

# **BRAINS, MINDS, AND THE SURGICAL PLANNING LABORATORY**

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FOUNDING CHAIR, DEPT OF NEUROSURGERY, BWH**

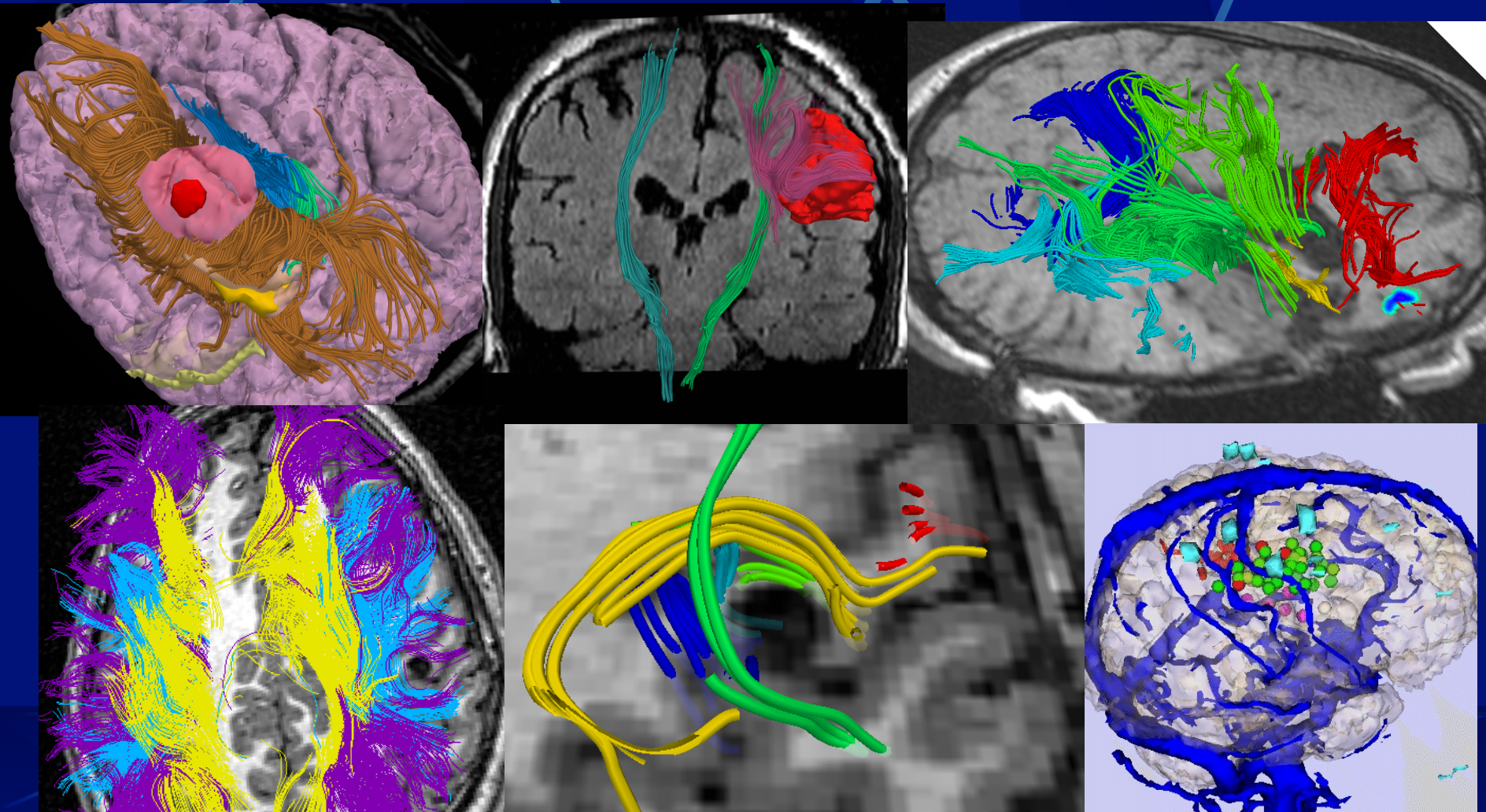
# THANK YOU TO FERENC, RON, CLARE. AND ALL SPL ALUMNI



