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Anna C. Gilbert and **Martin J. Strauss***, Dept. of Mathematics / Univ of Michigan, 2074 East Hall, 530 Church St, Ann Arbor, MI 48109-1043, and **Joel A Tropp** and **Roman Vershynin**. *One sketch for all: Fast algorithms for Compressed Sensing.*

In the heavy hitters problem, a vector of frequencies describes a large and changing collection of items and the goal is to track the most frequent items from the information in a small number of non-adaptive linear measurements that are made to the frequency vector. This problem also arises in image and signal processing, and is also known as "sparse recovery" and "compressed sensing." Over the last decade, a number of algorithms have been proposed for this problem. We present the first algorithms that simultaneously satisfy three important criteria: (i) the number of measurements is optimal, up to log factors; (ii) the reconstruction time is polynomial in the number of heavy hitters and polylogarithmic in the universe size; (iii) a single (randomly constructed) set of measurements works for all frequency vectors. The error of our recovery is optimal in the appropriate sense.

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