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NEST is on the road to GPU integration

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Most of the Top500 computer systems and all of the upcoming exascale machines employ GPUs alongside CPUs. To get the most performance out of these architectures, simulation software requires efficient support for both processor types. Decades of simulator development enable the routine simulation of large-scale neuronal network models on thousands of many-core CPUs in parallel [1]; recent GPU implementations show highly competitive results [2, 3]. Here, we present our project to integrate NEST GPU (formerly NeuronGPU [3]) into the ecosystem of the CPU-based simulator NEST [4]. NEST GPU, written in CUDA-C++, lends itself to this integration due to a similar interface and a modular structure. The development will continue within the NEST Initiative under the same GitHub organization [5], although the codes themselves are still separate. We pursue the unified, community-centered workflow already pioneered by NEST: build processes, model development (NESTML [6]), documentation standards along with quality assurance through continuous integration. We are looking forward to a fruitful exchange between NEST and NEST GPU, enabling the optimization of simulator performance under the hood while providing a common frontend for users to seamlessly harness both CPUs and GPUs in the future.

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Topic area

simulator technology and performance

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