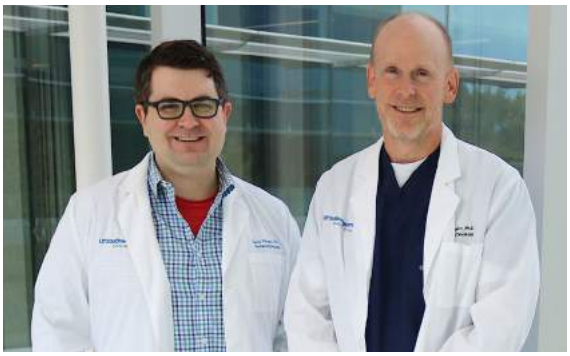
The North Campus Outpatient Cancer Care and Brain Research towers, scheduled to open fall 2022, will house research efforts of the Peter O'Donnell Jr. Brain Institute and outpatient care and clinical trials space for the Harold C. Simmons Comprehensive Cancer Center.

Medical Physics Residency Program

Our department is home to one of the largest medical physics residency programs in the world. Led by Paul Medin, Ph.D., Professor of Radiation Oncology and Program Director, and David Parsons, Ph.D., Assistant Professor and Associate Program Director, our program is a two-year, CAMPEP-accredited program emphasizing clinical excellence and academic career development in radiation oncology physics. We admit four new residents per year and have had 31 graduates of the program as of June 30, 2022. The program is comprised of 34 physics and engineering faculty, 19 molecular radiation biology faculty, and 22 physicians.

Applications for July 2023 start date are due September 30, 2022.

- Applicants must have a Ph.D. degree or equivalent in medical physics, physics, or a closely related field and must have completed four graduate level didactic courses described in the AAPM Report Number 197S.
- Applicants must qualify to receive a temporary license through the Texas Medical Board (TMB).
- Applicants must submit their CV, a personal statement, a statement of their visa status, three reference letters, and transcripts from graduate and undergraduate schools.



David Parsons, Associate Program Director and Paul Medin, Program Director

Please submit application materials via email to Adiba.Mobin@UTSouthwestern.edu.

The current annual medical physics resident salary is **$58,965** for PGY1 and **$61,785** for PGY2.

Graduation Requirements

- Completion of all eight clinical rotations
- Completion of two full years of clinical training
- Seven quarterly written reports
- Completion of 24 oral exams
- Ethics and professionalism modules
- Education conferences, meetings, lectures, chart rounds, and tumor boards
- Teach three lectures per year
- Didactic coursework (six courses required by CAMPEP)
- Clinical service

Available Elective Rotation Topics

- Artificial intelligence in radiation therapy
- Advanced brachytherapy
- CyberKnife
- Advanced treatment planning
- Advanced Gamma Knife
- Advanced QA in radiation therapy
- API scripting
- 3D printing/brachy applicator design
- GammaPod
- RefleXion

Medical Physics Resident Duties

Medical physics residents are trainees immersed in the clinical operations of radiation oncology and are valued members of the clinical team. Residents learn and support each clinical service as they progress through the program. Specific duties a resident can expect to perform in the program include:

- Linac weekly, monthy, and annual QA
- CT and MRI monthly QA
- Acceptance and commissioning of equipment
- Treatment planning (all services)
- Radioactive material calibration and delivery
- Clinical improvement projects
- Total body irradiation planning and support
- Total skin electron therapy planning and support
- Optically stimulated luminescence dosimetry
- 3D bolus fabrication
- Superficial radiation therapy simulation and calculations
- Vision RT support
- CBCT dose recalculation
- Weekly/final chart checks
- CyberKnife IMRT QA
- Emergency IMRT QA
- Electron output factor measurement
- Supervised physicist of the day

An integral part of the department, residents will experience:

- Uniquely diverse and personalized clinical training with access to state-of-the-art technology
- Hands-on experience with a full complement of special procedures
- Invaluable insight from a number of physics and engineering faculty focused primarily on research that is well-funded by the NIH, American Cancer Society, Radiological Society of North America, Cancer Prevention & Research Institute of Texas, and various corporations

Introduction to RadOnc	1	AAPM Task Groups-142
	2	AAPM Task Group-51 Calibration
	3	Linac design and function
Treatment Planning/ Ethos	4	Monitor unit calculations
	5	Treatment planning techniques
	6	Modern dosimetry
ART/Imaging	7	MRI and PET imaging
	8	SBRT
	9	MRgRT and adaptive RT
Stereotactic	10	MV photon/electron shielding design and accepted dose limits
	11	kV photon and isotopes shielding design
	12	Stereotactic radiosurgery
Electron/Proton /Special Procedure	13	Total body irradiation (TBI) and total skin electrons (TSE)
	14	AAPM Task Groups-25/70, electrons
	15	Proton therapy and heavy ion therapy
Brachytherapy	16	Radioactive isotopes: TG43 + addendum
	17	Treatment planning for brachytherapy
	18	Radioactive isotopes: regulations and brachytherapy QA
Treatment Delivery/POD	19	In vivo dosimetry
	20	Simulation/CT/IGRT
	21	Pregnant patients/pacemakers/hip replacements
Elective Rotation/ Wrap up	22	TG-100 lab
	23	Elective oral
	24	All Residency Comprehensive

