

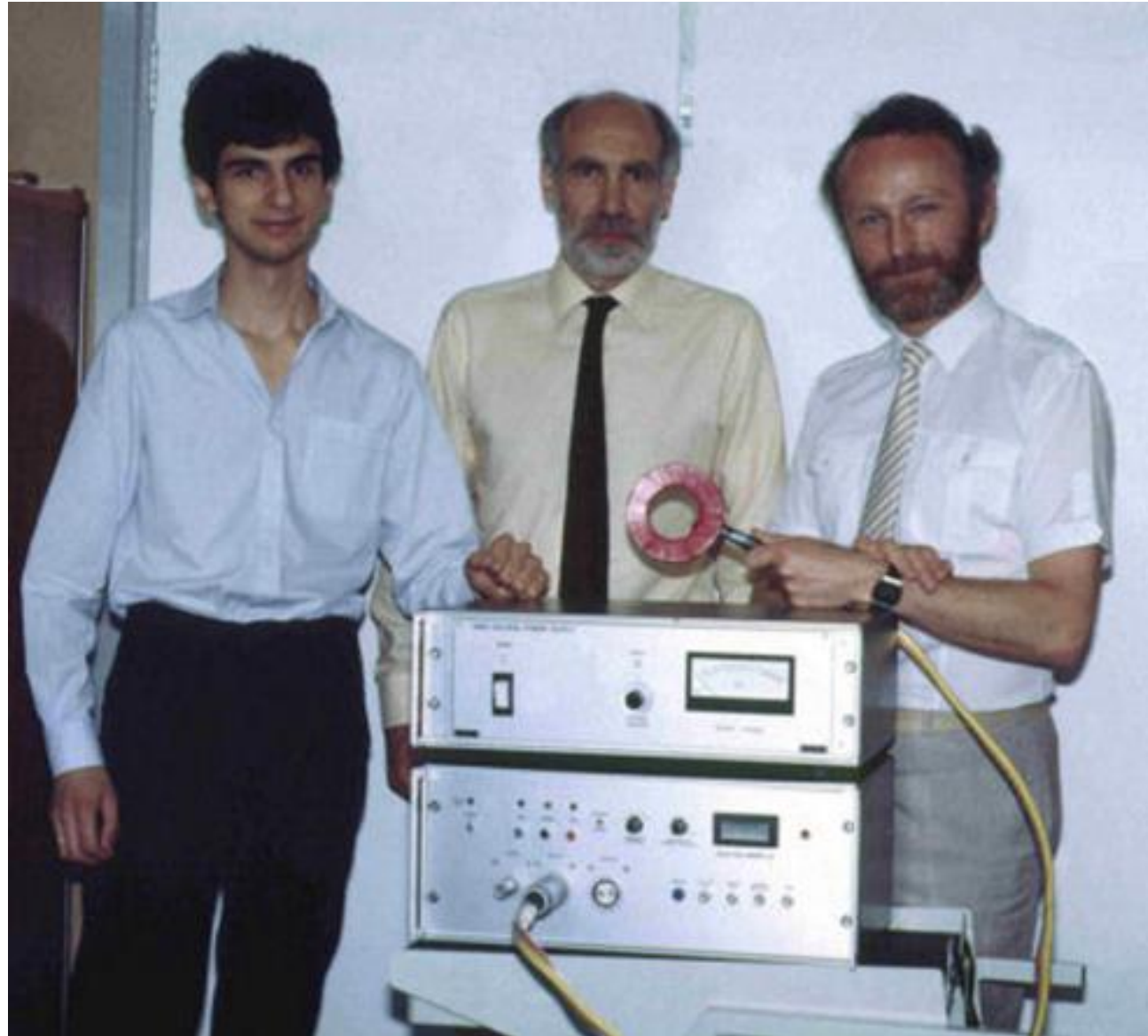


NATHANIEL ZEDOMI

DR. MARK YULY

HOUGHTON  
COLLEGE

# TRANSCRANIAL MAGNETIC STIMULATION

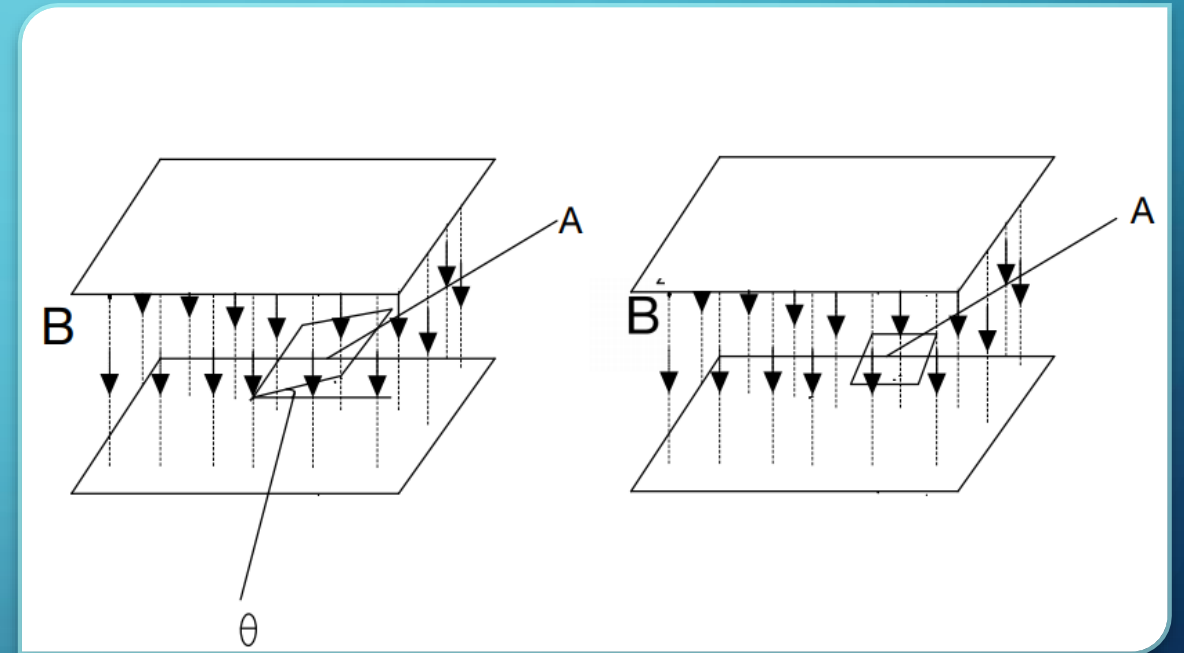


D. Kent, NuMe TMS (2017).

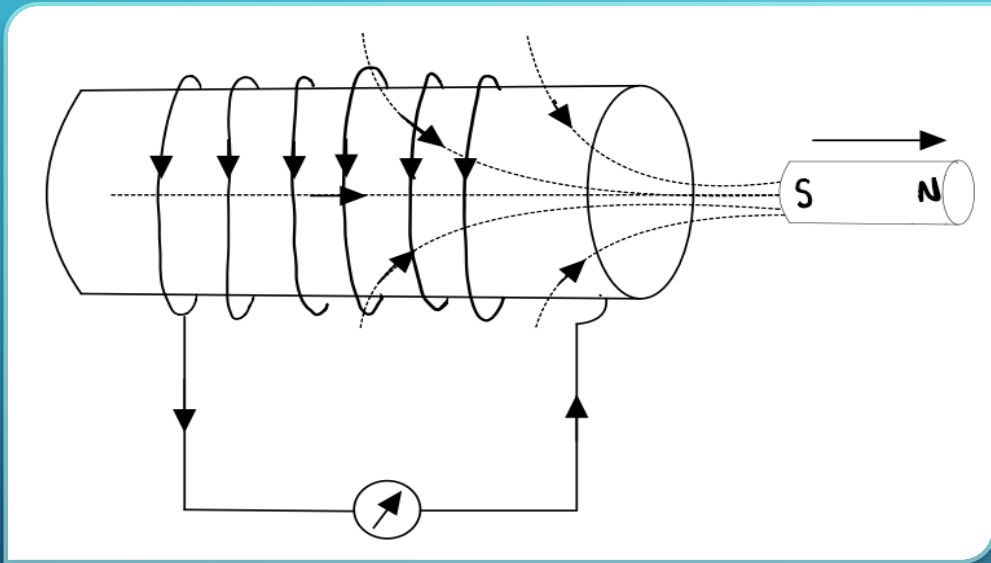
# MAGNETIC FLUX

$$\Phi = BA\cos\theta$$

- $\Phi$ -magnetic flux
- $B$ -magnetic field
- $A$ -Area permeated by magnetic field
- $\theta$ -Angle between the normal to the surface and the magnetic field lines



