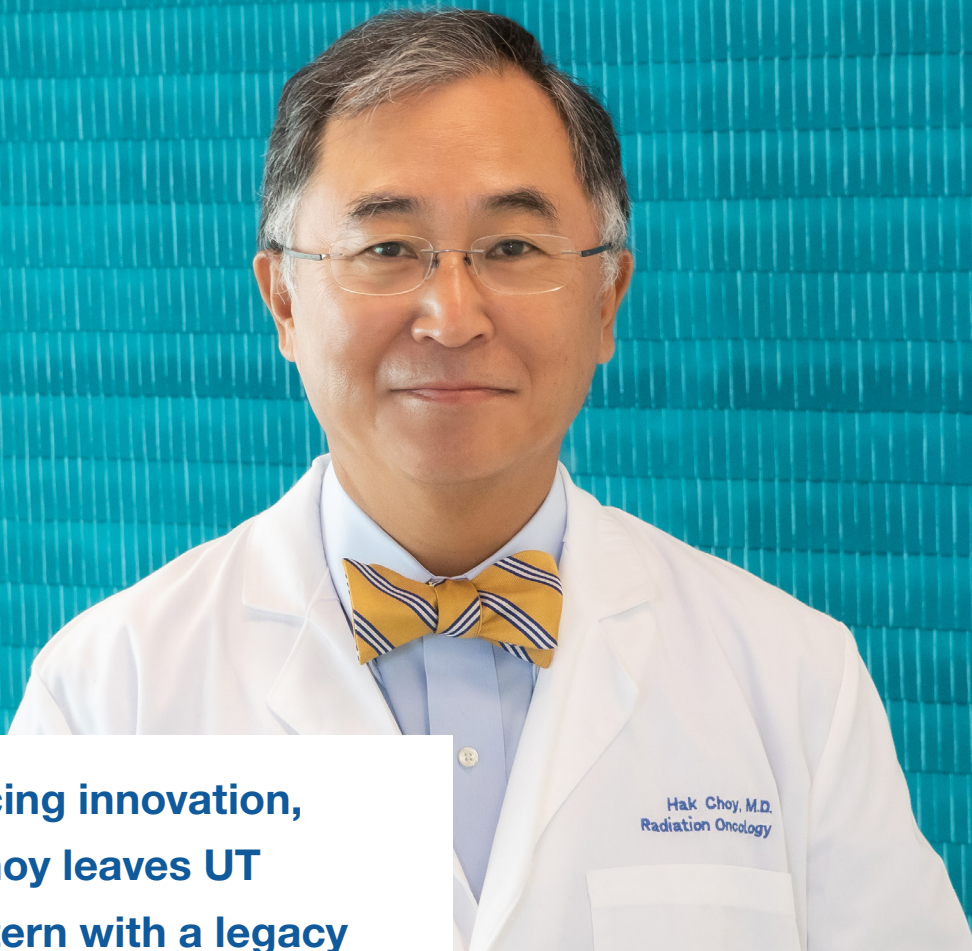


A Paradigm Shift: Adaptive Radiation Therapy

CARE • RESEARCH • INNOVATION • EDUCATION

OUR MISSION:

- Deliver world-class patient care with the most technologically advanced treatment options
- Conduct groundbreaking basic, translational, and clinical research
- Provide quality education to the next generation of medical practitioners and scientists



**By embracing innovation,
Dr. Hak Choy leaves UT
Southwestern with a legacy
as one of the nation's
leading centers for radiation
oncology treatment**

by Carol Cropper

When Hak Choy, M.D., joined UT Southwestern as Chair of Radiation Oncology in 2003, the Department had eight faculty members. It has since grown to more than 75 faculty members and more than 450 employees. Meanwhile, patient volume has increased fivefold, with 3,500 patients cared for during the most recent fiscal year. In addition, a heightened emphasis on the education and training of future radiation oncologists has attracted highly qualified applicants.

Along the way, the Department has become a research powerhouse. Radiation Oncology faculty brought in more than \$5.2 million in National

Institutes of Health (NIH) grant funding in fiscal year 2019, placing it eighth among medical school-based departments, according to an analysis of NIH data. Dr. Choy recruited Robert Timmerman, M.D., Steve Jiang, Ph.D., and Michael Story, Ph.D., as key leadership in the Department. They are also among the top researchers in the Department.

Robert Timmerman is celebrated as a pioneer in stereotactic body radiation therapy (SBRT), a procedure that uses multiple beams of precisely targeted, high-dose radiation to kill cancer inside the body. Dr. Jiang is a medical physicist and recognized leader in developing artificial intelligence tools to battle cancer; one example is the innovative use of computer graphics processing units for faster and better imaging to optimize radiation treatment for cancer. Dr. Story was recruited from UT MD Anderson Cancer Center in 2004. His laboratory research has led to clinical trials in radiation oncology for pancreatic, lung, and brain cancer.

In 2017, UT Southwestern became the first medical center in Texas – and second in the nation – to add a GammaPod, the first SBRT system optimized for treating breast cancer. This treatment has been found to be more effective and efficient, with fewer side effects. The GammaPod uses a multisource Cobalt-60 stereotactic radiotherapy system that rotates continuously, creating thousands of beam angles that combine to create an intense focal spot.

The goal is to destroy a patient’s cancer as quickly as possible, using fewer treatments, without the traditional months of radiation treatments. “We have advanced technology and have developed techniques to shorten treatment duration. UT Southwestern cancer patients now undergo an average of 14 radiation treatments compared with a national average of 28, freeing patients from many stressful return visits,” Dr. Choy notes.

“Someday, if I realize my vision, the patient will come in just one day and be treated and be done with it,” he adds.

A steady rise

If single-day cancer treatment sounds like a fantasy to some, Dr. Choy understands that asking radical questions leads to innovation.

Dr. Choy’s career began at UT San Antonio, where he worked as a technician in the lab of Daniel D. Von Hoff, M.D., a world-renowned medical oncologist who was studying cancer drugs.