FIGURE 1A. Physics Resident Rotations and Oral Exam Topics

			1st year				2nd year			
Date		Month	Res 1	Res 2	Res 3	Res 4	Res 5	Res 6	Res 7	Res 8
2022	Jul.	1	1	1	1	1	7	16	19	4
2022	Aug.	2	2	2	2	2	8	17	20	5
2022	Sep.	3	3	3	3	3	9	18	21	6
2022	Oct.	4	4	7	10	13	13	10	16	19
2022	Nov.	5	5	8	11	14	14	11	17	20
2022	Dec.	6	6	9	12	15	15	12	18	21
2023	Jan.	7	10	4	7	10	19	22	13	16
2023	Feb.	8	11	5	8	11	20	23	14	17
2023	Mar.	9	12	6	9	12	21	24	15	18
2023	Apr.	10	16	13	4	7	22	19	22	22
2023	May	11	17	14	5	8	23	20	23	23
2023	Jun.	12	18	15	6	9	24	21	24	24
2023	Jul.	13	7	16	19	4				
2023	Aug.	14	8	17	20	5				
2023	Sep.	15	9	18	21	6				
2023	Oct.	16	13	10	16	19				
2023	Nov.	17	14	11	17	20				
2023	Dec.	18	15	12	18	21				
2024	Jan.	19	19	22	13	16				
2024	Feb.	20	20	23	14	17				
2024	Mar.	21	21	24	15	18				
2024	Apr.	22	22	19	22	22				
2024	May	23	23	20	23	23				
2024	Jun.	24	24	21	24	24				

FIGURE 1B. Physics Resident Rotation Schedule Example

2022 physics residents with program directors, Paul Medin and David Parsons; Steve Jiang, Division Chief; and Robert Timmerman, Department Chair.

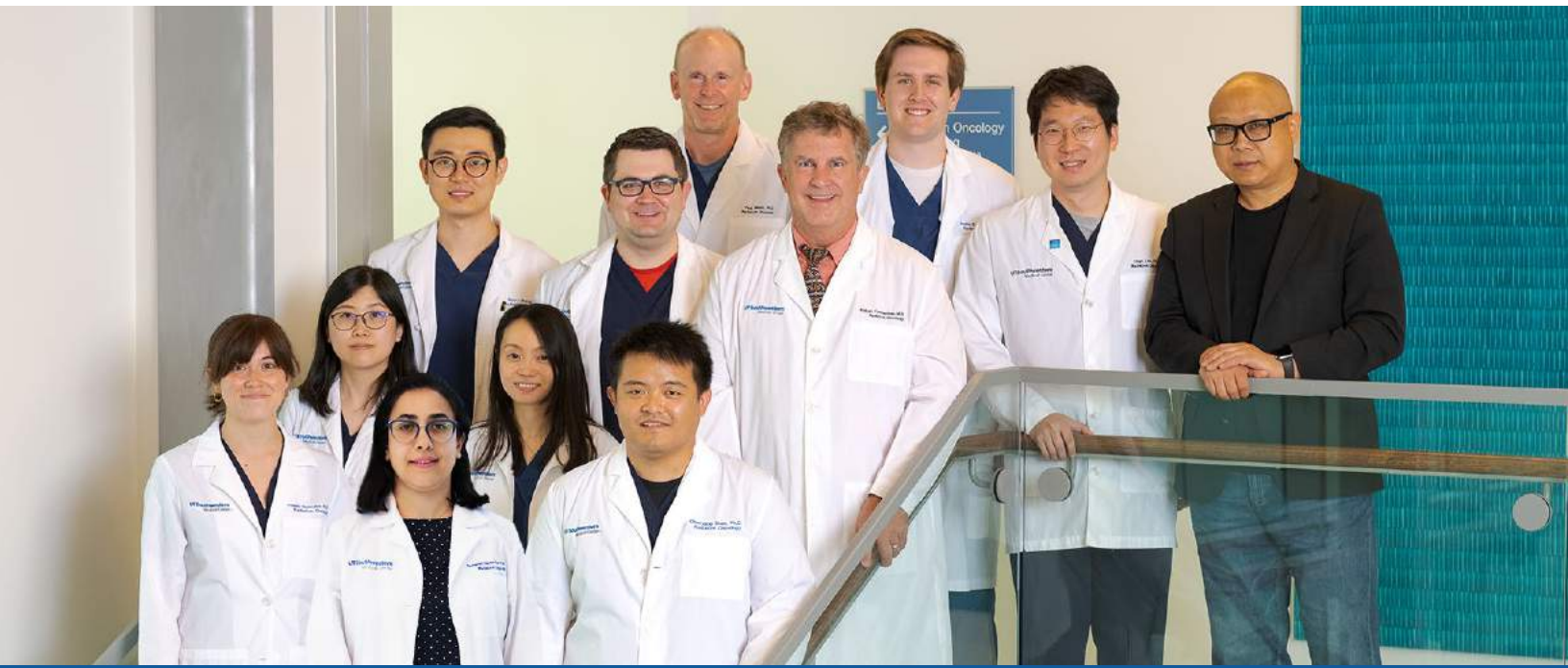
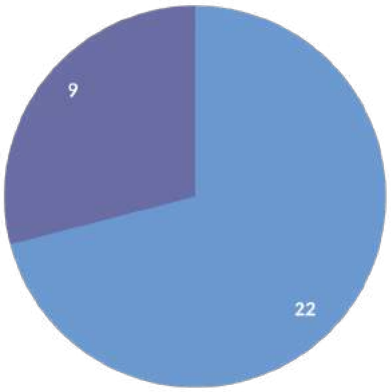
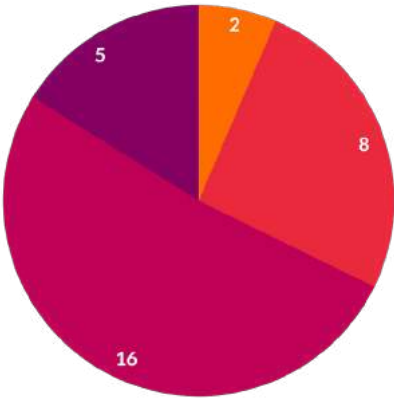


