

# Cross-training in clinical neuroscience

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# The clinical interface is important to neuroscience training

- Potential for medical benefit is a key source of inspiration, purpose, and funding for neuroscience.
- The necessary experimental platform for investigating, and ultimately understanding, the human brain and mind.



**Phonetic Feature Encoding in Human Superior Temporal Gyrus**  
Nima Mesgarani *et al.*  
*Science* **343**, 1006 (2014);  
DOI: 10.1126/science.1245994

# The clinical interface could be improved through greater collaboration

- Basic neuroscience training typically provides limited exposure to clinical medicine and clinical research.
  - “Pseudo-translation” (Landis) ideas can gain inappropriate traction, leading to dilution of resources and disappointments.
  - PhD neuroscience training is typically light on covering disease biology, as well as clinical research methods, opportunities, and limitations.
- Clinical training typically provides scant exposure to the scientific method
  - Clinicians vulnerable to unsubstantiated claims and prone to adopting dogmatic approaches based on a cult of individuals rather than available evidence.
- Clinical training and practice itself is highly fragmented along historical guild lines, loculating resources, and obstructing comprehensive understandings and treatment of diseases.

# Clinical fragmentation

- Distinctions between the missions of neurology and psychiatry are blurring (eg autism, AD), yet departments, cultures, and training programs remain separate
- Diseases of the nervous system typically managed by many clinical departments besides the core 3 (psychiatry, neurology, neurosurgery).
  - eg, medicine (AD, fibromyalgia, sleep disorders), pediatrics (CP, genetic/metabolic disorders), radiology (stroke), anesthesia (pain), ophthalmology (macular degeneration), otolaryngology (tinnitus, hearing loss), orthopedics (TBI), obstetrics (hot flashes, seizures, hyperemesis), rehabilitation (stroke, TBI), emergency medicine (stroke, TBI), cancer institute (CNS cancers, radiation encephalopathy), surgery (neuro intensive care)

# Some promising collaborative directions

- Enhance the availability and strength of neurobiology of disease courses
  - online delivery (eg, SFN NBD workshop, NINDS/Child Neurology NBD in Children website).
  - augmented to the level of online courses (eg, Stanford Online, HarvardX) with dates, readings, and discussions with faculty – even tests and recognition of achievement.
- Increase availability of clinical courses (pathophysiology, clinical research) and rotations to neuroscience PhD students (along the lines implemented by the HST MEMPH PhD program)

# more collaboration....

- Increase opportunities for exposure to basic neuroscience, as well as physics, informatics, engineering etc for selected medical students (eg, HST Program)
- Increase requirements for the training of clinical residents in core scientific methods, focusing on skills needed to read the clinical literature with a critical eye
  - Require completion of a research project
  - Journal clubs focusing on the critical analysis of key papers
- Build interdisciplinary and interdepartmental teams around shared clinical research or clinical care goals, involving both MDs and PhDs
- Merge neurology and psychiatry training – and eventually, departments?