



A Guide for Patients

STEREOTACTIC BODY RADIATION THERAPY

Using Power and Precision to Target Tumors



Allen G. Meek, MD
Chair, Radiation Oncology

As Chair of the Department of Radiation Oncology, I am pleased that Stony Brook University Medical Center offers patients with cancer one of the most advanced treatment options available—Stereotactic Body Radiation Therapy (SBRT), a specialized image-guided radiation therapy. Stony Brook’s SBRT Program, directed by Bong S. Kim, MD, has a team of physicians and staff who are the most experienced in the region in the use of this advanced treatment method. Together, team members provide individualized care to their patients—with expertise, compassion, and a commitment to excellence.

The Department of Radiation Oncology at Stony Brook University Medical Center is accredited by the American College of Radiation Oncology (ACRO) Practice Accreditation Program. ACRO has determined that the Department not only meets its high standards, but in many aspects exceeds those standards.



Zhigang Xu, Chief Medical Physicist; Marlene Ascenio, Radiation Therapist; Bong S. Kim, MD, Director, SBRT; and Sharon Azzato, RN.

**STONY BROOK UNIVERSITY
MEDICAL CENTER IS ONE
OF THE FEW HEALTHCARE
FACILITIES ON LONG ISLAND
EQUIPPED TO PROVIDE
IMAGE-GUIDED STEREOTACTIC
BODY RADIATION THERAPY.**

Stereotactic body radiation therapy (SBRT) is a way to deliver very high doses of radiation with great precision, while protecting surrounding healthy tissue. Our specialists use stereotactic radiosurgery (SRS) to treat cancer in the brain, and stereotactic body radiation therapy to treat cancer in the rest of the body. Physicians and staff at Stony Brook University Medical Center are the most experienced in the region in the use of this advanced treatment method. Bong S. Kim, MD, Director of Stony Brook’s SBRT Program, and his team provide individualized care to patients—with expertise, skill, and compassion.





Dr. Kim with a patient at a follow-up visit.



The ExacTrac® system helps to tightly focus radiation beams accurately to the tumor, sparing surrounding tissue and structures.

THE ADVANTAGES OF STEREOTACTIC BODY RADIATION THERAPY

SBRT offers a combination of precision and power to achieve better outcomes in targeting tumors.

Focused delivery

When radiation is delivered directly to the tumor site with a tightly focused, narrow beam of radiation instead of a wider and broader beam, there is less chance of damaging surrounding healthy tissue and structures. And, since radiation delivery is more precise, higher doses can be delivered, improving the chances of eradicating the tumor. This more precise delivery also minimizes the risk for complications often associated with radiation treatment.

Shorter treatment course

With stereotactic body radiation therapy, each dose of radiation is higher than with conventional radiation therapy. As a result, your treatment course is shorter. Usually, only three or five doses are given over one to two weeks rather than the 15 to 40 treatments over a period of three to six weeks with conventional treatment. Because of its high accuracy, stereotactic body radiation therapy can also be used at or near sites that have been previously irradiated.

IMAGE COURTESY OF BRAINLAB AG.



HOW SBRT WORKS

Accurate positioning and limiting movement

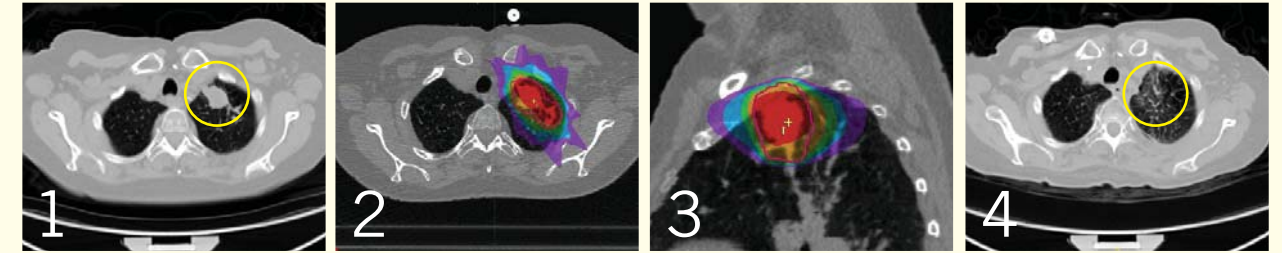
Accurately delivering the radiation dose directly to the tumor being targeted is key to the success of stereotactic body radiation therapy. This is why you will need to be correctly positioned for every treatment session.

With SBRT, you can be positioned within two millimeters of precision, which maximizes radiation treatment to the tumor. It is also important to limit your movement at the time the radiation dose is being delivered, even movement associated with normal breathing.

