

We need to be careful to distinguish the CA (cellular automata) simulation model from the GA (genetic algorithm) used to fit the model to data. I recommend thinking about the following things:

- (1) It may be beyond the scope of this semester to build both a simulation and an optimization to fit the simulation to data. Since we don't really have access to data, we might want to focus on the simulation.
- (2) The next steps should be to understand the dynamics for the CA. What are the possible states for each cell? Make a table of the quantities that determine the cell states.
- (3) What parameters are required to specify the model? Which of these parameters are physical (reaction rates, hydraulic conductivity) and which are CA-based (cell size and grid size)? Make a table of all the parameters.
- (4) Now, what are the dynamics? The structure of a CA is as follows:
  - a. The time step loop that moves the dynamics ahead
  - b. The cell loop that decides how to change each cell

Make a detailed description of the rules for changing cell states. Equations and the Procedure Listings in Section 6 of the reference should help.

- (5) Read some of the references from the paper to develop a better understanding of the problem: see especially [8,15,18,19,28]

Score for proposal: 100.