

Abstract Submitted  
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**Quantifying Spatiotemporal Patterns in the Expansion of Twitching Bacterial Colonies** ERIN SHELTON, University of Guelph, LORI BURROWS, McMaster University, JOHN DUTCHER, University of Guelph — Type IV pili (T4P) are very thin (5-8 nm 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 as twitching motility. Twitching can occur for isolated cells or in a collective manner [2]. The advancing front of the colony has finger-like protrusions consisting of aligned bacteria with between 5 to 30 cells across each finger. Although the average motion of the cells is radially outward, cells within rafts often reverse direction. Using a custom-built, temperature and humidity controlled environmental chamber, we have studied the motion of fingers at high spatial and temporal resolution. We have developed a bacterial segmentation and tracking technique to identify the trajectories of individual bacteria within the densely packed fingers, and we have used this technique to characterize the distance, displacement, orientation and direction reversals of the bacteria in the fingers. [1] Burrows, L.L. (2012) *Annu. Rev. Microbiol.* 66: 493–520. [2] Semmler, A.B., Whitchurch, C.B., Mattick, J.S. (1999) *Microbiology* 145: 2863-2873.

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