FIGURE 2A. Physics Resident Private vs. Academic Alumni Statistics (*as of June 30, 2022*)



Private	9
Academic	22
Grand Total	**31**

FIGURE 2B. Physics Resident Alumni Statistics by Region (*as of June 30, 2022*)



North Eastern

University of Rochester	1
Thomas Jefferson University	1
Memorial Sloan Kettering	1
Boston University Medicine	1
UPenn Radiation Oncology	1
RWJBarnabas Health	1
Roswell Park Cancer Center	1
Marsden Medical Physics	1
Grand Total	**8**

Southern

Wake Forest Medicine	1
Willis-Knighton Cancer	1
Winship Cancer Institute	1
UAB	1
Mayo Clinic, Jacksonville	1
Inova Fairfax Hospital	1
University of Arkansas	1
UTSW Medical Center	8
Texas Oncology, Dallas	1
Grand Total	**16**

Western

Ironwood Cancer Center	1
Torrance Memorial Cancer	2
Northwest Medical Physics	1
Billings Clinic	1
Grand Total	**5**

Central

Mercyhealth Cancer Center	1
Washington University	1
Grand Total	**2**

Life in Dallas

Dallas is one of the most populous cities in the DFW metroplex and fourth in the United States. A thriving economy, lower cost of living, no state income tax, and central location make it attractive to individuals, families, and companies looking to relocate.

The metroplex is consistently ranked as one of the top areas for growth in industry headquarters and statistically adds one new local resident every five minutes. Dallas has earned a solid reputation in a variety of areas including culture, dining, sports, outdoors, and shopping.

Medical Artificial Intelligence and Automation (MAIA) Lab

The MAIA Lab is a multi-PI lab established in July 2017 within the Department of Radiation Oncology. The lab's main objective is to innovate, develop, and apply artificial intelligence (AI) technologies to empower clinicians, especially those with less experience or limited resources, for improved patient care, from these aspects:

- Improve accuracy by retrieving hidden information from patient data/images and performing better than (most) physicians when there is ground truth
- Precise diagnosis and better clinical decision making
- Improve efficiency by automating clinical procedures and saving physicians time in front of computers
- Re-humanize medicine
- Transfer expertise to less experienced physicians by learning from experienced physicians when there is no ground truth
- Reduce health care disparities

Program Characteristics

- 13 faculty, 33 graduate students and postdocs
- Most faculty have both clinical and research duties
- 6 active R01s, 1 pending P01, and 7 pending R01s
- 12 patent applications filed, 5 licensed to companies
- 61 publications

