IEEE Brain Transition Discussion

August 30, 2019 Systems Council AdCom Meeting

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IEEE Brain Initiative

Transition Planning

- ▶ Currently in Year 2 of NIC Funding

- ▶ Proposal to NIC was a 3-year funding period, 2018 – 2020

- ▶ Post-NIC funding begins Jan 1, 2021

- ▶ Our Goal: Plan the transition well in advance to enable the continuation of a strong IEEE Brain program
  - Speak to stakeholders now to gauge interest of IEEE Brain post-NIC funding
  - Continue discussion with OU Presidents at Nov 2019 IEEE meeting series in Boston
  - Target to have Letter of Participation from interested OUs by end of 2019
  - Draft MOU and Charter 1Q 2020; execute transition 2020

Possible Transition Models to the IEEE Infrastructure

Option #1

Managing Society Assumes ALL Financial Responsibility

Absorbed into existing or new governance structure

- Technical Contributors
- Technical Contributors
- Technical Contributors
- Technical Contributors

May or may not have active steering committee (made up of representatives from OUs)

Option #2

Managing/Lead Society

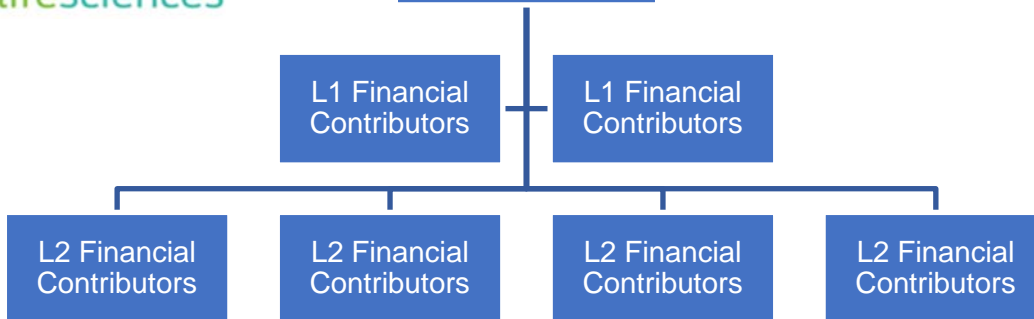Managing Society Provides Operational Support and Oversees Financials

- Financial Contributors
- Financial Contributors
- Financial Contributors
- Financial Contributors

Equal financial contributions

Option #3

Managing/Lead Society

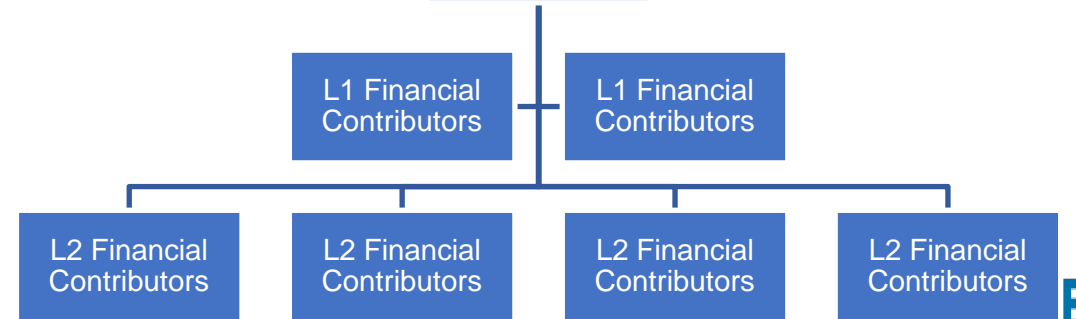Managing Society Provides Operational Support and Oversees Financials

- L1 Financial Contributors
- L1 Financial Contributors
  - L2 Financial Contributors
  - L2 Financial Contributors
  - L2 Financial Contributors
  - L2 Financial Contributors

Option #4

Independent Operational Unit

Stand-alone Independent Operational Unit with Own Financials and Charter

- L1 Financial Contributors
- L1 Financial Contributors
  - L2 Financial Contributors
  - L2 Financial Contributors
  - L2 Financial Contributors
  - L2 Financial Contributors

IEEE Brain Community - Post-NIC Funding

▸ **With a Managing/Lead Society or as an Independent Operating Unit**

▸ **Financial Contributors**

- Could have multi-level contributors, e.g. Major vs Minor Partners

- Pooled financial resources to support infrastructure cost (e.g., content creation, maintenance of IEEE Brain website, program manager, etc.)

