

## **abstract**

Computer Science/Discrete Mathematics Seminar II  
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

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**Abstract:**

We give near-tight lower bounds for the sparsity required in several dimensionality reducing linear maps. In particular, we show:

- (1) The sparsity achieved by [Kane-Nelson, SODA 2012] in the sparse Johnson-Lindenstrauss lemma is optimal up to a  $\log(1/\epsilon)$  factor.
- (2) RIP<sub>2</sub> matrices preserving  $k$ -space vectors in  $\mathbb{R}^n$  with the optimal number of rows must be dense as long as  $k < n / \text{polylog}(n)$ .
- (3) Any oblivious subspace embedding with 1 non-zero entry per column and preserving  $d$ -dimensional subspaces in  $\mathbb{R}^n$  must have  $\Omega(d^2)$  rows, matching an upper bound of [Nelson-Nguyen, 2012] for constant distortion.

Joint work with Huy Lê Nguyen (Princeton).