# NEWSLETTER OpenNeuroSig Consortium

On the 21st December 2018, nine neuroscience labs from different parts of the country gathered together on a virtual platform and agreed to form India's

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first unique consortium to discuss a well-defined, open source and leading edge framework in neuronal signaling. The rest, as they say, is history.

### General Consortium News

#### T minus 0 seconds!

We are officially announcing release weeklv the of а newsletter. The newsletter will be the source of the current buzz in the consortium. It wil. include an array of topics including updates about the project, updates on the membership of the consortium. present and future directions of the project and other relevant news. This newsletter will be exclusivelv sent to the paricipating labs every week. Partcipating labs will be encouraged and invited to discuss about their work apart from adding on to the common goals of the project. This may cover any plans, suggestions and results that are relevant for the broad framework of neuronal signaling.

In addition to the newsletter, we are also launching a website which will serve as an interface for the modelers and experimentalists alike to interact with FindSim/AutSim. It will also include information regarding the latest developments in the project. Users will be able to make their personal accounts which will allow them direct access to the database of experiments and models that will be regularly maintained on the server.

We also take this opportunity to announce that a Twitter feed @OpenNeuroSigConsortium is being initiated. Members can follow and interact with the most current news around the Consortium through this feed. Remember, you heard it here first, folks!

#### 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

#### **Resources already in place** for the Consortium

1) Multiscale modeling of ODE/ Gillespie/reaction-diffusion systems with detailed single neuronphysiology in MOOSE.

2) Curated database of modelfriendly experimental protocols and readouts: over 120 entries.

3) Capability in FindSim to perform 'experiments' of standard biochemical doseresponse, time-series, combinatorial stimuli, as well as a range of single neuron electrophysiology, LTP/LTD experiments and

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FindSim A Framework for Integrating Neuronal Home ExpModMapList Mode	Data and Signaling Models													
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Create new account Request new password	We examines how to systematically use experimental data to parameterize multiscale neuronal signaling models reproducibly, scalably, openly, and in a generally applicable manner. It is													
Log in clearly desirable to have a standard for facile mapping between experiments and models, especially in the rapidly expanding domain of neural physiology and signaling. We envised role of FindSim as a first key step towards a standard, by demonstrating a functional implementation of envision complementation of envision complementations of envision complemen						the								

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phosphoproteomics.

4) Capability to do model optimization to improve parameters using the experimental database as a criterion for model 'goodness'

5) Version 0.9 of a spine signaling model pertaining to Autism pathways.

6) First stages of web interface for community access to this platform (see screenshots below).

# The website is hosted at findsim.ncbs.res.in/ findsimweb

# Work from participating labs

Dr. James Clement Cheliah's lab's recent work focuses using Syngap1+/- mouse model of ID to study the effect of Synaptic **RAS-GTPase** Activating Protein (SYNGAP1) on protein synthesis, and their study a model proposes for its crosstalk with protein synthesis regulator, Fragile X Mental Retardation Protein (FMRP).

"Recent advancement in scientific techniques has proved that translation can occur in neurites (spines) which are far away from the



cell body", Abhik Paul from his lab writes. "Tight regulation of neuronal protein synthesis is vital for the brain as it has a direct impact on our learning and memory capability."

James says "The initiative on multi-institutional neuronal consortium would bring together not only the experimentalists but also researches who do simulations. The available experimental data can be incorporated in neuronal simulations which can facilitate further understanding of how modulating certain signalling pathways that regulate synaptic functions, and based onthose results from simulations, we can test further hypothesis in mouse model that may take many years. Therefore, in my opnion, this consortium will facilitate discovery of novel mechanisms and potential drug targets."

## Screenshots of the website

Screenshots Left: of the website allowing the user to the details of input the experiment, for eg. metadata, experimental information, model mapping, stimuli and readout. The user can view the model layout and perform simulation on a server located at NCBS-TIFR. Bangalore.

The website produces an output which informs the user of the best fit between the experiment and simulation.