

New, highly realistic computer models of neurons

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The Allen Institute for Brain Science and the Blue Brain Project are deepening their collaboration. Today, the US-based Allen Institute is releasing a set of 40 computer models of neurons from the mouse visual cortex, created using tools developed by the Swiss-based Blue Brain Project at EPFL. Using Blue Brain technology, the researchers were able to reproduce the physiology and electrical activity of the neurons with an extremely high level of detail.

The Blue Brain Project is the simulation core of the Human Brain Project, a huge pan-European initiative. The scientific journal *Cell* recently published a long paper demonstrating the effectiveness of the Blue Brain Project's modeling tools, focusing on the high accuracy and predictive power of the models and the discoveries they have already led to, including insight into the unexpected role of calcium. At the same time, the team has made these resources available to researchers around the world on a web-based platform.

"Our collaboration with the Allen Institute is an important step towards what we are striving to achieve," said Eilif Muller, the leader of the Blue Brain Simulation group. "The goal is to provide the scientific community with simulation-based tools and techniques that can give us a better understanding of how [neurons](#) and neural networks function."

The Allen Institute's virtual neurons accurately reproduce the biophysical activity of their real counterparts. Modeling the activity of dendrites - treelike extensions of neurons through which they integrate input from

other neurons - was especially realistic. "Combining the data, tools and knowledge from the world's two largest neuroscience-oriented enterprises demonstrates the synergy that can be achieved by an Open Science policy, freely sharing all available data and metadata", said Christoph Koch, President and Chief Scientific Officer of the Allen Institute for Brain Science. "Understanding the brain, here the nonlinear processing in cortical dendrites, is too difficult a task to accomplish in any other way."

For the Blue Brain Project researchers, this collaboration is just the first step. Now the project is in talks with other teams of researchers who would like to do the same. Sean Hill, a neuroscientist affiliated with EPFL, is delighted: "This is a watershed moment, when we can really have an impact: we're a Swiss project that is central to a major European project; now we're reaching out to the scientific community around the world."

Provided by Ecole Polytechnique Federale de Lausanne

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