The Laurent and Alberta Gerschel Positron Emission Tomography Center occupies approximately 1,225 square feet and includes two patient preparation rooms, a warm laboratory, the scanner room, a control room, and the electronics room. The service operates a total of eight PET/CT GE scanners, including three GE D690 time of flight systems, which consist of a 64-slice state-of-the-art CT and the dedicated full ring LYSO crystal PET. The scanner can operate in time of flight, with approximately 500 psec timing window, and 4.5 mm FWHM resolution at 1 cm off center. The sensitivity of the unit is 7.35 cps/kBq, and it operates in 3-D mode. The unit has a prompt correction module, and it is equipped with point spread function correction. Installation of an MR/PET system based on a 3T MRI with a time-of-flight capable PET insert is planned for Q2 2015.

The imaging equipment is connected to the hospital-wide General Electric (GE) Picture Archiving and Communication System (PACS). The Department of Radiology's GE PACS system accepts 1.8 million images a week and has kept all images submitted since 1997 continuously online and available for instantaneous recall and analysis. Redundancy and replication of clinical and imaging-system data ensures an environment whereby data is secure. There are multiple GE PACS viewing stations located within the nuclear medicine service. In addition, there are a number of software packages (IDL, MedX,

MatLab, Pmod) for novel image processing, analysis, and dosimetry.

Nuclear Medicine Physics

The Nuclear Medicine Physics Section of the Department of Medical Physics, which consists of six full-time faculty physicists and three medical physics postdoctoral fellows, is closely integrated within the Molecular Imaging and Therapy Service. Physicists and physicians work as a unified team to provide a comprehensive clinical and research backbone for all nuclear medicine–related projects within MSK, including all trials involving radionuclides and gamma camera and PET or PET-CT imaging.

The team performs quality-assurance testing of the PET scanners on a daily basis and collaborates on PET research projects, providing technical and analytical expertise to ensure the acquisition of quality PET data for analyses. PET scans are routinely corrected for attenuation and scatter and adjusted for system sensitivity and provide quantitative images of the tracer concentration within the imaging field of view.

Evelyn H. Lauder Breast and Imaging Center

The acquisition of the positron emission mammography (PEM) studies will be carried out in the Department of Radiology at Memorial Sloan Kettering's Evelyn H. Lauder Breast and Imaging Center. This center is a 16-story state-of-the-art facility that provides pioneering, comprehensive preventive, diagnostic, treatment, and support services for breast cancer patients. The imaging center is equipped with Siemens Acuson Sequoia units, ten mammography rooms, a bone densitometry unit, and GE Medical CT, PET, and MRI scanners. All scanners have state-of-the-art software and hardware updates. Each scanner has its own dedicated computer. Workstations are available to review all studies both in the Department and in the Imaging Laboratory.

A second GE Diamond DNP Polarizer will be installed for clinical use. We propose to make the Diamond Polarizer the nucleus of innovation in a unique new facility equipped with the most cutting-edge clinical molecular imaging capabilities, including integrated whole-body MR-PET and multinuclear-capable MR scanners. This will, for the first time, allow combined HP-MRSI/MRI/PET imaging in human patients, enabling these methods to complement and cross-validate each other synergistically.

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