

# digital cure for epilepsy

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Behnaam Aazhang

Electrical and Computer Engineering

# the team

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- Rakesh Malladi
- Suganya Karunakaran, Ph.D.
- Nitin Tandon, MD at UTHSC
- Giridhar Kalamangalam, MD at UTHSC
- current senior design group



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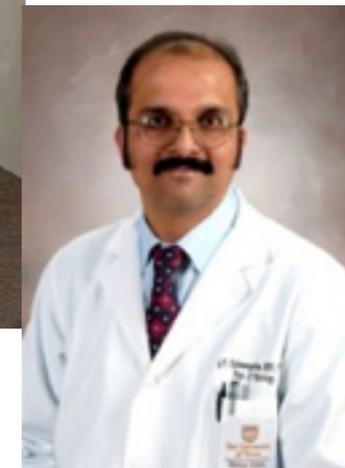
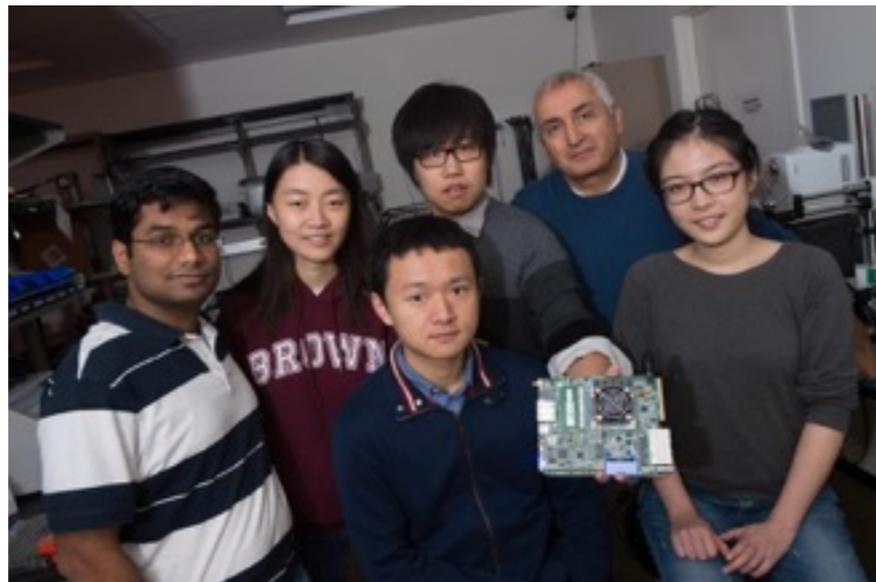
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# global grand challenge of the century

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- how does our brain work?

## **the BRAIN initiative!**

- our project focus
  - develop a reparative therapy for epilepsy

# epilepsy

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- unprovoked and recurring seizures
- seizure
  - no standard definition
  - abnormally synchronized hyper-excited neuronal activities

