NEWSLETTER
OpenNeuroSig Consortium
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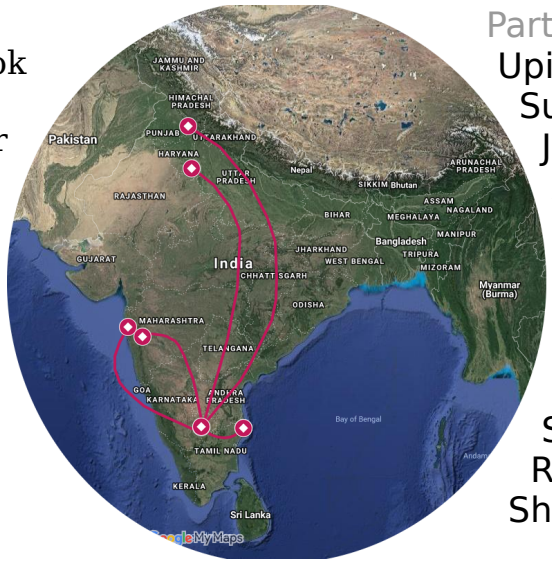
Highlights...

- 2nd consortium meeting took place on 16th April 2019
- San-diego Super Computer center (SDSC) agreed to run FindSim experiments on their server
- GsoC student from Peking University, China will work on integrating FindSim interface and SDSC server
- Dr. Sourav Bannerjee introduces his work



Participating labs:

Upinder Bhalla, NCBS
Suhita Nadkarni, IISER Pune
James Chellaiah, JNCASR
Aditi Bhattacharya, InStem
Sayak Mukherjee, IBAB
Rohit Manchanda, IITB
Sourav Bannerjee, NBRC
Raghu Padinjat, NCBS
Deepak Nair, IISc
Srinivasa Chakravarthy, IITM
Rishikesh Narayanan, IISc
Shailesh Appukuttan, CNRS

General Consortium News

The 2nd consortium meeting took place on 16th April 2019. Attendees included Suhita, James, Aditi, Deepak, Sourav, and Upi. Here are some highlights from the meeting:

- Members agreed to have an annual symposium for the consortium.
- Plan to formally lauch the consortium during the 1st symposium
- Several specific sub-projects were discussed that would fit in the framework of the consortium.
- Each project must be of interest to multiple consortium members
- Potential outreach to pharma companies for data and collaboration was discussed

Useful research and resources

A similar kind of experimental database effort has been reported by Prof. Tansu Celikel from the Dept. Of Neurophysiology at RadBound University. They published a large database of whole-cell intracellular recordings from more than 300 neurons in the supragranular layers (L2/3) of the primary somatosensory cortex in adult mice. Their database consists of more than 350 current-clamp experiments, more than 450 voltage-clamp experiments using a number of different recording protocols.
Below are the links to their paper and data bank.

Paper:
https://doi.org/10.1093/gigascience/giy147

Data bank:
http://gigadb.org/dataset/100535

Updates on Websites

The consortium website is taking shape and includes pages for the sub-projects, tools, and resources.
http://findsim.ncbs.res.in/findsimweb/

There will be a three-tier structure to use consortium data:
- Global access
- project-specific access and
- user-specific access.

Aditi and James have kindly offered to participate in the website development and aesthetics.

Sourav and Suhita have offered input to the newsletter.

A table of current consortium sub-projects and participants is at:
https://docs.google.com/spreadsheets/d/1Zla2yS6OCS5luLdflkzDcE0I9EcJAYPqhWQlXjRBHOc/edit?usp=sharing

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Google Summer of Code (GsoC) 2019

Currently the FindSim interface is configured to run the computation of FindSim experiment on bebinca server housed at NCBS IT center. In near future, we will need more compuation power to accommodate large number of users and run heavier jobs. To help with that, the San Diego supercomputer center has agreed to provide their resources via Neuroscience Gateway (NSG). (https://www.nsgportal.org/)

To set up the pipeline between the Findsim interface and NSG, a student from Peking University, China will be working on the as a part of GSoC -2019. The student will start working on the project from first week of June'19. The pipeline development and testing will be completed by mid September'19. This architecture will also facilitate running simulations on Cloud resources. Thus we anticipate having highly scalable resources available to consortium members and external users.
In parallel, we will also develop better and more asthetically pleasing visualization tools to set up simulations and display the results of the computations

Work from participating labs

The primary focus of the Synapse Biology laboratory at National Brain Research Center, headed by Dr. Sourav Banerjee, is to identify and dissect neuronal activity-induced RNA-based regulatory mechanisms that modulate a wide spectrum of functions within neural circuits. "The spatially restricted distribution of noncoding RNAs and their coexistence with protein synthesis and degradation machinery in sub-neuronal compartments make them pivotally positioned to integrate signals at a molecular level", says Dr. Banerjee. His laboratory is currently employing a genome-wide sequencing approach to catalog miRNAs and long noncoding RNAs (lncRNAs) that are enriched at the hippocampal synapses. He is investigating how these non-coding transcripts modulate synapse-specific protein synthesis at the hippocampus from subsets of mRNAs that bring about long term synaptic changes required for memory formation. The long-term goal is to evaluate impairment of these regulatory controls due to aging and in neurodevelopmental disorders, such as autism.

Dr Banerjee mentions that lncRNAs have emerged as a game changer in the field. He says, "lncRNAs were identified a decade ago but condemned as spurious by-products of transcription earlier. Emerging studies have revealed that long non-coding RNA is expressed in a cell type specific manner. These transcripts are alternatively spliced and spatially distributed within neurons, making them exciting candidates to investigate." Ongoing research from the Banerjee lab has shown that activity of specific-subsets of these lncRNAs is regulated in response to contextual fear conditioning. The laboratory employs fluorescent tagging of newly synthesized protein to analyze how lncRNAs influence memory formation through protein synthesis-dependent mechanisms.
Synapse Biology Laboratory is very excited to be a part of the open NeuroSig consortium. The team hopes to share its findings and collaborate with computational and system neuroscientists towards developing noncoding RNA-mediated gene networks operating exclusively at the synapse. The molecular networks developed would be crucial to identify signaling aberrations underpinning neurodevelopmental disorders such as Autism Spectrum Disorders.