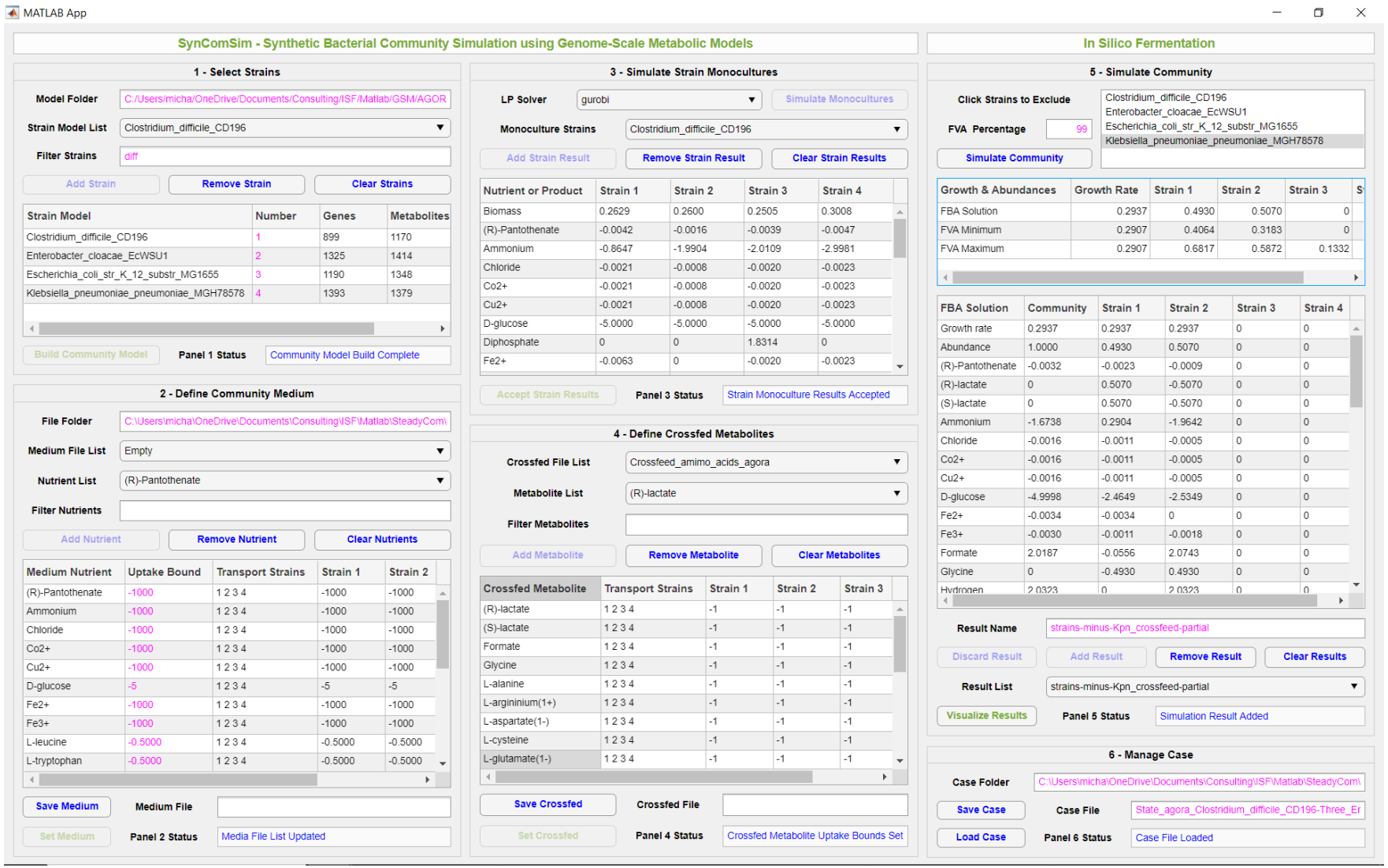
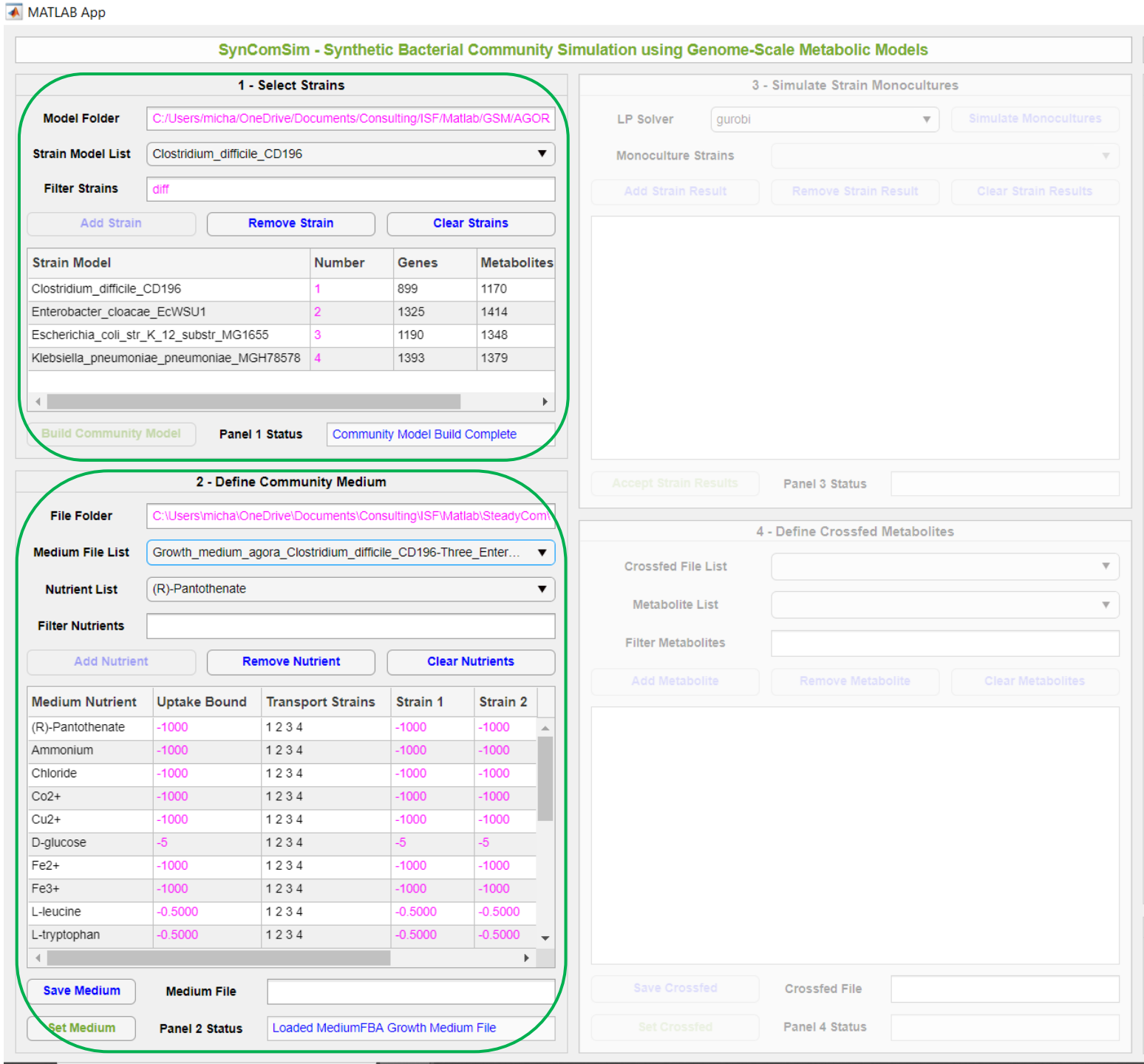
SynComSim – A MATLAB Application for Simulation of Synthetic Bacterial Communities