# epilepsy

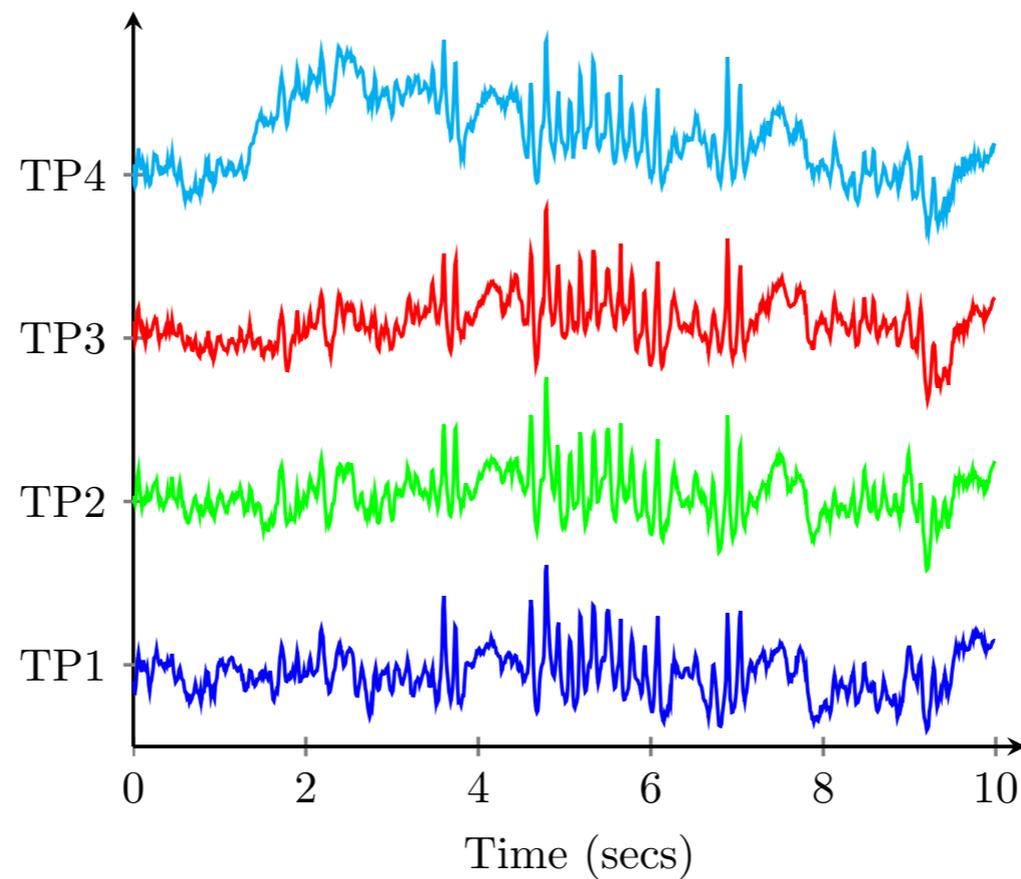
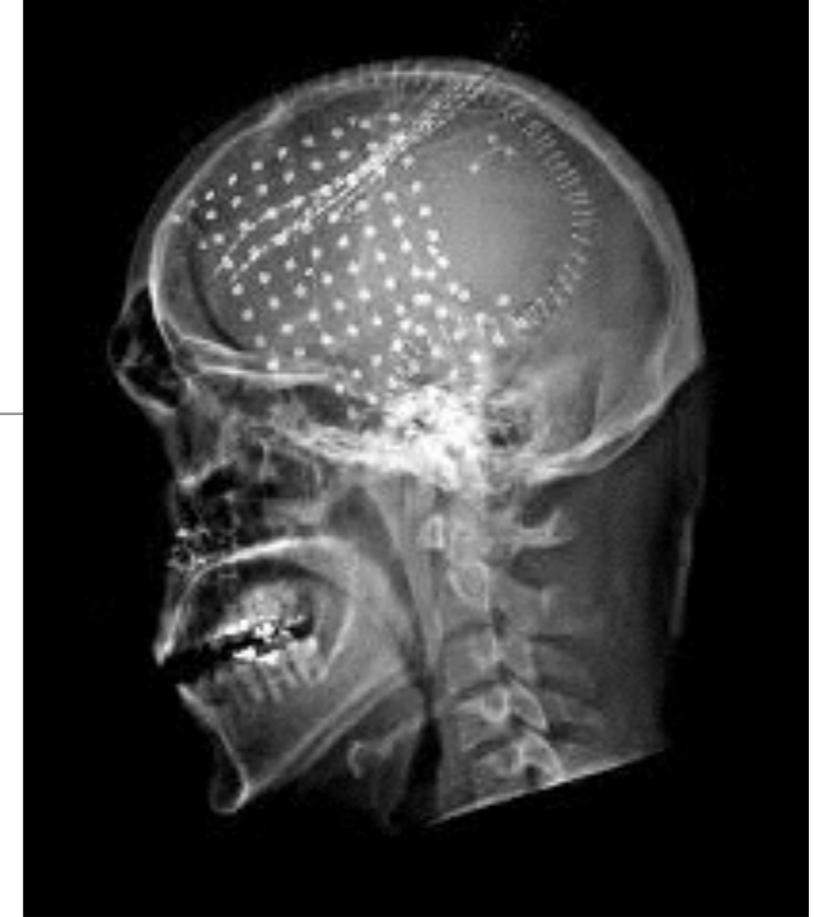
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- effects 3 million patients in the USA
  - medication
  - resection (surgery)
  - stimulation (modulation)
    - neurons respond to electric signals !

