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Expediting the Sequencing Process: Using Soft Lithography to Fragment Aligned DNA Molecules[1] MEENA JAGADEESAN, Phillips Exeter Academy, Exeter NH 03833, ADINA SINGER, Stella K. Abraham High School for Girls, Hewlett Bay Park NY 11557, NAHYUN CHO, KE ZHU, JULIA BUDASSI, JONATHAN SOKOLOV, Stony Brook University — Current sequencing technologies output short read lengths on the order of 10 kb, requiring DNA to be fragmented into small pieces, analyzed separately and recombined to obtain the full sequence. The accuracy and cost efficiency of sequencing has been limited by the computer algorithms required to assemble the random subsequesnces. The fragmentation method in this study can significantly simplify the assembly process with a novel lithographic cutting procedure that retains the position and order of DNA fragments. DNA was stretched linearly on a polymer coated silicon wafer. A polydimethylsiloxane (PDMS) lithographic stamp was coated in DNase I (DNA cutting enzyme) solution. The stamp was placed in contact with the surface aligned DNA, producing 3.5 micron (10 kbp) DNA fragments. Fluorescence imaging of dye labeled DNA was used to monitor the cutting effectiveness. The improved enzyme application procedure presented in this study enabled uniform, ordered cutting of the surface aligned DNA over approximately 80% of the 2 cm x 3 cm samples. Means to extract the cut DNA from the polymer surface were also explored. The effectiveness of solution methods, electric field desorption, and microfluidics will be discussed.

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