Who is this guy?

The way to UMass

Introduction Logistics

CS 520/620

Instructor

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Programming Languages & Software Engineering

- Software testing
- Static analysis
- Type systems

Mutation testing
Android security
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What is Software Engineering?
What is Software Engineering?

More than just programming

- The complete process of designing and developing a software system.
- From requirements/specification to building, running, and maintaining a system that meets the requirements.
- Some Software Engineering tasks, covered this semester:
  - Modelling a software system.
  - Designing a software system.
  - Testing a software system.

Why is Software Engineering important?

All of the above and much more. It’s more than just writing code!
Software is everywhere ...

Software is everywhere ... and buggy

A personal anecdote

Version control system

\texttt{LATeX}

\texttt{R}

\texttt{Git}

\texttt{S}

\texttt{ssh}

\texttt{git push}
**Introduction Logistics**

**A personal anecdote**

**Version control system**

**Well designed and implemented?**

**Sufficiently tested?**

**Software development: ad-hoc or systematic?**

**Pros: Ad-hoc**

- No formal process
- "Brain to terminal"
- Easy, quick, and flexible

**Cons: Ad-hoc**

- Might lack important tasks such as design or testing.
- Doesn’t scale to multiple developers.
- How to measure effort and progress?

**Summary: Software Engineering**

**What is Software Engineering?**

- Much more than just writing code!
- The complete process of designing and developing a software system that meets its requirements/specification.

**Why is Software Engineering important?**

- Decomposes a complex engineering problem.
- Organizes processes and effort.
- Improves software reliability.
- Improves developer productivity.

**Logistics and Expectations**
### Logistics

- Tuesday and Thursday 10:00am–11:15am.
- Goessmann Lab Addition 152.
- Lectures, lab session, and presentations.
- Submission of assignments via Moodle: http://moodle.umass.edu
- Course material, assignments, etc. on web site.

http://people.cs.umass.edu/~rjust/courses/2016Spring/CS520.620

### Grading

**Considered for evaluation:**
- Homework,
- Midterm,
- (Research) projects,
- Paper presentations,
- Participation.
- **620 students:**
  - Research term paper.

### Expectations

- Programming experience.
- Familiarity with one OO programming language (Java, C++, ...).
- Reading and presenting research papers.
- 620 students: research project.
  - Developing a novel technique or conducting an empirical study.

### Topics covered this semester

- Software modelling and the Unified Modelling Language (UML).
- Software design and architecture.
- Software testing.
- Experimental Software Engineering.