Studies I read:
"How to reconstruct dynamic cardiac PET data" Journal of Nuclear Cardiology

Resolution modeling enhances PET imaging

PET Scan: Positron emission tomography is a imaging test that is used to look for disease in the body. The patient swallows, inhales, or is injected with radioactive tracers. Your organs then absorb the tracers. The PET scan detects these tracers to see how well your organs and tissues are working.

- Tracers collect in areas of high chemical activity. This is helpful because some diseases will cause some areas to have high levels of chemical activity. These areas show up as bright spots on a PET Scan
- PET scan can also measure blood flow, oxygen use, how your body uses sugar and much more.

CT Scan: a computerized tomography scan combines X-ray images from different angles around your body to create cross-sectional images of your bones, blood vessels and soft tissues inside your body.

- Uses
    - Diagnose muscle and bone disorders, such as tumors and fractures
    - Guide procedures such as surgery, biopsy and radiation therapy
    - Detect and monitor diseases such as cancer, heart disease, lung nodules and liver masses
    - Monitor the effectiveness of certain treatments, such as cancer treatment
    - Detect internal injuries and internal bleeding
- **Contrast Material:** A special die used in some CT scans to help highlight areas of your body being examined. The contrast material blocks X-rays and appears white on images.
    - Delivery
        - By mouth for throat and stomach examination
        - Injection in vein for gallbladder, urinary tract, liver, band blood vessels
        - By enema, -> through rectum to visualize intestines

Myocardial: Heart Tissue/muscle

Oncology: The study/treatment of tumors

Hyperemia: Increase in blood flow

Lesion: region in an organ or tissue that has suffered damage through injury or disease

OSEM: Ordered subset expectation maximization.

- The newer algorithm a favored in **PET** scans and in **Oncology**

- Fast convergence for areas of high count lesions with low count backgrounds
- Slower convergence in low-count regions
    - Less optimal for **Cold Feature Imaging**

FBP: filtered back projection

Founder of **MIDI lab**: Medical imaging and data integration

Cold Feature Imaging: Images of areas of low-count lesions

- used for defect zones along myocardium

Hot Feature Imaging: Images of areas of high count lesions

- used for input function estimation especially

Time of Flight (TOF): A method for measuring the distance between a sensor and an object based on the time difference between the signal emission and its return to the sensor after reflecting off the object

Magnetic Resonance Imaging (MRI): Radio frequency pulses realign hydrogen atoms that naturally exist in the body. MRI's cause no chemical changes in the tissues. As hydrogen atoms return to their normal alignments, they emit different amounts of energy depending on the type of body tissue they are in. The MRI scanner captures the energy and uses it to produce an image. The magnetic field is produced by an electric current running through wire coils that send and receive radio waves. The computer processes the signals to produce a series of images. Each image shows a slice of the body. atomsA powerful magnetic field is along radio frequency pulses are generated to produce detailed images of organs, soft tissues, bone, and virtually all other internal structures.

- Used after breast cancer has been diagnosed to gather more information such as:
    - Size of the tumor
    - Whether it involves underlying muscle
    - Size of lymph nodes under armpit to see if the cancer has spread there
- Also used to evaluate this information during and after cancer treatment
- Imaging lasts between 30 and 60 minutes.