

# OPTIMAL PARALLELIZATION OF COLLOID TRACKING THROUGH POROUS MEDIA

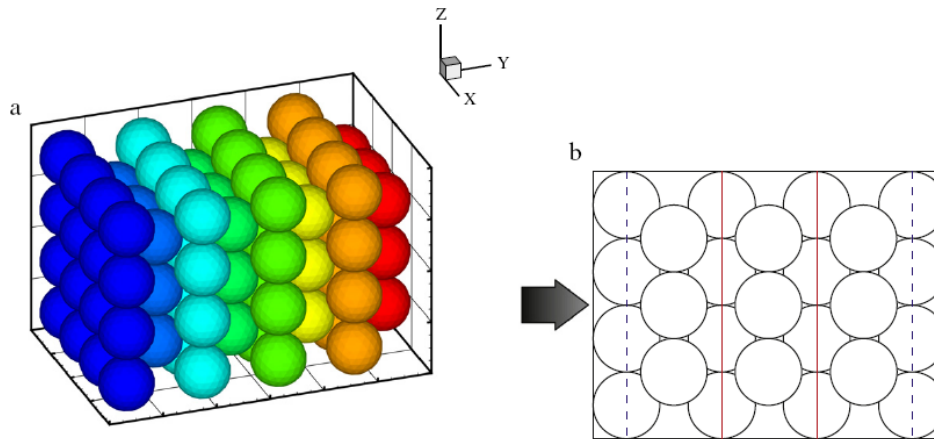
CHARLES ANDERSEN, MECHANICAL ENGINEERING

- What am I doing?
  - Working with previously developed code to model colloid transport through 3 dimensional porous media, to develop and eventually optimize a parallel implementation.
- Purpose
  - Why study colloids transport?
    - Modeling groundwater contamination
      - Predict rate of retention of colloids in soil porous medium
  - Why use supercomputing?
    - Slow fluid flow, small time steps, large number of colloids, complex interaction forces

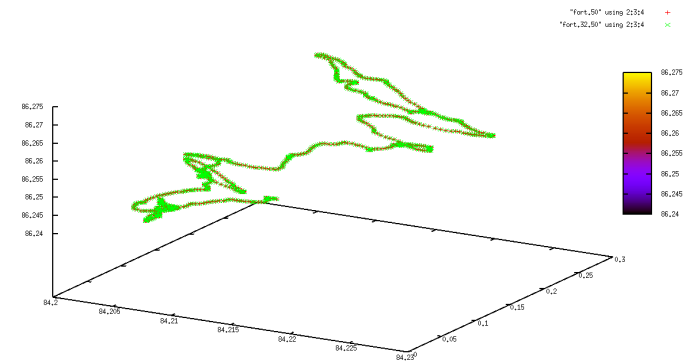
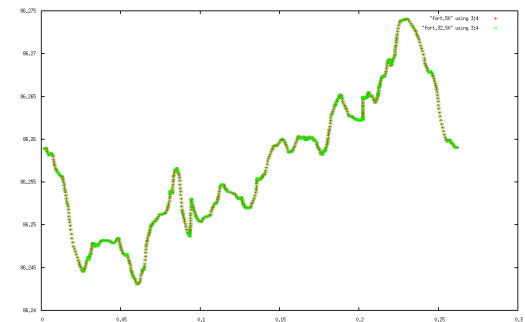
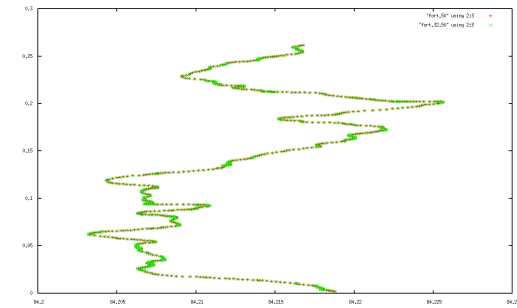


# MODELING

- Cage with “glass bead” sensors
- Periodic flow domain
- Dynamic time step
- OpenMP/MPI



\* H. Gao, et al., Three-dimensional microscale flow simulation and colloid transport modeling in saturated soil porous media, Computers and Mathematics with Applications (200), doi: 10.1016/j.camwa.2009.08.057



# RESULTS

Threads	Total Time	Time in Loop	memory
1	966.75	684.82	221 MB
2	608.01	359.10	221 MB
4	399.13	183.01	221 MB
8	309.62	94.31	223 MB
16	285.63	59.48	223 MB
32	267.62	61.11	223 MB