Artificial Intelligence for Radiation Therapy

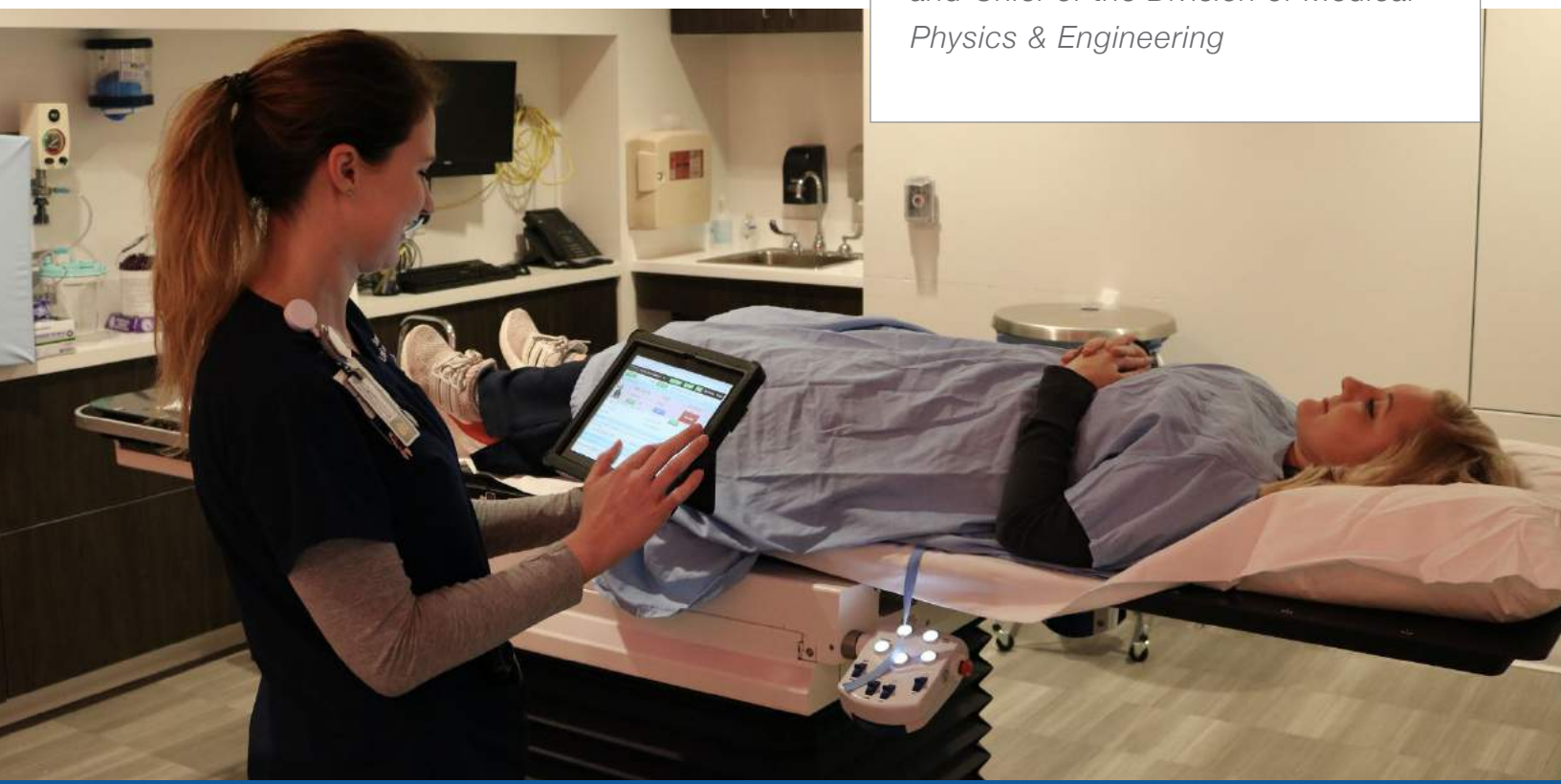
Residents in our program will have the opportunity to participate in the translation and clinical evaluation of AI technologies developed by faculty and trainees in the MAIA Lab.

The research in the MAIA Lab covers the use of AI in various aspects of cancer radiotherapy, including, but not limited to, organ segmentation, target delineation, dose prediction, treatment planning, outcome prediction, image processing, and smart clinics.
A main focus of our AI research is on the safe and effective deployment of AI in clinical practice to solve important clinical problems.

AI for Smart Clinic

- Infrastructure using Bluetooth technology
- Tracking patients, clinical staff, and device
- First app in clinic: A touchpad checklist before treatment steps are taken and to ensure correct devices are used

Steve Jiang, Ph.D., Professor of Radiation Oncology, Vice Chair, and Chief of the Division of Medical Physics & Engineering



Medical Physics Adaptive Radiotherapy Fellowship

To combat the shortage of physicists who are quality primary providers skilled in ART, our department offers a Texas Medical Board-approved, two- to three-year Medical Physics Adaptive Radiotherapy Fellowship (MP-ART). UT Southwestern Medical Center is the only institution in the world that has multiple advanced ART treatment modalities, and we aim to train the next generation of top-tier medical physicists. These ART treatment modalities include CBCT-guided and MR-guided adaptive radiation therapy and PET-guided radiation therapy.

COURSE LEADERSHIP

Bin Cai, Ph.D.
Associate Professor of Radiation Oncology
and Director of Advanced Physics Service

FIGURE 3A. PY 1 ART Fellowship Block Diagram

Adaptive Radiotherapy Medical Physics Fellowship Block Diagram					
PY 1					
Blocks	**1 (1 Month)**	**2 (3 Months)**	**3 (3 Months)**	**4 (3 Months)**	**5 (2 Months)**
Rotation Name	Adaptive radiotherapy orientation and radiation/MR safety training	CT- or CBCT-guided adaptive radiotherapy	MR-guided radiotherapy and adaptive radiotherapy	PET-guided radiotherapy and biology-guided radiotherapy	Research and clinical development
% Clinical effort	100	100	100	100	20
% Clinical development effort					80