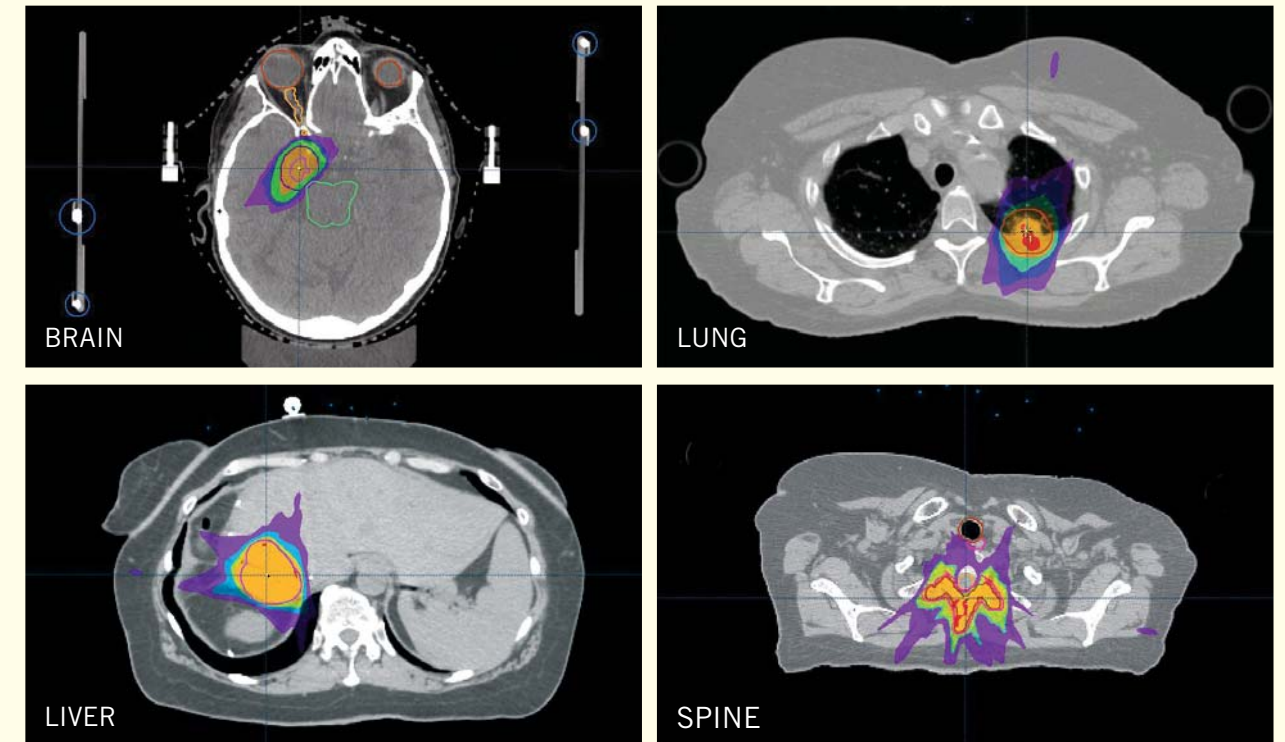
At Stony Brook, we use the following technologies to accomplish this:

- BodyFix® is a noninvasive immobilization device. The computerized system uses double-vacuum technology designed to limit your movement during radiation planning and treatments, including movement caused by normal breathing. It also limits movement of the tumor within the body.

- A GE CT (computed tomography) scanner acquires images of the region being treated.
- The BrainLab state-of-the-art treatment planning system ensures that the tumor is exposed to very high amounts of radiation, at the same time ensuring that the surrounding tissue and critical structures receive only a very minimal dose of radiation.
- The ExacTrac X-ray 6D system helps ensure accurate positioning and set-up, and monitors and corrects your positioning throughout your treatment sessions.
- A Varian advanced medical linear accelerator with a micro-multileaf collimator delivers the radiation according to the computer-generated treatment plan.

