CRUNCH Seminars at Brown, Division of Applied Mathematics

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Vascular Network of Zebrafish Brain

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Recently, the zebrafish attracts much attentions in the fields of biology and medical science due to its unique features such as small size, rapid development and optical transparency. Optical access inside its body allows us to observe the development processes of vasculature from an immature structure to mature one during the first few days after fertilization in vivo. In this talk, we present some results of live imaging of vascular network structure and blood flow in the zebrafish brain. From a stack of 2D images obtain from confocal microscope, we reconstruct 3D structures of vascular network, identifying the centerline and the local radius of each vessel, and extract the information on the connections of all the branches. These information is a key for conducting three-dimensional DPD simulation and simplified 1D model analyses of blood flow in the zebrafish.