CS2429 PCP and the Hardness of Approximation
Presentation Topics

Below is a list of suggested papers/topics for your presentation. Your presentation should be a laptop presentation. You may collaborate your presentation in groups of size at most 3. As a group you are jointly responsible for reading and discussing the topic, preparing the powerpoint presentation, and giving the lecture. Please turn in three to four topics of your choice, in order of preference, by September 25th, along with a list of your collaborators. Note that you can choose a topic even if it is not on the list below, subject to my approval.

- Hardness of Set Cover. This is covered in the UW lecture notes. You can also read the original references (Lund-Yannakakis, and Feige).
- Goemans-Williamson SDP approximation algorithm for MaxCut. Covered in lecture notes. Also see original JACM article.
- UGC-hardness of MaxCut. Covered in lecture notes. Also see paper by Khot, Kindler, O'Donnell and Mossell, available on course webpage.
- UGC-hardness of Vertex Cover. Paper is by Khot and Regev. Available on course webpage.
- UGC Hardness of Sparsest Cut, and related integrality gaps. This is a tough going but excellent paper by Khot and Vishnoi. Available on the course webpage.
- Gowers Uniformity and UGC hardness of MaxkCSP. Paper, available on course webpage, by Samorodnitsky and Trevisan.
- Feige's hypothesis and inapproximability results using this hypothesis. This is a fairly self-contained topic. The two papers are the original one of Feige, and one by Alekhnovich. They are available on the course webpage (MishaC-hardness, and FeigeC-hardness).

- Integrality gaps and connections to PCP-based inapproximability results. The starting paper here is by Arora, Bollobas, Lovasz and Tourlakis.
- The Parallel Repetition Theorem. This is a tough topic. You will not have time to present the whole proof in 2 hours. Ran's original proof was recently simplified by Holenstein. His paper is what you should read if you choose this topic, also available on course webpage.