# our methodology

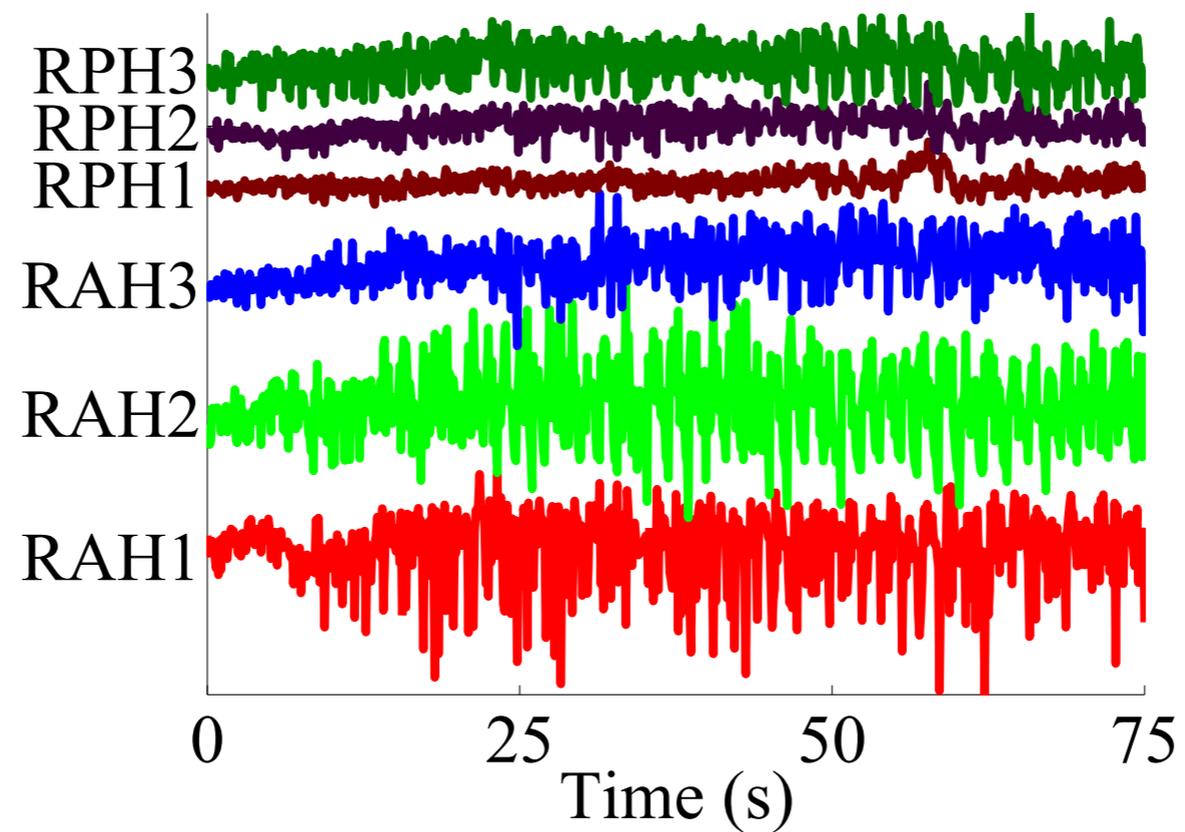
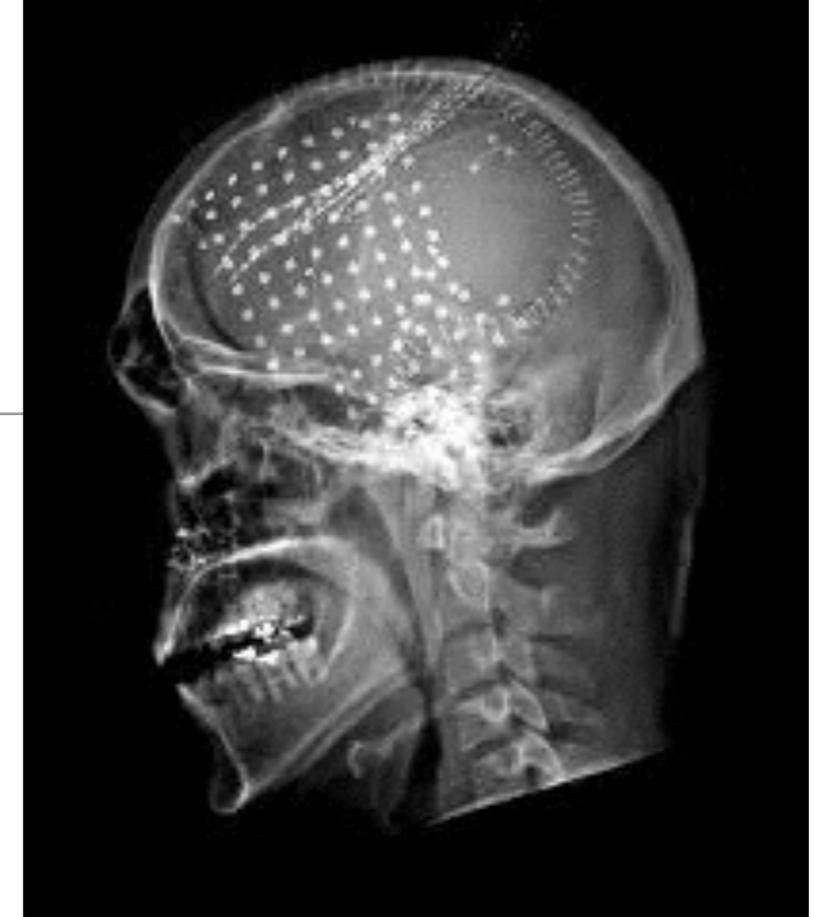
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- **subdural** (under the skull and the dura)
  - record
  - then
  - stimulate



