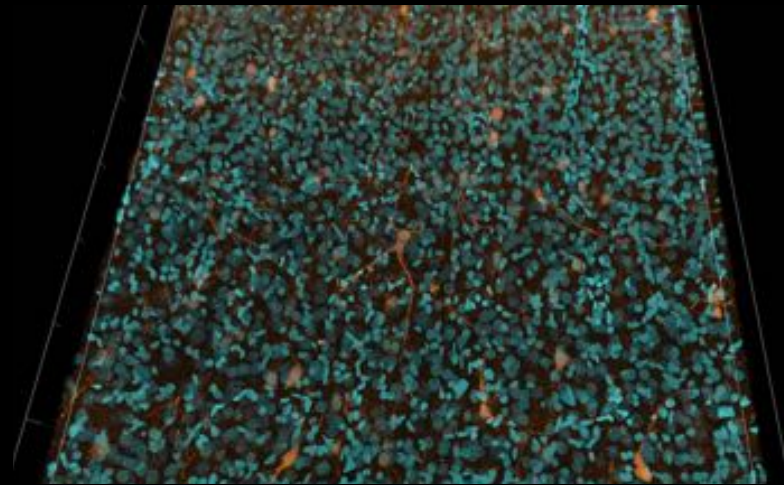


The Blue Brain Project

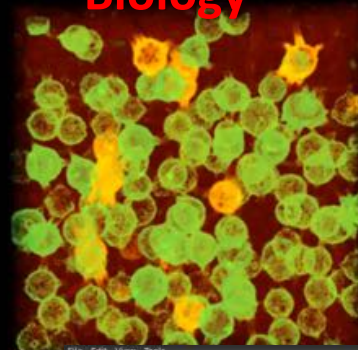
Digital Reconstruction and Simulation of the Brain

Henry Markram
Blue Brain Project, EPFL
Brain Forum, 2016

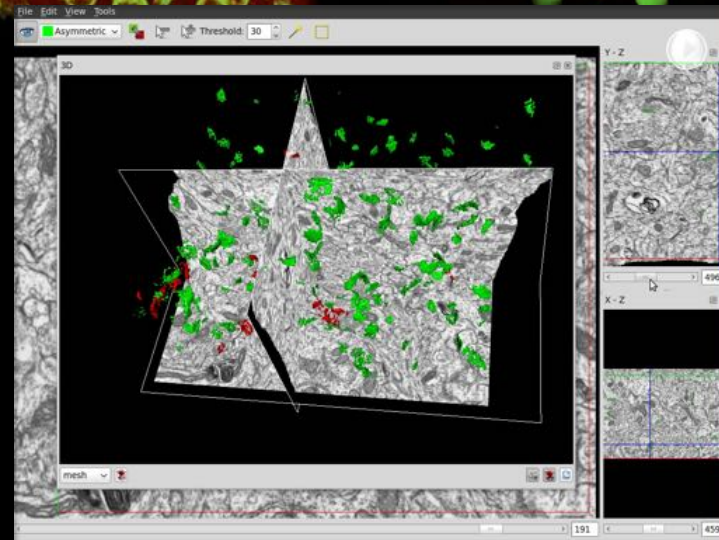
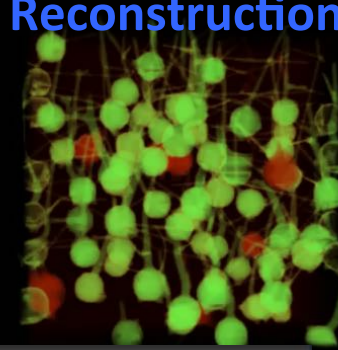
Reconstruction



Biology



Reconstruction



In vitro-like (Regenerative State)



