1145-65-1901 **Simone Cassani***, 100 Institute Road, Worcester, MA 01609, and **Sarah D Olson**, 100 Institute Road, Worcester, MA 01609. *A hybrid cellular automaton model of cartilage regeneration.*

Articular cartilage (AC) is a connective tissue that covers articular joints to provide a surface that allows bones to slide over each other, and absorb shocks. AC is composed of a dense extracellular matrix (ECM), including fluid, a collagen network, and proteins, and chondrocytes (cells). Nutrients and oxygen are provided via diffusion through the ECM. Pathologies, injuries and normal wear and tear cause the erosion and damage of AC. Cartilage is produced in vitro to be implanted at the site of the damage to restore normal functionality. A hybrid mathematical model is used to investigate the phenomena of AC growth in a tissue-engineered construct to elucidate the influence of different biological factors, such as scaffold porosity and cell velocity. The model couples a discrete approach for the chondrocytes, with a continuous approach for the other components of the matrix. The chondrocytes are described using an off-lattice cellular automaton model that accounts for biased movement, division, contact inhibition and death. The continuous components of the model, nutrients and porosity, are modeled consistently with the literature. The insight provided by the model are used to elucidate the outcomes of laboratory experiments involving tissue-engineered AC. (Received September 24, 2018)