Exciting advances in mathematics usually happen between disciplines!
Some examples how interesting things happen **between** areas in applied mathematics

- **Optimization**
- **Discrete mathematics** (algebra, graph theory)
- **Probability and statistics**
- **Numerical partial differential equations**

**HOT!**

- **Discrete optimization**
- **Coding and cryptography**
- **Probabilistic graph theory**
- **Parallel computing**
- **Data assimilation, quantification of uncertainty**

**Applications**

- Scheduling production, airlines, logistics, ...
- Secure communications, internet
- Computer programming, social networks, genomics
- Geoscience: Weather forecasting, wildfire modeling, geology, ...
- Sensors, epidemics forecasting, real-time systems
Advice for your graduate study

• Choose your advisor and your field carefully.
  – The advisor assigned to you now does not have to be your PhD advisor. It is OK to change.
  – Look around for what you like, for interesting topics, and where the jobs are.
• Get the exams (prelims, comps) out of the way as soon as possible.
• Build a large toolbox for your work
  – Take as many courses in different areas as you can
  – Remember that progress often comes by an unexpected application of one area in another
• Publish several papers already as a student
• Grow independent of your advisor over time
• Become the best teacher you can
• Learn all you can about computers by doing
• Good luck!