- Sustains the program while key IEEE Brain products build up revenue streams

▸ **Steering/executive Committee**

- Consists of representatives from financial contributors

- Helps make decisions and direct the IEEE Brain activities

IEEE Brain Assets

▸ **Branding & Infrastructure**
- Website
- Technical Community (TC)
- Social Media Channels and followers/members

▸ **Online Technical Presence/Content**
- eNewsletter
- Webinars
- Podcasts
- Q&A Brain talks

▸ **Hackathons and Competitions**
- BR41N.IO BCI Designers Hackathon Series
- Brain Data Challenges

▸ **Conferences and workshops**
- IEEE Brain Initiative Workshop on Advanced NeuroTechnologies
- Neurotech Entrepreneurs Workshop
- IEEE Brain Virtual Conference (2019 on Bioelectronics)
- Data Science Workshop (2020)

▸ **Publications**
- Encyclopedia BRAIN
- Neuroethics Guidelines for Engineers

▸ **Neurotech White Paper & Standards**

▸ **Technology Roadmap(s)**

IEEE

IEEE Brain Technical Community

Free as a Society Member benefit

▶ 2020 Renewal Cycle – Individuals Joining the IEEE Brain Technical Community
- All IEEE Society Members (member benefit) – FREE
- IEEE Member Price -$10.00
- IEEE Student Member Price - $5.00
- Non-Member Price - $50.00

IEEE Brain Assets Inventory and Monetization Opportunities

Asset	Potential Revenue/Sponsorship
IEEE Brain Initiative Technical Community	Paid TC membership
Webinars	Live registration can be free; fees for on-demand recorded webinars
BCI Hackathons and Data Competitions	Co-located with workshops/conferences and target sponsorships (e.g. for prizes) to minimize expenses
IEEE BI Workshop on Advanced Neurotechnologies	Surplus from event and sponsorships to offset expenses; content creation from IEEE.tv recordings
NeuroTech Entrepreneurs Workshop	Sponsorships to offset expenses; potential educational materials; indirect benefits connecting with industry players
IEEE Brain Virtual Conferences	Minimal expenses; free to TC members to stimulate memberships; record tutorial sessions & partner w/ Educational Activities for revenue opportunities
Data Science Workshop & BIA events	BRAIN Initiative Alliance (BIA) sponsorship to offset expenses
Encyclopedia BRAIN	% of Royalties from Sales
Neuroethics Guidelines	Ancillary products (e.g., training materials, workshop)
NeuroTech for BMI Industry Connection + Standards	Standards sales (IC has led to creation of 3 standards working groups)
Technology White Papers and Roadmaps	Ancillary products (e.g., Industry Summit)

Preliminary Financials

▸ Preliminary financial plan at $175K to keep most aspects of the program
- Conferences/workshops, competitions, standards, publications, education
- TC infrastructure cost of content curation and maintenance of the IEEE Brain website
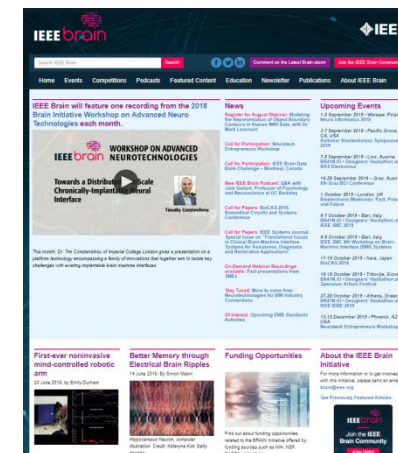- Centralized staff to manage IEEE Brain