Example – Investigate metabolite crossfeeding strategies for a 4-species community consisting of the gut pathogen *Clostridioides difficile* and three Enterobacteriaceae species

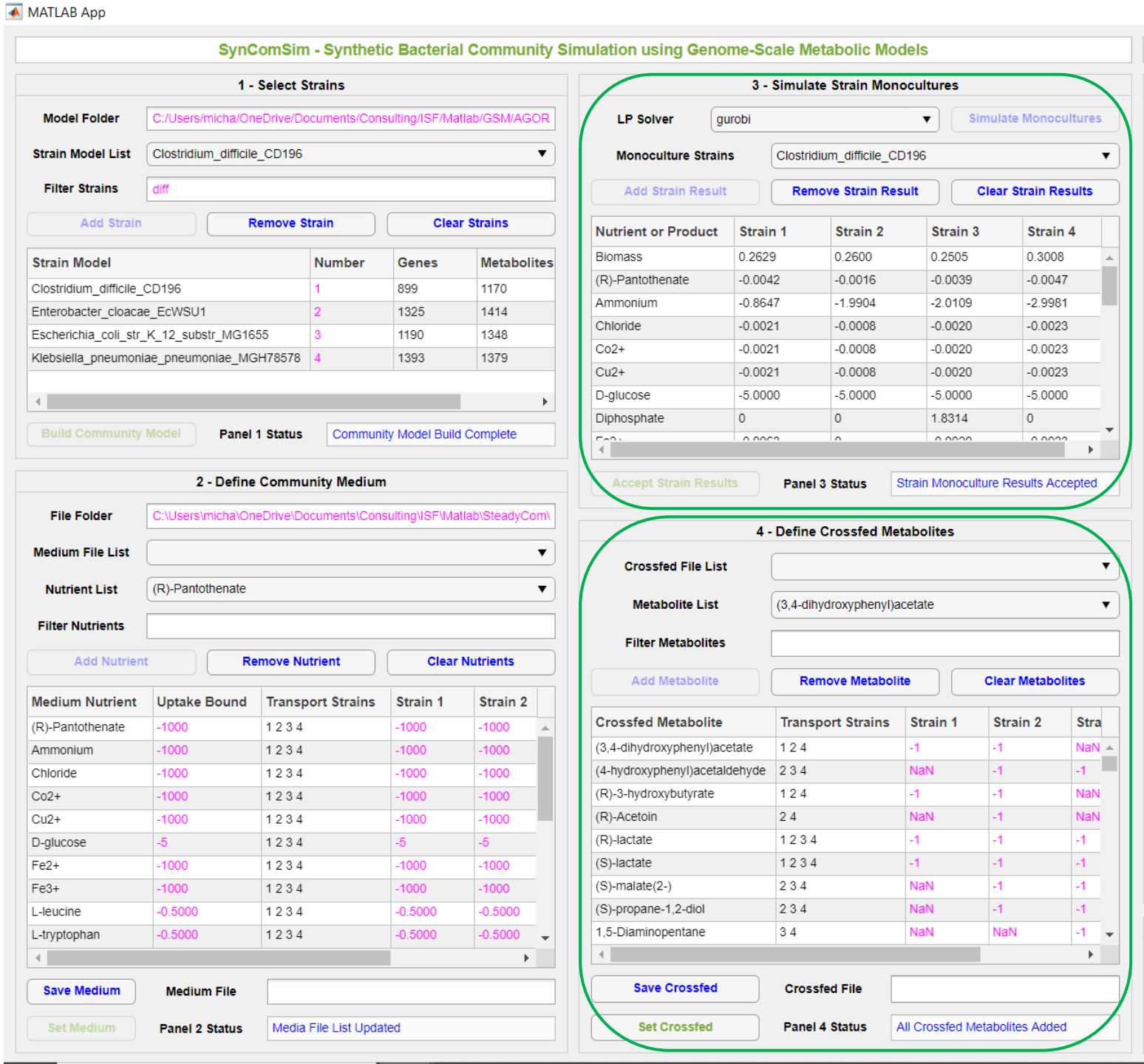
1. Select metabolic models for the strains of interest. Strains can be removed from selected simulations later in the workflow.

