

# UT SOUTHWESTERN THE TARGET

News from the Department of Radiation Oncology

## Radiation Oncology at UT Southwestern: Introduction from the chairman

**W**ith this first issue of **The Target**, we look forward to informing you on a regular basis of the clinical care and research efforts taking place in one of the most advanced radiation oncology facilities in the world: the Department of Radiation Oncology at UT Southwestern Medical Center.

We are the only center in the U.S. to house this combination of advanced stereotactic radiosurgery platforms: the Elekta Gamma Knife,

cers. Several of our doctors are recognized internationally for significant contributions to specific areas such as lung cancer, head & neck cancer, and stereotactic body radiation therapy (SBRT). We also offer the only training program for radiotherapy technicians based in Dallas / Fort Worth through our affiliation with the medical school at UT Southwestern.

Our clinical trials program is very active, enrolling over 100 patients each year in clinical studies.

Our research is divided into clinical research, molecular radiation biology, and medical physics and engineering.

The program in molecular radiation biology investigates the biological response to ionizing radiation, with the ultimate goal of developing personalized treatments for cancer patients. This program was key in establishing UT Southwestern in 2006 as a National Aeronautics and Space Administration (NASA) Specialized Center of Research. Our program in medical physics and engineering

likewise has been on the forefront of developing and implementing new technologies.

The year 2010 is going to be an important one for the department, with a major expansion and implementation of even newer technologies on the way. We look forward to sharing our clinical and research findings with you in the days to come. ♦



a fourth-generation Accuray CyberKnife, an Elekta Synergy-S and a Varian Trilogy. Based on these capabilities, we are able to choose the best treatment tool for each patient, as well as conduct comparative studies for each modality.

With the largest radiation oncology practice in North Texas, our physician team is able to specialize in the treatment of particular can-

VOLUME 1, SPRING 2010

## Early results with Calypso “GPS” for prostate cancer

**P**hysicians at UT Southwestern are leading clinical investigation of the new Calypso “GPS for the body” tumor tracking system and are conducting the first study integrating Calypso with stereotactic treatment of prostate cancer.

The 4-D tracking system has been widely implemented in the Department of Radiation Oncology for standard, multi-fractionated treatment of prostate cancer. In each patient, three tiny radio transmitters are implanted as markers for the treatment area. A receiver

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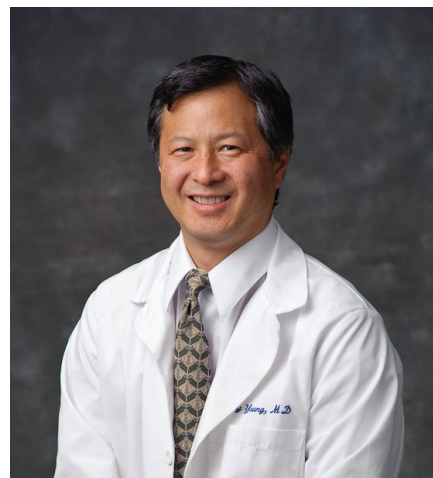
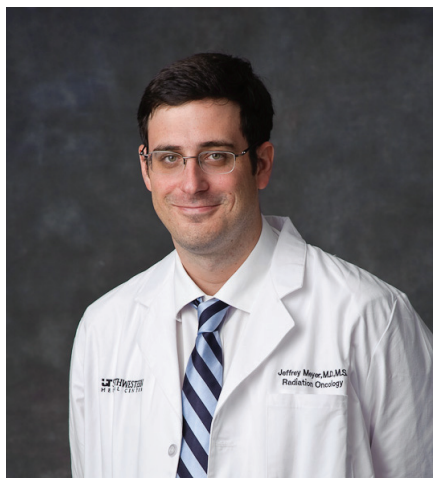
## Physicians join Radiation Oncology practice at UT Southwestern

Two physicians recently have joined the patient care team of the Department of Radiation Oncology.

