

# NeuroML Development Workshop @ Harmony 2022

Date/time of meeting: 28th April, 15:00-18:00 UTC; [converter](#)

Zoom link for meeting:

<https://ucl.zoom.us/j/91720715131?pwd=YmtLa29jd0ROWnNMVGovVzhCd0Nldz09>

## Attendees:

Padraig Gleeson, Ankur Sinha, Boris Marin, Marmaduke Woodman (TVB), Charl Linssen (NESTML), Jonathan Karr (BioSimulators/BioSimulations; [jonrkarr@gmail.com](mailto:jonrkarr@gmail.com)), Konstantin Bülau, Leon Stefanovski, Leon K. Martin (TVB / TVB-O), Angus Silver, Thorsten Hater (Arbor/FZJ/JSC/HBP), Bilal Shaikh (BioSimulators/BioSimulations; Mount Sinai), Sharon Crook, Salvador Dura-Bernal, Sotiros Panagiotou, Kelly Chen, Sandra Diaz, Cengiz Gunay, [Christos Strydis](#), [Sotirios Panagiotou](#) (EDEN/[Neurocomputing Lab](#)/Erasmus MC), Valery Bragin

## AGENDA

### 1) Introductions

- a) What would people like to get out of the meeting

### 2) NeuroML update v2.2

Info here: <https://github.com/NeuroML/NeuroML2/blob/master/HISTORY.md>

Mainly a coordinated release of all updates to libraries/documentation

### 3) NeuroML updates: Documentation

The latest updates to the NeuroML documentation are at: <https://docs.neuroml.org>

- a) New interactive tutorials (under [Getting Started](#))
- b) Guide to converting (conductance based) models to NeuroML ([here](#)).
- c) Different approaches to “supporting” NeuroML [here](#).
- d) Pages for individual simulators (see below).

### 4) NeuroML/LEMS libraries - release process/testing updates

Dropped Python 2 support...

Much better testing using GitHub Actions

### 5) Recent simulator support updates (alphabetical order, but let us know if you need to present earlier...)

- a) Arbor

Arbor is a multicompartmental simulator optimised for use in high performance computing environments.

Latest developments on NeuroML<->Arbor:

<https://docs.neuroml.org/Userdocs/Software/Tools/Arbor.html>

<https://github.com/thorstenhater/nmlcc>

## **b) Biosimulators**

BioSimulators is a free [registry of biosimulation tools](#). The registry includes tools for a broad range of frameworks (e.g., logical, kinetic), simulation algorithms (e.g., FBA, SSA), and model formats (e.g., BNGL, CellML, **NeuroML/LEMS**, SBML, Smoldyn). Many of the simulation tools provide Python packages, command-line programs, and Docker images with consistent interfaces. Together, BioSimulators makes it easier to run simulations. BioSimulators is powered by several [conventions](#) including SED-ML, KiSAO, COMBINE, and other standards.

<https://biosimulators.org>

## **c) EDEN (preprint, [in press](#))**

EDEN is a recently developed simulator with native NeuroML 2 support...

Live demo: <https://github.com/spanag/eden-sim-jupyter-demo>

Installable through pip: [pip install eden-simulator](#)

Code: [https://gitlab.com/c7859/neurocomputing-lab/Inferior\\_OliveEMC/eden](https://gitlab.com/c7859/neurocomputing-lab/Inferior_OliveEMC/eden)

Latest developments on NeuroML<->EDEN:

<https://docs.neuroml.org/Userdocs/Software/Tools/EDEN.html>

## **d) MOOSE**

Latest developments on NeuroML<->MOOSE:

<https://docs.neuroml.org/Userdocs/Software/Tools/MOOSE.html>

## **e) NEST(ML)**

See <https://github.com/OpenSourceBrain/NESTShowcase>

<https://nestml.readthedocs.org/>

## **f) NetPyNE**

Recent updates:

- Schema for checking specifications;
- documentation+jupyter nb+video tutorials;
- new rules to distribute synapses along dendrites;
- coreNEURON
- GUI integration with OSB;
- GUI parameter exploration and batches;
- integration with EBRAINS platforms;
- interface with TVB;

- interface with LFPykit for EEG/MEG;
- interface with neurovascular coupling model for fMRI; coreNEURON (paper);
- new models: BBP/HBP S1 (paper), A1, thalamus, hippocampus

NeuroML<->NetPyNE: <https://docs.neuroml.org/Userdocs/Software/Tools/NetPyNE.html>

#### **g) TVB**

<https://github.com/OpenSourceBrain/TheVirtualBrainShowcase>

[https://github.com/the-virtual-brain/tvb-root/tree/master/scientific\\_library/tvb/rateML](https://github.com/the-virtual-brain/tvb-root/tree/master/scientific_library/tvb/rateML)

RateML - meeting 25th Oct

### **6) Interactions with other model specification formats**

#### **a) ModECI MDF**

<https://github.com/ModECI/MDF/tree/main/examples/NeuroML>

#### **b) SONATA**

Not very much since publication:

<https://journals.plos.org/ploscompbiol/article?id=10.1371/journal.pcbi.1007696>

#### **c) PyNN**

Updates from Andrew?

### **7) Databases & other neuroinformatics resources**

#### **a) NeuroML-DB**

[Preprint](#) has come out.

#### **b) OSB**

OSB v2.0 in development: <https://www.v2.opensourcebrain.org>

Includes a JupyterLab environment, with NeuroML libraries and many of the above mentioned tools preinstalled.

#### **c) EBRAINS - HBP platform**

Any updates??

### **8) Mentoring**

#### **a) Google Summer of Code project**

Call for more models to be converted to NeuroML

#### **b) Outreachy**

Very positive experience with ModeCI/MDF:

<https://www.outreachy.org/communities/cfp/modeci/>

**9) NeuroML v3.0 plans**

a) NeuroMLlite

i) Support for higher level network descriptions in Arbor:

<https://github.com/arbor-sim/arbor/issues/418#issuecomment-934277781>

Would be interested in combining this with our effort to add native NeuroML support in Arbor

**10) How can we build the NeuroML developer community?**

**11) Any other topics...**