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Quantifying Spatiotemporal Patterns in the Advancing Front of Twitching Bacterial Colonies ERIN SHELTON, MAX GIULIANI, University of Guelph, LORI BURROWS, McMaster University, JOHN DUTCHER, University of Guelph — Type IV pili (T4P) are very thin (5-8 nm in diameter) protein filaments that can be extended and retracted by certain classes of Gram-negative bacteria including *P. aeruginosa* [1]. These bacteria use T4P to move across viscous interfaces, referred to twitching motility. Twitching can occur for isolated cells or in a collective manner [2]. Using a custom-built, temperature and humidity controlled environmental chamber, together with particle image velocimetry and Fourier analysis techniques, we characterized the evolution of the advancing front of expanding colonies. We find that the advancing front consists of finger-like protrusions consisting of many bacteria, with the cells within the expanding colony arranged in a lattice-like pattern. We have characterized the average speed, width and bacterial orientation within the fingers as a function of agar concentration/stiffness. In addition, we have analyzed the motion of individual cells within the fingers at high spatial and temporal resolution. [1] Burrows, L.L. (2012) Annu. Rev. Microbiol. 66: 493520. [2] Semmler, A.B., Whitchurch, C.B., Mattick, J.S. (1999) Microbiology 145: 2863-2873.

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