# STUDY OF BUBBLE FORMATIONS IN FLUIDIZED BED WITH NON-SPHERICAL PARTICLES

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## INTRODUCTION

In recent years fluidized bed reactors are getting increasing importance in biomass processing for energy and chemical production. Biomass particles used in this processes (Figure 1) are characterized by elongated shape but still all numerical models for fluidized bed modeling approximate particles as spheres, thus limiting complexities encountered with hydrodynamic forces.

***Figure 1.*** *Shape of typical biomass materials*

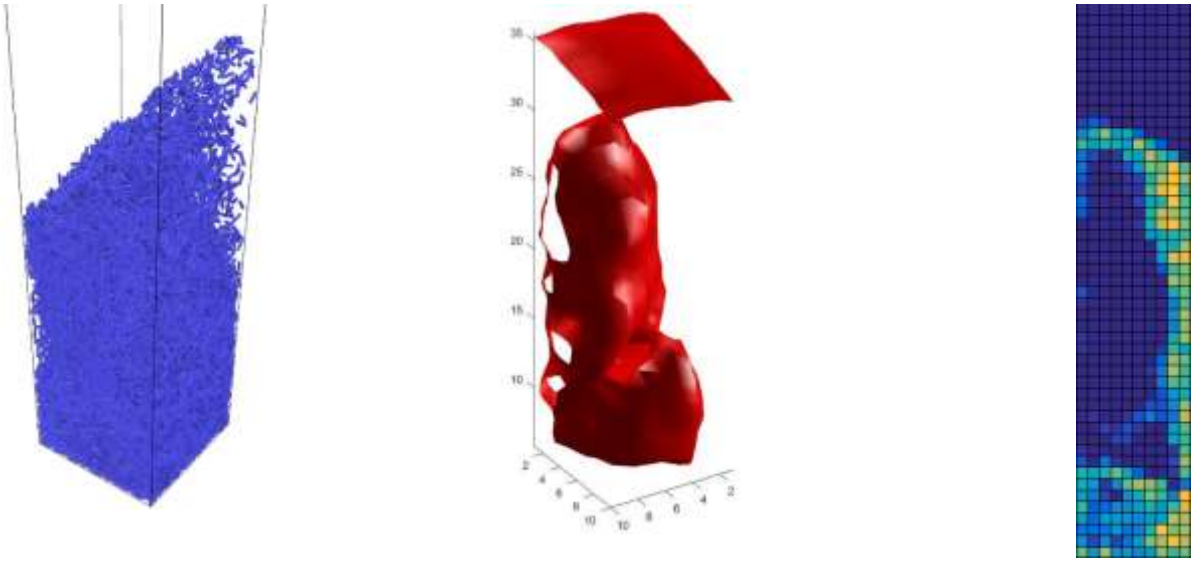
Bubble dynamic plays significant role in fluidized bed dynamic as solids motion is driven by bubble motion. Bubble properties like size, location and shape are of great importance for industrial application as next to driving fluidization big bubbles also increase heterogeneity and reduce gas-solid contact which can reduce reactor performance.

## OBJECTIVE OF THE STUDENT PROJECT

1. Study bubble properties from simulation data.
2. Look into the effect of different fluidizing condition (gas velocity, particle size and bed size) on bubble formation.

For this project student will use our in-house CFD-DEM code that can simulate fluidization of spherocylindrical particles. Student will work on developing MATLAB script for detecting and analyzing bubbles from simulation data.

In this project student will get familiar with CFD-DEM simulations of fluidized beds as well as open source packages for CFD (openFoam) and DEM simulations (LIGGGHT) and basic C++ programming.



*a.* *b.* *c.*

***Figure 2.*** *(a) Visualization of fluidized bed, visualization of bubble formation in (b) 3D and (c) 2D*