# THE SPL AS A GENERATOR OF

- INTERDISCIPLINARY AND  
MULTINATIONAL  
COLLABORATIONS
- VISIONARY LEADERS
- REVOLUTIONARY  
TECHNOLOGIES

# IMAGING TUMORS AND TRACTS

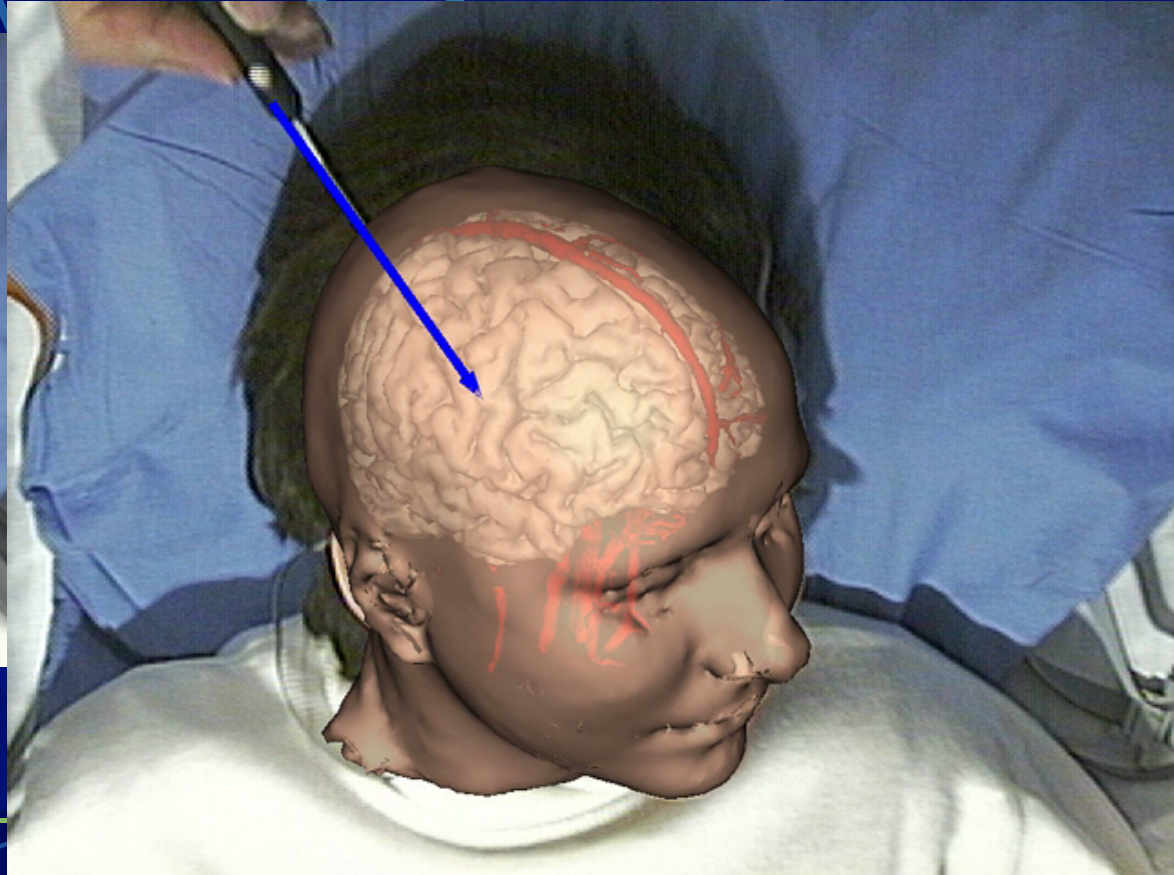


# VTI NAVIGATION 1993



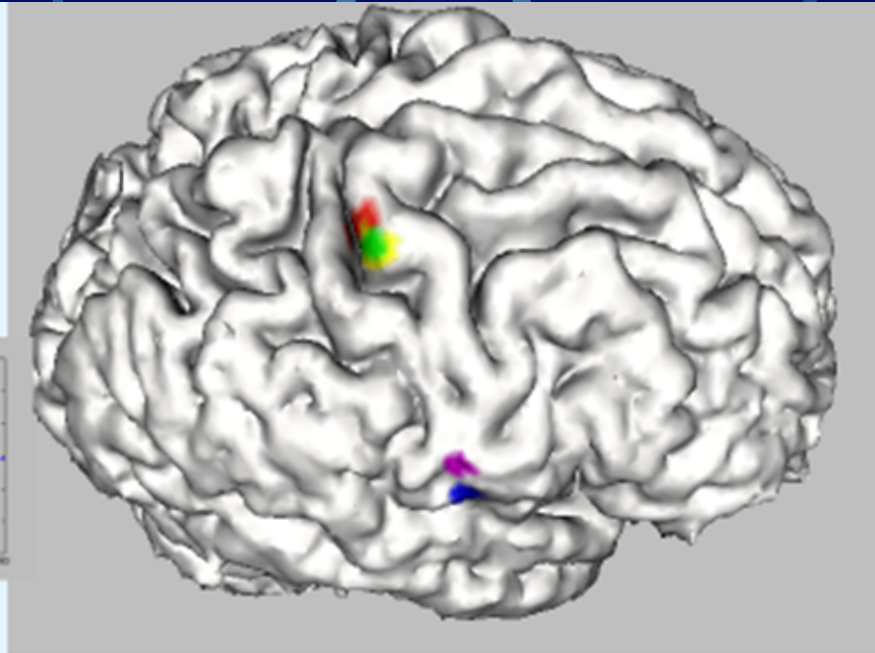
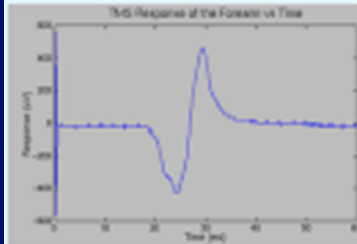
INDUSTRY, RADIOLOGY  
ENGINEERING, SURGERY

# VIRTUAL REALITY 1997



STUDENTS,  
MEDIA LAB  
RADIOLOGY,  
ENGINEERING,

# TRANSCUTANEOUS MAGNETIC STIMULATION 1998



Provided by Leventon et al.

