

Poster presentation

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The Blue Brain Project: building the neocortical column

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The Blue Brain Project is an attempt to reverse-engineer and model the neocortical column, to explore how it functions and to serve as a tool for neuroscientists and medical researchers. The project integrates physiological experimental databases, analysis tools, modeling applications, simulation software and 3D interactive visualization to provide a rich environment for the systematic study and calibration of the model to experimental data. To construct the column, electrical models of neurons are first generated from a combination of gene expression, ion channel, cell morphology and electrophysiological data. These models are then placed according to physiological data that constrains the volume constraints, composition and connectivity of the cortical microcircuit. Finally the column is simulated and calibrated in an iterative process to integrate multiple levels of experimental data. This process provides a data-driven modeling framework for large-scale realistic simulations that incorporates many levels of physiological detail and can be extended to capture a wide range of experimentally-observed phenomena.