

Welcome to CSE 521

Administrivia

- **Anna Karlin**
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 - Office hours, by appointment
- **Jeffrey Hon**
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 - Office hours: Monday, 3-3:45pm CSE 218,
Wednesday, 3-3:45pm, CSE 220
- **Course web page:**
 - <http://courses.cs.washington.edu/521>

What is this course about?

- **Algorithms in the modern era**
 - approximation, randomization
 - Different models for how input is received and constraints on algorithms: online, streaming, high-dimensional
- **Goal: expose you to a sampling of ideas, techniques, tools and applications.**

Tentative list of topics

- **Hashing and related topics**
 - Universal hashing, perfect hashing, load balancing, min-hashing, locality sensitive hashing, and applications to streaming
- **Linear programming**
 - Duality + applications, then bit of convex optimization
- **Online learning**
 - Multiplicative weight updates, applications and extensions
- **Dealing with high-dimensional data**
 - Dimensionality reduction, low rank approximation, etc.
- **Sampling of other topics**
 - ??

Goals

- To introduce you to some of the fundamental ideas that have become important in algorithms in the last 20 years.
- To show you how much fun, beautiful and clever the myriad of ideas in this space are.
- To convince you that no matter what area you end up working in, knowing more about algorithms and theory will serve you well.
- To help you develop a toolkit that is crucial no matter what you end up doing.

Background expected

- Discrete math at level of CSE 311
- Introductory probability at the level of CSE 312:
 - Probability space, random variables, basic distributions, independence, conditional probability, expectation, tail bounds
- Intro algorithms and data structures (e.g., CSE 332)
- “Mathematical maturity”

Workload

- 5-6 problem sets (60%)
- Project (40%)
 - Must work in pairs.
 - One-page preproposal due by April 28
 - Final (10 page) paper due on June 1.
 - Will be posted to class discussion page.
 - You will be commenting on each others papers
 - Each group will give a short presentation as well.

Other

- No book, but I'll post lots of references.
- No class April 9!

- Questions?