In the lab, Dr. Choy gained knowledge of the latest cancer drugs and became interested in learning how those drugs interact with radiation, leading him to specialize in radiation oncology after graduating in 1987 from the UT Medical Branch School of Medicine.



In 1992, Dr. Choy left San Antonio’s Health Science Center to become a Clinical Assistant Professor at Brown University’s Warren Alpert Medical School, where he decided to test his theory about combining paclitaxel and radiation in lung cancer patients, a group with a historically poor prognosis.

He designed and conducted the very first clinical trial combining paclitaxel and radiation in cancer patients. His research found that toxicity from the combination therapies was acceptable and that the overall outcome for lung cancer patients improved. That study was followed by others looking at the effects of concurrent radiation and chemotherapy treatment in other cancers (usually with the drug



Dr. Choy with Arnim Dontes, former Executive Vice President for Business Affairs (left) and Daniel Podolsky, M.D., President of UT Southwestern Medical Center (center) at the Radiation Oncology Building groundbreaking ceremony.

paclitaxel or Taxol), making him a pioneer in the field of combination therapy. “That’s how I got started,” Dr. Choy says.

Dr. Choy joined the Vanderbilt University School of Medicine as an Associate Professor, and Clinical Director of its radiation oncology center followed in 1995, then a promotion to full Professor and Vice Chair of the Department of Radiation Oncology three years later, when he was only 40 years old.

At the national level, the influential NIH-funded Radiation Therapy Oncology Group (RTOG) appointed Dr. Choy the Chair of its Lung Committee. “We developed many pivotal nationwide clinical trials in lung cancer,” he notes.

It was in an RTOG meeting that he met Dr. Timmerman.

Dr. Choy heard Dr. Timmerman speak about his research using high-intensity radiation treatment to precisely kill cancer cells while sparing the adjacent healthy tissue. Stereotactic, or precisely placed, radiation was made possible by using modern three-dimensional medical imaging to treat cancers in the brain. However, this novel technique was not an accepted treatment for other organs that move during breathing and food digestion. Dr. Timmerman, who holds degrees in nuclear engineering and reactor physics along with his medical degree, had figured out a way to limit motion and safely provide this intense therapy.

With ultra-high doses of radiation, fewer treatments were needed. Patients didn’t have to recover from the pain of surgery, and those with inoperable tumors suddenly had another option.

Dr. Choy invited Dr. Timmerman to appear before his RTOG Lung Committee, hoping it would lead to a nationwide trial of this new approach.

However, as with Dr. Choy's earlier idea of combining chemotherapy and radiation, Dr. Timmerman's approach was considered a radical concept and was met with resistance.

"But he had all the preliminary data showing that what he was doing was credible. The data were provocative," Dr. Choy remembers thinking.

It took a few years to win approval from the National Cancer Institute (NCI) for a trial. By then, Dr. Choy had not only become Dr. Timmerman's supporter – he had recruited him to UT Southwestern, where Dr. Timmerman is now a Professor and Interim Chair of Radiation Oncology and Professor of Neurological Surgery.

The new standard

In 2004, the first U.S. multicenter trial to test SBRT began, with 59 patients who had inoperable early-stage lung cancer. The results were published in *JAMA* in 2010, listing Dr. Timmerman as first author and Dr. Choy as senior author.

The study showed a three-year survival rate of almost 60% versus the 20-35% then seen with traditional treatment. SBRT accomplished this with three treatments instead of the 20-30 usually given with conventional radiotherapy, according to the study.

The findings were astounding. The result of this study, RTOG 0236, has become well known in the field of radiation oncology, Dr. Choy says. "It changed the practice pattern globally because the outcomes were way better than anyone anticipated. "That is probably one of the most important trials in lung cancer radiation oncology during the past few

decades. It set the new standard," he adds.

Dr. Timmerman notes, "In 2000 – 21 years ago – nobody in this institution got SBRT (also called SAbR) treatments, but now many cancer patients here get SBRT."

