

## abstract

COMPUTER SCIENCE/DISCRETE MATH I

Topic:

Speaker:

Affiliation:

Date:

Time/Room:

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Let  $F$  be a family of graphs. A graph  $H$  is  $F$ -universal if every  $G \in F$  is isomorphic to a subgraph of  $H$ . Besides being of theoretical interest, universal graphs have applications in chip design and network simulation.

For any two positive integers  $n$  and  $k$ , let  $F(n,k)$  be the family of graphs on at most  $n$  vertices with maximum degree at most  $k$ . It has been known that any  $F(n,k)$ -universal graph must have  $\Omega_k(n^{\{2-2/k\}})$  edges. We show that this lower bound is tight up to a constant factor by presenting an explicit construction of a  $F(n,k)$ -universal graph  $H(n,k)$  with  $O_k(n^{\{2-2/k\}})$  edges, which is an improvement over the best previously known construction which uses a logarithmic (in  $n$ ) factor more edges. We also present an efficient deterministic algorithm for finding a copy of each  $G \in F(n,k)$  in  $H(n,k)$ .

Joint work with Noga Alon.