

# OSHIMA LAB.

## [Bio fluid mechanics, micro-fluid and biochemical system]

Department of Mechanical and Biofunctional System / Center for Research on Innovative Simulation Software

<http://www.oshimalab.iis.u-tokyo.ac.jp/>

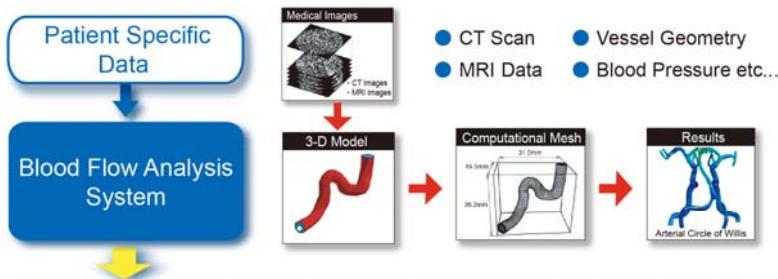
### Computational Fluid Dynamics

Department of Mechanical Engineering / Interfaculty Initiative in Information Science

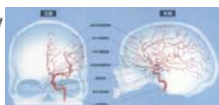
## Investigation of Bio/Micro-fluid Mechanics

### Background / Purpose

- The 2nd Highest Rate of Death in Japan
  - Cerebrovascular disorders
    - ➔ 10%%-subarachnoid hemorrhage
    - ➔ 90%%-rupture of cerebral aneurysm
- Characteristics in formation of aneurysm
  - Preferential location such as bend, bifurcation
  - Preferential age groups between 40's and 50's



➔ Any relation between vessel geometry and aneurysm?

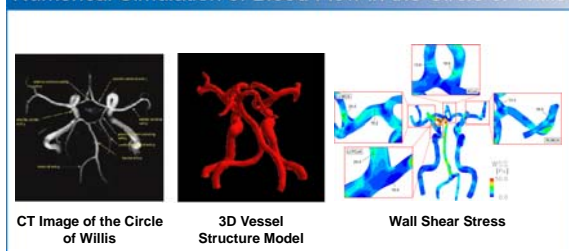


**Research Aim**

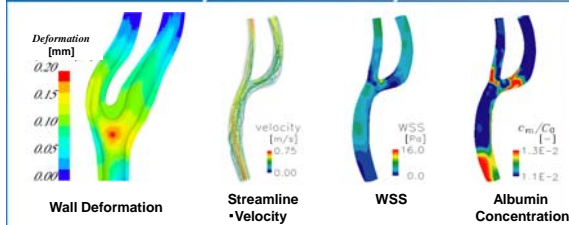
- Investigation of the effects of vessel geometry on the hydrodynamics
- Development of an integrated hemodynamic simulation system for clinical diagnosis

### Computational

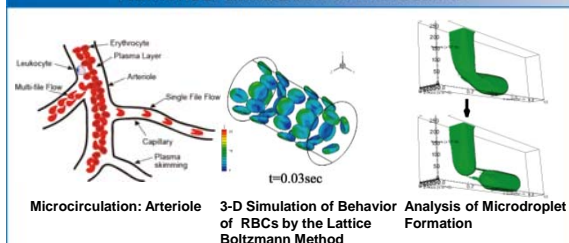
#### Numerical Simulation of Blood Flow in the Circle of Willis



#### Fluid-Structure Interaction and Mass Transport Analysis in Carotid Artery

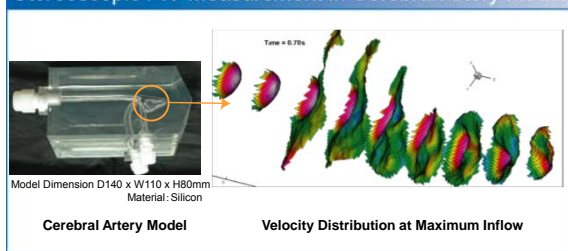


#### Numerical Simulation in Microscale

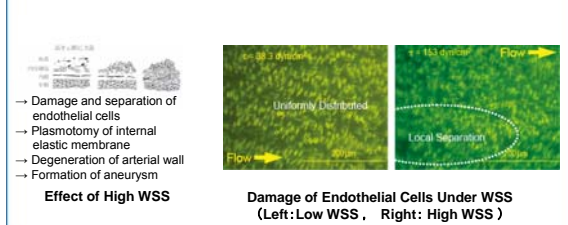


### Experimental

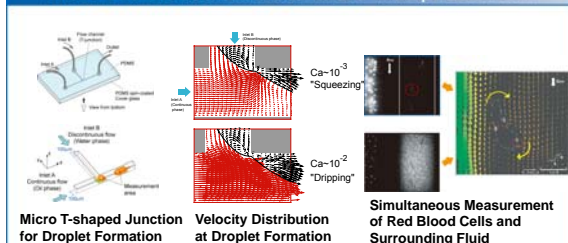
#### Stereoscopic PIV Measurement in Cerebral Artery Model



#### Quantitative Evaluation of Blood Vessel Damage



#### Micro-PIV Measurement of Micro-Multiphase Flow



Macro [mm~cm] / Micro [μm]