# our methodology

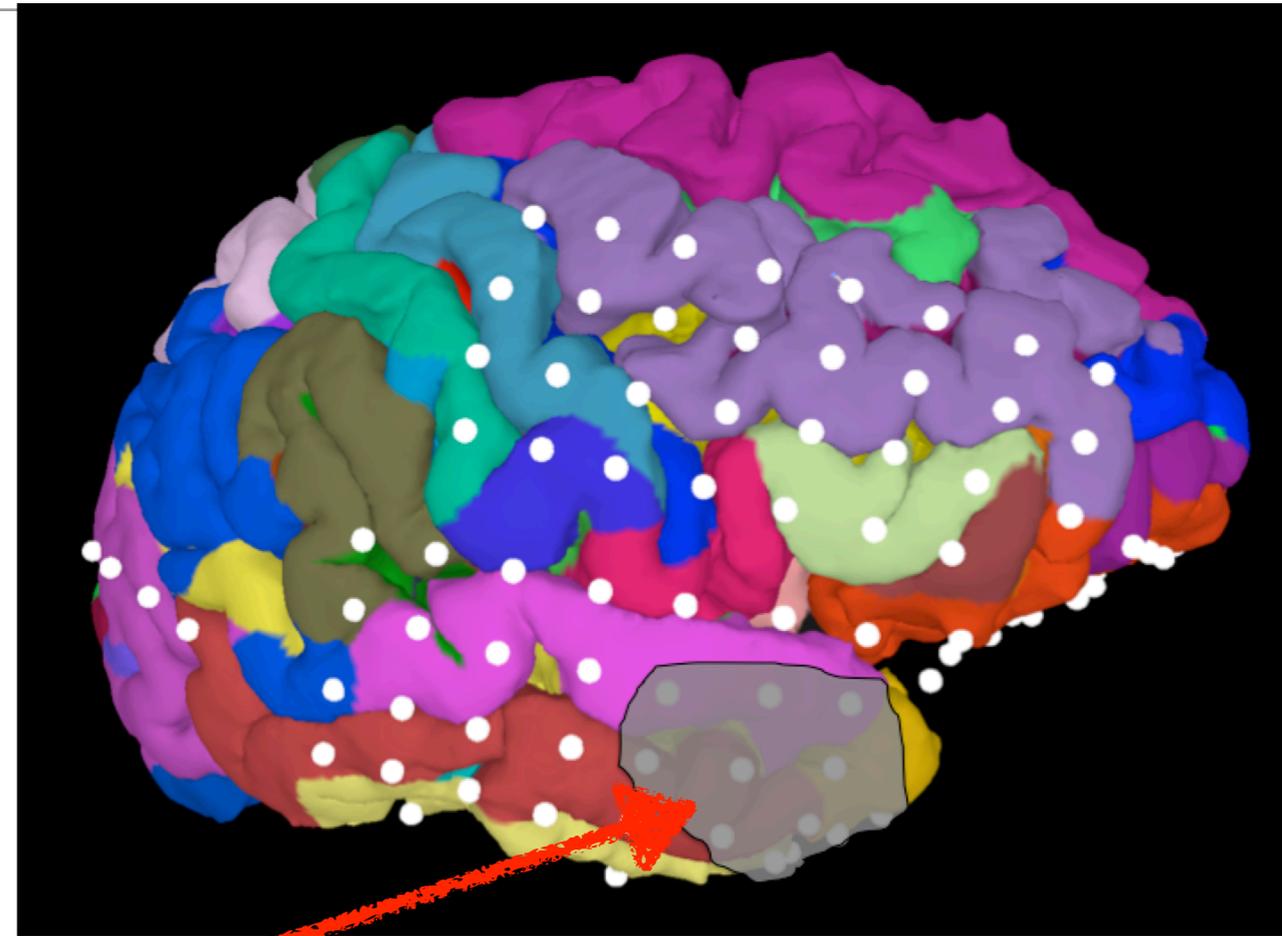
- **subdural** (under the skull and the dura)
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# hardware platform