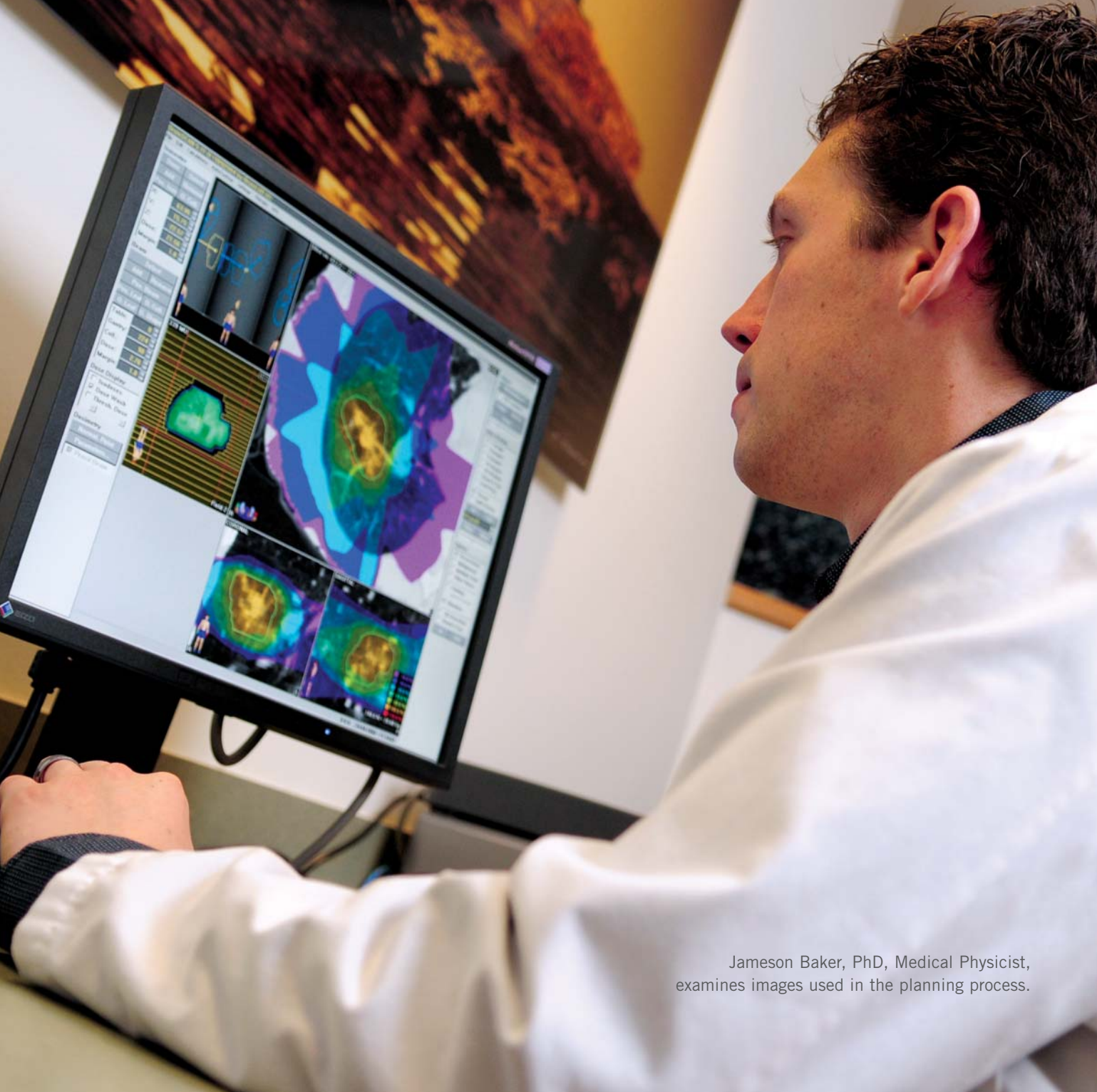


1: CT image of the lung shows the location of a tumor (right side). **2 and 3:** High-resolution images are used to plan targeted radiation treatment. Different views help specialists calculate precise and effective delivery. Image 2 is an axial view; Image 3 is a sagittal view. **4:** Six months after SBRT, a CT image shows that the tumor has been eradicated.



CT images above show tumors in the brain, lung, liver, and spine, and the treatment plans developed to target the tumors for stereotactic body radiation therapy.





Jameson Baker, PhD, Medical Physicist, examines images used in the planning process.

STEPS INVOLVED IN SBRT

Treatment Planning

Specialists at Stony Brook develop a detailed treatment plan for each patient. This individualized plan is necessary because exact positioning and limiting your movement during treatment is extremely important to the success of SBRT.

You will need a computed tomography (CT) scan, a noninvasive procedure combining x-ray and computer technology to produce cross-sectional images of your body. During the scan, an immobilization device is used to reduce your external body movement. The images obtained are used to help plan treatment. After the CT scan is complete, you can return home. Diagnostic images such as magnetic resonance imaging (MRI) and positron emission tomography (PET) scans can be fused with treatment planning CT scans to assist in delineating the tumor for radiation. Physicians and physicists then work together to develop your treatment plan.

The goal of treatment planning is to ensure that when radiation therapy is delivered, the tumor is exposed to a very high dose of radiation, while at the same time making certain that surrounding healthy tissue and structures receive minimal amounts of radiation. A computer program helps determine the amount of radiation exposure that is needed to deliver the desired dose to the tumor.

