

**RYERSON UNIVERSITY**  
**DEPARTMENT OF MATHEMATICS**  
**GRAPHS AT RYERSON (G@R) SEMINAR**

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Date: Thursday, November 3, 2016  
Time: 10am  
Location: ENG 210

## On Percolation and NP-Hardness

**Abstract:** We study the computational hardness of problems whose inputs are obtained by applying random noise to worst-case instances. For an appropriate notion of noise we show that a number of classical NP-hard problems on graphs remain essentially as hard on the noisy instances as they are in the worst-case.

Focusing on the Graph Coloring problem, we establish the following result: Given a graph  $G$ , let  $H$  be a random subgraph of  $G$  obtained by deleting the edges of  $G$  independently with probability 0.5. We show that if  $\chi(G)$  is large, then  $\chi(H)$  is also large with high probability. This means that the chromatic number of any graph is “robust” to random edge deletions.

Joint work with Huck Bennett and Daniel Reichman.

ALL FACULTY, STAFF, STUDENTS AND GUESTS ARE WELCOME TO ATTEND