# GE SIGNA—WORLD'S FIRST INTRAOPERATIVE MRI 1994-2006





# COLLABORATIONS-MRT-2003



TECH

ENGINEER

INDUSTRY

TECH

SURGEON

AIDE

TECH

SURGEON

NURSE

AIDE

RADIOLOGIST

NURSE

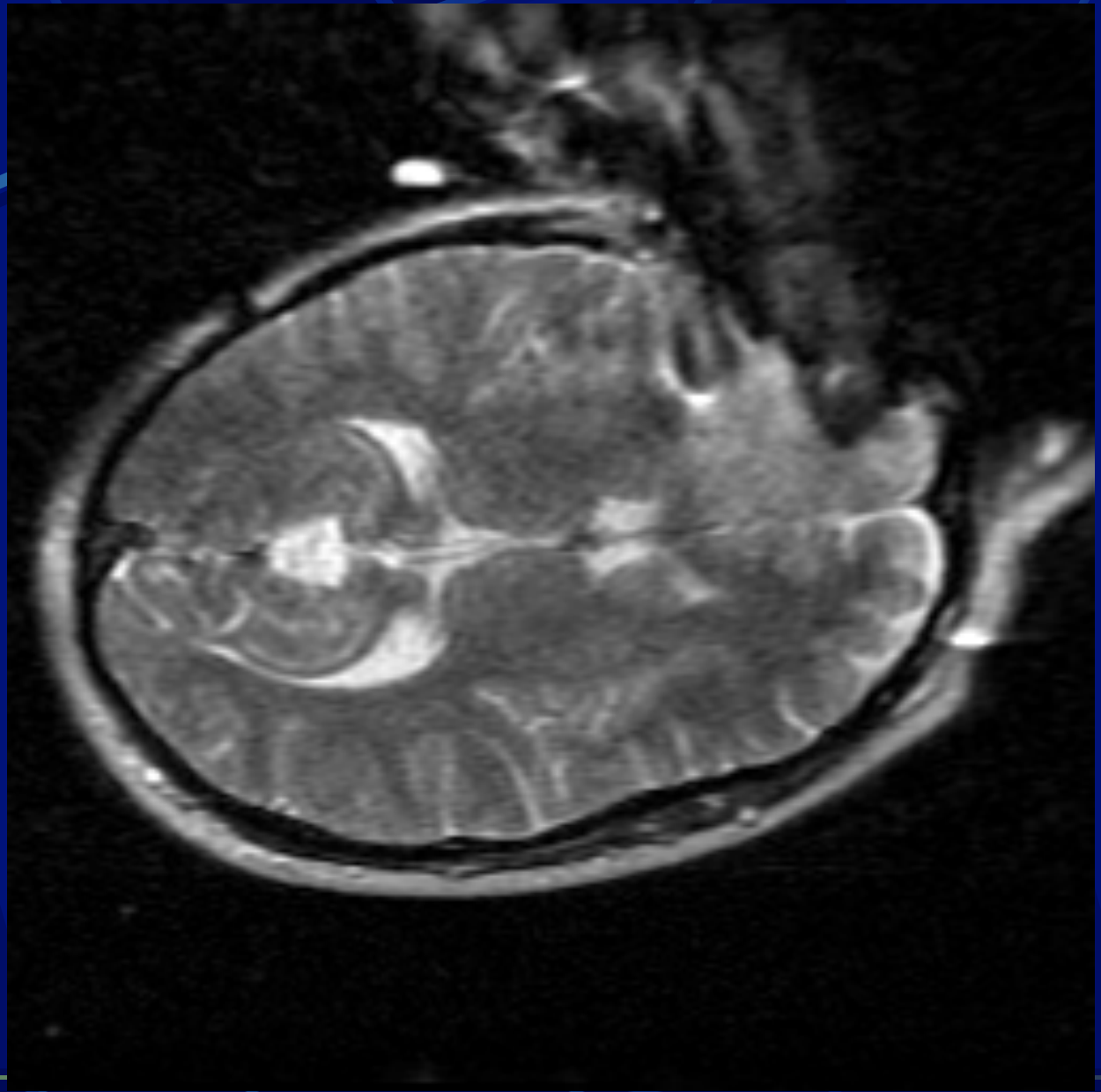
SURGEON

ADMIN

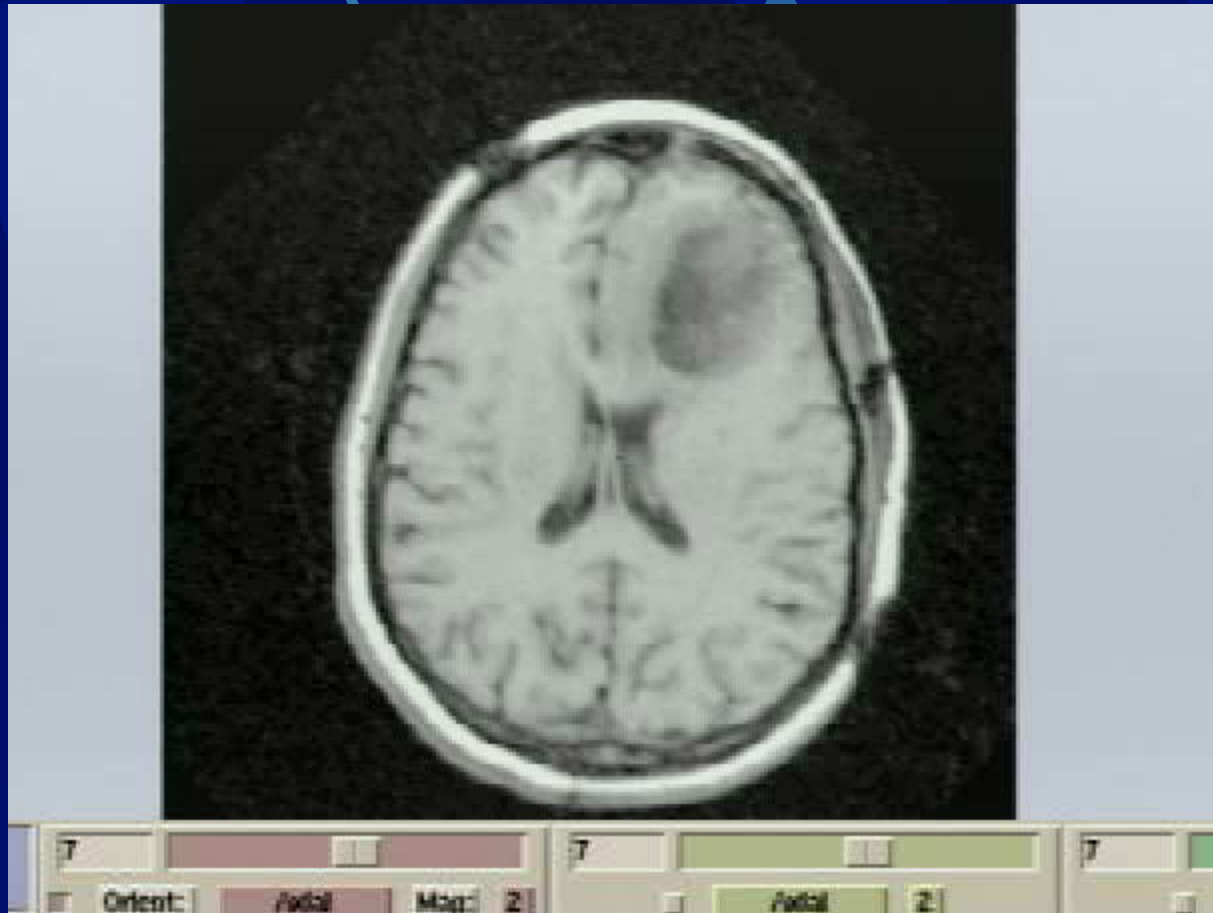
RADIOLOGIST

RADIOLOGIST/

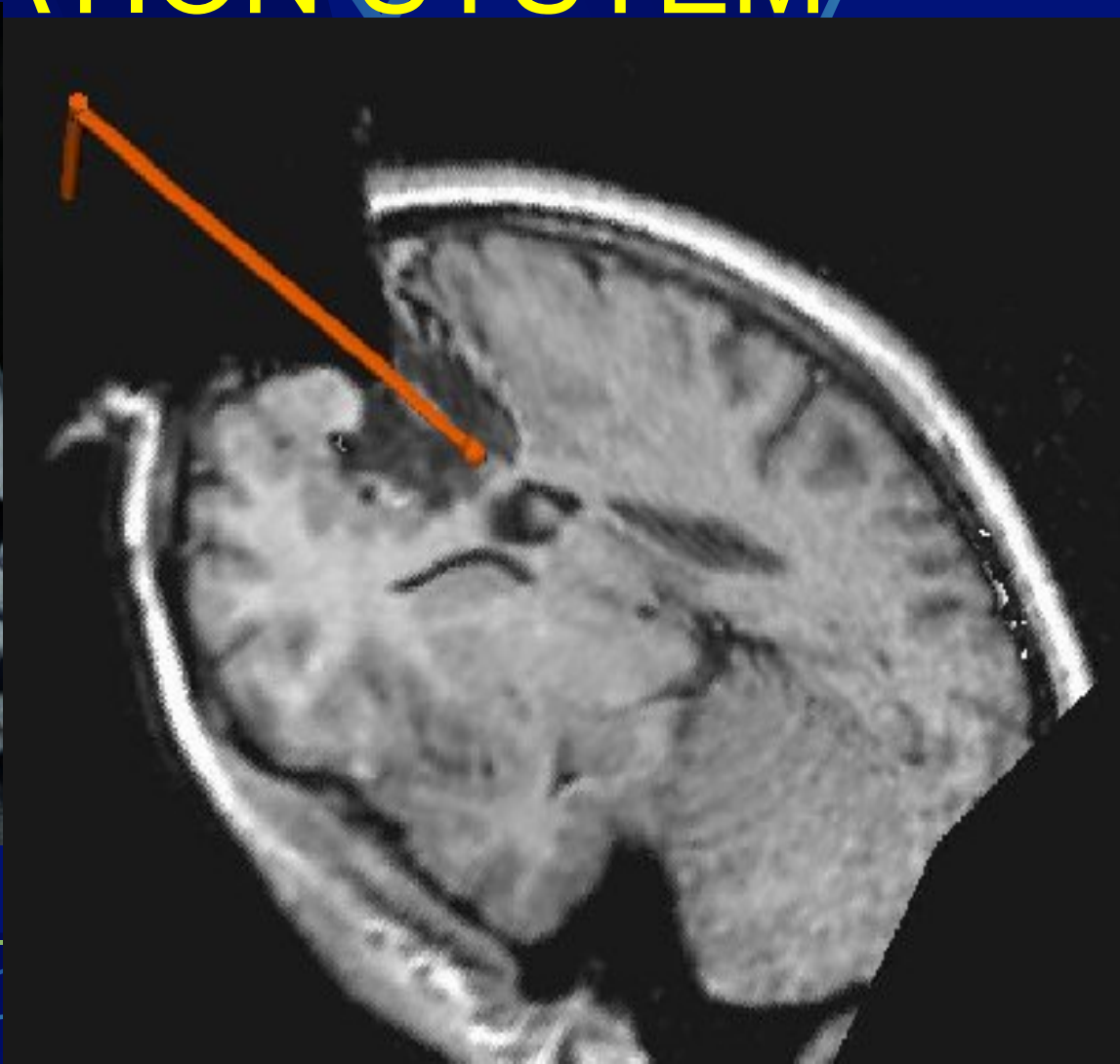
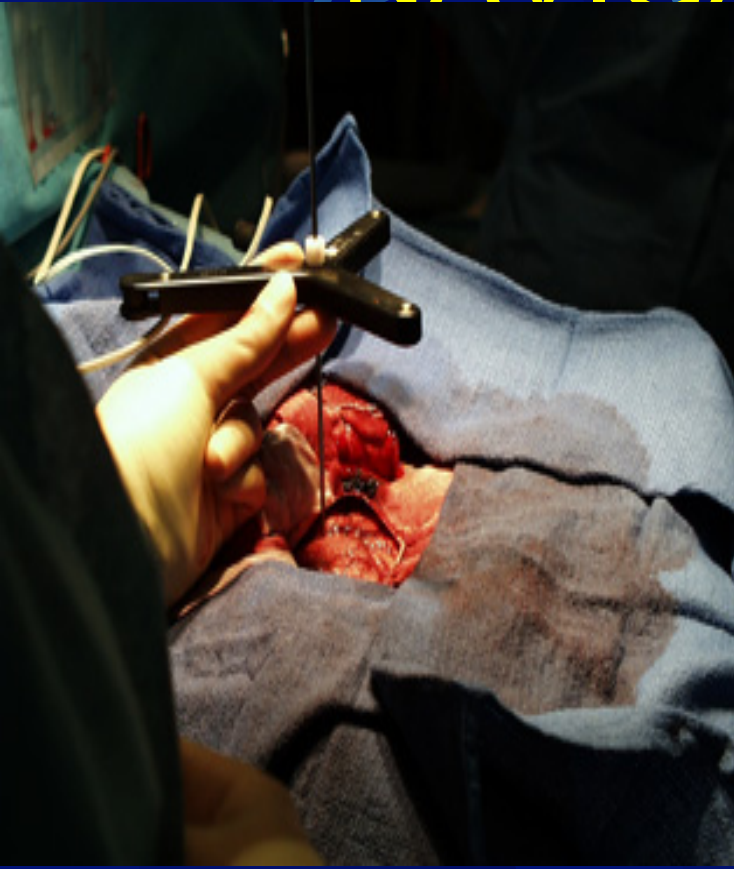
SURGEON