Jeffrey Meyer, M.D., Assistant Professor of Radiation Oncology, is dedicated to treating patients with gastrointestinal cancer (including esophageal, hepatobiliary, pancreatic and anorectal tumors), as well as those with lymphomas and prostate cancer.

An award-winning researcher, he earned his medical degree at the Pritzker School of Medicine at the University of Chicago and completed his residency at Duke University Medical Center, followed by a fellowship in proton beam therapy at the M.D. Anderson Cancer Center.

His recent papers include “Is there a role for intraoperative radiation therapy in patients with resected pancreatic adenocarcinoma?” (*Ann Surg Oncol.* 2009 Aug;16(8):2081-3) and “Impact of collimator leaf width and treatment technique on stereotactic radiosurgery and radiotherapy plans for intra- and extracranial lesions” (*Radiat Oncol.* 2009 Jan 21;4:3).



Left to right: Jeffrey Meyer, M.D., and Gary Young, M.D.

Gary Young, M.D., Assistant Professor of Radiation Oncology, is dedicated to treating patients with head & neck and lung cancers.

He earned his medical degree at Oral Roberts University, completed residencies in internal medicine and radiation oncology at the University of California, Irvine Medical Cen-

ter, and is board certified in both disciplines.

“Dr. Meyer and Dr. Young will add considerable strength to our radiation oncology team and will allow us to better meet the needs of the community and referring physicians,” said Hak Choy, M.D., chairman of the Department of Radiation Oncology. ♦

### News in brief

#### Department chairman named to IASLC board

Hak Choy, M.D., has been elected to the board directors of the International Association for the Study of Lung Cancer for 2009-2011.

#### Dates for 2010 SBRT training

The remaining 2010 program dates for training in stereotactic body radiation therapy (SBRT) are May 6-7, September 9-10 and December 2-3.

The primary focus of this two-day, non-CME course is to help oncology professionals in both large and small centers, including both academic and community practice, learn about the proper implementation of a viable and effective SBRT treatment practice.

Covered topics include the evolution of ablative SBRT, guidelines for conducting proper treatment, billing and compliance, physics and dosimetry, with attention to the

unique requirements of SBRT beyond conventional radiotherapy and IMRT. Clinical outcomes and treatment patterns in spine, liver, lung, GI and GU cancers, and descriptions of various treatment platforms in the clinical operation area are also included.

For more information, contact Ewa Papiez at 214-645-2864 or [ewa.papiez@utsouthwestern.edu](mailto:ewa.papiez@utsouthwestern.edu).

#### “Best” awards at ASTRO

Two abstracts by UT Southwestern researchers were selected for presentation at the “Best of ASTRO” session at the 51st annual scientific meeting of the American Society for Radiation Oncology (ASTRO) in November.

Paul Medin, Ph.D., was the lead author of the abstract “Lateral dose volume effects and reirradiation tolerance of the porcine spinal cord.”

Another paper, led by Robert Timmerman, M.D., focused on SBRT treatment

of lung cancer in inoperable patients. (*More on page 5.*)

#### Japanese doctors pay visit

Government-sponsored physicians from the West Japan Oncology Group visited the department’s main clinic last fall to learn more about U.S. best practices in radiation therapy and radiosurgery.



## Treating prostate cancer with Calypso *continued*

mounted on an arm is positioned directly over the patient and reads the signals. Unlike X-rays used to align patients initially, Calypso transmits positioning information 12 times *per second* throughout treatment, allowing the radiation therapist to track the exact position of the prostate gland in real time.

There are some clinical limitations for usage of the system, such as the size of the patient's abdomen. "Someone who has a pot belly would not be a candidate," said David Pistenmaa, M.D., Ph.D. "Either their anatomy or abdominal wall motion caused by respiration would interfere with the device.

"We've also found that it is more difficult to position the transmitters in patients who have had surgical resection of the prostate," he continued. "However, these patients can greatly benefit from Calypso as it helps limit the extent of the rectum receiving the full radiation dose."