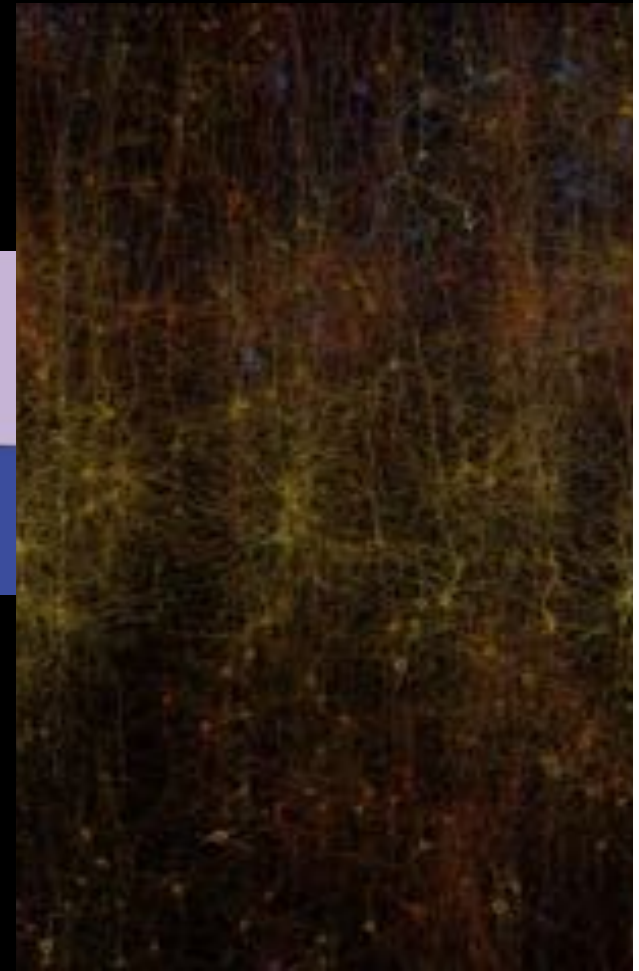
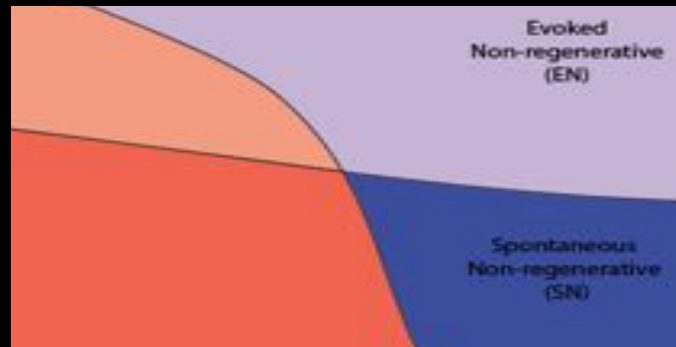
In vivo-like (Non-Regenerative State)