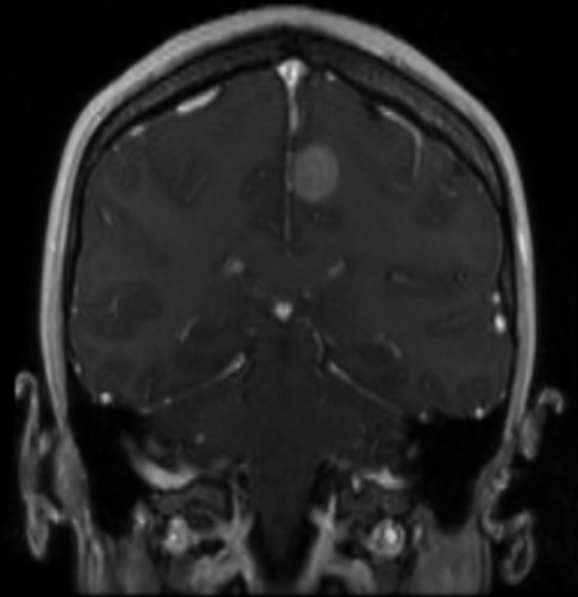
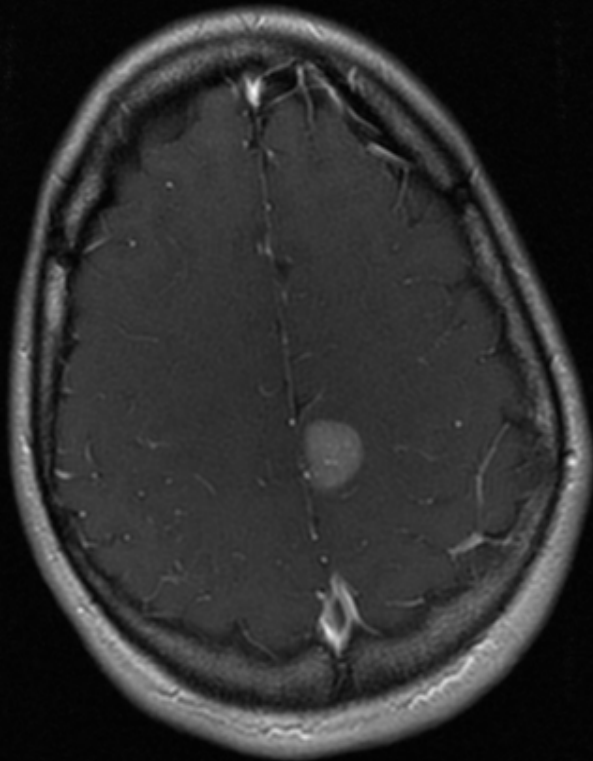
# BRAIN SHIFT



# 1995--THE "SLICER" NAVIGATION SYSTEM



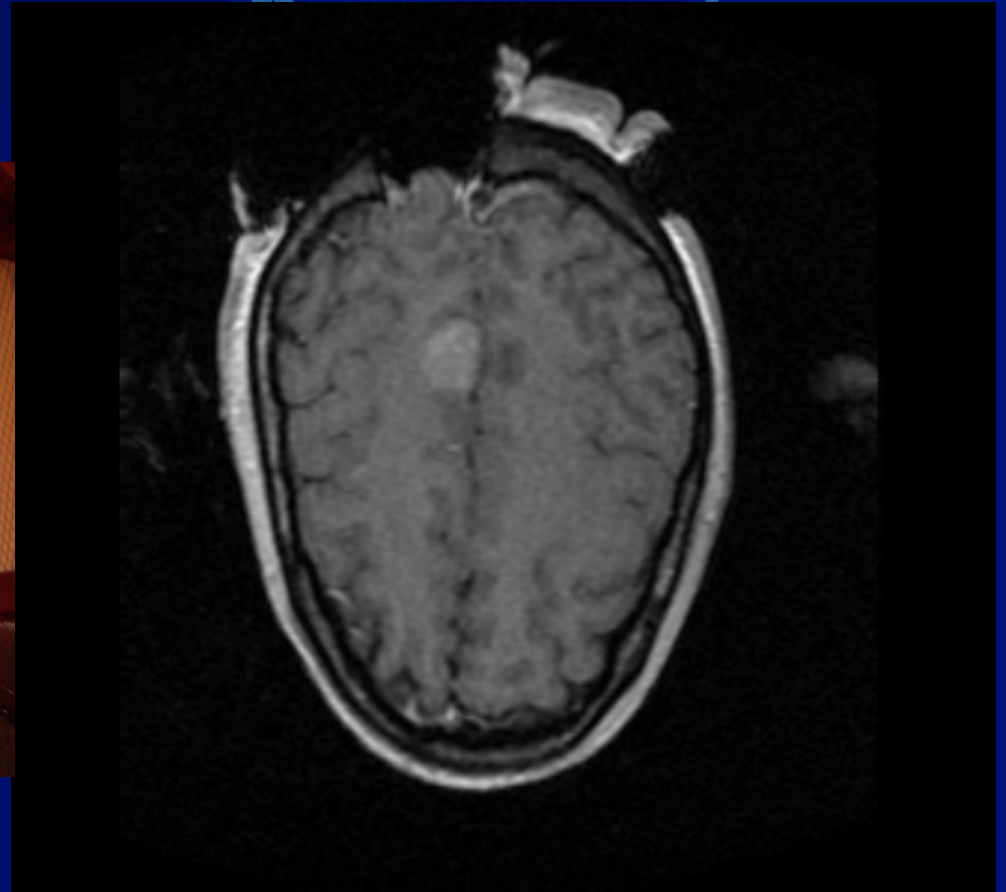
21-Year-Old Woman With Intractable Seizures of the Right Leg and Hand– MRI Shows a Tumor in Motor Cortex



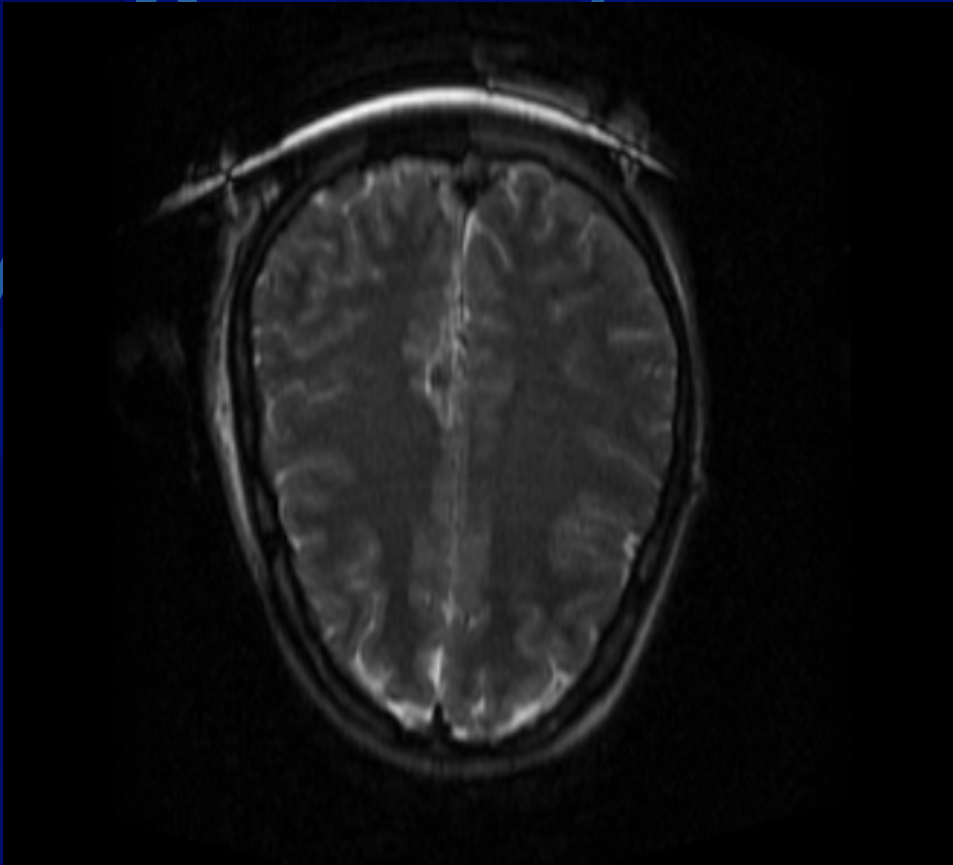
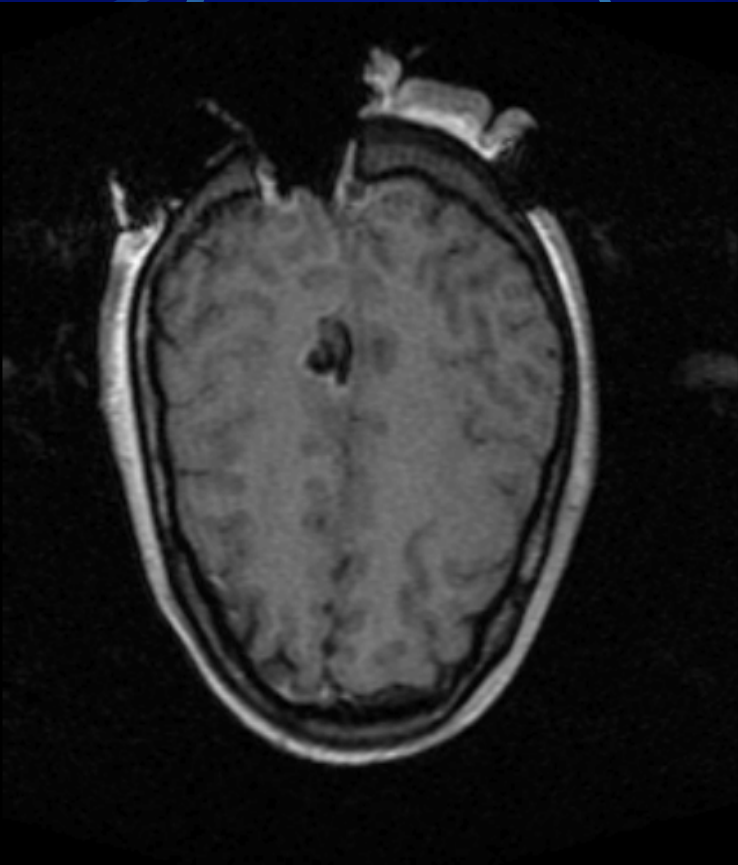
# Before and During Intraoperative Resection



