

# Fluid flow and solute transport modeling with lattice

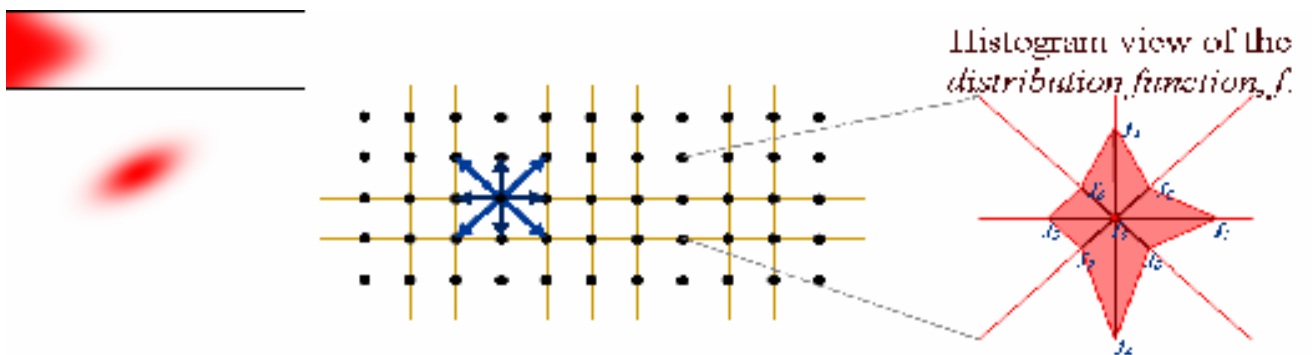
## Boltzmann models

Ph.D. Proposal:

Shadab Anwar

Department of Earth Sciences

Florida International University, Miami.



## **Abstract:**

This study will deal with solute transport and fluid flow modeling in porous media using lattice Boltzmann model (LBM). LBM will be used to simulate dispersion/diffusion in 1-D and 2-D domain under first-type and third-type inlet boundary condition in effectively semi-infinite and finite domains and the dispersion coefficient will be verified with Taylor-Aris theory. The simple BGK model will be expanded into a multiple relaxation time (MRT) model and coupled with a probabilistic bounce-back model to simulate anisotropic dispersion at the Darcy scale for uniform and arbitrary velocity fields. The model will be verified against available 1-D and 2-D analytical solutions. LBM will be applied to simulation of multi component multiphase fluids in complex porous media as applicable to leaching process for the extraction of minerals. LBM will be developed for 3-D simulation of co/counter-current flow of binary fluids in porous media.