FIGURE 3B. PY 2 ART Fellowship Block Diagram

Adaptive Radiotherapy Medical Physics Fellowship Block Diagram				
PY 2				
Blocks	**1 (3 Month)**	**2 (3 Months)**	**3 (3 Months)**	**5 (3 Months)**
Rotation Name	CT- or CBCT-guided adaptive radiotherapy	MR-guided radiotherapy and adaptive radiotherapy	PET-guided radiotherapy and biology-guided radiotherapy	Research and clinical development
% Clinical effort	100	100	100	20
% Clinical development effort				80

Postdoctoral Medical Physics Certificate Program

This CAMPEP-accredited program provides postdoctoral fellows with essential medical physics didactic elements for entry into the medical physics profession, particularly medical physics residencies. The program offers one or two three-credit-hour courses each semester, including:

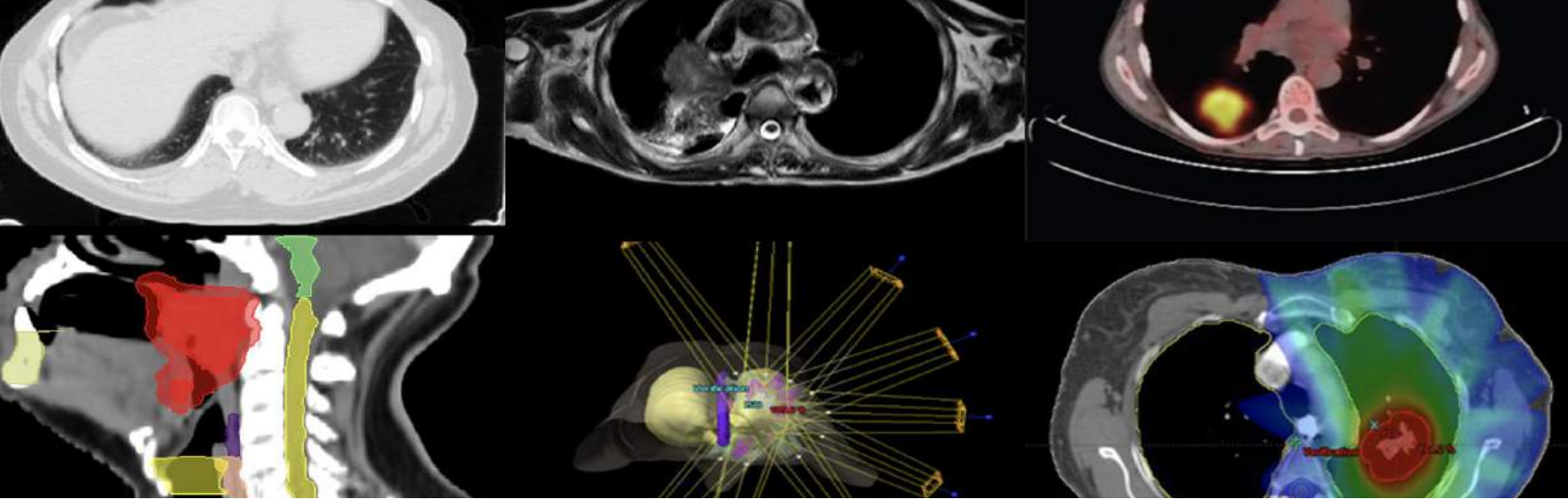
- Radiological Physics and Dosimetry
- Radiation Therapy Physics
- Radiation Protection and Safety
- Fundamentals of Imaging in Medicine
- Radiobiology
- Anatomy and Physiology

The program is offered to current radiation oncology postdoctoral fellows and all six courses are offered to graduate students of the Biomedical Engineering (BME) Graduate Program. Since the program is offered to internal candidates only, we do not have a strict application deadline. Students can start to take courses for the program in either fall or spring.

**A prerequisite for the American Board of Radiology certification is completion of a Postdoctoral Medical Physics Certificate Program.*

