Welcome

- Paul Sajda: Initiative Chair, EMB
- Jose Carmena: Initiative Vice Chair, SMC
- Sin-Kuen Hawkins: IEEE Brain Initiative Project Manager

Brain Initiatives

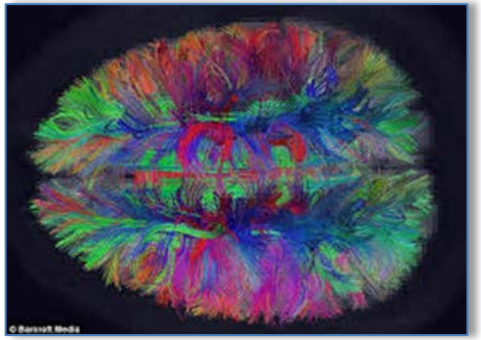
Global and Technology Focused

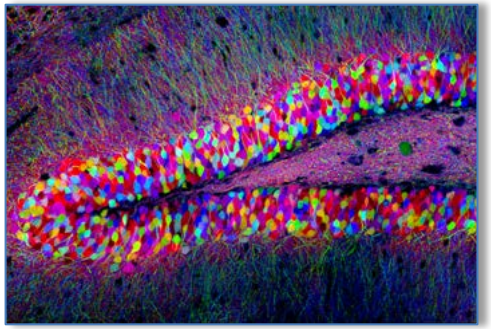
- US: Brain Research through Advancing Innovative Neurotechnologies (BRAIN)
- EU: Human Brain Project: Computing and Information Technology
- JAPAN: Brain/MINDS: Brain Mapping by Integrated Neurotechnologies for Disease Studies

Brain/MINDS

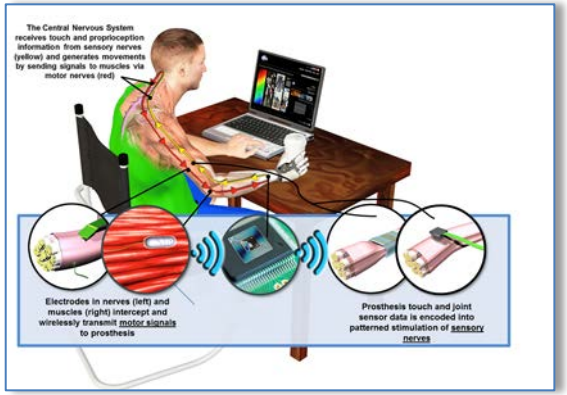
US: BRAIN Initiative

- Decentralized strategy: closer to traditional investigator-driven neuroscience research with different funding agencies (including the National Institutes of Health, National Science Foundation and Defense Advanced Research Projects Agency);





- An emphasis on the development of technologies to facilitate neuroscience research forms a basic theme for the BRAIN Initiative

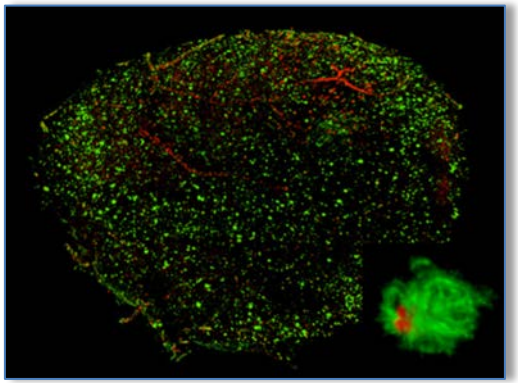


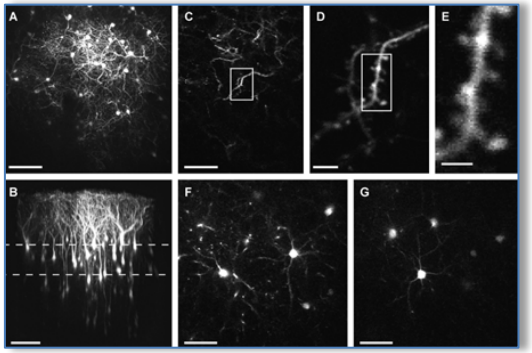
EU: Human Brain Project

- Centralized, large-scale effort with a computational focus aimed at building detailed models of neural circuitry. Includes 13 complementary sub-projects:
  - SP1, Strategic Mouse Brain Data
  - SP2, Strategic Human Brain Data
  - SP3, Cognitive Architectures
  - SP4, Mathematical and Theoretical Foundations of Brain Research
  - SP5, Neuroinformatics
  - SP6, Brain Simulation
  - SP7, High-Performance Computing
  - SP8, Medical Informatics
  - SP9, Neuromorphic Computing
  - SP10, Neurorobotics
  - SP11, Applications
  - SP12, Ethics and Society
  - SP13, Management

Japan: Brain/MINDS

- Devote considerable effort to mapping the brain of a small New World monkey, the common marmoset.
- Brain/MINDS adopts both centralized and decentralized strategies. Areas of focus are
  - structure and functional mapping of the marmoset brain;
  - development of innovative neurotechnologies for brain mapping; and
  - human brain mapping and clinical research.





Why an IEEE Initiative and Why Now?

- Massive global efforts, across government, academia, and industry, focused on developing neurotechnology
- Technologies becoming mature enough to be considered for commercialization and standardization
- Brain machines interfaces are an example of such a technology area, unique in that its needs/challenges span ***ALL*** aspects of IEEE societies.