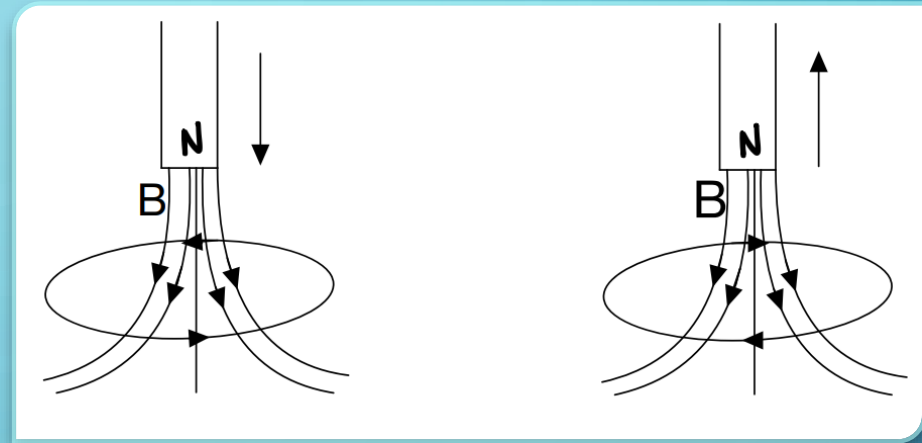
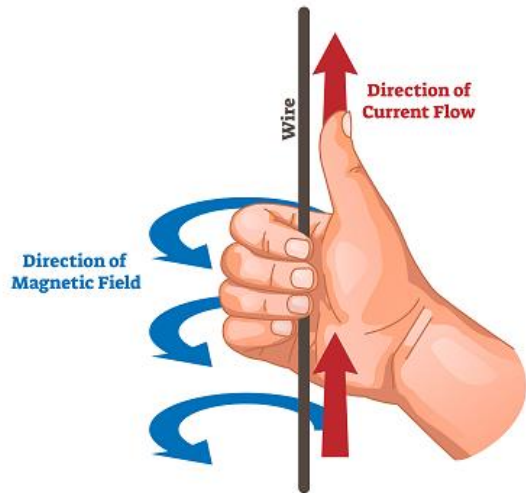
# FARADAYS LAW OF ELECTROMAGNETIC INDUCTION



$$\varepsilon = -N \frac{\Delta\Phi}{\Delta t}$$

- $\varepsilon$ -Induced EMF
- $N$ -Number of loops
- $\Delta\Phi$ -Change in magnetic flux
- $\Delta t$ -Change in time