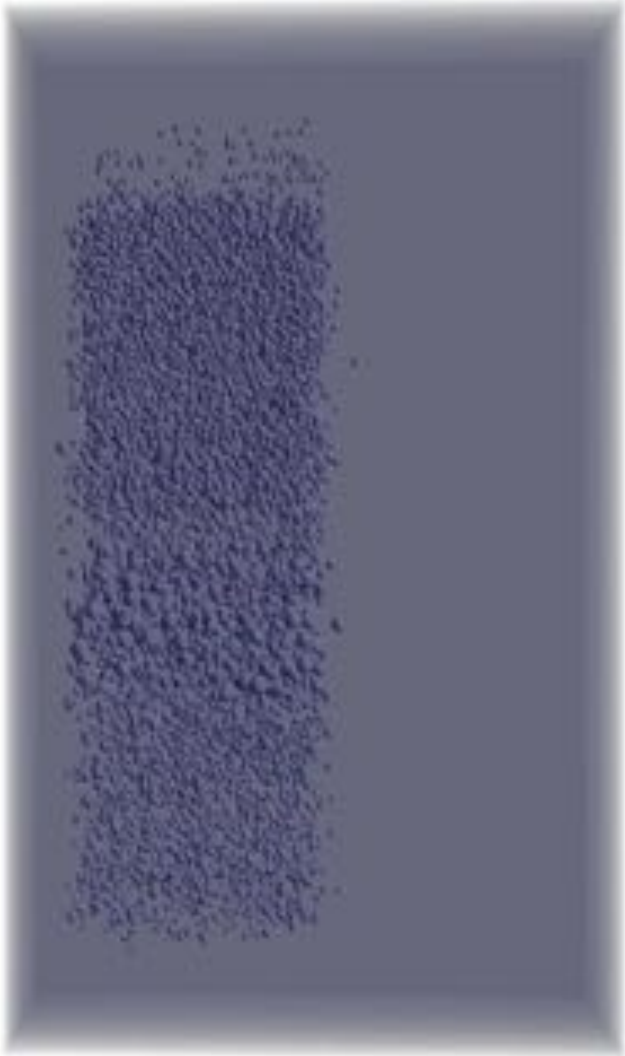
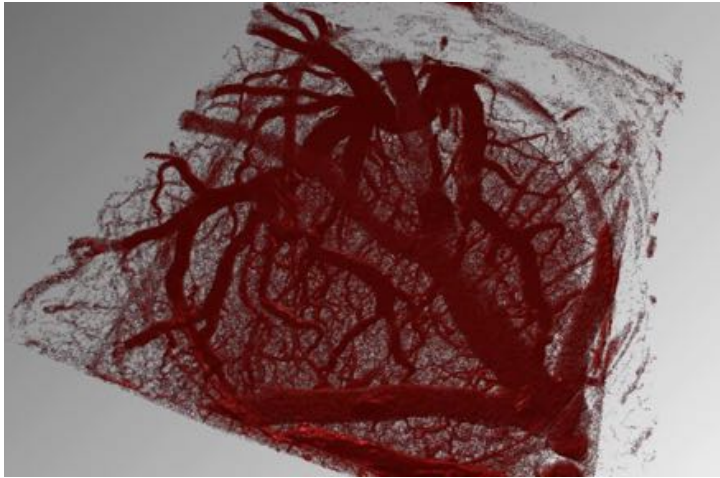
A Spectrum of States