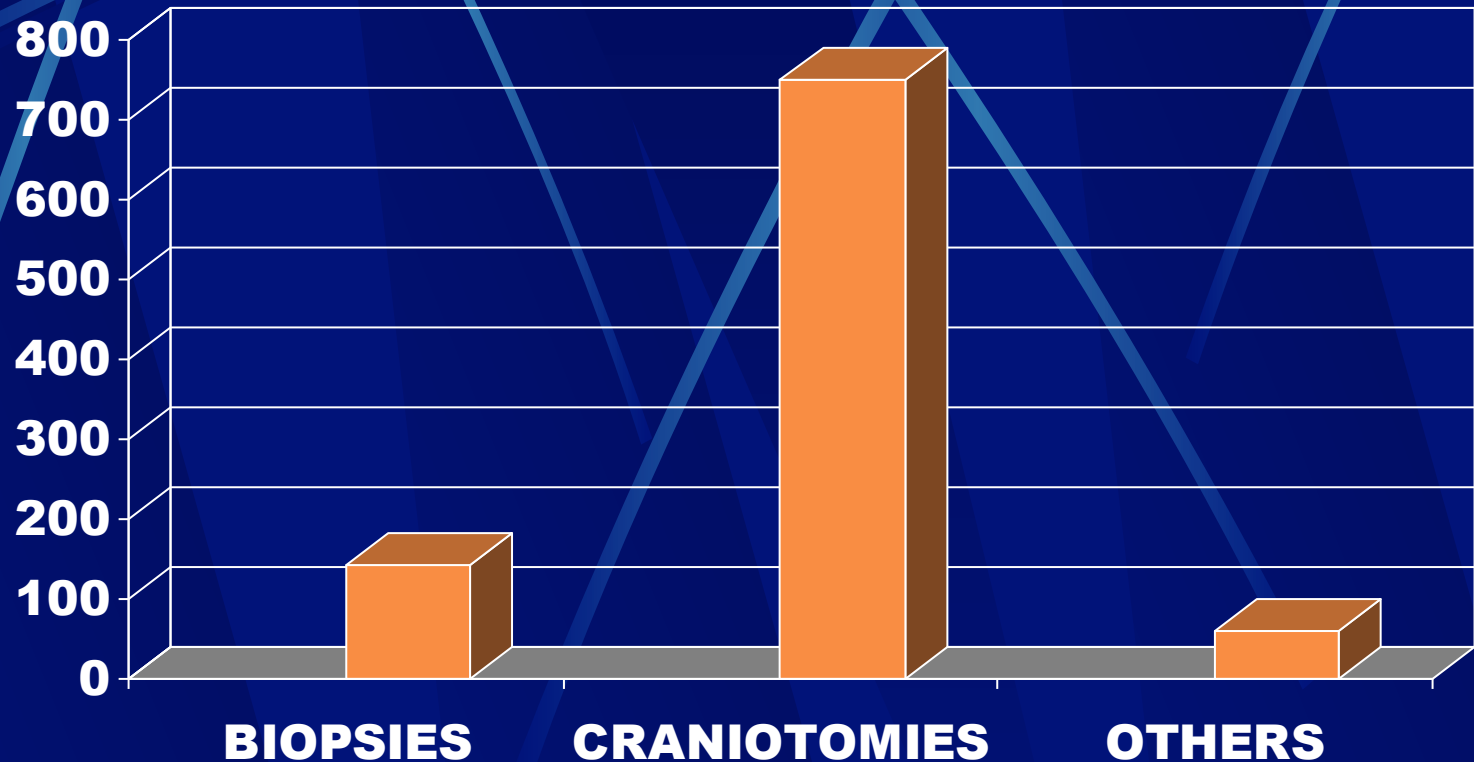
**The incision**



# Tumor Gone, and the Brain Returns to Normal



# INTRAOPERATIVE MRI IN NEUROSURGERY





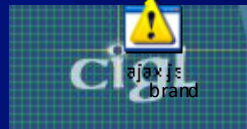
# 2005--THE FIRST HUMAN FOCUSED ULTRASOUND THROUGH INTACT SKULL



