

## 9/4 Research Methods

- Clinical enterprise (patients with brain damage)
  - Mostly strokes: damage diffuse (not well defined)/aging
  - Wars-brain injuries: well defined areas of lesion.
- Animal lesion studies (100% controlled)
- Epilepsy: H.M, hippocampus responsible for new memory formation.
- Post mortem autopsies
- Case studies vs group studies: shared difference
- Brain imaging techniques
  - Structural Imaging
    1. CAT (computerized axial tomography)
      - x-rays (absorbed different rates depending on density, high energy atomic particles)
      - Lesion location (cerebral spinal fluid)
      - Resolution: Spatial (fine grained) 5-10mm, Temporal (time)
      - CAT, decreased temporal resolution
    2. MRI: strong magnetic field (earth magnetic field has fluctuations)
      - Better resolution (2-5mm, 3-4 secs)
    3. SQUID
      - EEG (low resolution measuring, summed action of all neurons)
      - measures magnetic field
      - Teslas (measurements)
      - Resolution: 1mm, 1 thousandth milli sec.
  - Functional imaging: measures metabolic activity
    1. PET (positron emission tomography) radioactive decay
      - radioactive glucose/oxygen in body

- 5mm, 45 sec

## 2. fMRI

- hemoglobin molecule line up in magnetic field, density of hemoglobin (more=more neural activity)

- 2-3mm, 1 sec

- areas: (output, input, association of a task)

- threshold (high threshold) how many regions light up? Correct threshold.