Regenerative
State

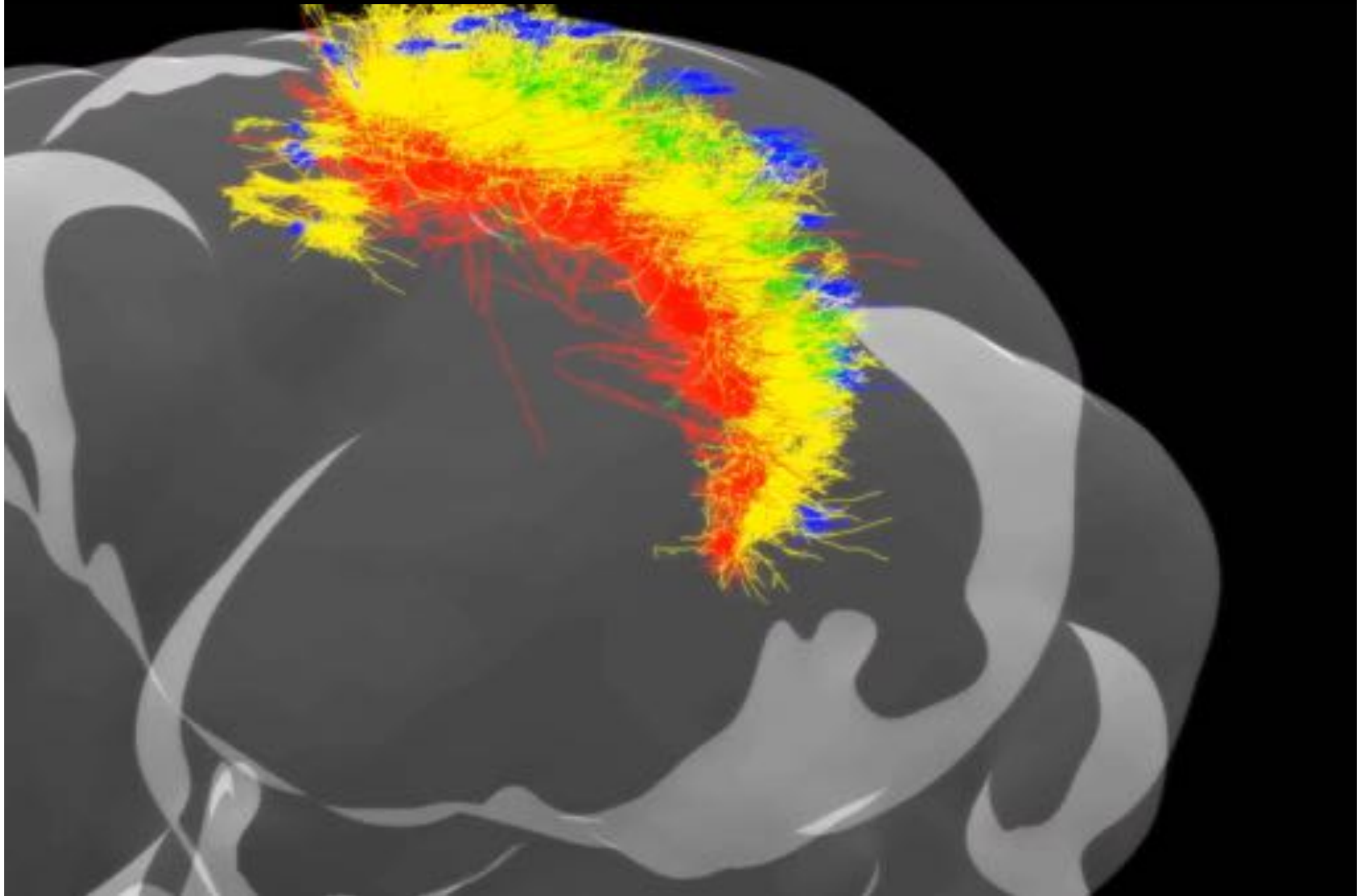
Non-Regenerative
State



Digital Reconstruction of the Glial and Vascular System

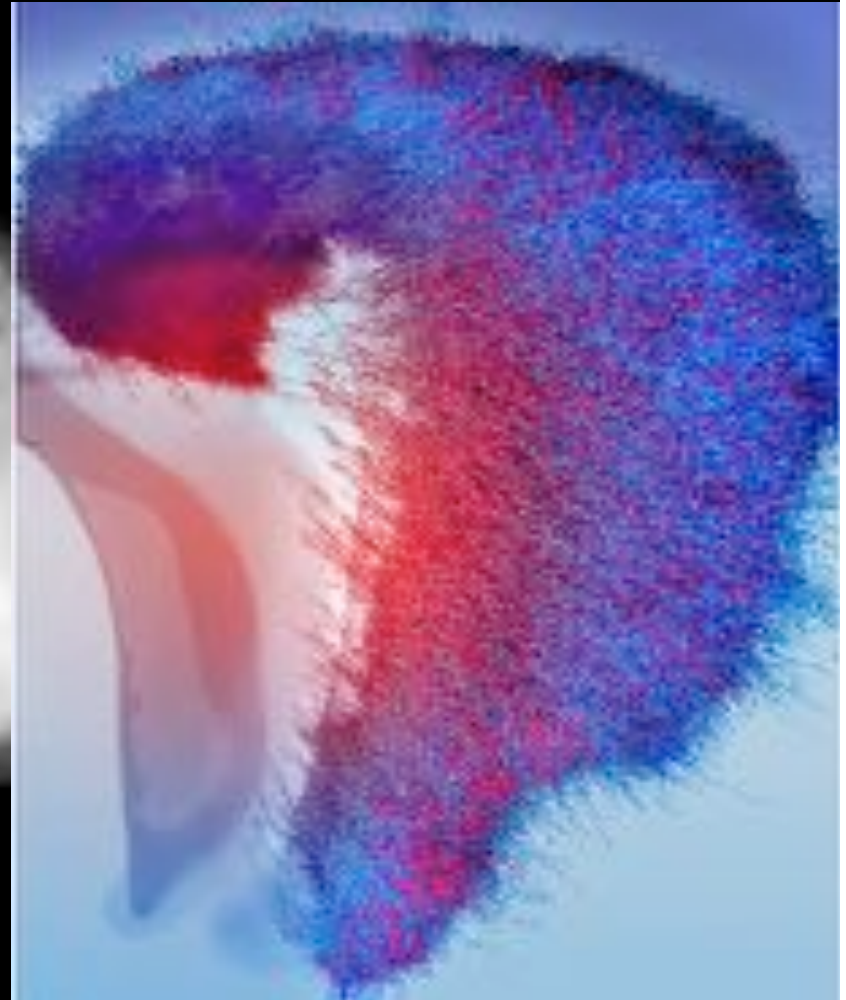