BMIs/BCI

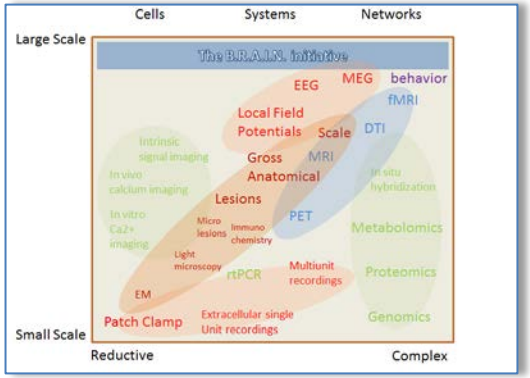
a natural for IEEE

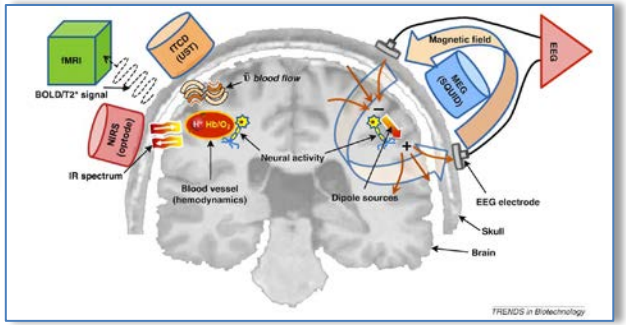
- Brain Machine (Computer) Interfaces for augmenting action and performance
- Invasive systems focus on improving quality of life for individuals with neuro-related disease and injury.
- Non-invasive systems focus on improving performance in human-machine interaction.

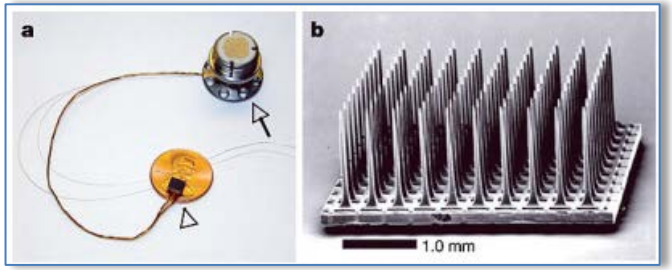
BMIs/BCI

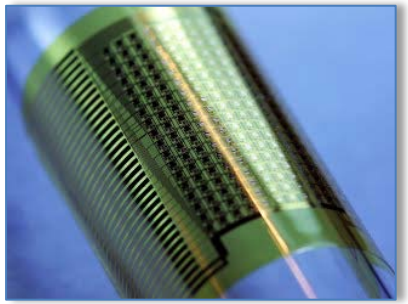
a natural for IEEE

- Sensing/Imaging
  - Multi-scale
  - High bandwidth
  - Multi-modal
- Microelectronics
  - Low power
  - Biocompatible





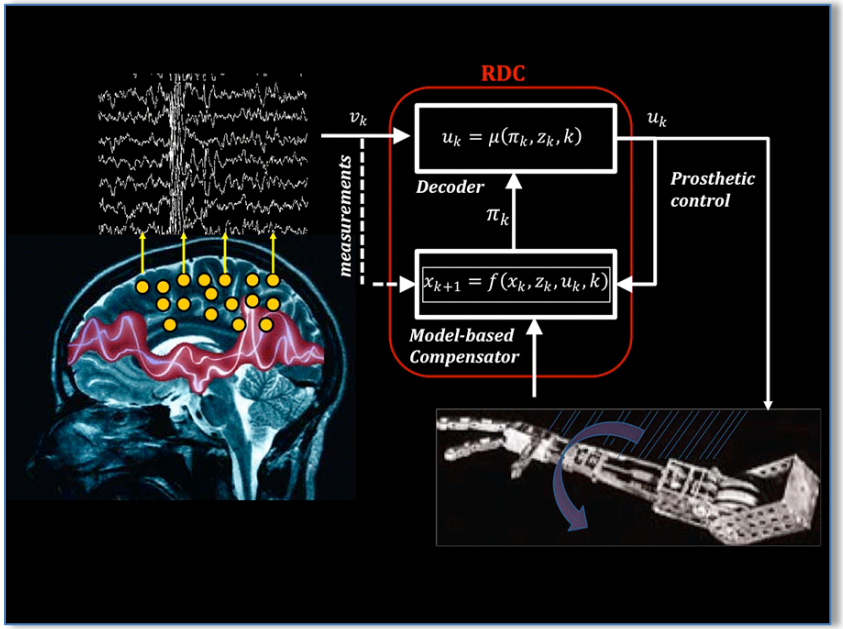




BMIs/BCI

a natural for IEEE

- Transmitting and compressing
- Signal processing and filtering
- Decoding (machine learning)
- Robotics



IEEE BI Plan for 2015

…build identity and community…

- Outreach to all interested IEEE societies, councils, and OUs
  - Form a Steering Committee across IEEE S/Cs
  - Build a well-coordinated approach and unified message for IEEE Brain
- Promote IEEE thought leadership and grow the Brain community
  - Branding and a Brain website (brain.ieee.org)
  - Curate content including promo and lab videos with experts in the field
- Begin nurturing collaboration beyond IEEE
  - Small workshop (Dec at Columbia University)

IEEE BI Plan for 2016

…increase visibility and collaboration…

- NAS/NAE/Keck style seedling projects promoting technical interaction between S/Cs
- Co-sponsored conferences/workshops
- Special issues in existing journals
- Collaborate with government/industry through workshops/events
- Identify standards needs and help launch projects