

Abstract Submitted
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How to Concentrate Genomic Length DNA in a Microfabricated Array YU CHEN, Princeton University, EZRA ABRAMS, CHRISTIAN BOLES, Sage Science Inc., JONAS PEDERSEN, HENRIK FLYVBJERG, Danish Technical University, JAMES STURM, ROBERT AUSTIN, Princeton University — We demonstrate that a microfabricated bump array can concentrate genomic-length DNA molecules efficiently at continuous, high flow velocities, up to 40 $\mu\text{m/s}$, if the single-molecule DNA globule has a sufficiently large shear modulus. Increase in the shear modulus is accomplished by compacting the DNA molecules to minimal coil-size using polyethylene glycol (PEG) derived depletion forces. We map out the sweet spot where concentration occurs as a function of PEG concentration, flow speed, and bump array parameters using a combination of theoretical analysis and experiment. Purification of DNA from enzymatic reactions for next-generation DNA-sequencing libraries will be an important application of this development.

Robert Austin
Princeton University

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