Large scale marmoset monkey cerebral cortex connectivity mapping

The marmoset is an emerging animal model for large-scale attempts to understand primate brain connectivity, but achieving this aim requires the development and validation of procedures for normalization and integration of results from many neuroanatomical experiments. This talk will present a computational pipeline for co-registration of retrograde tracing data on connections of cortical areas into a 3-dimensional marmoset brain template, generated from Nissl-stained sections. The procedure results in a series of spatial transformations that are applied to the coordinates of labeled neurons in different cases, bringing them into common stereotaxic space. Comparison between the results of the automated and human-based processing of these cases reveals the method performs comparably to an expert neuroanatomist in terms of accuracy of assigning individual cells to their respective brain structures. The present procedure enables comparison and visualization of large data sets, which in turn opens new avenues for integration and analysis of results from many animals. Its versatility, including applicability to archival materials, may reduce the number of additional experiments required to produce the first detailed cortical connectome of a primate brain.