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*Spatio-temporal modeling of cellulosic biofilms*

Cellulosic ethanol is a transportation biofuel, primarily produced from non-edible, renewable plant material. An important step in its production is hydrolysis of cellulosic material by certain anaerobic bacteria. Whereas mathematical models of biofilms typically focus on microbial aggregates that form on non-reactive, impermeable surfaces, cellulosic biofilms grow in thin layers and degrade the substratum on which they grow. We present a highly nonlinear spatio-temporal model for their formation. It is able to reproduce important experimentally observed phenomena, including the formation of inverse colonies, crater-like colonies, degradation of paper chads at constant speed (which correspond to a traveling wave solution of the model), and temporal CO<sub>2</sub> production patterns. This based on joint work with Eric Jalbert, Alexandru Dumitrache and Gideon Wolfaardt.