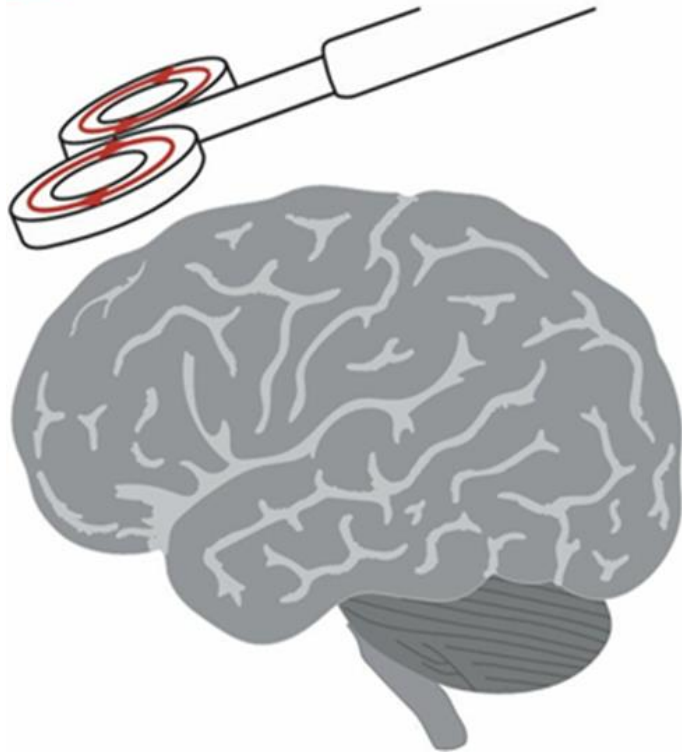
## CURL RIGHT HAND RULE



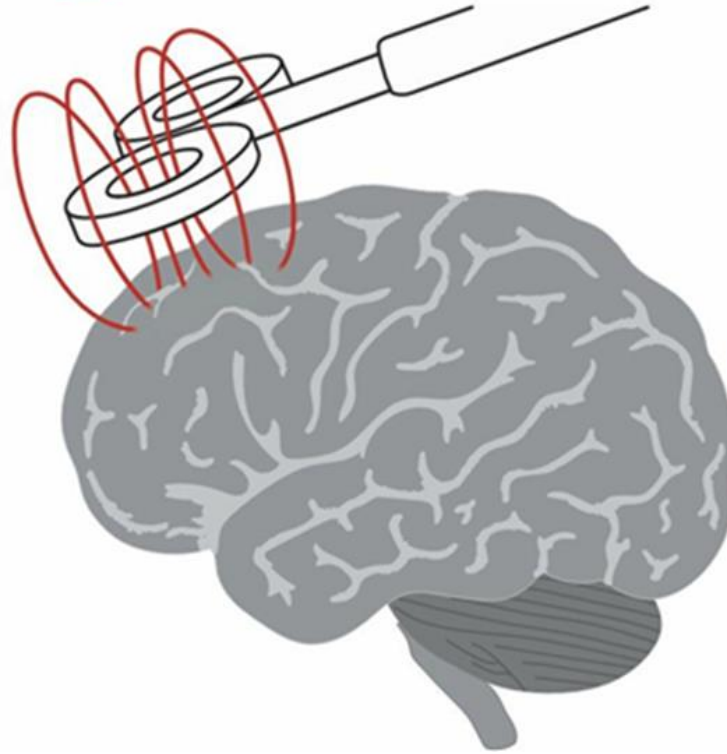
“Right Hand Rule.” PASCO Scientific,  
[www.pasco.com/products/guides/right-hand-rule](http://www.pasco.com/products/guides/right-hand-rule).

