Modeling & Simulation of Complex/Particulate Fluids

Shape-based Micro/Nanoparticle Separation
- Develop theoretical/numerical model for field-flow fractionation and microfluidic device based on the dynamics on nonspherical ellipsoidal particle

Rheological Model for Polymer Melts/Solutions
- Predicts rheological properties and flow behaviors of monodisperse and polydisperse linear entangled polymer more accurately in high deformation regime

CFD Simulation of Non-Newtonian Fluids in Complex Geometries and Boundary conditions
- Viscoelastic fluids in microfluidic device under oscillatory force fields
- Thixotropic/Yield-stress fluids

Keywords
- Shape-based particle separation, field-flow fractionation, entangled polymer, rheology, rod-like particle dynamics, microfluidic device, acoustic streaming, CFD, viscoelastic fluid, yield stress fluid

Recognitions
- KICheE Young Investigator Awards 2016
- Ray W Fahien Teaching Awards 2008

PoC: Joontaek Park, PhD, Assistant Professor
Chemical & Biochemical Engineering
parkjoon@mst.edu
http://chemeng.mst.edu/facultystaffandfacilities/pagejoontaekpark/index.html

Funding
- CIES, CBSE, ERDC, UMRB

---

Model for Shape-based Particle Separation
Model for Entangled Polymer under a Strong Shear Flow
CFD of Complex Fluids in Complex Flow fields
Oscillatory Viscoelastic Flow
DNA Separation in Microfluidic Device
Drug Delivery Particle Transport

---

CBR Research