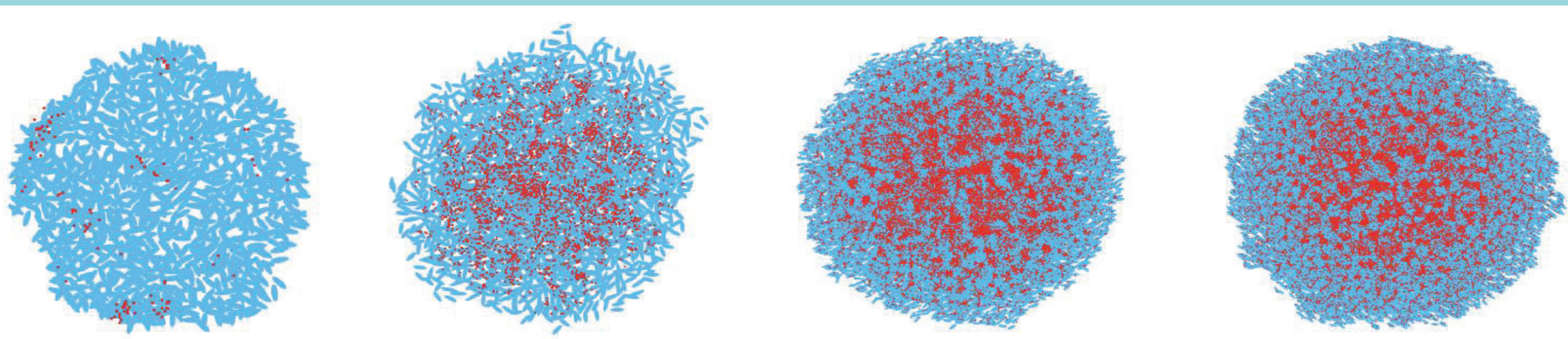
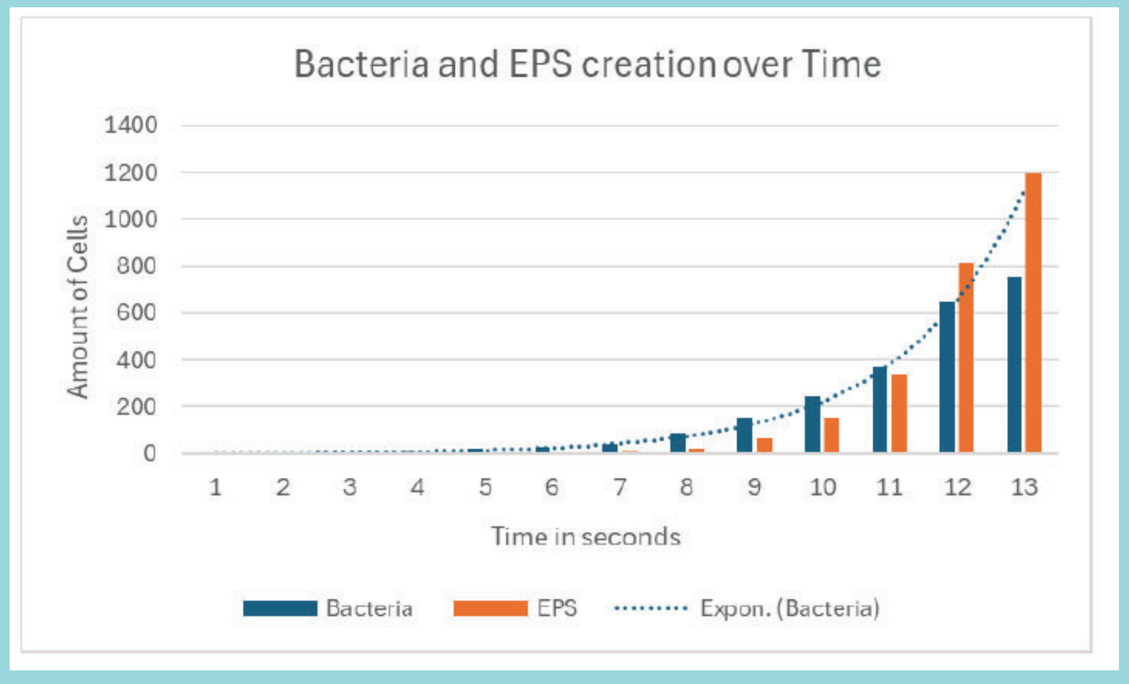
Biofilm Creation Simulation

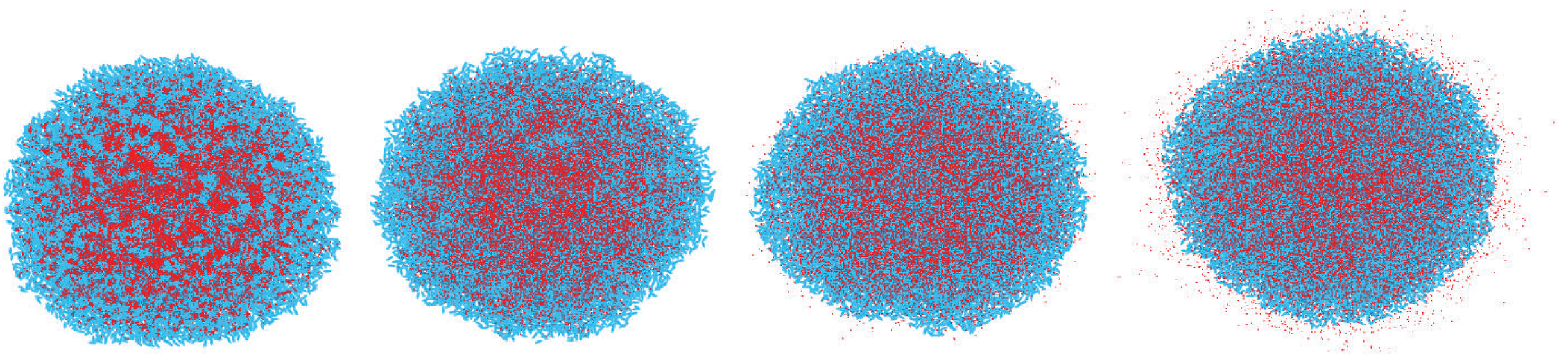
Extracellular Polymeric Substances represent the matrix that bacteria produce to their surrounding area. It can either cluster or spread out, determined by bacteria density and other mechanical parameters. EPS is triggered when a certain bacteria area reaches a threshold.

A lower threshold means that more bacteria can make up the threshold easier and hence EPS will form faster appearing as tight clusters. A high threshold means there are less bacteria that can make up the density to secrete EPS, meaning slower clustering and more spread-out patches of EPS.





The elastic modulus is the most critical parameter as it directly controls the strength of repulsive forces in the Hertzian contact formula. In our simulation we modeled this force as the self repulsion force. As shown in the diagrams below, the greater the self repulsion force, the more dispersed the EPS are to each other.



Self Repulsion = 100 Self Repulsion = 500 Self Repulsion = 1000 Self Repulsion = 1500

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