# LENZ LAW & THE RIGHT-HAND RULE

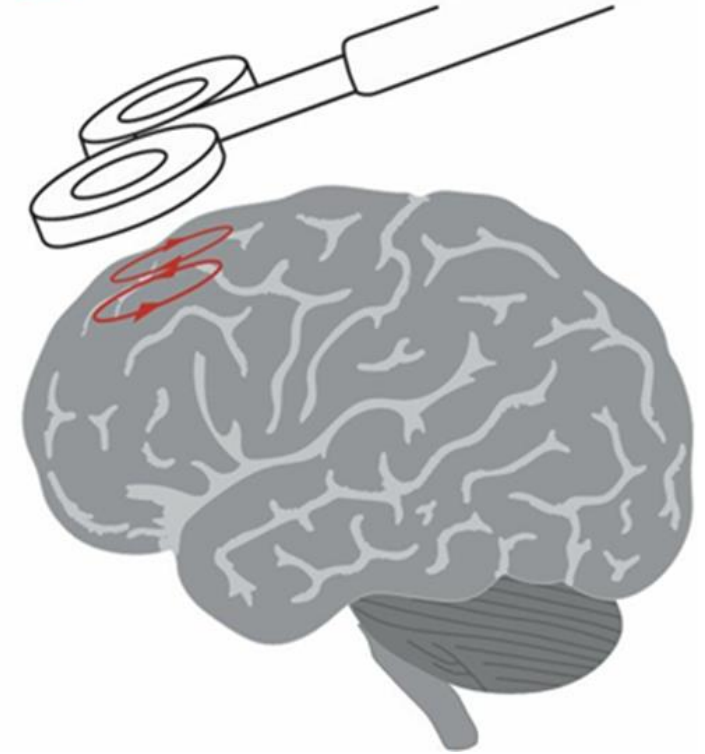
**a** Pulsed current in coil



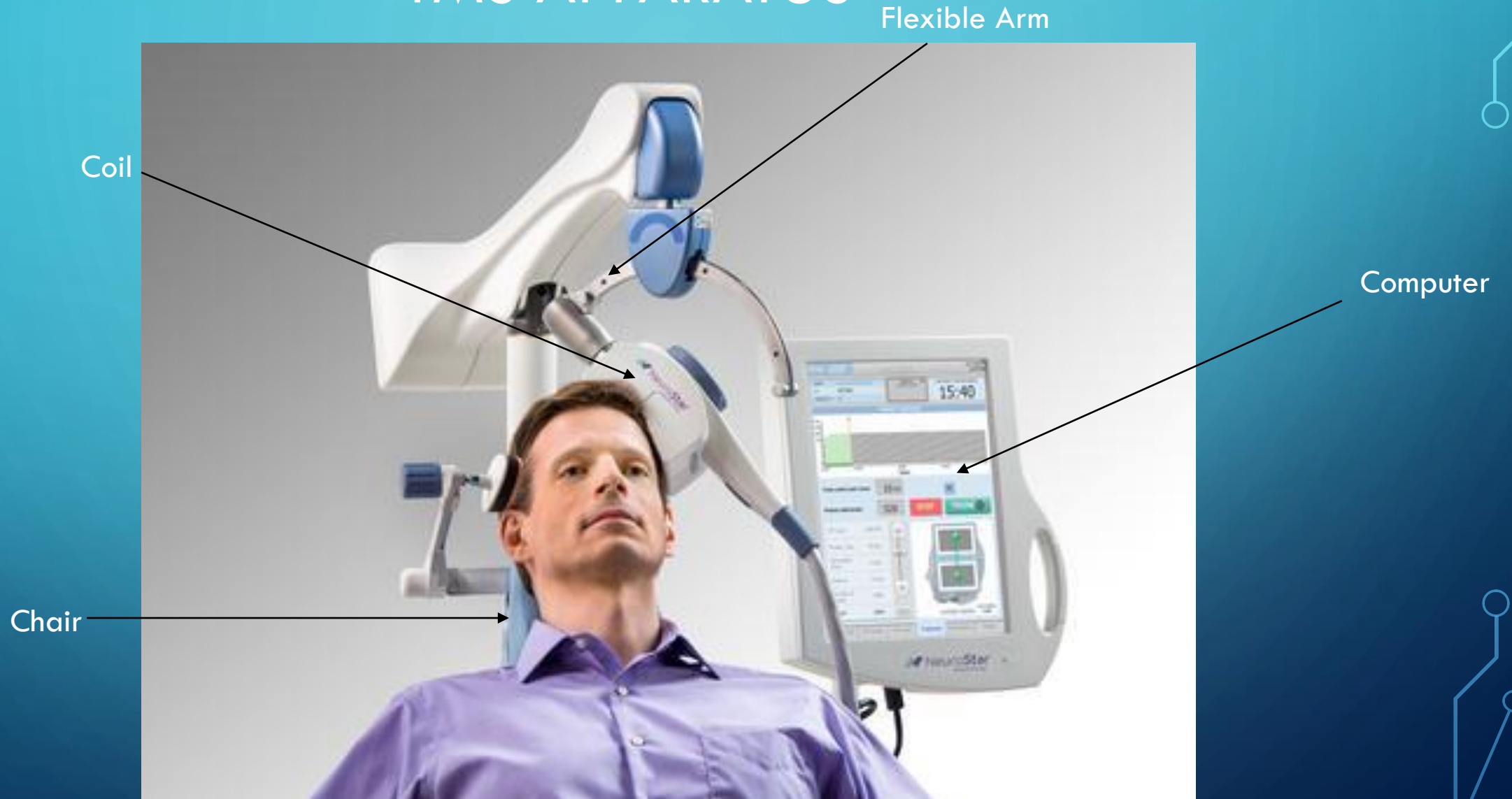
**b** Pulsed magnetic field



**c** Induced current in brain



# TMS APPARATUS



Y. Wang, Principium Psychiatry (2020).

# MAGNETIC PULSE WAVEFORM & MAGNETIC INDUCTION PHASE SHIFT

- A waveform is a representation of signal recording of an electromagnetic field over a given period.
- Magnetic pulse waveform measures both frequency, intensity and pattern of stimulation. It is one of the clearest indicators of the functionality of a TMS machine.
- Magnetic Induction Phase Shift (MIPS) is the method used to measure magnetic pulse waveform.



