香港中文大學
The Chinese University of Hong Kong

Institute of Theoretical Computer Science and Communications

Joint CSE-ITCSC Seminar

Graph sparsifiers

By

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U.C. Berkeley

11 December 2018, Tuesday

3:30 pm – 4:30 pm

Room 804, 8/F, **William MW Mong Engineering Building**, *CUHK*

Abstract:

A weighted graph H is a sparsifier of a graph G if H has much fewer edges than G and, in an appropriate technical sense, "approximates" G. Sparsifiers are useful as compressed representations of graphs and to speed up certain graph algorithms. In a "cut sparsifier," the notion of approximation is that every cut is crossed by approximately the same number of edges in G as in H. In a "spectral sparsifier" a stronger, linear-algebraic, notion of approximation holds.

We discuss a new lower bound on the number of edges that any spectral sparsifier must have, and we interpret our result as a generalization of the Alon-Boppana theorem to graphs that are irregular and weighted. We also show that any compressed representation of a graph that allows to answer queries of the form "how many edges cross this cut?" with a multiplicative error 1+epsilon must use Omega(epsilon^{-2} n log n) bits, showing that known constructions of spectral sparsifiers provide a space-optimal solution to this problem.

(Based on joint work with Charles Carlson, Alexandra Kolla and Nikhil Srivastava.)

Biography:

Prof Luca Trevisan is a professor of Electrical Engineering and Computer Sciences and of Mathematics at U.C. Berkeley and a senior scientist at the Simons Institute for the Theory of Computing.

He is from Rome, where he studied at the Sapienza University of Rome, advised by Pierluigi Crescenzi. He has also been a post-doc at MIT (with theTheory of Computing Group) and at DIMACS, an assistant professor at Columbia University and a professor at Stanford. He is interested in Theoretical Computer Science.

***** ALL ARE WELCOME *****

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