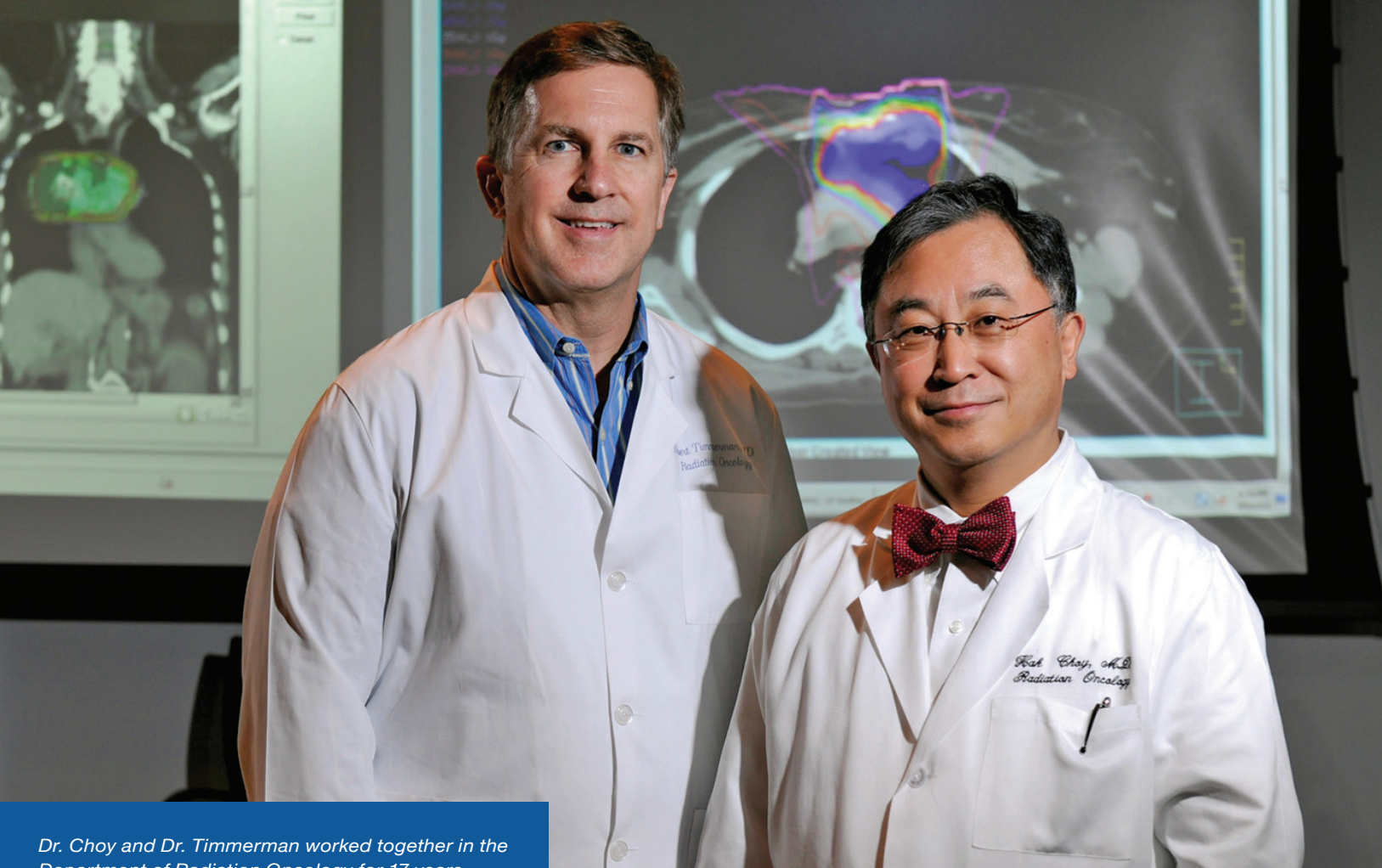
This represents a sea change for many older patients who get cancer, Dr. Choy says. Their chances for survival are better, and they don't face 30 trips for radiation treatment. Instead, they often can be treated in as few as one to three sessions. In addition, Dr. Choy says new research is showing another benefit of killing the cancer with radiation rather than removing it via surgery. Left in place, the dead cancer cells can act like a vaccine to trigger the immune system and help fight the cancer's spread.

Dr. Timmerman looks back on the resistance he and Dr. Choy faced early on. "Sadly, you sometimes get aggressive pushback when attempting to change the current practice of medicine. Competence performing today's version of therapy is so hard-earned for many doctors that they simply don't want to hear about new therapies that might make their skills obsolete," he says.

Making the impossible possible

For Dr. Choy, whose father died of cancer when he was a child, finding better outcomes was non-negotiable.

"In the early days using SBRT, health insurance companies often refused to reimburse UT Southwestern for the new treatment," says Dr. Jiang, Professor, Vice Chair, and Chief of the Division of Medical Physics & Engineering. But Dr. Choy persisted. "Many Chairs, they do things in the comfort zone, and they will improve care a little bit here, a little bit there." Dr. Jiang says. "Dr. Choy liked to do things on the boundary between the possible and the impossible. When you succeed, you actually make the impossible possible."



Dr. Choy and Dr. Timmerman worked together in the Department of Radiation Oncology for 17 years.

Says Dr. Timmerman, “We’ve tried to create nothing but incentive to change. Dr. Choy wanted us to think about what is the next paradigm to improve outcomes.”

“Dr. Choy always tried to provide us the tools and the space to test our ideas and to push boundaries,” says Dr. Story, Professor, Vice Chair, and Chief of the Section of Molecular Radiation Biology. “The expectation is that we will be successful. So far, I would say that we’ve done well for ourselves.”

The next journey

In September of 2021, Dr. Choy started his next journey – retirement – leaving a legacy of clinical innovation and research for others to continue. Over his 18-year tenure as Chair, the Department grew exponentially. His leadership transformed

UT Southwestern into one of the leading treatment centers for radiation oncology in the nation and helped the Department hit many impressive milestones in its field.

As for the future, Dr. Choy leaves behind a mindset of bringing in the best researchers and hammering down the number of treatments needed to cure cancer.

“You don’t want to just maintain the program. You want to push forward,” he says.

That is exactly what the Department and his former colleagues are doing – pushing forward. Only now, the path has moved right into a new phase in the field of radiation oncology – a phase that is not just the next iteration in care but a paradigm shift.

Exploring New Approaches

For years, UT Southwestern has been a recognized leader in the field of radiation oncology, advancing research in stereotactic ablative radiotherapy, immunotherapy, and personalized patient care through the use of artificial intelligence.

We have now entered an exciting new phase in the field of radiation oncology – adaptive therapy. Our behind-the-scenes research in the Section of Molecular Radiation Biology is led by Michael Story, Ph.D., Professor of Radiation Oncology and Chief of the Section of Molecular Radiation Biology, and Debabrata Saha, Ph.D., Associate Professor of Radiation Oncology.

“Using adaptive therapy, we’re exploring an innovative, more personalized way of delivering radiation treatments for our patients,” Dr. Story says. “This concept, called personalized ultrafractionated stereotactic adaptive radiotherapy (PULSAR™), will be evaluated in a series of clinical trials at UT Southwestern over the next several years.”

PULSAR is based on a limited number of fairly large dose “pulses” in the ablative range that are separated in time by weeks or months. The expectation is that separating the individual pulses by longer periods will allow for significant changes to be observed in the tumor, its microenvironment, adjacent tissues, and immune responses. Conventional techniques of radiotherapy treatment for cancer patients have almost exclusively been restricted to fractionated doses of radiation, which are administered within a short time frame, on consecutive days – or even multiple times per day or every other day – over the course of a few weeks.

