### 17-939 Project Status: Timothy Halloran

- Analyze the development and maturation of a Software Engineering research idea, from early problem definitions to actual application, or promise of application
- My topic areas of interest:
  - Software Maintenance
  - Software Engineering Tools & Environments

### Schedule/Project Roadmap

- **Project**: TBD
- **Topic Selection**: 09/16
- **Literature Search**: TBD
- **Refine Process**: TBD
- **Meeting (Dr. Shaw)**: TBD
- **Class Presentation**: 10/24
- **Write Report**
- **Report Due**: 12/3

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Today: Topic Summaries

- Software Maintenance
- Software Engineering Tools & Environments

Software Maintenance

- IEEE Definition of Software Maintenance:
  - Modification of a software product after delivery to correct faults, to improve performance or other attributes, or to adapt the product to a modified environment

Evolution?
Why is Software Maintenance Important?
- Consumes bulk of overall lifecycle costs
- Inability to change software quickly and reliably means lost business opportunities

Incorporation of new user requirements is the core problem

Why not just design a “flexible” system?
- Use: parameter files, database, Java, etc.

Research Areas
- System dynamics (model software change)
- Maintenance processes (improve them)
- Studies of software change (impact analysis)
- Linking software attributes to maintainability
- Program comprehension methods and tools
- Management (business and people issues)
- Legacy and reverse engineering
- Validation (do changes to the software work)
- NEW: Web maintenance and open source
Software Maintenance

- One final word and caution:
  - “Very small programs do not have maintenance problems, and research results must scale up to industrial applications for them to be useful”
  - Research must work with Industry
  - CS Education is also problem

Software Engineering Tools & Environments

- Tools have existed since the beginning of programming (the assembler)
- New demand for tools as time-to-market decreases (e.g. e-commerce)
- Evolution:
  - Unix (utilities / pipes)
  - Programming Support Environments – CODE
  - Software Engineering Environments
  - Process-Centered SEEs
Software Engineering Tools & Environments

- Integration a key challenge
- Context is a hindrance to progress
  - Vast number of languages
    - Even within just one software system
  - Vast number of operating systems
    - Even within just one software system