

## MOEBIUS Accurate, Fast & Customizable Solver

### CORE TECHNOLOGY

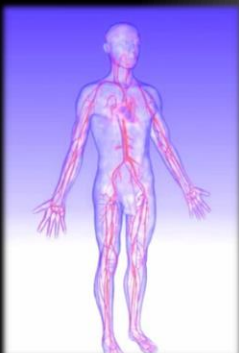
MOEBIUS is a complete multi-physics and multi-scales fluidic and molecular solver developed and validated over the past 20 years

### CAPABILITIES

Simply define the agents of the problems and put them together in an universe including user defined rules to tailor the physics. The solver will provide time and space evolution of the system giving access to a detailed quantification and analyze of the system

### CUSTOMIZABLE

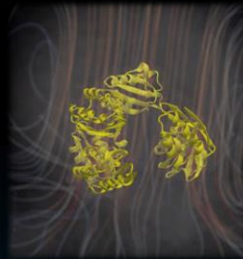
MOEBIUS unique architecture enables easy and fast configuration of any problems involving FLUIDS, PARTICLES and/or SCALARS leveraging a large set of predefined "universes"



Physiological flows

### MULTI-SCALES COMPUTATIONS

- Access an infinite number of "universes" each combining multiple FLUIDS, PARTICLES and/or SCALARS called "agents"
- Physics between agents defined through a database of customizable "user-defined rules"



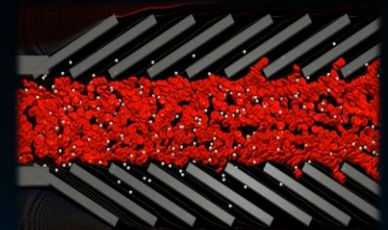
Vesicle firing across a membrane

### FLUIDS MODELING

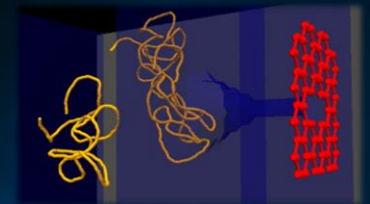
- Single Specie DNS
  - Porous media*
  - Local viscosity modulations*
  - Non-Newtonian rheology*
  - Local forcing*
- Multi-Species DNS
  - Multiphase fluids*
  - Miscible solutions*
- Charged fluids
  - Electro-osmosis, electrophoresis*
  - Electrolytes in microdevices*
- Stabilized propagation
  - Entropic methods*
  - Extended robustness*
- Multi-levels grid resolution
- Boundary Conditions
  - Freely moving elements*
  - Dynamic fluid-surface interaction*
  - Semi-permeable, no-slip and free-slip walls*
  - Flow, pressure and windkessels conditions*

### PARTICLES MODELING

- Biomolecules
  - Proteins, lipids, sugars, ...*
- Chemicals
  - Organic/inorganic molecules*
- Charged Molecules
  - Polye-electrolytes*
  - DNA and RNA*
- Blood cells
  - Erythrocytes, leukocytes, platelets*
- Solvation and Hydrodynamics
- Emitters, sprays and confinement



Red blood cells sorting simulation



DNA nanotranslocation modeling

### GENERIC SCALAR SOLVER

- One-the-fly electrostatics
- Fourier solution for thermal flows
- Advection-diffusion-reaction scalars
- Boundary Conditions
  - *No-flux / Equipotential: Dirichlet & von Neumann*
  - *Emitters*