“An ablative dose may cause considerable damage to the tumor’s DNA, disrupting proliferation and vasculature and also causing serious cell death through apoptosis,” Dr. Saha says. “Split-course treatments are less toxic, and long intervals between pulses facilitate adaptation. By allowing tumors to shrink and enabling adaptation, radiotherapy can be personalized.”



Michael Story, Ph.D.

Professor of Radiation Oncology and Chief,
Section of Molecular Radiation Biology



Debabrata Saha, Ph.D.

Associate Professor of Radiation Oncology

Expanded Facility Opens the Door to New Therapies

In May 2021, UT Southwestern's Radiation Oncology Building opened an additional 71,000 square feet of space, ushering in a new avenue of adaptive therapy that combines real-time, high-resolution imaging and modern radiation techniques to deliver ultra-precise treatment that can quickly be adapted to changes in patients' anatomy and tumor size.

The key to that advancement is the technology. UT Southwestern has filled the expanded building with seven imaging/treatment machines that are truly state of the art – and unmatched. UT Southwestern's collection of these highly advanced machines is the largest in the world within one facility.



“With this equipment, we’ll be able to account for the shape, position, and relationships of all organs close to the tumor each day and literally replan the treatment, if needed, while patients are on the table,” says Puneeth Iyengar, M.D., Ph.D., Associate Professor of Radiation Oncology and Medical Director. Previous technologies would take a week or more to prepare sophisticated radiotherapy plans, he notes.

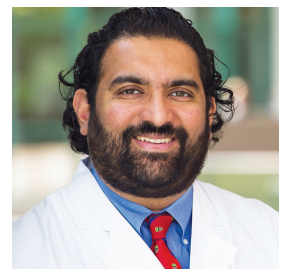
The plan is to take the technology further by combining it with a “big data” approach enhanced by artificial intelligence and applying preclinical research. The goal: create even more effective and highly personalized treatments. This innovative approach – PULSAR – is being explored in multiple clinical trials for many disease sites.

“The adaptive machines not only provide precise image guidance to tumors, but in addition, they can realign and reshape radiation beams to the borders of the tumor as it changes, meaning we’ll be able to better target tumors and avoid healthy tissue,” Dr. Iyengar says. “When fully operational, the adaptive process will take just minutes and will also make treatment regimens easier on patients.”

Learn more about our clinical trials:
utswmed.org/rad-onc/clinical-trials



Puneeth Iyengar, M.D., Ph.D.
Associate Professor of Radiation Oncology, Medical Director, and Chief of Lung Radiation Oncology Service



TECHNOLOGY:

Adaptive Radiotherapy Treatment Machines

Robert Reynolds, Ph.D., Assistant Professor of Radiation Oncology and Director of Treatment Delivery, leads a team of engineers for the installation and implementation of most of the Department's major equipment. He also leads a team of physicists who perform QA for routine, repair, and upgrade work for the mainstream treatment machines and is closely involved with the therapy and dosimetry teams in developing new treatment workflows and engaging new technologies for patient use.

"My main role in adaptive therapy has been to get the technology operational and maintained," Dr. Reynolds says. "This involves the physical infrastructure and network connectivity and managing the implementation and deployment of all of our new and repurposed measurement equipment. These machines are still very new, and the technology has a lot of room to grow and develop. We are in a unique position to be at the forefront just by the sheer volume of adaptive therapy cases we will be able to perform in a day, and that is something I expect we will take full advantage of to really steer this growing field."



Robert Reynolds, Ph.D.

Assistant Professor of Radiation Oncology and Director of Treatment Delivery

Arnold Pompos, Ph.D., Associate Professor of Radiation Oncology and Director of Strategic Expansion Plans, agrees. "This distinctive campus with its unique technology opens the opportunity for our medical doctors to provide truly personalized adaptive radiation therapy to our patients," he says.

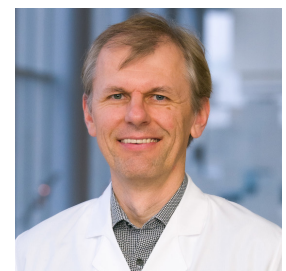
UT Southwestern's Radiation Oncology facility has a collection of the most sophisticated treatment machines housed anywhere. Coupled with image-guided therapy, the equipment is extremely versatile and capable of treating an array of cancer malignancies – giving us the ability to provide total cancer care under one roof.

The additional "smart" treatment technologies provide:

- A personalized patient experience
- Artificial intelligence-assisted radiation therapy
- A wide range of options for treatment delivery, including:
 - Flexibility, efficiency, and precision
 - Adaptability to changes in the patient's anatomy, tumor size, and position
 - Ability to monitor the treatment progress due to biological and functional changes

Arnold Pompos, Ph.D.

Associate Professor of Radiation Oncology and Director of Strategic Expansion Plans



A Noticeable Difference with Unity

Justin Park, Ph.D., Assistant Professor of Radiation Oncology and Director of Adaptive Therapy, oversees the adaptive radiotherapy program in the Department, sets up the adaptive therapy workflow for the MRI linear accelerators, and is involved with the commissioning of the new machines.

“My role is to manage the adaptive radiotherapy program as a whole and lead the clinical physics aspect of the MRI linacs, which includes machine commissioning,” Dr. Park explains. “This process helps to ensure patient safety for the MRI linacs under all possible scenarios. The goals of the adaptive radiotherapy program include establishing a clinical workflow to treat the patient adaptively and to account for organ and motion changes, optimizing the MRI linacs to maximize the visibility of the tumor and surrounding organs, and then minimizing treatment time and ensuring patient comfort during the course of treatment.”

THE TUMOR NO LONGER HIDES

The Elekta Unity MRI linear accelerator provides:

- Personalized adaptive radiation therapy with MR guidance
- Imaging capabilities equal to a diagnostic MRI scanner
- Enhanced quality of soft tissue visualization compared to computed tomography (CT imaging)
- Real-time visualization of the tumor during irradiation

Justin Park, Ph.D.

