



Contribution ID: 16 Contribution code: P2-4

Type: **Poster & advertisement flash talk**

## Fully automated model generation in PyNEST

*Friday 24 June 2022 13:39 (3 minutes)*

NESTML is a concise modeling language for neuron and synapse models. It comes with a software toolchain to generate efficient simulation code for different target platforms.

Previously, all used neuron-synapse combinations involving synapse models with a dependency on post-synaptic variables, such as spike-timing dependent plasticity (STDP), had to be provided manually to NESTML before running the simulation. We have now developed a just-in-time (JIT) framework that eliminates this step, by intercepting function calls in PyNEST and invoking the NESTML workflow and making all model classes available for use in the network simulation in a completely automated manner.

One drawback of this approach, however, is that neuron parameters only become available after model instances have been connected, as connection with a synapse model like STDP might modify the parameters of a neuron model. Caching such attributes on the Python level at create-time could solve this problem, but doubles the amount of memory required. To overcome this issue, we instead have modified the data structures holding the model parameters in C++ by making the model independent of its parameters, which also opens up possibilities for future optimizations.

### Acknowledgements

This software was developed in part or in whole in the Human Brain Project, funded from the European Union's Horizon 2020 Framework Program for Research and Innovation under Specific Grant Agreements No. 720270, No. 785907 and No. 945539 (Human Brain Project SGA1, SGA2 and SGA3).

The SDL Neuroscience has been funded by the Helmholtz Association as part of the Helmholtz Portfolio Theme "Supercomputing and Modeling for the Human Brain (SMHB)", and the Jülich Aachen Research Alliance (JARA).

### Preferred form of presentation

Talk & (optional) poster

### Topic area

simulator technology and performance

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## References

## Speaker time zone

UTC+2

## Keywords

just-in-time (JIT), vectorization

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**Session Classification:** Poster

**Track Classification:** Main track