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High throughput electronic cell identification techniques for microfluidic systems DAVID WOOD, University of California - Santa Barbara, GARY BRAUN, JEAN-LUC FRAIKIN, LOREN SWENSON, NORBERT REICH, ANDREW CLELAND, Departments of Physics, Chemistry and Biochemistry, University of California - Santa Barbara — We address the problem of whole-cell identification using an all-electronic microfluidic approach, with potential applications to cell sorting. We present the development of a radiofrequency microsensor, capable of detecting cells or cell labels in a microfluidic system. This device has demonstrated detection of individual cellular labels at throughputs of 30,000 labels/s in a single microfluidic channel. We also present the development of digital barcodes, which can be used to label cells for identifying individual strains in a diverse population. These barcodes were developed using fully-scalable lithographic techniques, providing a means for low-cost, large volume production. We have demonstrated biological functionalization of these barcodes as well as readout, using our radiofrequency microsensor, at throughputs greater than 1,000 labels/s.

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