Reconstructing the Neocortex

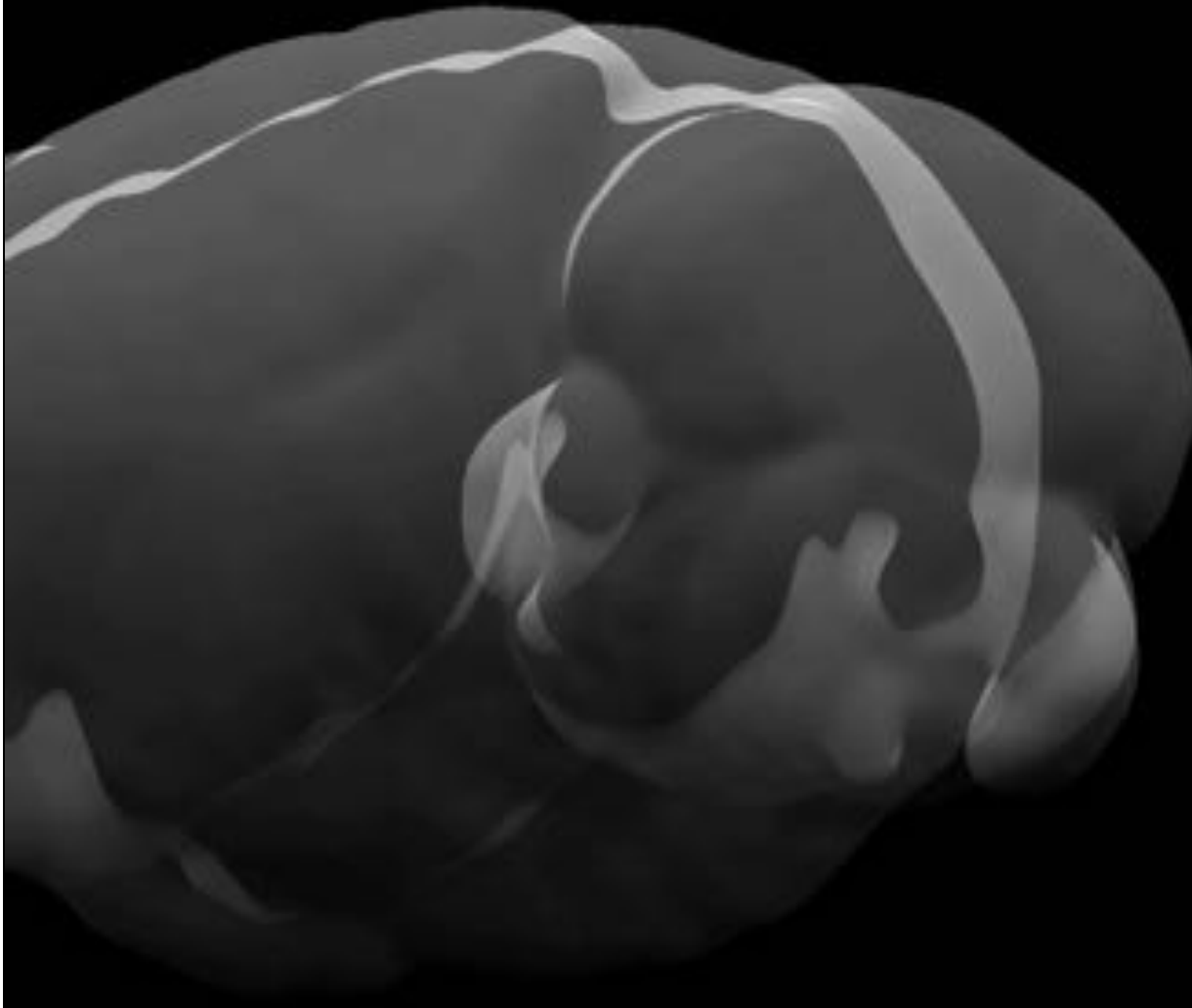


Simulating Somatosensory Cortex

Reconstructing other brain regions (eg the hippocampus)