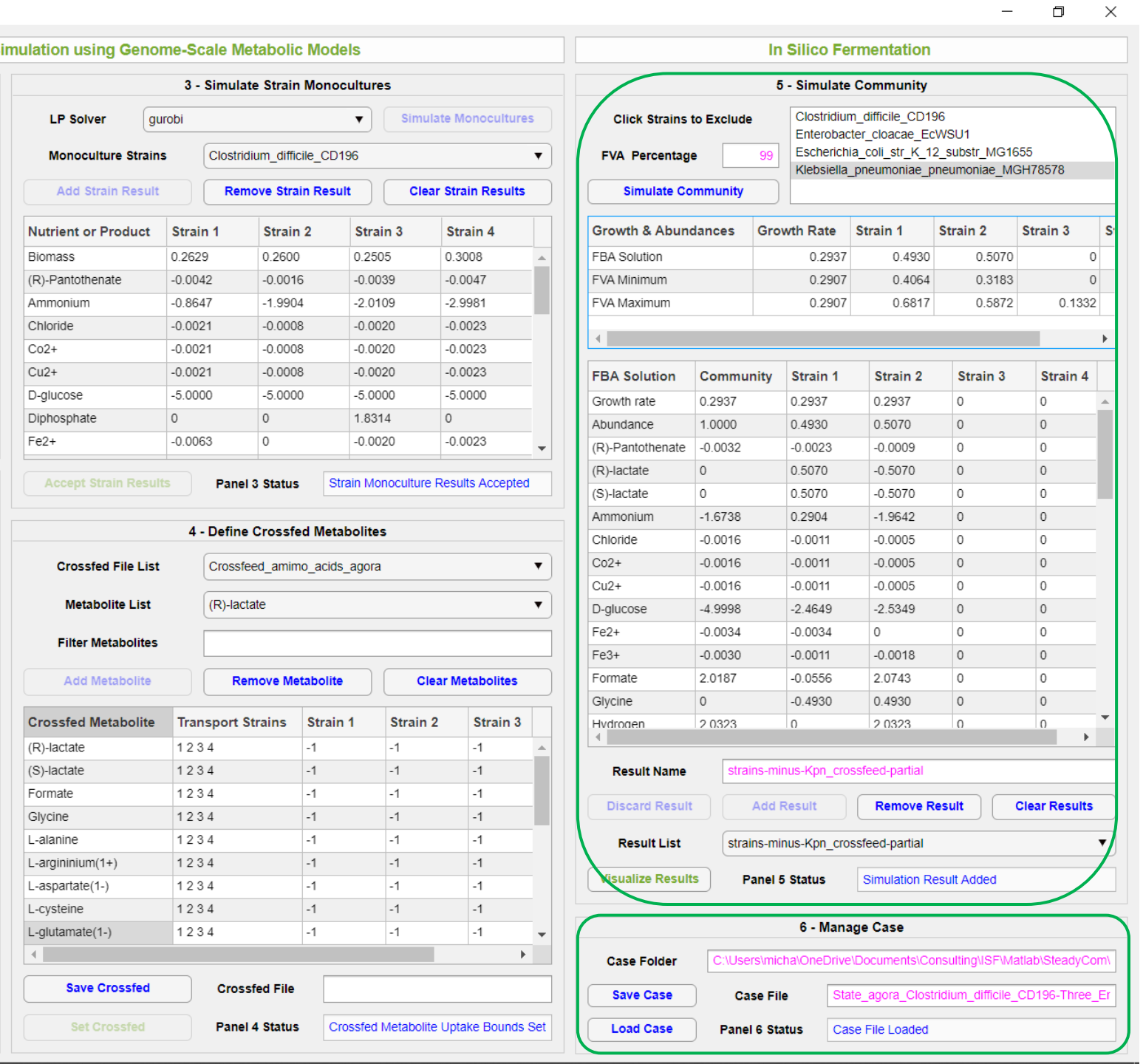
2. Define nutrients contained in the culture medium. Nutrients and their uptake bounds can be added individually or loaded from a medium file created with our App MediumFBA.



3. Perform monoculture simulations to examine strain growth behavior. Fluxes of consumed nutrients and secreted products are predicted for each strain.

4. Define metabolites allowed to be crossfed between community strains. Options include all possible metabolites, individually added metabolites, or metabolites loaded from a previously saved file.





5. Perform community simulation for the specified uptake bounds on medium nutrients and crossfed metabolites. Specific strains can be excluded from any simulation. Different simulations can be stored to allow comparison through a companion visualization App.

6. Save current case to completely capture the current App state for subsequent loading.

SynComSim – Companion App for Result Visualization and Comparison