Assistant Professor of Radiation Oncology and Director of Adaptive Therapy

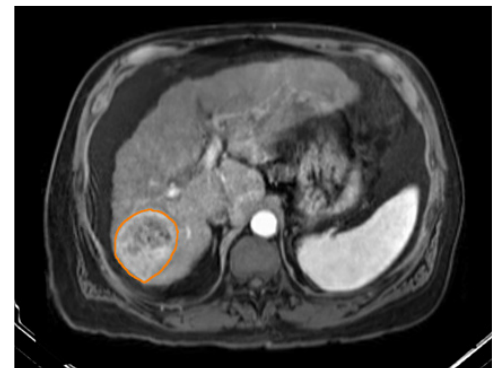


Magnetic Resonance-Guided Radiation Therapy

MR-Guided Adaptive Therapy



Conventional CT



MR imaging



A Stepping Stone to an Entirely New Radiation Treatment

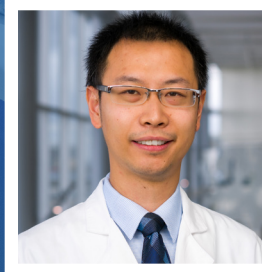
Bin Cai, Ph.D., Associate Professor of Radiation Oncology and Director of Advanced Physics Service, helps oversee and establish the novel treatment modalities – adaptive radiotherapy, image-guided radiotherapy, and biology-guided radiotherapy – and ensures that their clinical implementation is successful and safe for patients.

“In my role, I help to make sure the clinical implementation of these novel treatment modalities is successful in a safe way,” Dr. Cai says. “Not only do we want to use the current available technology, but we also want to aim for the future and propose new innovative uses, as well as new treatment strategies and procedures. A big step is to educate our entire team on these new modalities and how we can safely implement this new technology. How we can improve these innovations, and how can they benefit our

patients? We want to share our experience of how to tackle these problems and challenges not only in the U.S., but globally as well.”

REFLEXION IS DESIGNED TO DELIVER:

- Image-guided radiotherapy (IGRT).
- Biology-guided radiotherapy (BgRT) with tumor tracking. BgRT is currently awaiting approval from the United States Food and Drug Administration (FDA).
- Unique treatment field up to 100 centimeters long for treating longer anatomical areas.
- High-quality computed tomography imaging, rotating 60 times faster than other radiotherapy machines.
- Radiation distribution in 100 different directions.
- Reduced side effects through enhanced conformal planning.



Bin Cai, Ph.D.

Associate Professor of Radiation Oncology and Director of Advanced Physics Service

Future Imaging Research in Radiation Therapy Advancement Using RefleXion

• UT Southwestern is one of three centers in the world pioneering the adoption of this technology. RefleXion is an advanced radiotherapy machine that plans to integrate a positron emission tomography (PET) scanner and a ring gantry medical linear accelerator.

• UTSW is currently collaborating with both industrial and academic partners to prepare and conduct a clinical trial with the FDA to show the potential benefits from BgRT.*

• The successful deployment of this technology will enable BgRT, which utilizes both anatomic information, such as determined on CT, and biological information captured from PET to precisely treat the tumor with a personalized radiotherapy plan and real-time tumor tracking.

** BgRT is currently not FDA approved.*



Adaptive Therapy Requires Transformative Technology and Evolutionary Thinking

To successfully offer adaptive therapy requires a number of highly sophisticated imaging machines capable of quickly adapting to changes in a patient's anatomy and tumor size. To then take that precise level of treatment and bring it to the next level of personalized care requires strong research, the use of artificial intelligence (AI) – and a vision for the future.

Adaptive therapy today is focused on conforming radiation to changing anatomy to make treatment more precise, notes Steve Jiang, Ph.D., Vice Chair of Radiation Oncology. But, he adds, the dosage level and treatment schedule remain the same throughout, despite the other changes. Moving forward, UT Southwestern's goal is to take data gleaned from research and AI to make the care not just more precise but more personal.

"In the near future, we'll have more intelligent adaptation based on biomarkers, for example,"

he says. "We'll be able to prescribe different levels of radiation to patients based on their unique response to treatment and what models and past data for similar conditions suggest are optimum."

He points to PULSAR, UT Southwestern's innovative concept in radiotherapy treatment that will be tested in eight clinical trials, as an example of the approach.

"We can deliver one dose, and then based on feedback measures such as biomarkers, imaging, and other things, we can determine the ideal time for the next dose," Dr. Jiang says. "Is it one week later? Three weeks? And how much radiation should we give in the next treatment? More? Less? That is the ultimate way to deliver adaptive therapy and to tailor treatment to every individual patient. We hope in the future we'll be able to do that."

Steve Jiang, Ph.D.

Professor, Vice Chair, and Chief of the Division of
Medical Physics & Engineering



A More Visible Role with Adaptive Therapy

A primary part of the new adaptive therapy process is the increased role the physics team plays in the treatment. Because the adaptive therapy plan changes daily and is personalized based on the patient's anatomy, a medical physicist from the adaptive service is at every single treatment to guide and run the adaptive process.

“Physics is involved in every part of the adaptive process for these machines, and what we are doing with patients is more centric with the patients than before,” says Andrew Godley, Ph.D., Associate Professor of Radiation Oncology and Director of Clinical Medical Physics. “The initial feedback from physicians is that with physics present, the process has been of high quality, and the physicians and patients are getting the most out of adaptive therapy.”

The physician starts with a discussion with the physicist to determine if a patient is a candidate for adaptive therapy. If a patient is deemed a candidate, the physicist, rather than the dosimetrist, will then work

directly with the physician to devise a treatment plan. The fact that the physicist is working on the initial plan makes the daily replanning a smoother process.

Although the Radiation Oncology Building expansion opened in May, the physics team has been working on the new adaptive machine workflow for the past year, which includes the Ethos, RefleXion, and Unity equipment. Physicists started practicing on emulators of these systems to develop optimal workflows before the actual machines arrived.

