Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

Investigation of cyanobacteria in a controlled hyperbolic straining flow[1] FARZAN AKBARIDOUST, JIMMY PHILIP, IVAN MARUSIC, Univ of Melbourne — Here we report a systematic study on the effect of straining flow on cyanobacteria, which are a cause of significant water contamination issues worldwide. We focus on the species Anaebena Circinalis. A micro-cross channel equipped with two online computer-controlled on-chip membrane valves was designed and fabricated using standard soft-lithography. The device produces a hyperbolic straining flow on a micron-scaled region similar to G. I. Taylor's four-roll mill at larger scale. It was used to investigate the behaviour of a single filament of cynobacteria in a crowded medium under an increasing uniform strain rate flow. The velocity field and the resulting uniform strain-rate was measured in the absence of bacteria filaments using micro-PIV. A large number of single filaments of bacteria were trapped and exposed to stain-rates over 2 to 15 s^{-1}. Previous studies have reported anecdotal evidence of suspected mechanical damage to Anaebena Circinalis for strain rates considerably lower than the maximum values studied here. In our case, no mechanical damage was observed.

[1]This work was performed in part at the Melbourne Centre for Nanofabrication (MCN) in the Victorian Node of the Australian National Fabrication Facility (ANFF)

Farzan Akbaridoust
Univ of Melbourne

Date submitted: 31 Jul 2016 Electronic form version 1.4