

## Magnetoresistive Biosensors for Quantitative Proteomics

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### Abstract

Giant magnetoresistive spin-valve (GMR SV) sensors coupled with magnetic nanotags (MNTs) possess great promise as ultra-sensitive biosensors for diagnostics. We report an integrated sensor interface for an array of 256 GMR SV biosensors designed in 0.18  $\mu\text{m}$  CMOS. Arranged like an imager, each of the 16 column level readout channels contains an analog front-end and a compact  $\Sigma\Delta$  modulator (0.054  $\text{mm}^2$ ) with 84 dB of dynamic range and an input referred noise of 49 nT/ $\sqrt{\text{Hz}}$ . Performance is demonstrated through detection of an ovarian cancer biomarker, secretory leukocyte peptidase inhibitor (SLPI), spiked at concentrations as low as 10 fM.