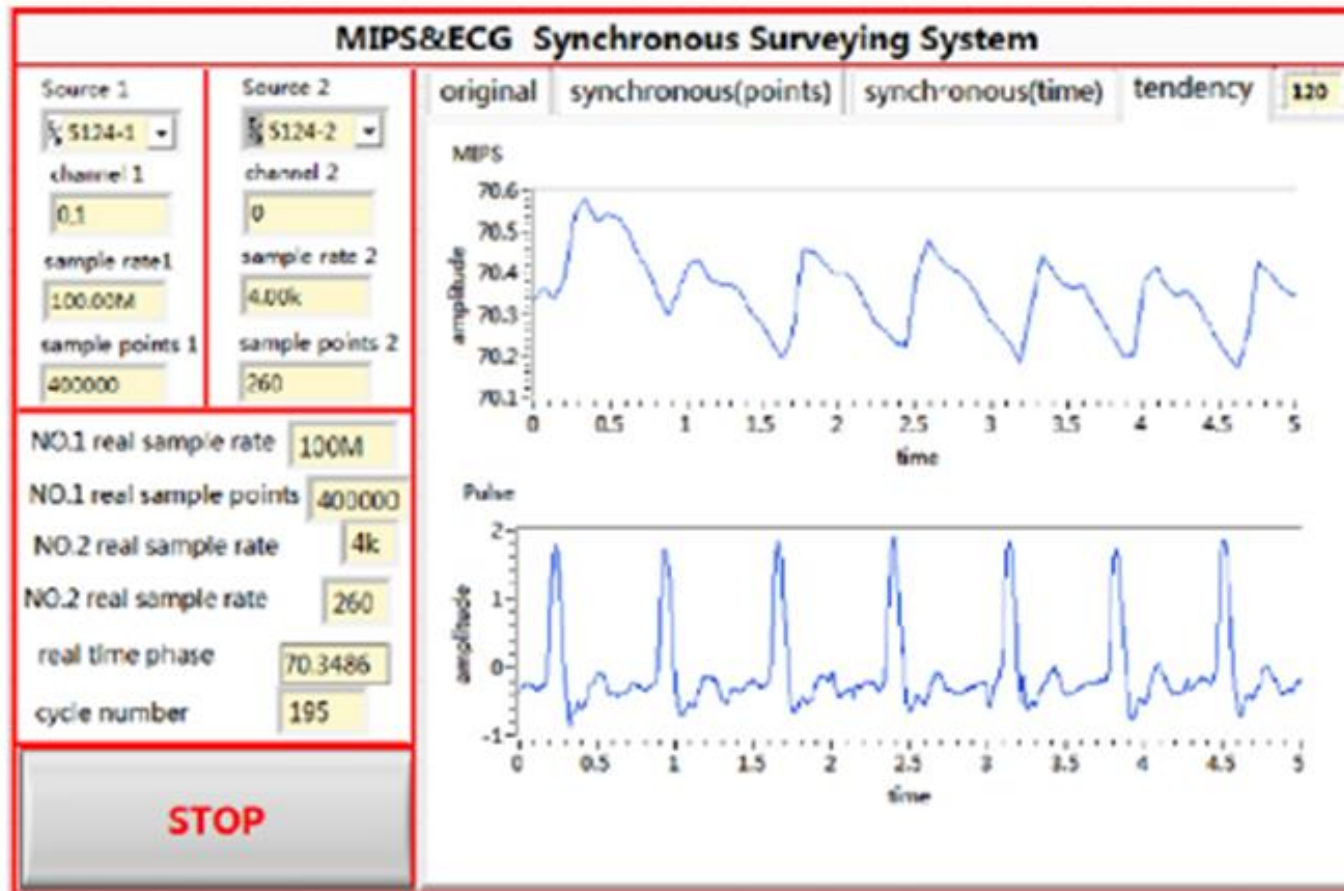


Fig. 4. Front panel of the synchronous measurement system.