### Clinical results

UT Southwestern physicians and radiation therapists have found that the real-time feedback provided by Calypso can ensure more accurate treatment within traditional radiation

therapy plans.

"Our radiation therapists have detected movement of the prostate gland significant enough to warrant stopping treatment and realigning the patient using Calypso," said Dr. Pistenmaa. "This can occur on a daily basis with some patients and almost never with others."

### Future technology use

"The way I'd like to see Calypso used is to decrease the margins of the target volume even further," said Dr. Pistenmaa.

"If we can be certain that Calypso is detecting the motion, and the motion is very small, we could reduce the current 6 mm margin around the prostate to 3 mm, which would decrease the possibility of adverse effects.

"The problem we've always had in radiotherapy is the risk of adverse effects from the treatment," he continued, "but we can minimize those by decreasing the volume of normal tissue irradiated."

This is particularly important with stereotactic body radiation therapy (SBRT) of the prostate, in which a tightly confined radiation dose of 1000 cGy is given five times over a two-week period.

"Although the potential adverse effects of this high radiation dose could be extreme, our patients are tolerating treatment very well, thanks to the excellent immobilization of the prostate gland and the elegant radiation dose distribution inherent in our SBRT treatment plans," said Dr. Pistenmaa. "We've never given that much radiation in the past with conventional plans because it almost certainly would result in injury."

Immobilization of the prostate gland is key to the SBRT plan.

"Using Calypso we've verified that the prostate barely moves during SBRT procedures because of the rectal balloon that holds the prostate in place," said Dr. Pistenmaa.

"Typically, we may make some adjustments at the beginning, for example if a patient is tense and then relaxes into a different position later," he continued.

"But once that adjustment is made, the rest of the treatment tends to proceed smoothly, which Calypso enables us to confirm."

UT Southwestern is currently leading a national trial investigating SBRT in the treatment of prostate cancer and is the only investigator in the trial using Calypso to verify targeting accuracy. ♦



## Partial breast irradiation: What are the treatment options?

Ann Spangler, M.D.

Just as the surgical management of breast cancer has changed over the years, so has the use of radiation therapy in breast cancer treatment.

Initially, surgery consisted of mastectomy, while radiation therapy primarily was used following mastectomy for patients with locally advanced disease and a high risk of cancer recurrence on the chest wall or in the lymph nodes of the axilla.

Clinical trials initiated in the 1970s demonstrated that many breast cancers could be treated equally well with removal of the breast tumor and normal surrounding tissue, provided radiation therapy was used following surgery to treat the remaining, intact breast tissue.

Whole breast radiation therapy is administered via external beam irradiation, using radiation in the form of X-rays or gamma rays delivered by a treatment machine such as a linear accelerator. External beam treatment generally is given once a day, five days per week, for four to six weeks. This regimen is known as breast conservation therapy and is the local therapy recommended for most early stage breast cancers today.

Traditionally, external beam irradiation of the intact breast has used 3-D conformal treatment planning and delivery, with the use of two tangential beams for coverage of the entire breast.

In some cases, particularly for left-sided breast cancers in which the dose to the heart

may be higher or the internal mammary nodes must be treated, intensity-modulated radiation therapy (IMRT) may be used. IMRT employs a sophisticated computer planning system to devise a plan using multiple beams from multiple directions to shape the field to provide the coverage needed, without exceeding normal tissue tolerance doses. While IMRT is not required for all breast cancer treatments, it is a powerful tool for select patients.

**“The goal of partial breast irradiation is to provide a high dose of radiation therapy to [the tumor bed] while keeping the dose to normal tissues below the level that may cause permanent changes.”**

Unfortunately, radiation therapy does carry a risk of side effects to normal tissues within the irradiated area. For breast cancer, this has spurred research into partial breast irradiation, which limits the volume of normal breast, lung and heart within the radiation treatment area.