▸ Other interested OUs to date: EMBS, SMC, CAS, CSC and SPS
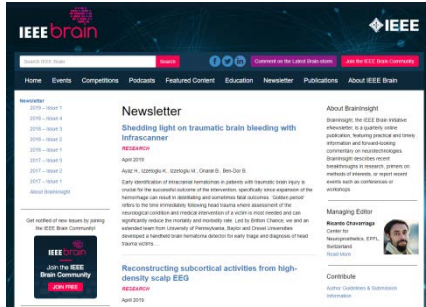
Backup Slides

IEEE

Branding & Infrastructure

▶ Recognized as the community that develops tools and technologies to advance the field of neuroscience

▶ IEEE Brain was asked to join the **BRAIN Initiative Alliance (BIA)**
  - Joining other stakeholders including NIH, NSF, DARPA, White House BRAIN Initiative, FDA, Kavli Foundation, and Allen Institute for Brain Science

▶ Growing community
  - 4292 technical community members
  - 2066 Facebook Likes
  - 2912 Twitter Followers
  - 6588 Collabratec Brain members

▶ Brain.ieee.org, total pageviews from inception 123K
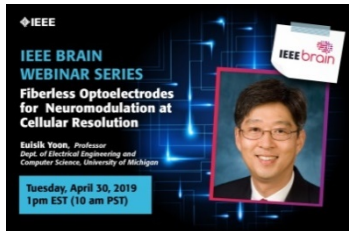
Online Technical Presence

▸ eNewsletter
- Published 3-4 times/year
- Practical and forward-looking commentary on neurotechnologies

▸ Webinar Series
- Launched Feb 2019, bi-monthly
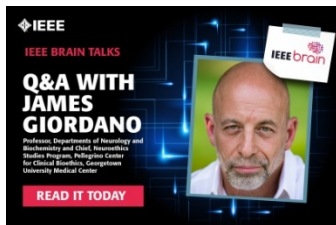- Averaging 65 registrants per webinar
- Available on-demand afterwards

▸ Podcasts
- Leveraged from IEEE Brain events, 5-10 minutes long
- Available on iTunes & Google Play & IEEE.TV
- 1880 iTunes/Google Play Reach; 3500 IEEE.TV Views

▸ Q&A Brain Talks
- Interviews with SMEs

Hackathons and Competitions

Global Hands-on Events

▸ [BCI/BMI hackathon series](#) with well defined projects organized by g.tec provide much visibility and content for IEEE Brain

▸ [Brain data challenges](#) encourage creative analytics on open source brain data

▸ Both have been great global outreach activities since 2016

▸ Some are co-located with a conference

  - Adds a unique dimension to the conference program

  - Brings new conference attendees

▸ Future events to focus on research grade level competitions

IEEE Brain Initiative Workshop on Advanced NeuroTechnologies
Connecting with Neuroscience Community

- Satellite event to Society for Neuroscience (SfN) Annual Meeting
  - Nov 1-2, 2018 in San Diego
  - Nov 9-10, 2017 in Washington D.C.
  - Nov 10-11, 2016 in San Diego

- Consistently 125-130 attendees

- Extend the IEEE brand to the neuroscientists and neuroscience community

- Added an abstract/poster component to the Brain Workshop in 2018 which was well received
  - Consistent with SfN annual meeting format – no papers

- Future workshops to be held every other year; next one in 2020

NeuroTech Entrepreneurs Workshop

Tech-Transfer and Commercialization

- Exciting new [intensive training workshop](#) in the areas of ideation, market analysis, customer and stakeholder analysis, intellectual property, regulatory affairs, reimbursement, valuation, and fundraising
- Strong interest from industry members volunteering to be speakers
- Partnering with ASU/UH BRAIN Center, an NSF-funded center
  - ASU providing free meeting space, Dec. 13-15, 2019
- Target audience is graduate students, post-doc fellows, and other early-career professionals
  - Limited to 30 participants; selected from a pool of applicants
- Involvement from both IEEE Entrepreneurship and IEEE.TV
- Confident industry sponsorship will off-set some expenses
- Recordings to be used as potential educational materials
- Looking to evolve future workshops to include a recruiting element