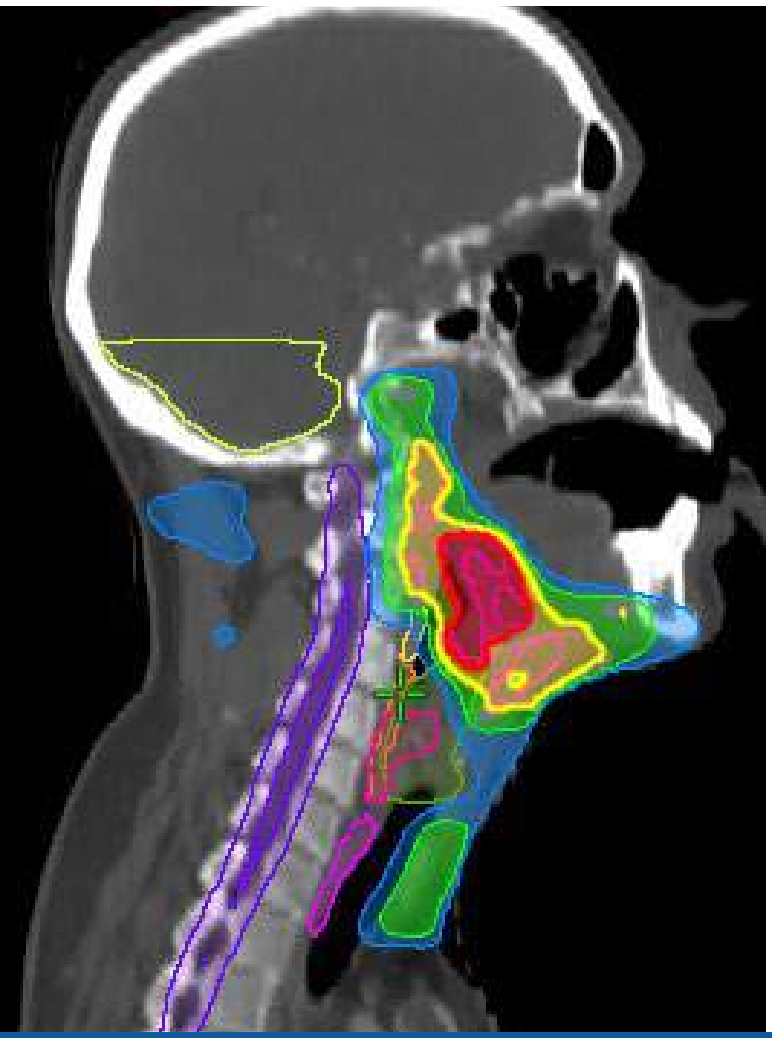
COURSE LEADERSHIP

Dan Nguyen, Ph.D.
Assistant Professor of Radiation Oncology



Biomedical Engineering Graduate Program – Medical Physics Track

The research focus of this CAMPEP-accredited program is development of cutting-edge imaging and therapeutic tools to help cancer radiotherapy treatment. This program is offered to students with undergraduate training in physics, engineering, computer science, or related physical sciences who are looking to establish a career in clinical or medical physics research. Applications open **August 1, with a December 1 deadline**. Students are accepted for fall admission only, with 5.5 years as the average time to degree completion.

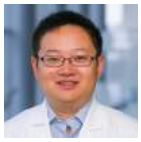


COURSE TOPICS

- Medical image reconstruction and application in radiotherapy
- Radiotherapy treatment planning and adaptive replanning
- High-performance computing for radiotherapy, such as Monte Carlo radiation transport simulation
- Modeling of organ motion
- Developing advanced imaging and therapeutic approaches
- Modeling radiobiological phenomena and understanding the mechanisms
- Applying AI technologies in radiotherapy

COURSE LEADERSHIP

You Zhang, Ph.D.
Assistant Professor of Radiation Oncology



SBRT/SAbR Training Program

The Department of Radiation Oncology offers a Stereotactic Body Radiation Therapy (SBRT)/Stereotactic Ablative Radiotherapy (SAbR) training program, which is the longest running of its kind in the U.S.

Radiation oncologists, medical physicists, medical dosimetrists, administrators, and radiation therapists interested in implementing SBRT/SAbR into clinical practice are encouraged to attend this CME program.

COURSE LEADERSHIP

Zabi Wardak, M.D.
Assistant Professor of Radiation Oncology
Chief of Gamma Knife Radiation Oncology Service

Paul Medin, Ph.D.
Professor of Radiation Oncology and Director of the Medical Physics Residency Program

UPCOMING COURSE DATES

- July 27-29, 2022
- October 5-7, 2022

FOR MORE INFORMATION
SBRTProgram@UTSouthwestern.edu

FIGURE 4.
SBRT/SAbR Training Program
Course Attendees by Country

GRAND TOTAL 465

FIGURE 5. Gamma Knife Training Program Course Attendees by Country

GRAND TOTAL 45

Gamma Knife Training Program

The Gamma Knife Training Program, geared toward radiation oncologists, neurosurgeons, neuro-otologists, and medical physicists, provides a comprehensive understanding for both new and experienced users. The CME/CAMPEP-accredited program offers a new user four-day course, as well as a three-day course for experienced Gamma Knife users upgrading to Icon.