After arrival, the primary step in ensuring these machines will provide safe treatment to patients involves a process called commissioning. During commissioning, physicists measure the radiation beam characteristics and then recreate them within the treatment planning system. Cases are planned for treatment sites expected to be treated on these machines and then delivered to a “phantom” – a device that contains detectors – which measures the radiation and compares it to what the treatment planning system is telling physicists. These measurements are then double-checked by a national agency to ensure the delivered radiation dose is as accurate as possible.

“Having the physicist involved in each step improves continuity for the patient,” Dr. Godley says. “Patients can expect to have a physicist at each treatment who is very familiar with their plan. I think the workflow is going very smoothly.”



Andrew Godley, Ph.D.
Associate Professor of Radiation Oncology and
Director of Clinical Medical Physics



Artificial Intelligence-Assisted Radiation with Ethos

Mu-Han Lin, Ph.D., Associate Professor of Radiation Oncology and Director of Treatment Planning, specializes in putting treatment planning techniques as well as the translation of research, such as artificial intelligence (AI) and cutting-edge technology, into clinical use.

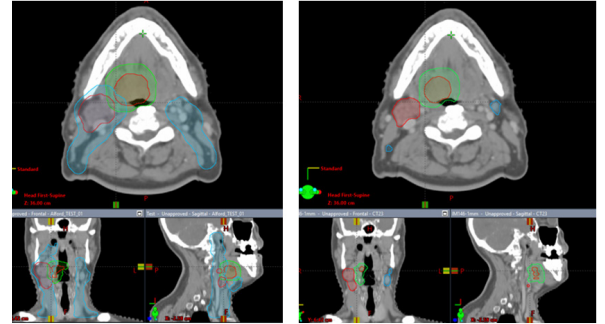
“With our new expansion open, I will be leading the Ethos physics service, which includes simulation activities all the way through patient treatment,” Dr. Lin says. “We want to bring our knowledge and our expertise in planning, as well as to integrate AI, into the clinical setting. With Ethos featuring AI-guided adaptive therapy, it meshes well with my specialty. As we deliver these adaptive treatments, we’ll further work with the Medical Artificial Intelligence and Automation (MAIA) Lab to develop the next generation of AI technologies to guide and improve the quality, efficiency, and safety of adaptive treatment.”

Features:

- X-ray-driven personalized adaptive radiation therapy
- High quality and fast delivery of CT images
- AI-driven technologies to assist in real-time adaptive treatment planning

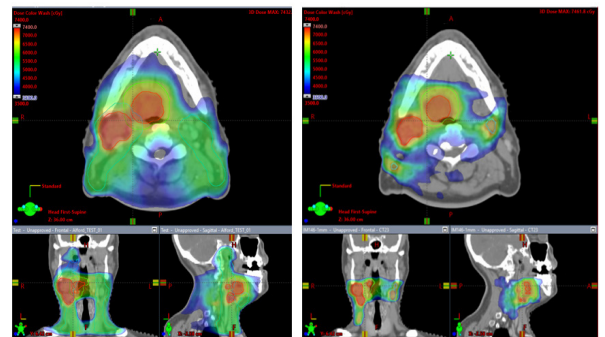
Head and Neck Case Demonstration

Treatment Volume and Area Comparison



Conventional Radiation Treatment Volume

AI-Assisted Daily Adaptive Treatment Volume



Conventional Radiation Treatment Area

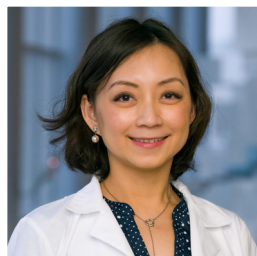
AI-Assisted Daily Adaptive Treatment Area

Learn about the MAIA Lab:
utsouthwestern.edu/labs/maia



Mu-Han Lin, Ph.D.

Associate Professor of Radiation Oncology and Director of Treatment Planning



Optimizing Quality, Safety, and Outcomes

“The expanded Radiation Oncology Building is a confluence of multiple state-of-the-art technologies and the foundation of our vision for radiation oncology over the next five to 10 years,” says David Sher, M.D., M.P.H., Professor of Radiation Oncology and Associate Vice Chair for Clinical Operations. “That vision, and all the technology behind it, is aimed at vastly improving outcomes, including both the cancer control rate and patients’ quality of life. These machines possess unbelievable tools for fine-tuning the delivery of radiation therapy, precisely defining the location of disease, and minimizing the dose to normal, healthy tissues to an extent almost unimaginable just five years ago.”



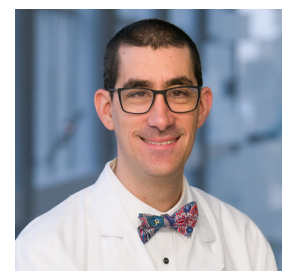
Complementing the precise instruments and enhancing the quality and safety of therapy at UT Southwestern is a one-of-a-kind system designed to improve safety, efficiency, and the patient experience. Upon arrival for treatment, patients are equipped with wristbands that use real-time location system (RTLS) technology that allows providers to know not only where each patient is but how they are moving through their visit.



“This is a unique system we developed that provides our patients with a crucial safety advantage,” Dr. Sher says. “It seamlessly aligns and verifies all components of treatment for each individual person, thus eliminating errors, and it allows us to know how long each treatment takes, which in turn provides us with tools to optimize the scheduling of treatments. This minimizes wait times, which can’t be overstated because time is important, and the live feedback it gives us – having all parts of the treatment automated and linked together electronically – is wonderful for the patient experience.”

David Sher, M.D., M.P.H.

