Michael Kearns: Some Personal Info

- Faculty in Computer and Information Science
- Co-director (with Prof. Liberman) of Institute for Research in Cognitive Science
- Joined Penn faculty in January 2002
- Spent previous decade in basic research at AT&T/Bell Labs
- Undergrad at Berkeley, PhD. at Harvard
- Research interests: artificial intelligence, machine learning, game theory, algorithms, cryptography
- First large undergrad class!

A Little More Detail on MK's Research Program

- Models representing complex "natural" data or environments
- Algorithms for manipulating these models efficiently
- Performing "natural" computations on these models
- Examples:
  - Learning how to generalize from sample observations
  - Inferring the consequences of given knowledge
  - Deciding how to act in uncertain environments
  - Interacting strategically or cooperatively with others
- Emphasis on probabilistic or statistical approaches
- Systems for AI in human interaction

Some Sample Projects

- Adaptive software agent providing "social statistics", conversation, telephone access in LambdaMOO (well-known Internet chat environment)
- Adaptive spoken dialogue systems
- Algorithms for game theory
- Automated trading in financial markets
- Software agent for mediation/arbitration in human conflicts

AI versus CogSci, Psychology, Neuroscience,. . . ?

- Traditionally, CogSci, Psychology and Neuroscience:
  - Primarily concerned with the understanding of human or biological intelligence, cognition, physiology, etc.
  - Differ in their methods and scale
- Traditionally, Artificial Intelligence:
  - Primarily concerned with replicating the functionality of human or biological intelligence
  - May choose to do it "differently" than biology
  - However, biology provides at least "existence proofs" and sometimes algorithms
- This course will mix these two perspectives and approaches