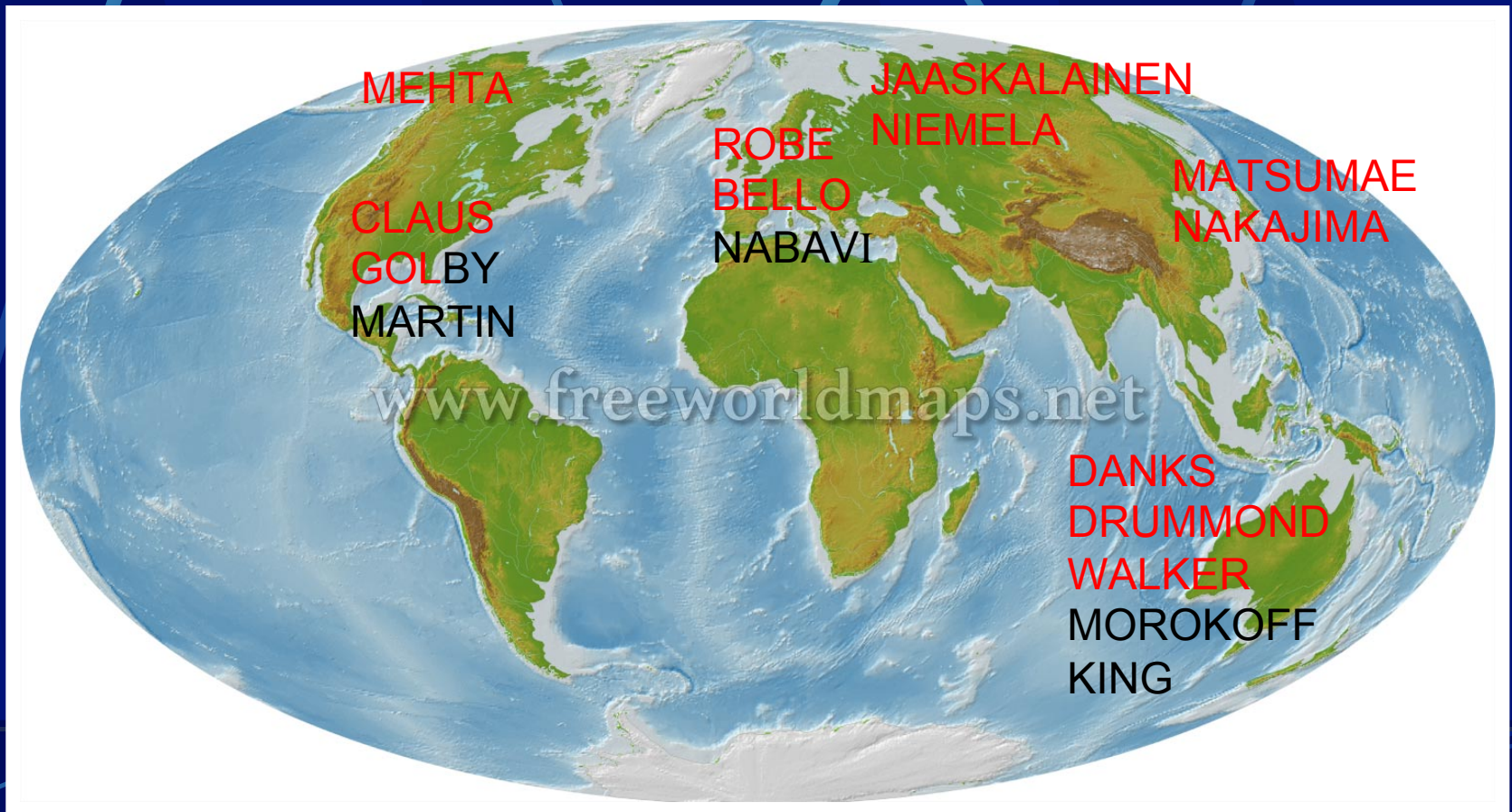
# SPL COLLABORATORS 2015



pages  
placeholder.html



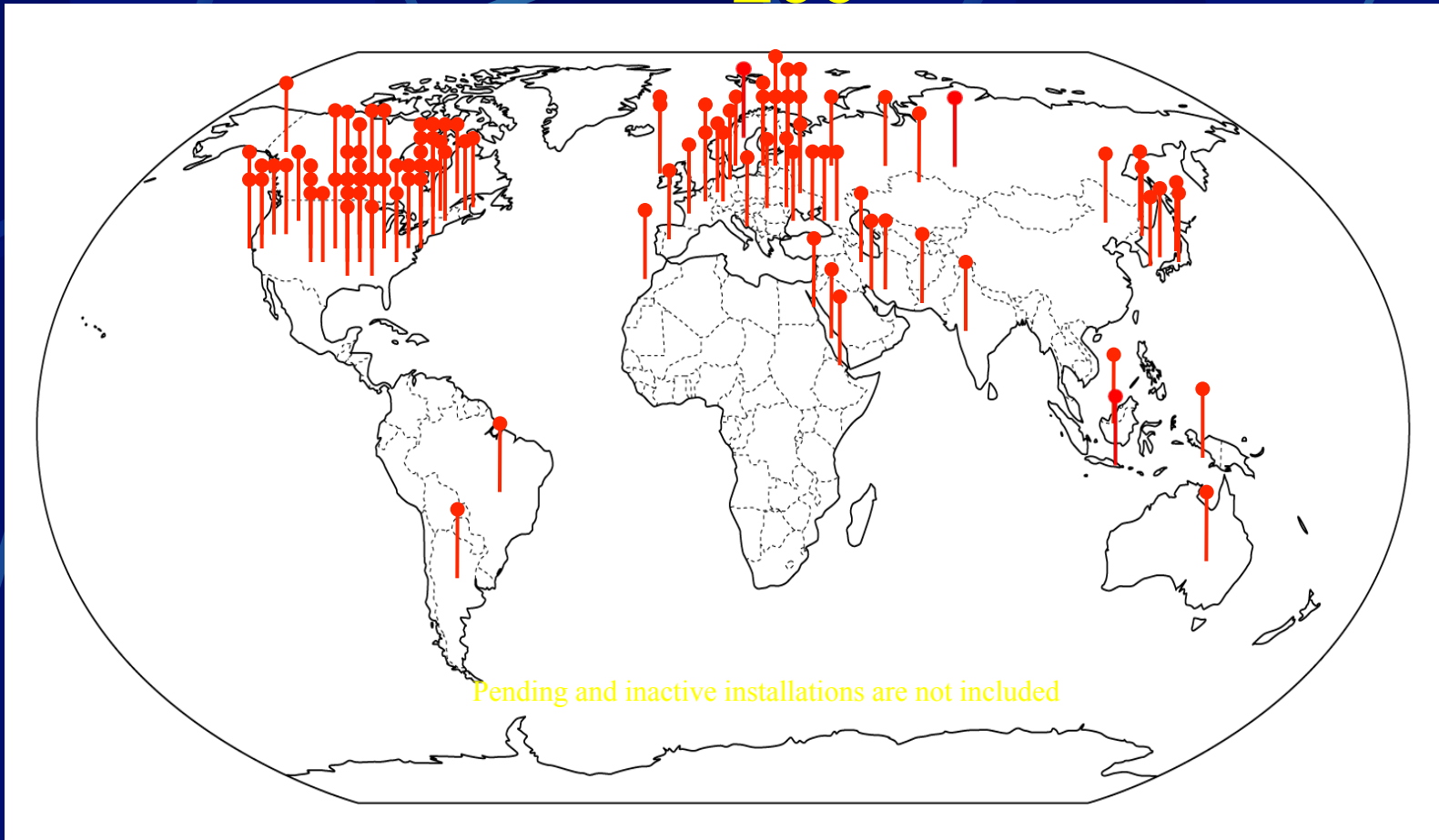
# 2) LEADERS: SPL NSURG FELLOWS-PROFESSORS IN RED



# LEADERS IN INTROPERATIVE MRI ISTANBUL 2011



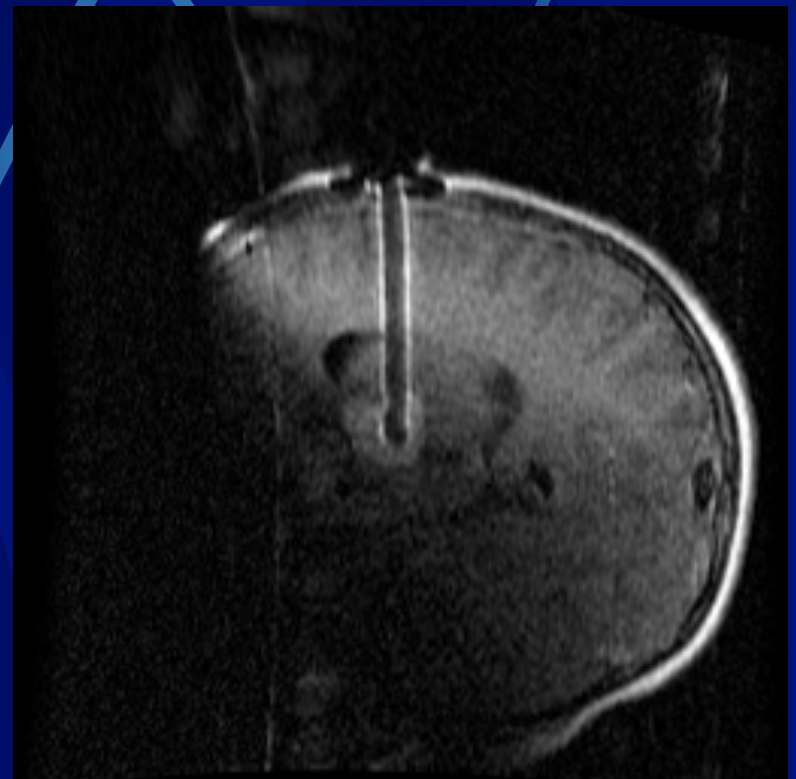
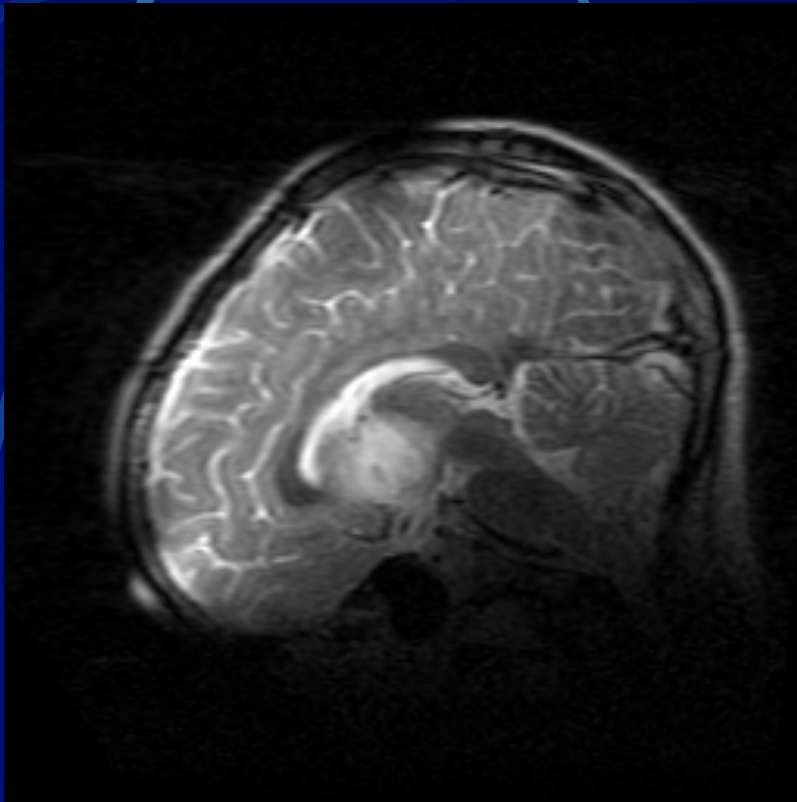
# Neurosurgical iMRI sites >200



