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Memorial Sloan Kettering
Cancer Center

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"What do medical physicists do?" Simply put, we provide expertise in physics and engineering that is vital to quality cancer care through the impact it has on radiation oncology, imaging, and biomedical engineering.



Physicist Joseph O. Deasy

Precision in Radiation Treatment

Under the umbrella of radiation oncology physics, our medical physicists ensure that the radiation dose a physician prescribes for a patient's cancer treatment is accurately and safely targeted to cancer tissue and spares nearby normal tissue. Doing this correctly is a complex procedure that involves multiple steps. We design, test, and routinely use complex calculations to create a complete picture of where the radiation dose will be delivered inside the patient.

We also use specialized images from computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET) scans to generate precise and individualized treatment approaches for each patient.

This carefully controlled use of radiation to target cancerous tissue has contributed to improved treatments for cancer patients everywhere. My colleagues at MSK and I are always working toward making radiation treatment ever more precise. In addition to this, we have the crucial goals of protecting healthy tissue during radiation treatment and using the lowest radiation dose possible. To ensure accurate delivery, we take images during the course of radiation treatment.

Safety and Calibration

Our department's radiation safety group oversees its use by MSK clinicians and researchers. Physicists and biomedical engineers ensure that the amount of radiation produced by our equipment is accurate, as well as calibrate and maintain the more than 18,000 pieces of medical equipment used throughout MSK's numerous locations to ensure that they are in excellent working condition.

Imaging is another key part of cancer care in which our expertise and development work is important. Our medical physicists frequently test and calibrate imaging equipment. We develop and use imaging protocols that meet or exceed the national recommendations for radiation dose limits.

Medical physicists also help maintain a massive digital image archive that enables doctors to efficiently retrieve any patient image taken at MSK. More than three million images are added to this repository every week.

The Future

Looking ahead, our physicists and engineers are advancing the science and technology of radiotherapy and imaging. Among other endeavors:

Our engineers are developing new medical devices to make patient care safer and more effective.

Our physicists are leaders in the development and improvement of radiotherapy technologies, which include intensity-modulated radiation therapy (IMRT), an approach that relies on daily imaging during radiation treatment to ensure accurate delivery.

We are also leading the way in an advanced form of cancer treatment called brachytherapy, in which radioactive seeds or sources are placed in or near the tumor itself to expose the tumor to a high dose of radiation while reducing exposure to surrounding healthy tissues.

The Department of Medical Physics is also proud to train the next generation of medical physicists through our accredited residency training program.

In these and other ways, the outstanding physicists, engineers, and staff in our department play an integral role in MSK's commitment to providing the best cancer care anywhere.

- [Joseph Deasy](#), Chair, Department of Medical Physics

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