UPCOMING COURSE DATES

- September 26-29, 2022
- December 5-8, 2022

FOR MORE INFORMATION

GammaKnifeProgram@UTSouthwestern.edu

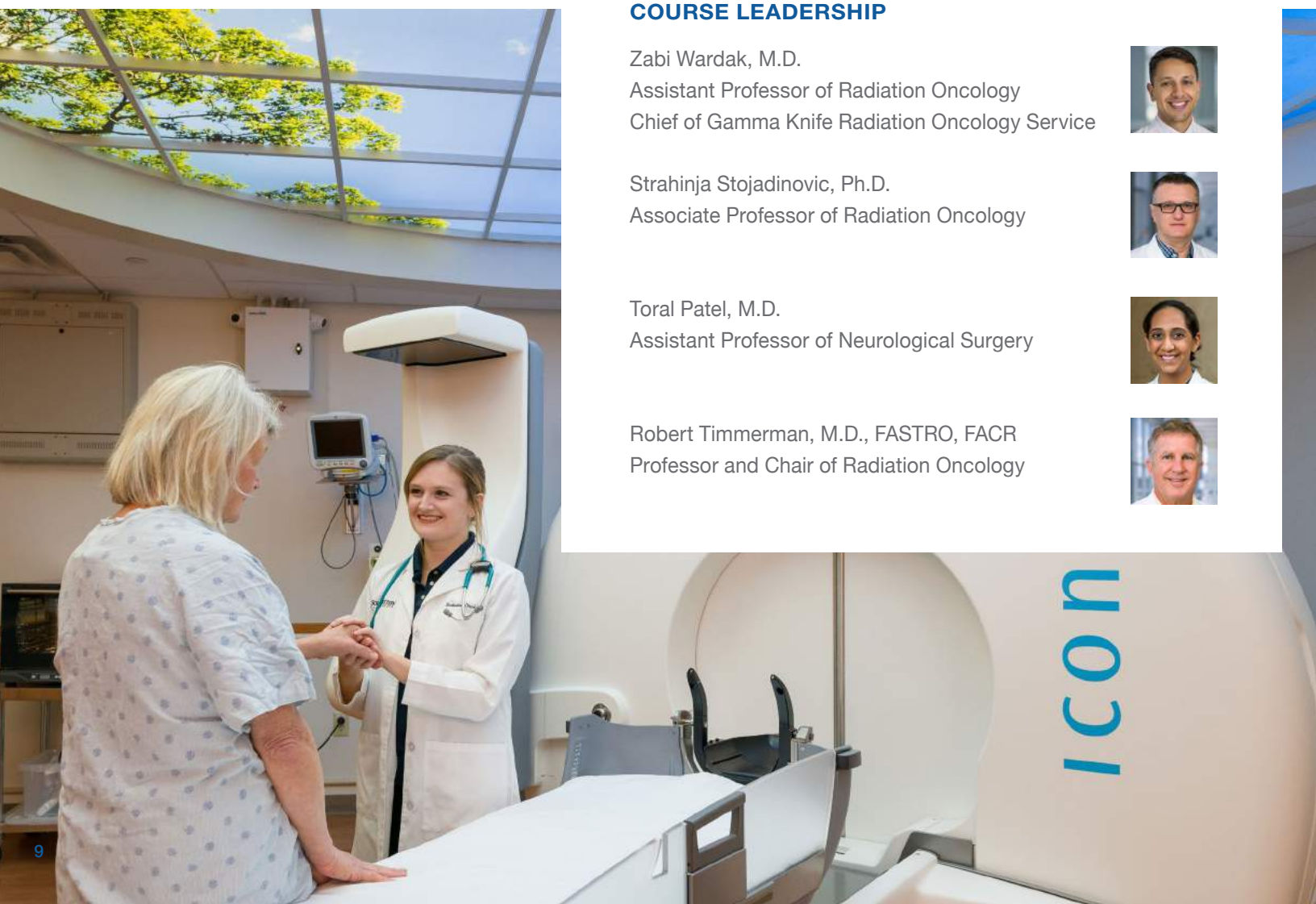
COURSE LEADERSHIP

Zabi Wardak, M.D.
Assistant Professor of Radiation Oncology
Chief of Gamma Knife Radiation Oncology Service

