



# **SNS COLLEGE OF TECHNOLOGY**

## **(AN AUTONOMOUS INSTITUTION)**

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## **Department of Biomedical Engineering**

Vision Tit 2

Vision Title 3

**Course Name: 19BMB203 Medical Instrumentation**

**II Year : IV Semester**

**Unit III – Neurological Equipment**

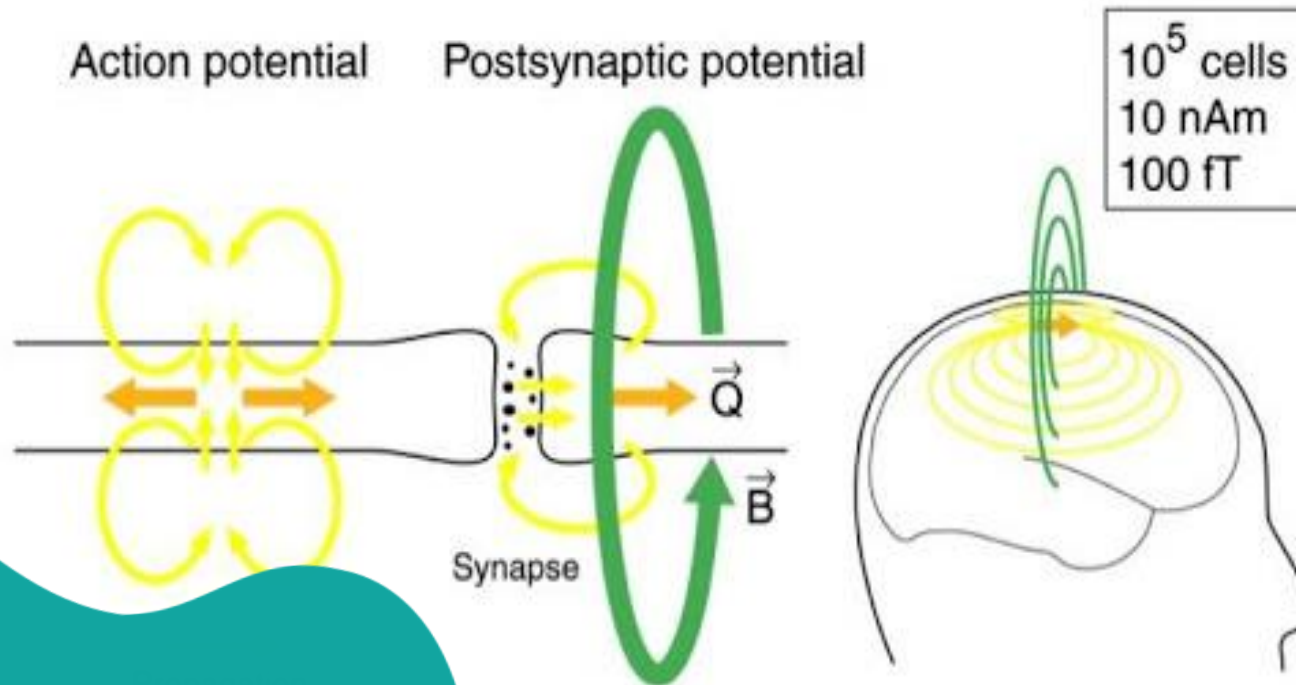
**Topic : Magnetic Encephalography**

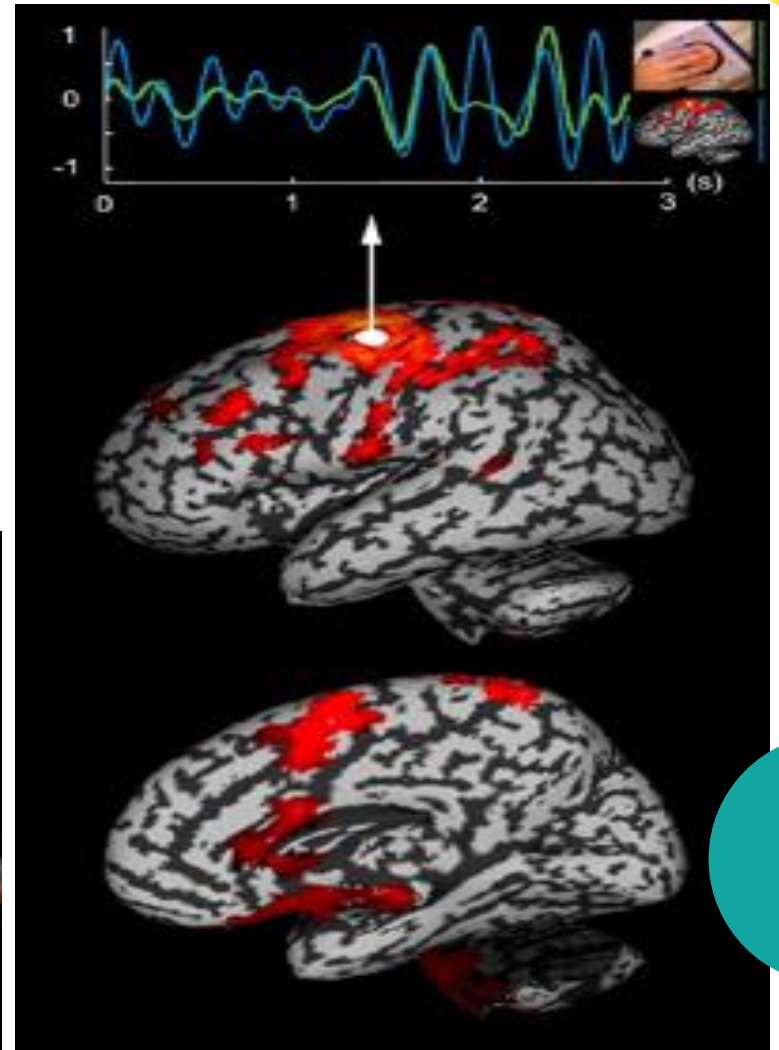
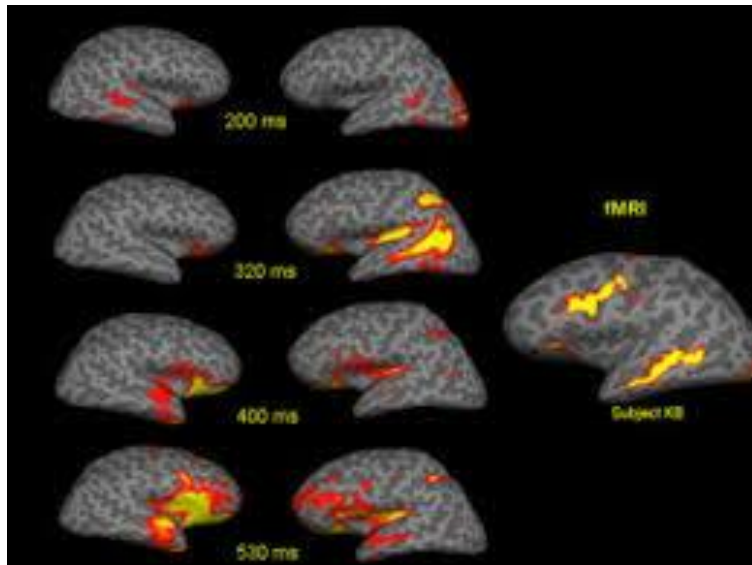
19BMB203/Medical Instrumentation/Unit 3 /Mrs.J.Jareena /AP/BME



# Magneto Encephalography

- MEG  $\rightarrow$  functional neuroimaging technique for mapping brain activity by recording magnetic fields produced by electrical currents occurring naturally in the brain using very sensitive magnetometers.
- Records the magnetic flux arises from source current
- Current is always associated with magnetic field







# Recording of Magnetic flux

- Recorded by special sensors called magnetometers
- Magnetometer is a loop of wires placed parallel to the head surface
- The strength of magnetic flux at a certain point determines the strength of current produced in magnetometer
- Current produced in magnetometers are extremely weak and must be amplified
- **Super conductive quantum interference device (SQUIDS)**
- It is filled with liquid helium to keep them at externally low temperature
- Different types of sensors
  - Magnetometer – magnetic flux through single coil
  - Gradiometers – difference in Magnetic flux between 2 points



# MEG Uses

- Epilepsy
- Seizure location
- Lesion
- Tumor



# EEG Biofeedback Instrumentation

- In general, Feedback is used to control a process is applied to biological process with in the body → “ **Biofeedback**”
- Biofeedback instrumentation includes a transducer and amplifier to measure the body variable that is to be controlled by biofeedback process.
- Magnitude of the measured variable is converted to suitable **visual, auditory output** is presented to the subject
- Success of biofeedback depends on interpretation of data & training of the subjects so that they can use results effectively.



- Patient bodily functions/activity like heart rate, EEG, Muscle activity is measured by a transducer which then amplified and compared
- This error signal is converted to visual & auditory signal, by seeing or hearing the signal a patient can control his/her signal ( physiological activity)