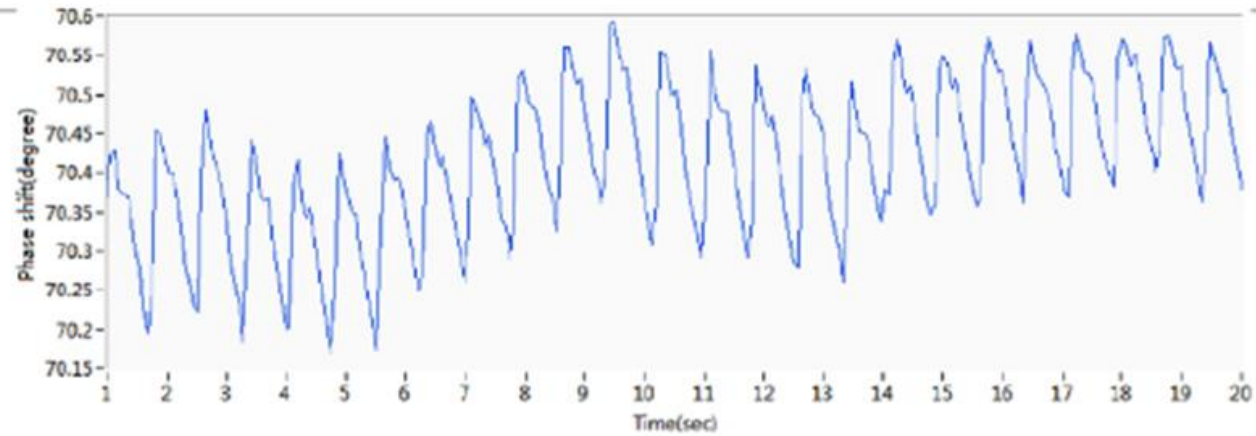


Fig. 7. Original phase shift curve for subject 5.

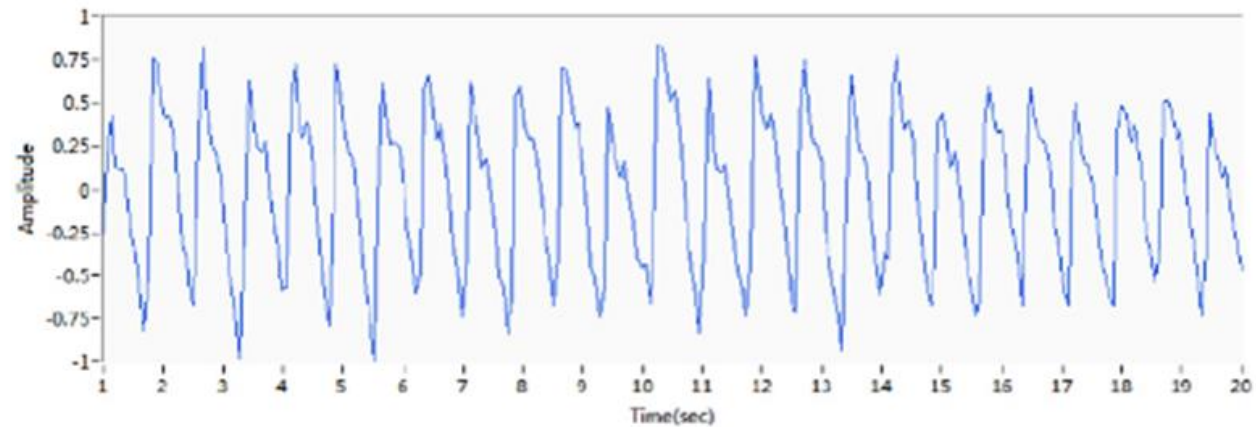


Fig. 8. Change in phase shift after removal of the baseline drift.



# CONCLUSION & FUTURE RECOMMENDATIONS

---