Professor of Radiation Oncology, Associate Vice Chair for Clinical Operations, and Chief of Head and Neck Radiation Oncology Service

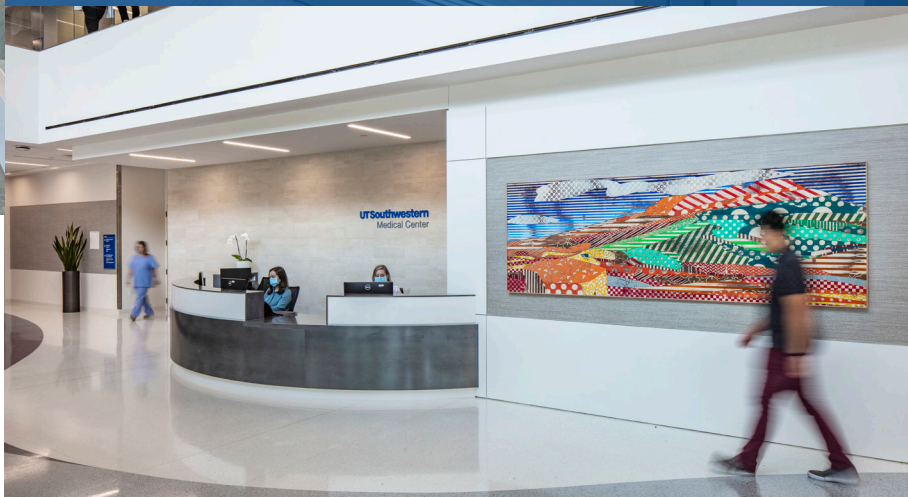


“Our expansion brings together the latest accumulation of data, research, advancement, and technology in oncology, and our patients can feel assured we will find the best solution toward their care.”

Weihan Lee, Radiation Therapist

“Our Department is truly an outstanding cancer treatment facility. After opening our expansion, we continue to move forward, offering the most advanced and personalized treatment options available. The expansion creates a beautiful and remarkable space for collaborative work with our clinical and research teams while housing state-of-the-art technology. Working in this Department for nearly 20 years has been an exciting and wonderful experience – and a significant piece of that is the amazing team of people who work together to put the needs and support of patients ahead of themselves.”

Catherine Wallace, M.B.A., B.S.R.T.(T), CMPE
Assistant Director of Clinical Operations



“With this expansion, I believe we provide patients – established or new – a sense of innovative advancement. No one ever wants to be at a hospital, but the design and environment of the building does not have the typical hospital ‘feel.’ The new expansion’s design makes everyone – from the patients to the staff – feel like they are in a great, homelike environment and that they will be well taken care of.”

George Green, Clinical Staff Assistant I

“The whole team is very excited about the new expansion. Personally, I am excited for the new procedural area for our gynecology brachytherapy and genitourinary SpaceOAR patients. This new space has individual holding bays that allow for additional privacy for patients and a smooth workflow for the treatment team.”

Katie Klenda, Registered Nurse

A Glimpse of the Future of Radiation Oncology

The expanded Radiation Oncology Building at UT Southwestern is not just state of the art: it's a home for where the future of radiotherapy is headed. Advanced, leading-edge technology. New treatment paradigms. Innovative clinical research. All of that – and more – is here within the walls of this remarkable addition, bringing our total combined space to more than 130,000 square feet. “Patients can continue to expect high-quality care administered by exceptional physicians and staff,” says Kajal Desai, Assistant Vice President of Radiation Oncology Services. “The other thing they can expect is an efficiently run clinic. It's all part of a focused investment to advance patient care.” Patient experience is one of our key focuses. Workflows in the clinic are designed to personalize patient care. Patients moving through their clinic and treatment visit get to meet with support staff, such as financial advisors, dietitians, and social workers to meet their needs.

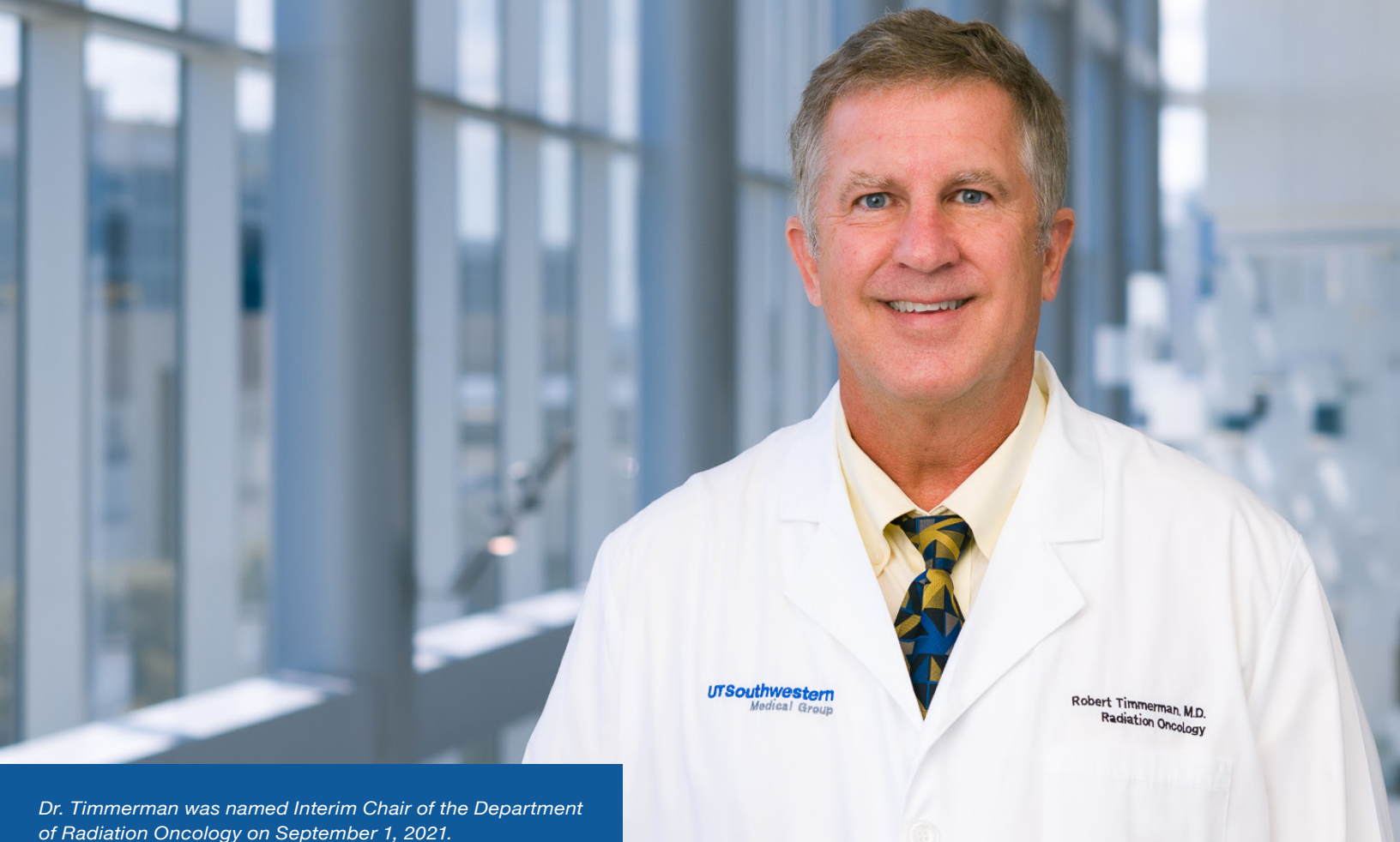
Kajal Desai, M.P.A.

