CMSC201
Computer Science I for Majors

Lecture 0X – Careers

Prof. Jeremy Dixon

Today's Objectives

- To introduce careers in Computer Science
- To explore using Computer Science with other fields (interdisciplinary)
- To better understand Computer Science job listings and descriptions
- To discuss grad degrees in Computer Science

Careers in STEM Fields

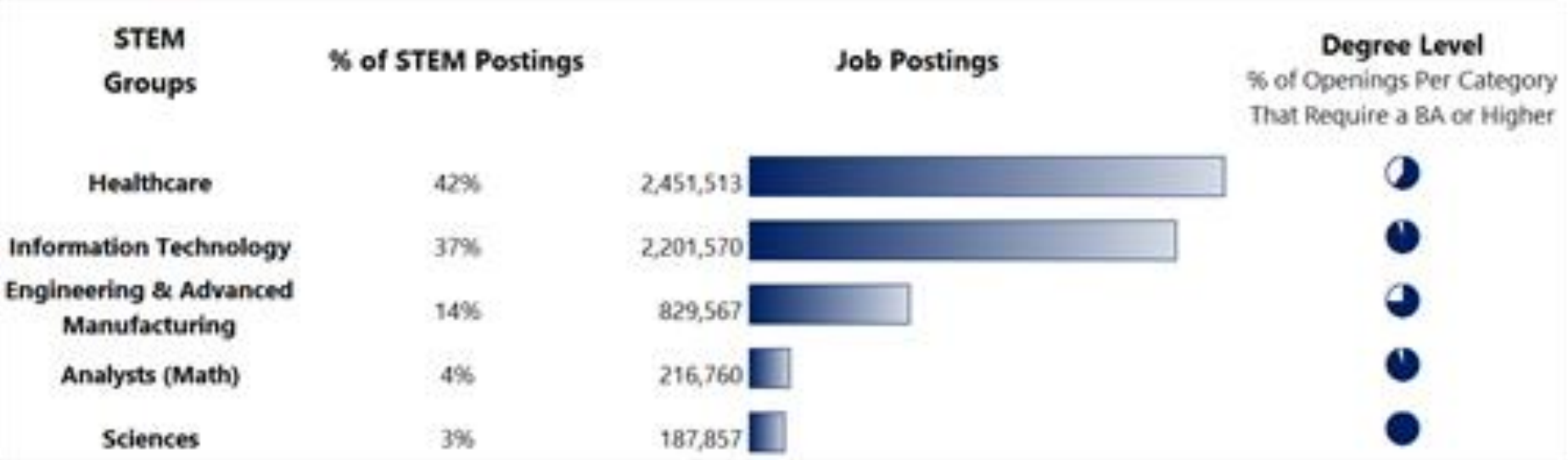
What is STEM?

- STEM is an acronym referring to the academic disciplines of:
  - Science,
  - Technology,
  - Engineering, and
  - Mathematics

STEM Job Market (2013)

- 5.7 million total postings in STEM fields
- 4.4 million (76%) require at least a bachelor's degree
- 2.3 million (41%) are entry-level jobs
  - Requiring less than 2 years of experience