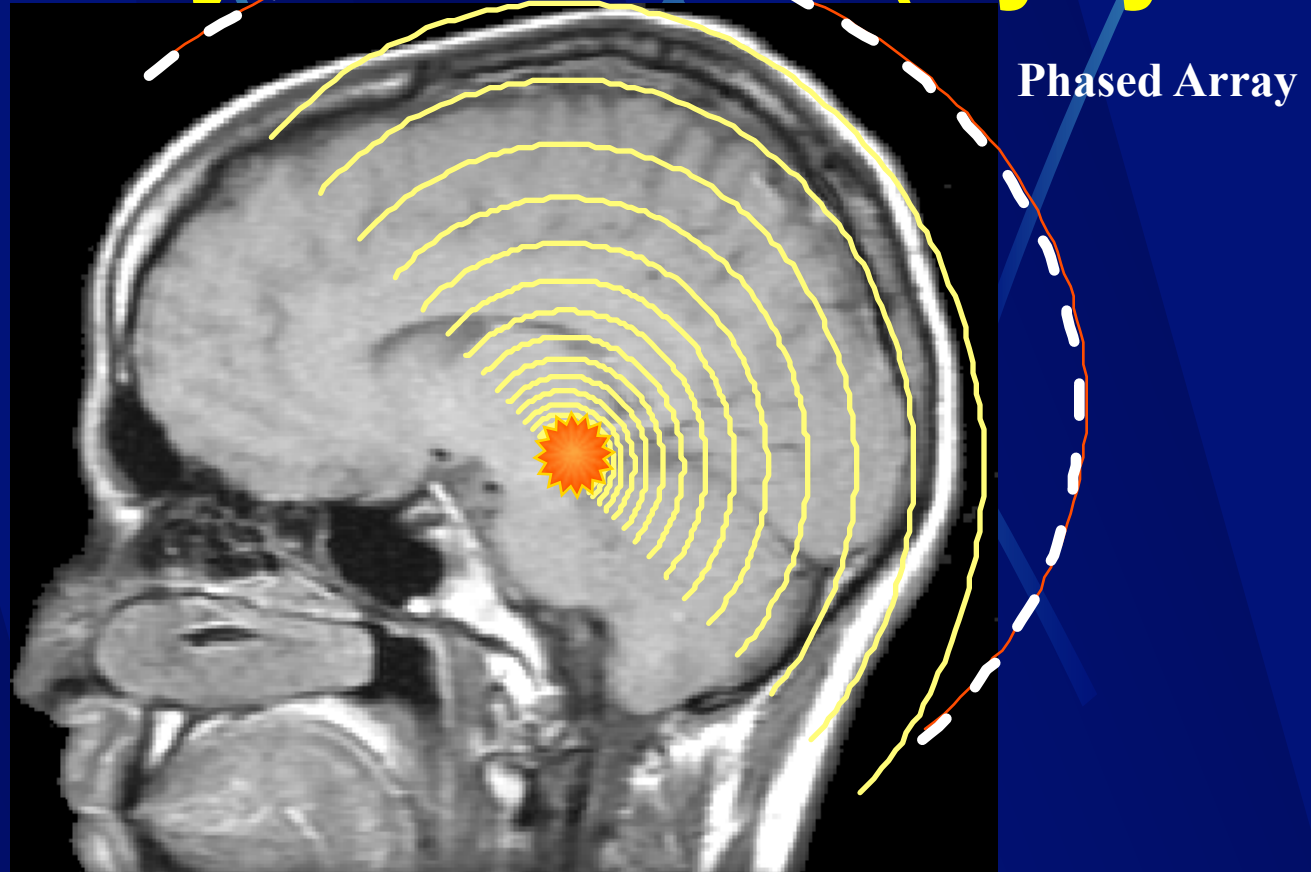
# 3) DISRUPTIVE TECHNOLOGIES

- Interstitial laser therapy
- Focused ultrasound
- Robotic neurosurgery
- AMIGO

# INTERSTITIAL LASER THERAPY (ILT)



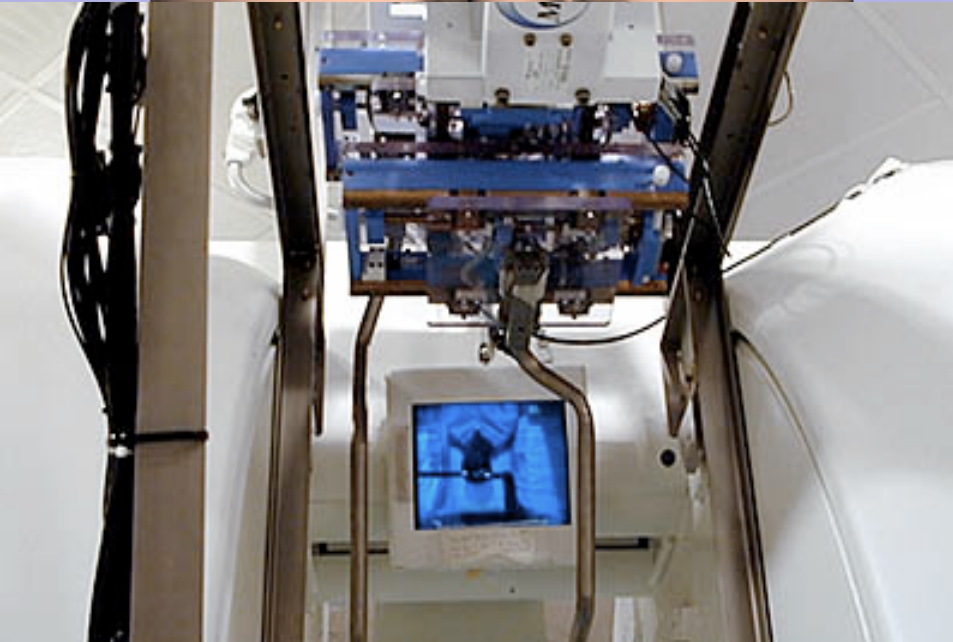
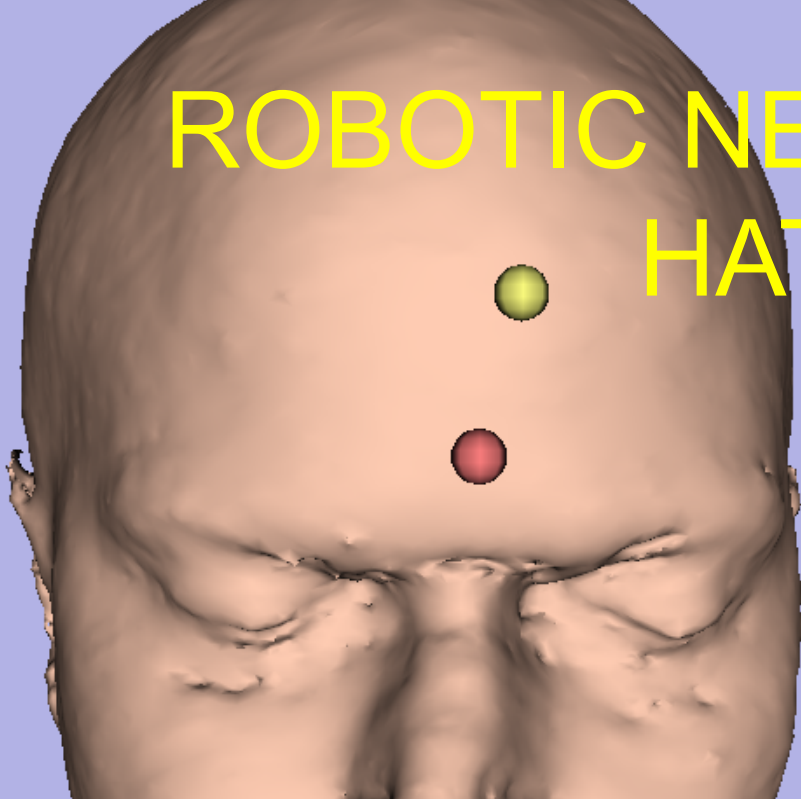
# Focused Ultrasound in Brain with A Phased Array Transducer (Hynynen)