With this treatment, patients with small breast tumors undergo partial mastectomy and possible axillary node biopsy. Radiation therapy is then delivered to a limited volume of breast tissue surrounding the cavity left by the tumor’s removal, rather than to the entire breast. Treatment is generally given twice a day for five days.

The area of the breast statistically at greatest risk of recurrence of breast cancer is this tissue surrounding the site of the breast tumor exci-

sion, called the tumor bed. The goal of partial breast irradiation is to provide a high dose of radiation therapy to that area, while keeping the dose to normal tissues below the level that may cause permanent changes.

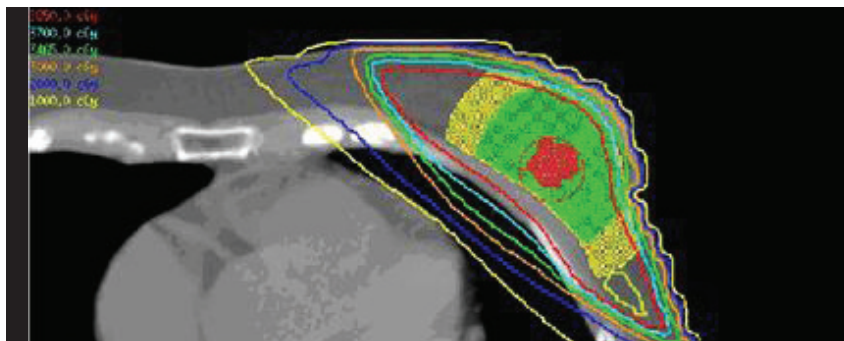
The first modality used for partial breast irradiation was interstitial implant. In this procedure, radioactive sources are temporarily implanted into the breast tissue in a way which provides a uniform, high dose of radiation to the area at greatest risk. The dose can be shaped by modifying the position of the radioactive sources.

In an attempt to provide a simpler way of delivering the radiation inside the breast, a balloon catheter was devised which is inserted into the cavity where the tumor was formerly located. One or more radiation sources are then temporarily placed inside the balloon to deliver the desired dose.

An additional method of delivering partial breast irradiation is to use external beam irradiation to the tumor bed, thereby avoiding the use of an implant. However, the volume of normal breast tissue that is irradiated using external partial breast irradiation is increased due to the need to enlarge the size of the treatment area to compensate for movement of the breast with each respiration.

A new method of providing external partial breast irradiation is currently under investigation using the department’s CyberKnife, a specialized radiosurgery machine capable of ultra-precise radiation delivery. Small metal markers are placed into the breast to provide information as to the exact position of the area to be treated, taking into account the change in position of the breast with each respiration.

The position of these markers is tracked during treatment delivery, and the volume of breast tissue treated can therefore be reduced, decreasing the risk of side effects while still delivering a higher dose to the tumor bed. Treatment may be delivered in a single fraction, in just one day. A clinical trial to assess the feasibility and effectiveness of this treatment will soon open at UT Southwestern. ♦



Partial breast irradiation using external beam plan

## Success with SBRT in medically inoperable, early-stage lung cancer leads to new protocols

Recent three-year results of a national Phase II clinical trial, Radiation Therapy Oncology Group (RTOG) 0236, found that biologically potent doses of stereotactic body radiation therapy (SBRT) successfully halted the growth of cancer at its original site in the lung for three years among nearly 98 percent of 55 patients with medically inoperable, early non-small cell lung cancer (NSCLC).

The study showed that more than half (56 percent) of these patients lived for three years after diagnosis, while 48 percent survived for three years after cancer treatment with no sign of the disease returning.

Researchers also found that despite the high potency of treatment, less than 20 percent of these extremely frail patients experienced a serious decline in their health status. This finding was better than researchers expected and is similar to the risk for healthier patients who undergo radical surgery.