Reconstructing the Whole Mouse Brain



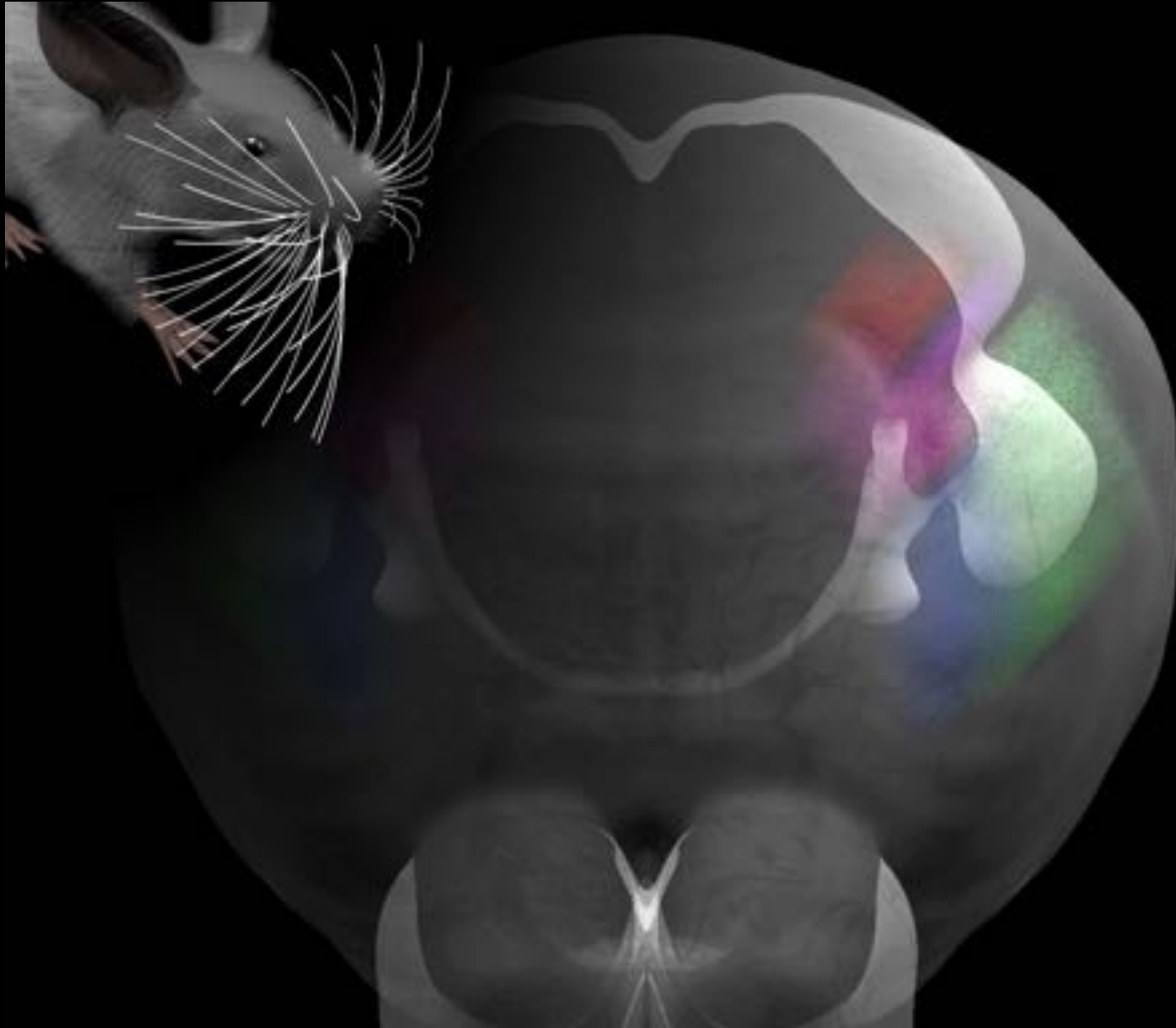
Simulating the Mouse Brain



Digital Robotics



Digital Behavior



The Human Brain Project

Infrastructure for Collaboration

Collaborators

Henry Markram,^{1,2,19,*} Eilif Muller,^{1,19} Srikanth Ramaswamy,^{1,19} Michael W. Reimann,^{1,19} Marwan Abdellah,¹ Carlos Aguado Sanchez,¹ Anastasia Ailamaki,¹⁶ Lidia Alonso-Nanclares,^{6,7} Nicolas Antille,¹ Selim Arsever,¹ Guy Antoine Atenekeng Kahou,¹ Thomas K. Berger,¹ Ahmet Bilgili,¹ Nenad Buncic,¹ Athanassia Chalimourda,¹ Giuseppe Chindemi,¹ Jean-Denis Courcol,¹ Fabien Delalondre,¹ Vincent Delattre,² Shaul Druckmann,⁵ Raphael Dumusc,¹ James Dynes,¹ Stefan Eilemann,¹ Eyal Gal,⁴ Michael Emiel Gevaert,¹ Jean-Pierre Ghobril,² Albert Gidon,³ Joe W. Graham,¹ Anirudh Gupta,² Valentin Haenel,¹ Etay Hay,^{3,4} Thomas Heinis,^{1,16,17} Juan B. Hernando,⁸ Michael Hines,¹² Lida Kanari,¹ Daniel