

CMSC 764
&
AMSC 607

Topics in Optimization:
ADVANCED Numerical Optimization

ABOUT ME

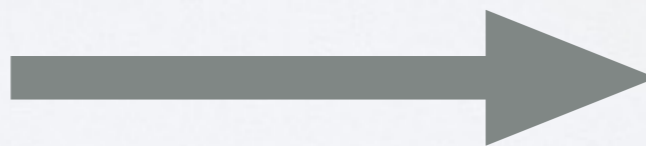
- Im (relatively) new!
- Joined the CS faculty in fall 2014

Before Faculty Job



PhD at UCLA

Postdoc at Stanford/Rice



After Faculty Job



Frozen hellscape

RESEARCH INTERESTS

- Large-scale optimization for...
 - Distributed computing
 - Model fitting and data mining in the cloud
 - Machine learning
 - Neural nets and classification methods on distributed datasets
- Image Processing
 - Variational methods for imaging tasks

ABOUT YOU...

WHAT THIS CLASS IS

- Crash course on optimization

WHAT THIS SORT OF IS

- Machine learning
- Statistics
- Image Processing



“but I don’t care about the FFT...”

PREREQUISITES

No specific courses are required....but

- STRONG linear algebra skills
- strong multi-variable calculus skills
- strong programming skills
- not scared of math



COURSE ORGANIZATION

<http://www.cs.umd.edu/class/spring2015/cmsc764/>

- Prof: Tom Goldstein
 - tomg@cs.umd.edu
 - AVW Pi (3141)
- TA: Hao Li
 - ???

GRADING

- 50% Homework
 - Will be assigned most weeks
 - Programming (Matlab or python required)
 - Theory
- 25% midterm exam
- 25% final exam



Subject to change at ANY time!!!

BOOKS?

- All sources are free
- Some can be purchased in hard-copy for cheap
- All have authors with hard to spell names
 - Convex Optimization - Boyd and Vandenberghe
 - Numerical Linear Algebra - Trefethen and Bau
- Lots of review articles

TOPICS OVERVIEW

- (Numerical) Linear algebra review
- Convex Functions
- Duality Theory
- Unconstrained Optimization
- Linear Programming
- Interior Point Methods
- Iterative Methods
- Stochastic Methods
- Derivative-free Methods
- **Other stuff**