A graph $G$ on $n$ vertices is a $k$-dot product graph if there exist vectors $v_1, \ldots, v_n \in \mathbb{R}^k$ such that $v_i^T v_j \geq 1$ if and only if $ij \in E(G)$. The dot product dimension of $G$ is the least $k$ such that $G$ is a $k$-dot product graph.

In this talk I will survey some results on dot product dimension, and sketch a proof that every planar graph has dot product dimension at most 4, and that there are planar graphs with dot product dimension equal to 4. This answers a question of Fiduccia et al. Time permitting, I will also sketch the proof that, for every $k \geq 2$ there are $k$-dot product graphs for which in every choice of vectors $v_1, \ldots, v_n \in \mathbb{R}^k$ exponentially many bits are needed to store these vectors in the memory of a computer. This answers a question of Spinrad.

(joint work with Ross J. Kang) (Received September 15, 2010)