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Distinguished Lecturer Series

Supported by Jeffrey & Holly Ullman



Uriel Feige

Weizmann Institute

Preprocessing of NP-hard problems

Abstract: Consider a setting in which an input instance for an NP-hard optimization problem is supplied in two steps. In the first step, one gets to see some partial information about the input instance, referred to as a "preview". Based on this preview, a preprocessing algorithm can spend arbitrary (e.g., exponential) time in preparing some polynomial size "advice" string. In the second step, one gets to see the full input instance. Thereafter, a polynomial time algorithm attempts to solve the instance, and may use for this purpose the advice string prepared by the preprocessing algorithm. For various NP-hard optimization problems we present natural preview functions whose study appears to be well motivated. In certain cases we can prove that preprocessing leads to improved approximation ratios, and in certain cases we can prove limitations on how much preprocessing can help. Many natural questions within this framework remain open, and can serve as fertile ground for future research.

Uriel Feige received his PhD at the Weizmann Institute, and except for a few years in Princeton University, IBM Research, Compaq Research and Microsoft Research, stayed there ever since. His research explores the border between P and NP, whether for worst case or average case input instances, and involves the design and analysis of algorithms, and the proof of computational hardness results.

12:00 – 13:00 on Monday June 1, 2015—Room 202, Alon Bldg (37/202)
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