The promising results of institutional trials led by Robert Timmerman, M.D., at UT Southwestern, along with increasing international publications on SBRT, resulted in the formation of the national RTOG 0236 trial with Dr. Timmerman as principal investigator.

Based on early concerns about toxicity in patients with centrally located tumors, RTOG 0236 excluded patients with planning target volumes encroaching on a 2-cm margin around the mediastinum and major airways. This trial involved treatment of biopsy-proven stage I

NSCLC up to 5 cm, with radiation of 60 Gy given in three fractions of 20 Gy, at institutions undergoing an extensive accreditation process.

Generally, radiotherapy-treated patients have a host of medical problems that would make a lobectomy or pneumonectomy intolerable. Comorbidities include severe pulmonary disease, heart disease, severe diabetes, or history of stroke. These patients are deemed “medically inoperable” and have competing causes of death in the three- to five-year period after cancer diagnosis such that survival is inherently greatly compromised.

Nevertheless, the results of the RTOG 0236 study confirm that SBRT should now be considered a standard treatment in early-stage lung cancer patients with coexisting serious medical problems. It also begs the question of whether SBRT should be considered in healthier patients with lung cancer who are treated with surgery.

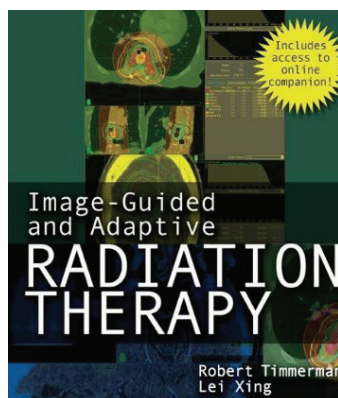
Currently, UT Southwestern is participating in the RTOG 0618 study, which offers select healthy patients with stage I/IIA NSCLC treatment with SBRT and reserves surgical salvage for the relatively rare local failure.

The National Institutes of Health also has recently approved a trial comparing sublobar resection versus SBRT in high-risk, operable patients, to be jointly led by Dr. Timmerman and Boston Medical Center’s Hiran Fernando, M.D. (ACOSOG Z4099 / RTOG 1021). ♦

## In press

Members of the Department of Radiation Oncology contributed significantly to the new book “Image-Guided and Adaptive Radiation Therapy.” Department Vice Chairman Robert Timmerman is co-editor of the volume; Timothy Solberg and Paul Medin of the medical physics and engineering program wrote a chapter on image-guided stereotactic radiosurgery and SBRT; and Practice Manager Claire Mendenhall contributed a chapter on billing and reimbursement practices specific to IGRT.

*Image-Guided and Adaptive Radiation Therapy.* Eds R. Timmerman and Lei Xing. Lippincott Williams & Wilkins; Har/Pas edition (2009).



## Clinical trials: lung cancer

Patients currently are being enrolled in the following clinical trials for the treatment of lung cancer:

### Small Cell Lung Cancer

CALGB 30610/RTOG 0538: Phase III comparison of thoracic radiotherapy regimens in limited small cell lung cancer patients also receiving cisplatin and etoposide.

### Non-Small Cell Lung Cancer Adjuvant/Preventative

RTOG-0618: A phase II trial of stereotactic body radiation therapy (SBRT) in the treatment of operable stage I/II NSCLC.

### Locally Advanced (III) or Inoperable (I/II)

RTOG-617: Phase III comparison of standard-dose (60 Gy) vs. high-dose (74 Gy) radiotherapy w/ concurrent and consolidation carbo/paclitaxel +/- cetuximab in stage IIIA/IIIB NSCLC.

RTOG-0813: Phase I/II study of SBRT for early stage, centrally located NSCLC in medically inoperable patients.

82005020: Phase I/II study of Alimta + carbo or Alimta + cisplatin in inoperable stage IIIA/B NSCLC.

RTOG-0915: A randomized phase II study comparing two stereotactic body radiation therapy (SBRT) schedules for medically inoperable patients with stage I peripheral NSCLC.