Keller,¹ John Kenyon,¹ Georges Khazen,¹ Yihwa Kim,¹ James G. King,¹ Zoltan Kisvarday,¹³ Pramod Kumbhar,¹ Sébastien Lasserre,^{1,15} Jean-Vincent Le Bé,² Bruno R.C. Magalhães,¹ Angel Merchán-Pérez,^{6,7} Julie Meystre,² Benjamin Roy Morrice,¹ Jeffrey Muller,¹ Alberto Muñoz-Céspedes,^{6,7} Shruti Muralidhar,² Keerthan Muthurasa,¹ Daniel Nachbaur,¹ Taylor H. Newton,¹ Max Nolte,¹ Aleksandr Ovcharenko,¹ Juan Palacios,¹ Luis Pastor,⁹ Rodrigo Perin,² Rajnish Ranjan,^{1,2} Imad Riachi,¹ José-Rodrigo Rodríguez,^{6,7} Juan Luis Riquelme,¹ Christian Rössert,¹ Konstantinos Sfyarakis,¹ Ying Shi,² Julian C. Shillcock,¹ Gilad Silberberg,¹⁸ Ricardo Silva,¹ Farhan Tauheed,^{1,16} Martin Telefont,¹ Maria Toledo-Rodriguez,¹⁴ Thomas Tränkler,¹ Werner Van Geit,¹ Jafet Villafranca Díaz,¹ Richard Walker,¹ Yun Wang,^{10,11} Stefano M. Zaninetta,¹ Javier DeFelipe,^{6,7,20} Sean L. Hill,^{1,20} Idan Segev,^{3,4,20} and Felix Schürmann^{1,20}