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

**Option #2**
Managing/Lead Society
May or may not have active steering committee (made up of representatives from OUs)

**Option #3**
Managing/Lead Society
Managing Society Provides Operational Support and Oversees Financials

**Option #4**
Independent Operational Unit
Stand-alone Independent Operational Unit with Own Financials and Charter
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 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

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