### Metastatic (2 or more)

42007003: Phase II trial of erlotinib in combination w/ stereotactic body radiation therapy for locally advanced or metastatic NSCLC.

### Non-therapeutic

SCCC-01508: BOLD MRI of lung tumors for the physiological characterization of lung cancer.

For more information, contact Jean Wu at 214-648-7015 or visit our Web site.

## Dietitian specializes in nutrition needs of cancer patients

Although physicians agree that meeting basic nutritional needs during cancer treatment is important, the Department of Radiation Oncology at UT Southwestern is one of the few programs in North Texas that retains a full-time dietitian on staff to consult with patients as needed.

Aria Gollner, R.D., CSO, L.D., was one of the first in Dallas to be board certified as a specialist in oncology nutrition by the Commission on Dietetic Registration.

“Maintaining weight is important for all cancer patients to improve treatment outcomes but is particularly important for those undergoing radiation therapy,” Ms. Gollner said. “Our treatments are based on very exacting measurements of the patients’ dimensions. If they lose too much weight it can impact the accuracy of the treatment and we may have to redesign their treatment plan.”

Ms. Gollner provides assessment, counseling and menu assistance to help patients get the right amount of nutrition, whether making meals themselves at home or receiving meals in a hospital.

In particular, Ms. Gollner works closely with patients receiving treatment to the head and

neck, as these areas are particularly vulnerable to side effects that make adequate nutritional intake difficult.

“One of the most common complaints is taste — patients say their food tastes metallic or like cardboard,” Ms. Gollner said. “I think it’s the worst of the side effects because, unlike nausea or constipation, there are no medications to help.”

Ms. Gollner has some creative solutions to overcome this obstacle, however.

“Some things that have worked in the past include flavoring foods with tart flavors like vinegar, citrus or pickled items,” she said. “Marinating meat prior to cooking and using different seasonings also helps.”

Patients seen by the Department of Radiation Oncology are not automatically scheduled with the dietitian; however, anyone can re-



Aria Gollner, R.D., CSO, L.D.

“Good nutrition is an important part of healing. You can take an active role in your own recovery.”

quest a free consultation at any time during treatment. Doctors, nurses and therapists also refer patients to her when they believe someone may need help.

“Good nutrition is an important part of healing,” Ms. Gollner said. “You can take an active role in your own recovery by getting enough protein, carbohydrates and fat. And I’m here to help, too.” ♦

### Healthy menu: protein-rich quinoa

“My favorite side dish to make is quinoa (pronounced KEEN-wah),” says radiation oncology dietitian Aria Gollner. “It’s similar to rice or couscous, but has a slight crunch to it. When you buy quinoa, be sure to notice whether it is pre-rinsed. If not, you need to rinse it thoroughly with water, otherwise your dish will come out bitter.”

“I love this Black Bean Quinoa recipe because both main ingredients are high fiber foods, so the total grams of fiber per serving are 10.24 or one-third of the minimum daily recommended amount! There is evidence that foods containing dietary fiber, like beans and whole grains, can decrease one’s risk of developing colorectal cancer. Quinoa is also a complete protein as it contains all nine essential amino acids.”



#### Quinoa with Black Beans and Cilantro

4 to 6 servings

Ingredients:

1 tablespoon vegetable oil	1/2 teaspoon salt
2 cups chopped white onions	1 1/2 cup water
1 cup chopped red bell pepper	1 15-ounce can black beans, rinsed, drained
1 cup quinoa, rinsed & drained	1/2 cup chopped fresh cilantro, divided
2 teaspoons chili powder	Crumbled Cotija cheese or feta cheese (optional)
1/2 teaspoon ground cumin	

Heat oil in heavy medium saucepan over medium-high heat. Add onions and red pepper; sauté until beginning to soften, about 5 minutes. Stir in next 4 ingredients. Add water; bring to boil. Cover, reduce heat to medium-low, and simmer until quinoa is almost tender, about 14 minutes. Add beans and 1/4 cup cilantro; cook uncovered until heated through and liquid is fully absorbed, about 3 minutes. Transfer to bowl; sprinkle with 1/4 cup cilantro and cheese, if desired.