# ROBOTIC NEUROSURGERY

## HATA 1995

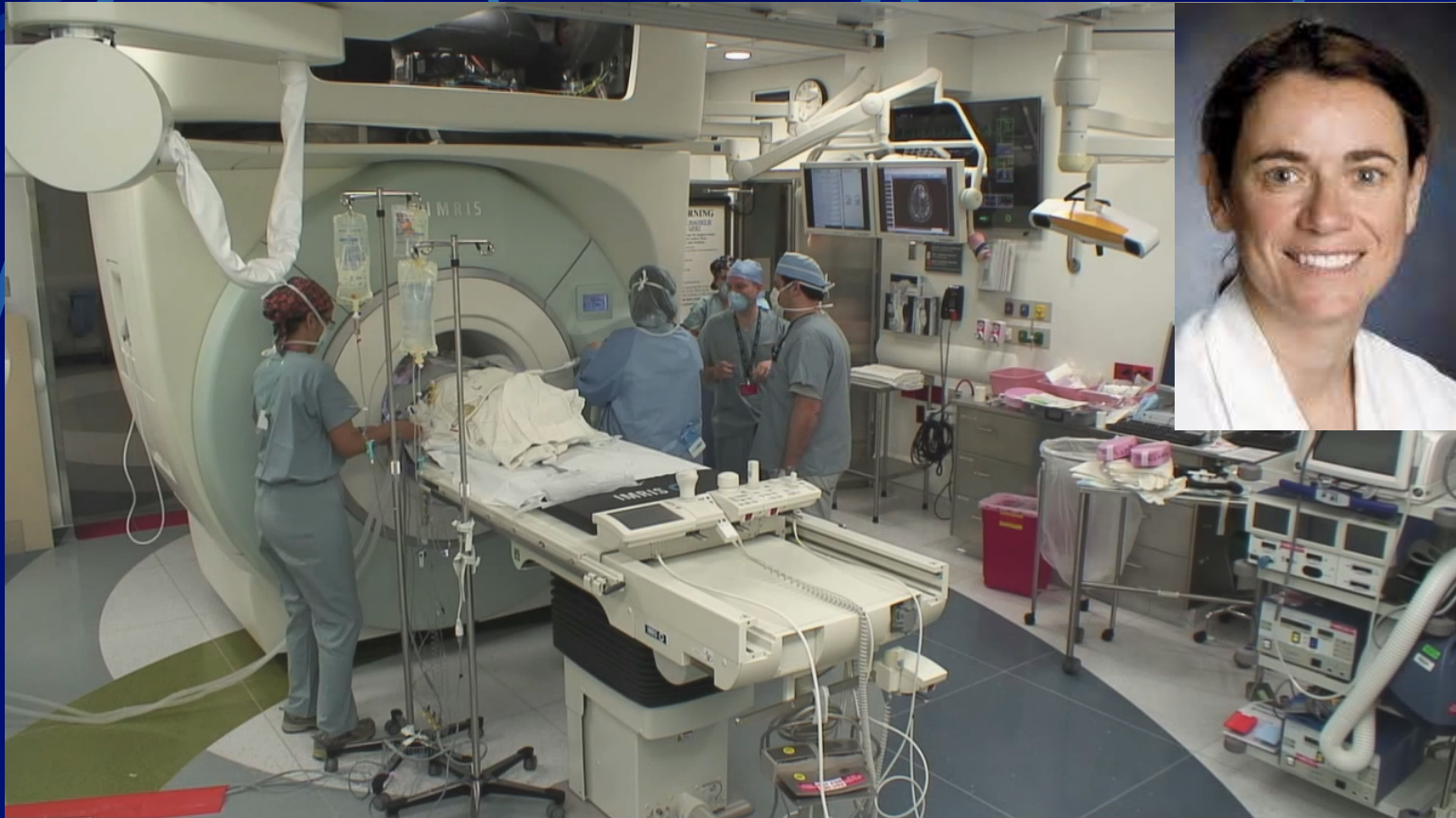


Provided by Hata, Peters et al.

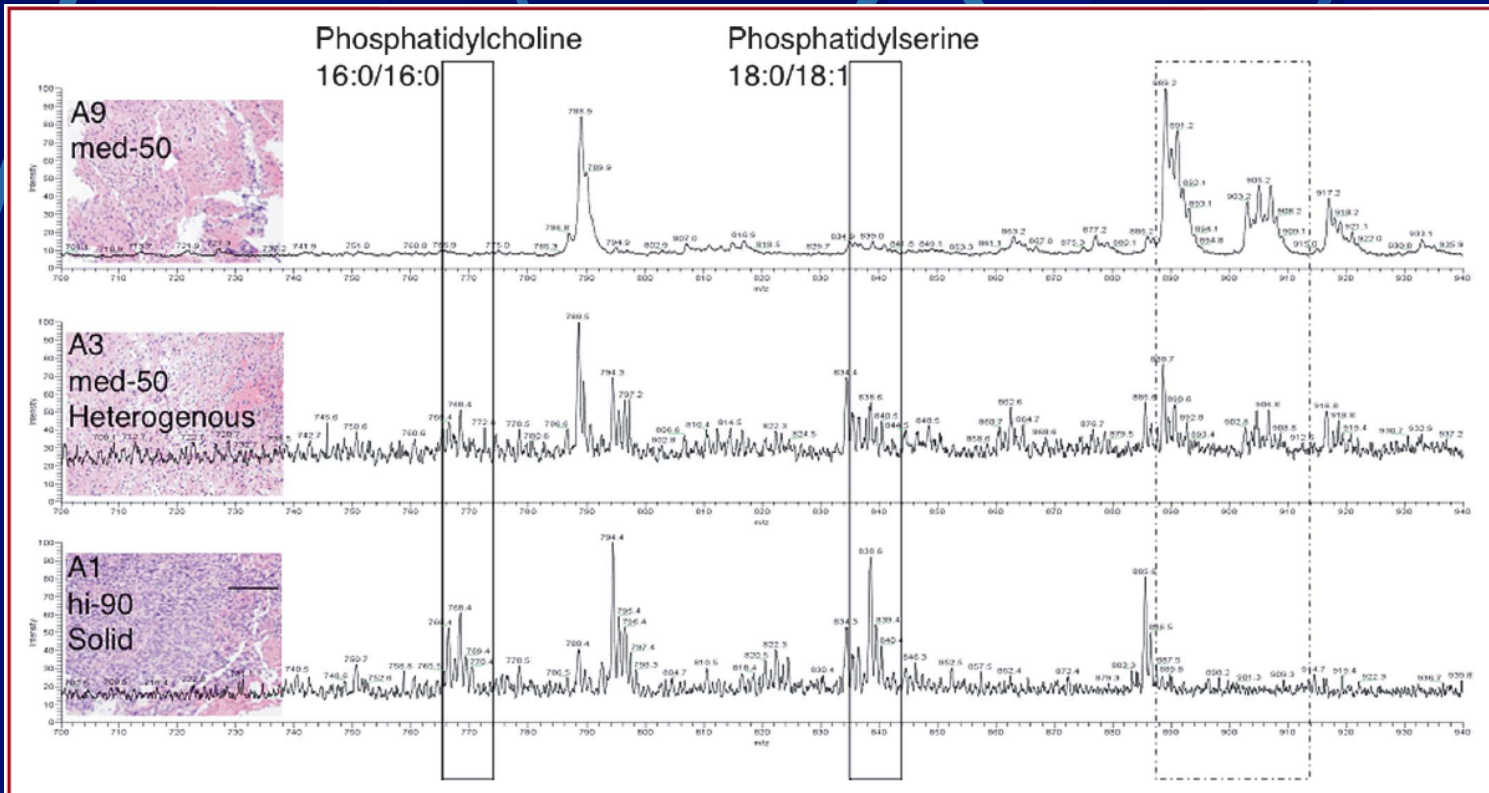
# ROBOTIC SYSTEM IN CLINICAL USE IN IMRI---SUTHERLAND



# OR AS LABORATORY—DR. GOLBY AND AMIGO



# MASS SPECTROMETRY—N. AGAR



**FIGURE 5.** Correlation between molecular and histopathological changes. Qualitative correlation of different phospholipid proportions with histological evaluation of tumor cell prevalence for compared specimens. Scale bar represents 100  $\mu$ m.

# THE SPL—BRINGING THE WORLD TOGETHER WITH COMPUTATION AND IMAGING



**MAY THE NEXT 25 YEARS  
BE AS EXCITING AS THE  
FIRST**