Investigation of Bio/Micro-fluid Mechanism

Objectives:

- To investigate and elucidate the influences of vascular geometry on the hemodynamics
- To develop a simulation system for the clinical study and treatment

Simulation

- Three-dimensional geometric modeling from medical images
  - Cerebral aneurysm
  - Circle of Wills

- Wall shear stress (WSS) of the cerebral aneurysm by the FSI simulation

- 1D-0D blood flow simulation

Experiment

- Stereo-PIV measurement of blood flow in the realistic geometric model
  - Realistic model of the cerebral aneurysm
  - Streamline in the aneurysmal model

- 3D Measurement of the flow in the microchannel using digital holography
  - 3D interfacial geometry between water and oil
  - 3D flow inside the droplet

- Quantitative damage evaluation of endothelial cells under the WSS loading

- Confocal micro-PIV measurement of single RBC motion and the surrounding flow
  - Tank-treading motion of single RBC and the velocity distribution of the surrounding flow