IEEE Brain Virtual Conference

Thought Leaders in Emerging Technologies

▸ Kick-off event on November 26, 2019 on Bioelectronics

▸ Half-day format using the On24 platform to provide an active engagement with the audience
  - On24 is the platform selected by Educational Activities for hosting virtual events

▸ Structure to include education + professional development
  - 3 Tutorials
    • Organic Bioelectronics
    • Electrode Microfabrication
    • Electrode Mechanics
  - Young Faculty Panel
  - Senior Faculty Panel

▸ Free to members of the IEEE Brain Technical Community to drive memberships

▸ Tutorials to be recorded for post-conference revenue opportunities

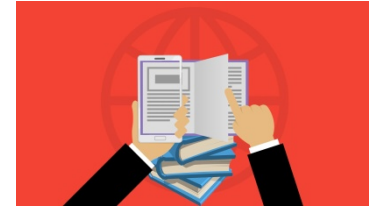# Collaborative Events with BRAIN Initiative Alliance (BIA)

Entrench with other Global BRAIN Leaders

▸ Active contributor working with other recognized global BRAIN Initiative leaders (e.g., Kavli, NIH, NSF, etc) on collaborative efforts

▸ Neural Data Science Workshop in 2020
   - Help address a universal problem in the neuroscience community

▸ Annual BRAIN Initiative Investigators Meeting
   - Connect with other PIs and get them involved with IEEE Brain

▸ Annual BRAIN Initiative Alliance Tools & Tech
   - Features 25 researchers and their tools

Publications
Online Brain Reference Source

- *Encyclopedia BRAIN: The Convergence of Engineering, Technology and Neuroscience for Revolutionizing Mental and Neurological Healthcare*
  - Online eBook multi-media reference source in neural engineering
    - Multiple themes/chapters (e.g., neural signal processing and imaging, neural computation and modeling, bioelectronic medicine, biomaterials for neural tissue engineering)
  - Wiley-IEEE Press publishing partners
    - Wiley handles editing, production, distribution
    - IEEE provides reviews and technical content
- IEEE Brain to receive a percentage of royalties from sales
- Editors contract signed; finalizing Wiley-IEEE Press contract
- Establishing editorial board and identifying contributing authors

Publications

Ethical Guidelines for Engineers

▸ IEEE Brain Neuroethics Committee working toward a set of "Ethical Considerations and Guidelines for Research and Use of Neurotechnologies"

▸ Initial deliverable is a framework of technologies and applications

- Enables a deeper dive of ethical, legal, and social implications for each technology/application intersection
- Will begin socializing framework 3Q 2019 at various events
- Goal is to identify SMEs to work on each technology/application intersection

Standards

Driving Neurotech Standardization

- ▸ IEEE Industry Connections Group – Neurotech for Brain-Machine Interfaces (BMI)
  - White paper providing a summary and gap analysis of the BMI landscape with respect to standardization, as precursor for further BMI standardization

- ▸ As an outgrowth of the IC Group, 3 Standards Working Group have been created to develop standards
  - P2725.1 – Standard for Microwave Structural, Vascular or Functional Medical Imaging Device Safety
  - P2731 – Standard for a Unified Terminology for Brain-Computer Interfaces
  - P2794 – Standard for Reporting of in vivo Neural Interface Research

Technology Roadmap

Engaging with the Industry

- ▶ Releasing in 3Q 2019 a Roadmap White Paper on Closed-Loop Control of Neural Activity
  - Stimulate industry-wide dialogue to discuss the challenges and advancements needed to promote next generation closed-loop neural technologies and systems
  - Lunch meeting with invited companies for discussion at Neuroscience 2019
- ▶ Provide the opportunity to engage with the neurotech industry and have them be part of the team to drive the technology
- ▶ Path toward more detailed roadmaps and Industry Summits