Assistant Vice President of Radiation Oncology Services



Here's some of what you'll find inside the Radiation Oncology Clinic:

- 49 exam rooms
- 14 advanced imaging/treatment machines
- 2 CT simulators/AIRO
- MR simulator
- High-dose-rate brachytherapy suite
- Xstrahl treatment machine
- GammaPod treatment machine for breast cancer
- 2 minor procedure rooms
- Patient support room
- 2 children's areas
- Cafeteria



Dr. Timmerman was named Interim Chair of the Department of Radiation Oncology on September 1, 2021.

Affirming a Goal of Personalization

As the Department of Radiation Oncology shifts its vision toward adaptive therapy in our new expansion, the main goal revolves around one aspect: personalization.

Adaptation takes the next step in radiation therapy. This requires identifying unique features of each individual patient so we can find ways to characterize the cancer, react to it, and provide means to identify a new, unique treatment. In simpler terms, we want to personalize it. All along the way, we want to keep this at the forefront so we do not become complacent and go back to a “one-size-fits-all” therapy. We want to treat patients on a timeline, not a moment – and we have to adapt to that timeline.

To do this requires a lot of attention, equipment, and processes. But we want to take it further. We want to make personalization a Department-wide mission for all radiation oncology core activities, including our education, administrative, and research areas.

We have created databases in which we will be able to store vital information about how a patient with a certain diagnosis is progressing – or not progressing – and try to learn along the way how fast and how much treatments change and whether or not we should consider alternatives. To that end, we expect artificial intelligence (AI) to have a big role. Not only will AI help us mine information from the patient through biopsies, blood work, and imaging – and analyze it to a form that can be more easily understood – but it will also help us understand if a patient is on a trend to success or a problem if we do not change their course of treatment.

On the education side, we want to personalize the training to fit the specific needs and objectives of the learner. We will see if we can accommodate people in the way they learn best – whether remote or hands-on – and the hope is that having this option will create professionals who see each patient as a unique individual. And that is not just for our residents and medical students but also for our staff; we



Dr. Timmerman views a patient's CT scan at an imaging session.

want to ensure they each have unique experiences that will help them grow to meet their professional ambitions.

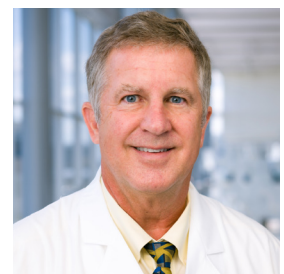
Our collaborations with other departments have increased as well. The new therapy wing in our expansion will be more complementary to our partners in medical oncology who provide systemic therapies. Systemic therapies are given as PULSAR rather than conventional radiation, and they are administered every three to four weeks. Now our PULSAR treatments will be given in a similar schedule, so we can work together, evaluating and examining whether we are on the right course.

Moving forward, we plan to increase our interest in image guidance to make sure we have the best view of the tumor

and prevent as much collateral damage as possible. Therefore, I think our relationship with radiology will only become more important. Biologically, we are trying to move solidly into the two areas of metabolomics and immunocology, which complement one of our current focuses on DNA damage and repair very nicely.

Many places across the world look to our institution for what's next in the field of radiation oncology. Right now, that is adaptive therapy. As we align our Department's vision toward a common goal of personalized treatments, we want to continue to push forward and be at the forefront of this new, exciting paradigm shift.

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



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Department Overview

LEADERSHIP

- **Robert Timmerman, M.D.**, *FASTRO, FACR, Professor and Interim Chair*
- **Steve Jiang, Ph.D.**, *Professor, Vice Chair, and Chief of the Division of Medical Physics & Engineering*
- **Michael Story, Ph.D.**, *Professor, Vice Chair, and Chief of the Section of Molecular Radiation Biology*
- **Kajal Desai, M.P.A.**, *Assistant Vice President of Radiation Oncology Services*

OUR SPECIALIZED DISEASE TEAMS INCLUDE

- Breast
- Central Nervous System
- Gastrointestinal
- Genitourinary
- Gynecological
- Head and Neck
- Lung
- Lymphoma
- Melanoma and Sarcoma
- Pediatrics

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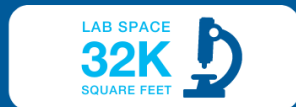
Education: utsouthwestern.edu/radonc
Patient Information: utswmed.org/rad-onc

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