Image-Guided Treatment

After the treatment plan is complete (usually a few days after your CT scan), you will return to Stony Brook's Radiation Oncology Suite to begin stereotactic body radiation therapy. A machine called a linear accelerator delivers the actual radiation beam according to the treatment plan developed specifically for you. At the same time, the ExacTrac® system maintains your correct positioning throughout the treatment session to ensure accuracy of the radiation dose. For the best possible results, at each SBRT session you can expect the following:

- The automated and image-guided positioning system is used for your set-up, based on the form and the location of your tumor.
- High resolution x-rays pinpoint the internal site of your tumor and verify the location of the tumor across six dimensions.
- A remote control system corrects and confirms your set-up.
- Throughout each session, the automated system tracks any movement you make, and makes necessary adjustments so that the radiation is delivered safely and accurately.





Specially trained oncology nurses like Sharon Azzato help patients throughout their course of treatment with skill, expertise, and compassion.

WHO CAN BENEFIT?

Stereotactic body radiation therapy is an excellent alternate choice of treatment for patients with early stage non-small cell lung cancer that is medically inoperable, elderly patients who are at high risk for surgery, or those patients who refuse surgical treatment. It can deliver an optimal radiation dose to both new primary and metastatic cancer sites, and even to previously irradiated sites safely, while avoiding damage to critical structures such as the spinal cord.

SBRT is also a well-suited therapy for primary and metastatic liver tumors that are inoperable, pancreatic tumors, localized spinal tumors, and other selected tumors.

Your radiation oncologist will explain stereotactic body radiation therapy to you in person. To learn more, call Stony Brook's Department of Radiation Oncology at (631) 444-2200, or visit www.StonyBrookMedicalCenter.org/radiationoncology.

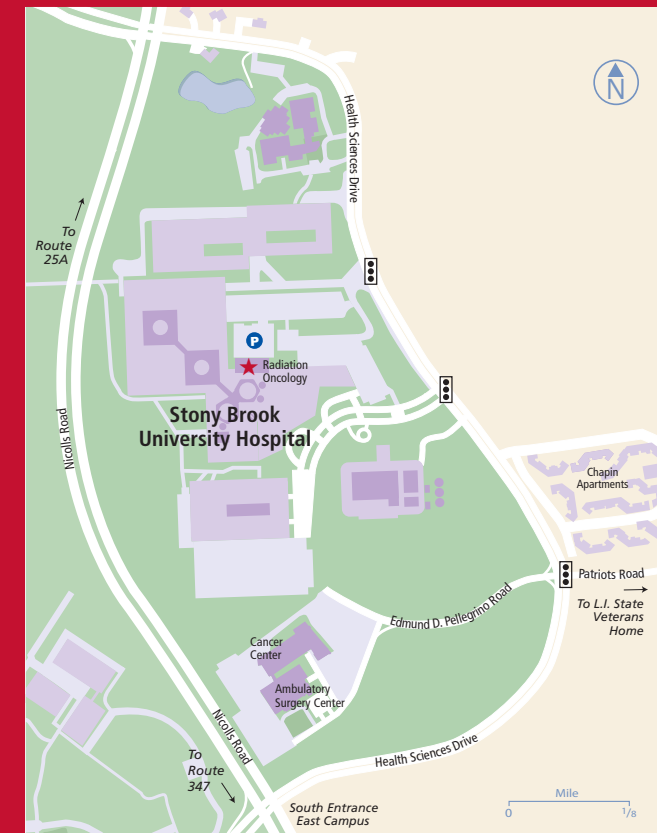
Directions to Stony Brook University Medical Center Radiation Oncology Entrance

From the Long Island Expressway (I-495)

- Take the Long Island Expressway to Exit 62 North, Nicolls Road (CR 97).
- Travel approximately 8 miles, crossing Route 347 (Nesconset Highway).
- At the third traffic light, turn right at the sign for "Stony Brook South Entrance, East Campus" (Health Sciences Drive).
- Continue to the third light, turn left and left again into the parking lot, following the signs for "Radiation Oncology." At the far end of the parking lot is the Patient Pickup/Radiation Oncology Hospital entrance and free valet parking.

From Technology Park

- Take Belle Mead Road, south to Route 347 (Nesconset Highway).
- At Route 347, turn right (west) and proceed to Nicolls Road (CR 97).
- At Nicolls Road turn right (north) and travel approximately two miles, following signs to the Hospital.
- Turn right at the sign for "Stony Brook South Entrance, East Campus" (Health Sciences Drive).
- Continue to the third light, turn left and left again into the parking lot, following the signs for "Radiation Oncology." At the far end of the parking lot is the Patient Pickup/Radiation Oncology Hospital entrance and free valet parking.



Stony Brook University Medical Center improves the lives of our patients, families, and communities, educates skilled healthcare professionals, and conducts research that expands clinical knowledge. Stony Brook serves as the region's only tertiary care center and Level 1 Trauma Center. It is home to the Stony Brook University Cancer Center, Heart Center, and the Center for Perinatal and Neonatal Intensive Care. To learn more about Stony Brook University Medical Center and its many services, physician referrals, or appointment scheduling, call (631) 444-4000, or visit www.StonyBrookMedicalCenter.org.





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