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- subdural stimulation
  - prevent the network “from going to” hyperexcitable state
  - identify seizure zone
  - identify temporal markers
  - low frequency stimulation

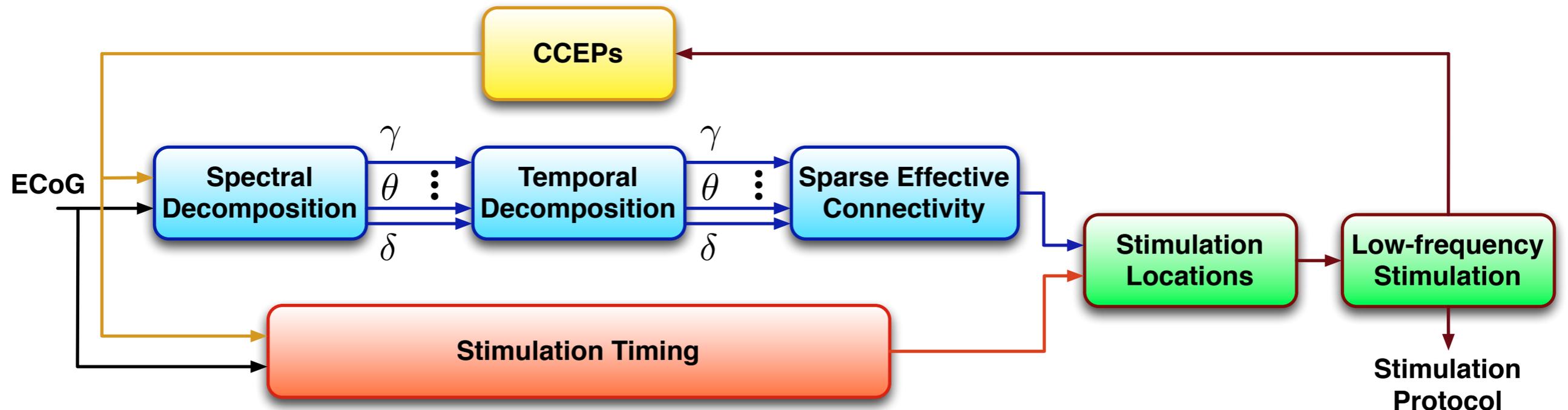


**epileptic zone**

# VIP goals

- “closed loop” stimulation
  - from data to stimulation signal parameters
  - real time
  - build the hardware

**low frequency stimulation  
to depress the excitable state**



# the challenge

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- as engineers
  - are we going to do any about neurological disorders or are we going to sit back and watch millions suffer?