## Symposium highlights radiation, travel, health in space

More than 200 people, including Dallas-area middle and high school students and teachers as well as college students from area universities, spent a Saturday last fall at UT Southwestern learning about space travel, radiation and health.

The daylong forum, sponsored by Science Teacher Access to Resources at Southwestern (STARS) and the Harold C. Simmons Comprehensive Cancer Center, highlighted how medical advances from space research may translate into treatments on Earth that will improve human health.

Presentations by the Department of Radiation Oncology included:

Dr. David Chen, professor of radiation oncology and director of the Division of Molecular Radiation Biology: “Radiation DNA Damage and Repair.”

Dr. Michael Story, associate professor of radiation oncology and deputy director of the Division of Molecular Radiation Biology: “Ra-



David Chen, Ph.D.

diation Effects on Lung Cancer and Leukemia: Genomic Approaches to Assessing Radiation Risks.”

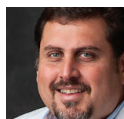
Presentations were also made by Johnson Space Center officials and other UT Southwestern scientists.

Dr. Daniel K. Podolsky, president of UT Southwestern, offered the opening remarks and welcomed U.S. Rep. Ralph M. Hall, the ranking member of the House Science and Technology Committee. Hall is a member of the House Action Team, a bipartisan group of House members dedicated to promoting NASA and keeping alive the vision of space exploration.

“I’m looking into the face of the future,” Rep. Hall said as he surveyed the young faces in the audience.

The STARS program was established in 1991 to improve science education in North Central Texas. ♦

## Our physicians



*Ramzi Abdulrahman, M.D., Assistant Professor.* Dr. Abdulrahman oversees the pediatric treatment program and has a special interest in cancers of the brain and thorax.



*Jessamy Boyd, M.D., Assistant Professor.* Dr. Boyd treats all types of cancer at the department’s clinic in Richardson.



*Hak Choy, M.D., Professor and Chairman.* Dr. Choy’s primary clinical focus is the treatment of lung cancer. He is chairman of the lung cancer committee of the national Radiation Therapy Oncology Group.



*Dan Garwood, M.D., Associate Professor.* Dr. Garwood focuses on breast malignancies.



*Jeffery Meyer, M.D., Associate Professor.* Dr. Meyer has a special interest in gastrointestinal malignancies.



*Lucien Nedzi, M.D., Associate Professor and Vice Chairman.* Dr. Nedzi is medical director of the radiation oncology clinic at UT Southwestern and is an expert in both head and neck cancer and spinal stereotactic surgery.



*Elesyia Outlaw, M.D., Assistant Professor.* Dr. Outlaw’s primary focus is in gynecological malignancies.



*David Pistenmaa, M.D., Ph.D., FACR, Professor.* Dr. Pistenmaa has a clinical focus on prostate cancer.



*Ann Spangler, M.D., Assistant Professor.* Dr. Spangler is director of the residency program and has a primary interest in breast malignancies.



*Robert Timmerman, M.D., Professor and Vice Chairman, Director of Clinical Research.* Dr. Timmerman is one of the most experienced experts in the world in the field of stereotactic radiosurgery. He focuses on brain and lung malignancies.



*Gary Young, M.D., Associate Professor.* Dr. Young has a primary interest in lung and head and neck cancer.

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UT Southwestern Medical Center – General Info.... 214-648-3111  
UT Southwestern Patient Services Ambassadors..... 214-648-7001

Physicians who would like to make a referral may call the department's main clinic number or UT Southwestern's physician referral line at 214-645-5455 (toll free 866-645-5455) for adult patients or 800-244-5379 for pediatric patients.



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