Strahinja Stojadinovic, Ph.D.
Associate Professor of Radiation Oncology

Toral Patel, M.D.
Assistant Professor of Neurological Surgery

Robert Timmerman, M.D., FASTRO, FACR
Professor and Chair of Radiation Oncology



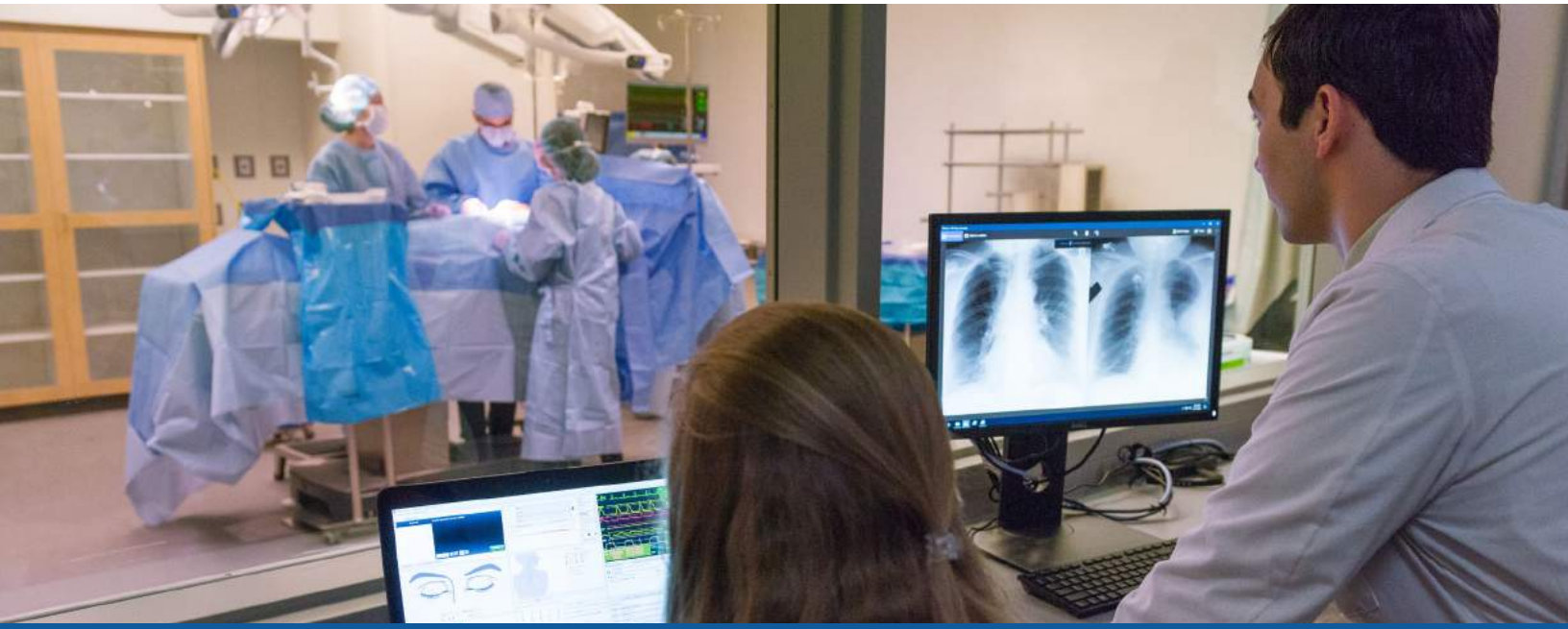
Observerships

Our department also offers two month-long observerships that allow physicists to learn about the various aspects of patient care under the supervision of sponsoring faculty. We also offer student observerships.

Our medical physics observership provides observers with many different educational opportunities, including exposure to state-of-the-art equipment such as the GammaPod, Gamma Knife Icon, MR-linacs, PET-linac, various Varian linear accelerators, CyberKnife, and numerous adaptive radiotherapy machines.

Simulation Center

UT Southwestern's Simulation Center, one of the largest in the United States, replicates and creates virtual environments for training in clinical care and procedures. The enhanced simulation program provides training in 13 competencies, or entrustable professional activities (EPA), and includes valuable hands-on instruction in more than two dozen course areas. Our simulation training and activities are accredited by some of the nation's leading organizations. Future simulation projects include creating a series of simulation mastery-based labs to teach brachytherapy procedures and elective rotations for MRI-guidance, adaptive therapy, 3D printing, particle therapy, and artificial intelligence.



UTSouthwestern
Harold C. Simmons
Comprehensive Cancer Center

Radiation Oncology

UT Southwestern is an Affirmative Action/Equal Opportunity Employer. Women, minorities, veterans, and individuals with disabilities are encouraged to apply.

UT Southwestern is a diverse family, including many cultures and perspectives, which strengthens our ability to reach our full human potential. We celebrate individuality as we deliver excellence in health care, education, and research.

RADIATION ONCOLOGY AT UT SOUTHWESTERN

A key component of the Simmons Cancer Center – the only NCI-designated Comprehensive Cancer Center in North Texas and one of 52 in the nation

2	7	22	59
RESIDENCY PROGRAMS	ADV TRAINING PROGRAMS	TOTAL RESIDENTS	TOTAL ALUMNI

200 PATIENTS CARED FOR DAILY

AVERAGE NUMBER OF RADIATION TREATMENTS PER PATIENT

UT SOUTHWESTERN **14** vs **28** NATIONAL AVERAGE

LARGEST INDIVIDUAL FACILITY FOR RADIATION ONCOLOGY IN NORTH TEXAS

CLINICAL SPACE **134K** SQUARE FEET

RESEARCH SPACE **30K** SQUARE FEET

LEADING-EDGE TECHNOLOGY
ULTRA-MODERN FACILITIES

TECHNOLOGY • BY THE NUMBERS

17 TREATMENT SYSTEMS

TREATMENT MACHINES WITH ADAPTIVE TECHNOLOGY **5**

4 SIMULATION MACHINES

BRACHYTHERAPY SUITES **2**

DISCOVER MORE

UTSOUTHWESTERN.EDU/RADONC

CONTACT US

2280 Inwood Road, Dallas, Texas 75390
214-645-8525

FOR MORE INFORMATION, VISIT OUR WEBSITES

Education: utsouthwestern.edu/radonc
Patient Information: utswmed.org/rad-onc

FOLLOW US ON SOCIAL MEDIA

Facebook.com/UTSWRadiationOncology
Twitter.com/UTSW_RadOnc
Instagram.com/utswradonc
LinkedIn.com/showcase/ut-southwestern-radiation-oncology

FOR ALL PROGRAM INFORMATION, CONTACT:

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