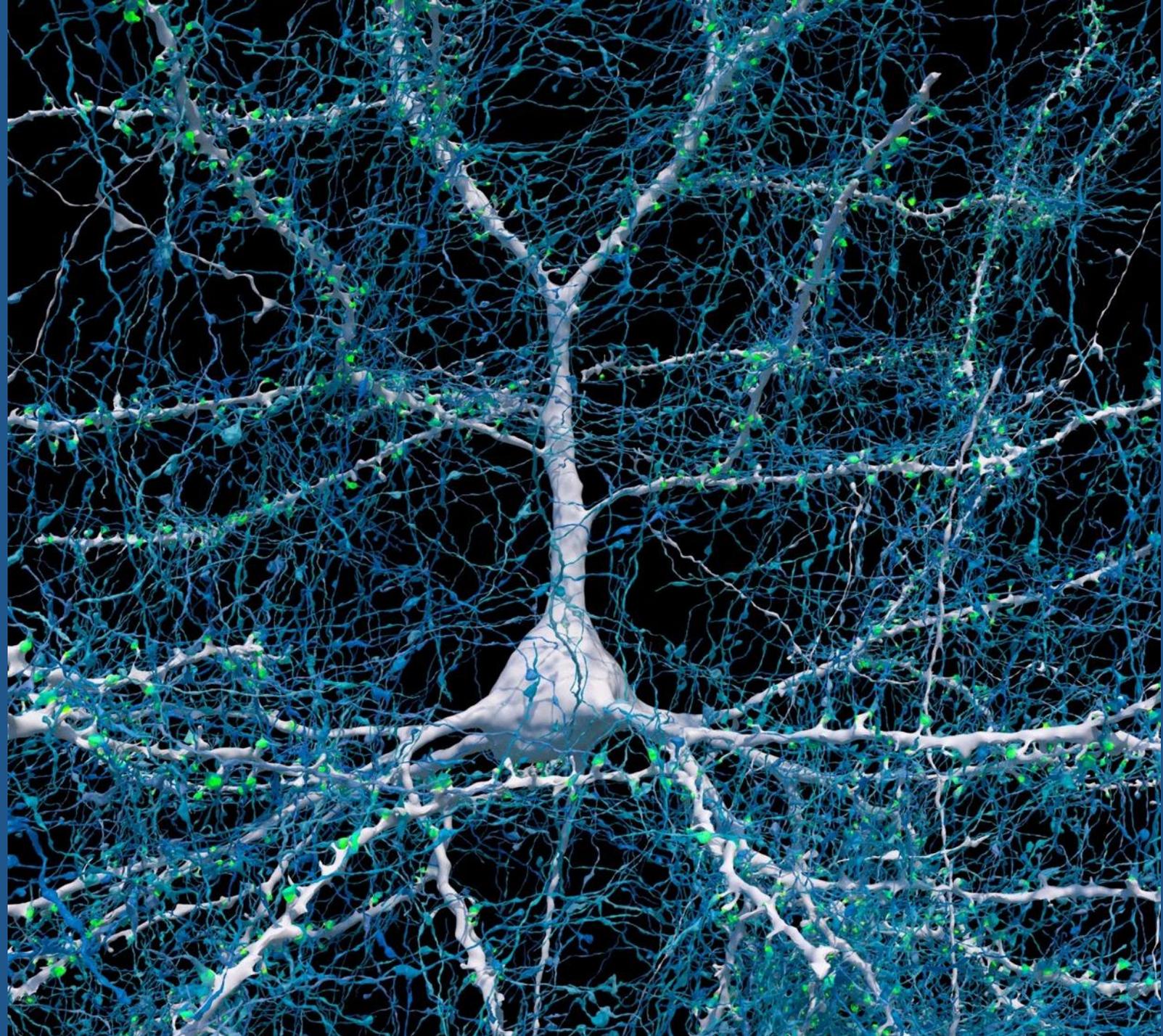


The BRAIN Initiative®

EMBS NER25: Neuromorphic Engineering for Clinical Care Minisymposium

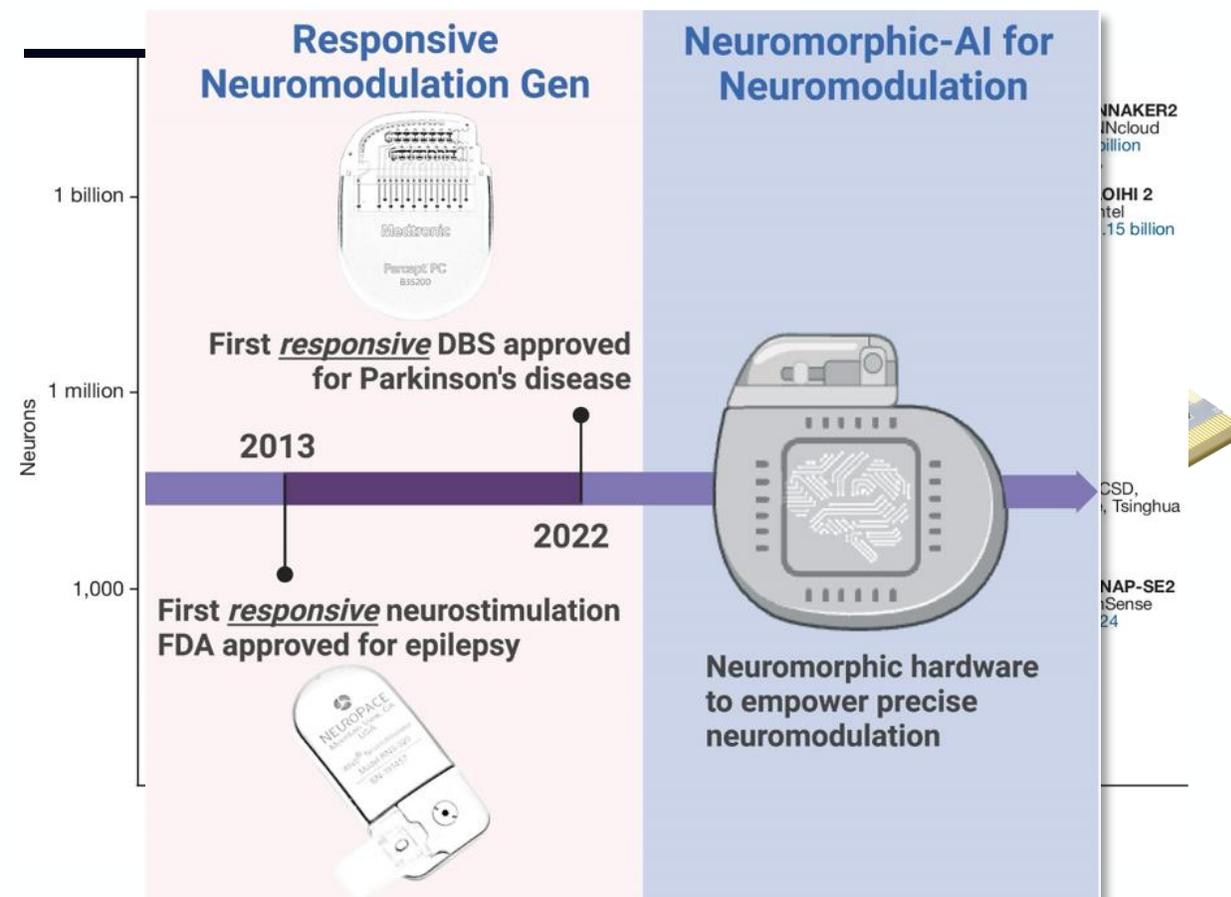
Moderated by
William Nourse, Case Western

Thursday, November 13, 2025



The Convergence Moment for Neuromorphic: Why Now?

- **Data Revolution:** BRAIN has created unprecedented neural datasets: complete connectomes (FlyWire), cell atlases (BICAN), and connectivity maps (CONNECTS)
- **AI at the Wall:** Training frontier LLMs is estimated to cost ~\$100M and 100+ GWh (enough to power a small city for a year)
- **Hardware Breakthrough:** Neuromorphic chips demonstrate that brain-like efficiency is achievable
- **Perfect Storm:** The convergence creates a unique window for transformative progress



Kudithipudi, D. et al. Neuromorphic computing at scale. Nature 637, 801–812 (2025).

Herbozo Contreras LF, Eshraghian JK, et al. Neuromorphic neuromodulation: Towards the next generation of closed-loop neurostimulation. PNAS Nexus. 2024;3: gae488. doi:10.1093/pnasnexus/pgae488

BRAIN NeuroAI Vision: Beyond Computing to Emulation

- **Current AI:** Gigawatts of power for training, static data processing, narrow capabilities, unclear trajectory to general intelligence
- **Human brain:** Only 20W, embodied capacity for continuous adaptive real-world interaction, prime exemplar of general intelligence
- **The gap:** Embodiment and physical interaction are missing from AI
- **The opportunity:** Brain-inspired computing that emulates biological principles

The **convergence of neuroscience and AI** has reached an inflection point where biological principles can transform computing efficiency and capabilities, creating **technologies for science and health that adapt by emulating brain function.**

BRAIN NeuroAI Workshop, Nov. 12 & 13 2024

BRAIN Blog: Bridging Brains and AI



Detailed Workshop Summary



NIH VideoCast Recordings

Day 1 — <https://videocast.nih.gov/watch=55160>

Day 2 — <https://videocast.nih.gov/watch=55262>

