SELECT TOPICS OF TRANSPORT AND FATE THROUGH POROUS MEDIA
ECI-289I, Fall Quarter (4 units)

Instructor:
Verónica L. Morales (vermorales@ucdavis.edu)

Meeting times:
TBD

Office hours:
TBD, 3136 Ghausi Hall

Course description:
Solute and colloid mass transport processes in porous media. Characterizing and quantifying physical processes of advection, diffusion/dispersion, as well as basic biogeochemical reactions. Colloid-facilitated transport in porous media. Analytical and numerical solutions to the reactive advection-dispersion equation in Eulerian and Lagrangian forms.

Pre-requisites (or equivalent courses):
Upper division standing. ECI-144, solid foundation in calculus, ability to program

Content:
The course involves study of selected topics from the following:
- Groundwater flow review
- Advection, dispersion, retardation processes and ADE (Goltz)
- Equilibrium vs kinetically-controlled reactions (Fetter, HYDRUS lab)
- Analytical solutions (Goltz)
- Preferential and Nonequilibrium Flow and Transport (Fetter, HYDRUS lab)
- Continuous-time random walk models (Berkowitz, Dentz, Matlab lab)
- Mixing processes and mixing driving reactions (Bolster, Matlab lab)
- Percolation theory (Hunt)
- Colloid transport, filtration theory with DLVO interactions (Borkovec)

Evaluation:
Homeworks & lab assignments (70%), written review and presentation (20%), class participation (10%)

Learning outcomes:
My goal for this course is for you to
- comprehend the basic concepts and techniques used to study contaminant transport
- gain an understanding of the natural processes controlling contaminant fate and transport
- acquire some diverse modelling techniques that can be used to approach complex problems

References (select chapters from):