

The DIADEM Challenge

Neuroscientists map the tree-like structure of nerve cells to better understand how networks of neurons assemble into circuits to enable complex behavior must now build those maps by hand. Despite the advent of computer technology that enables mapping in three dimensions, neuronal reconstructions are still largely performed by hand and reconstructing a single cell may take months. The vast majority of axons (the long neuronal projections that transmit information to neighboring cells) and dendrites (the branches on nerve cells that receive information from neighboring cells) must be traced manually. The lack of powerful – and effective – computational tools to automatically reconstruct neuronal arbors has emerged as a major technical bottleneck in neuroscience research.

Organizers of a new competition hope to provide incentives for the development of new computer algorithms to advance the field – including a **cash prize of up to \$75,000** for the qualifying winner. The DIADEM Competition – short for Digital Reconstruction of Axonal and Dendritic Morphology – will bring together computational and experimental scientists to test the most promising new approaches against the latest data in a real-world environment.

The competition is open to individuals and teams from the private sector and academic laboratories. Competitors will have a year to design an algorithm and to test it against the manual gold standard. Up to five finalists will compete in the final phase at the Janelia Farm Research Campus in August 2010.

The DIADEM Competition is organized by the Allen Institute for Brain Science (AIBS), the Janelia Farm Research Campus of the Howard Hughes Medical Institute (HHMI) and the Krasnow Institute of George Mason University (Krasnow Institute). The cash prize has been established by the AIBS and HHMI.

Five Institutes of the National Institutes of Health (NIH), including the National Institute of Neurological Disorders and Stroke (NINDS), the National Institute of Mental Health (NIMH), the National Institute on Drug Abuse (NIDA), the National Institute of Biomedical Engineering and Bioimaging (NIBIB), and the National Institute of General Medical Sciences (NIGMS) are providing partial support for a scientific conference that is independent of— but held in conjunction with—the final phase of the DIADEM challenge.*

For data download, the rules and more details, please visit <http://DIADEMchallenge.org>

* The co-sponsorship of the conference by these NIH institutes does not represent an endorsement of the DIADEM Challenge, specific software products that may emerge from the competition or the activities of the AIBS, HHMI, or the Krasnow Institute.