STEM Jobs by Career Area



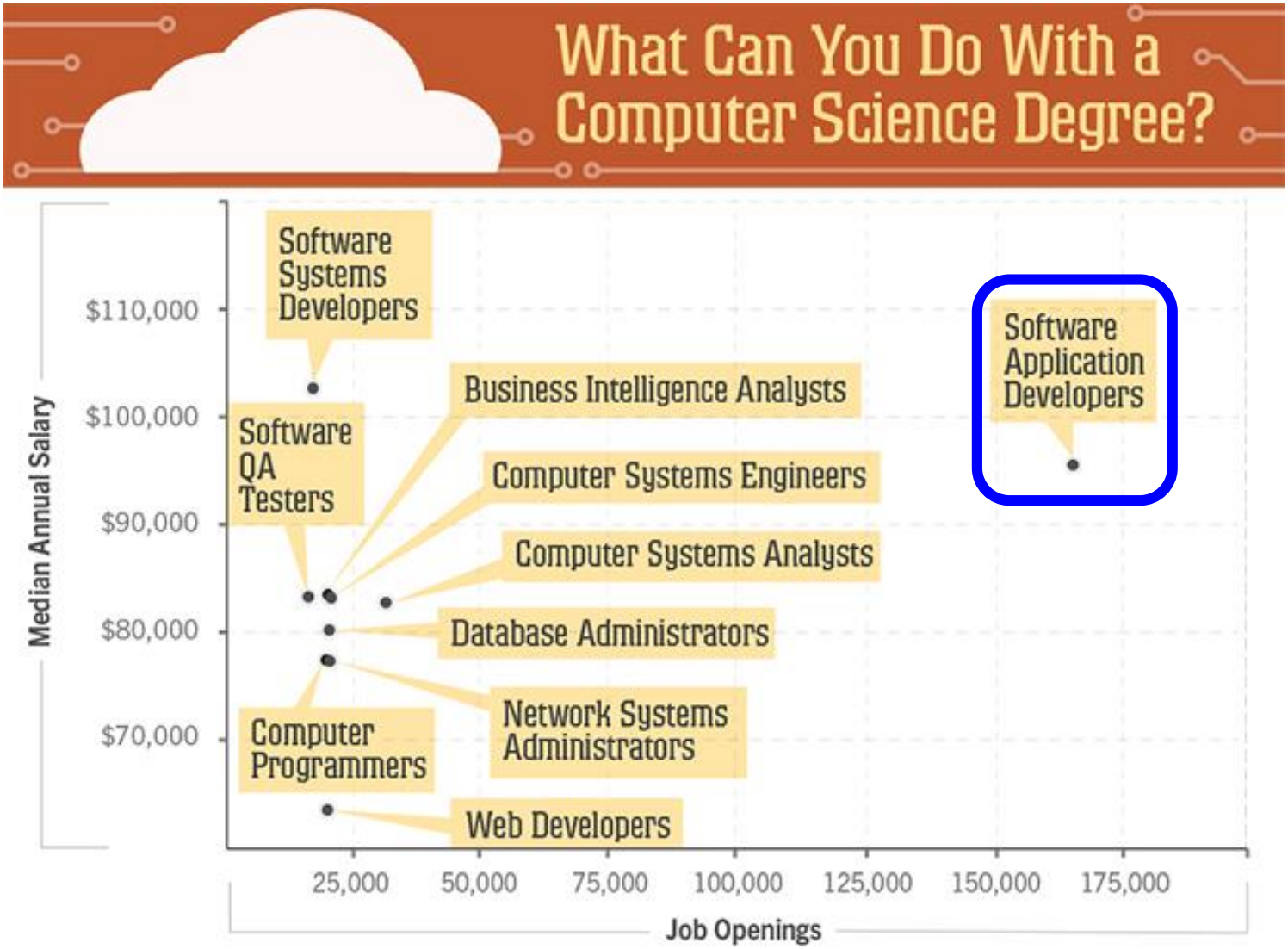
Entry-Level STEM Jobs by Career Area

STEM Groups	% of STEM Postings	Entry-Level Postings
Healthcare	65%	1,553,937
Information Technology	20%	482,388
Engineering & Advanced Manufacturing	9%	210,670
Sciences	3%	72,689
Analysts (Math)	2%	53,102

Demand for STEM Graduates

- 48% of all entry-level jobs requiring a bachelor's degree or higher are in STEM fields
  - Only 29% of bachelor's degrees are in a STEM field
- There are 2.5 entry-level job postings for each new 4-year graduate in STEM fields
  - Compared to 1.1 postings for each new graduate in non-STEM fields

Introduction to Careers in Computer Science


What Can You Do With a Computer Science Degree?
Median Annual Salary
$110,000
$100,000
$90,000
$80,000
$70,000
Software Systems Developers
Software QA Testers
Business Intelligence Analysts
Computer Systems Engineers
Computer Systems Analysts
Database Administrators
Network Systems Administrators
Computer Programmers
Web Developers
Software Application Developers
25,000
50,000
75,000
100,000
125,000
150,000
175,000
Job Openings

Software Applications Developer

- Daily duties:
  - Design or customize computer applications software
  - Modify existing software to optimize operational efficiency or correct errors
  - Evaluate software requirements and user needs to determine software feasibility
- **Available jobs (7/2014 – 6/2015): 165,063**
- **Projected growth (2012-2022): 22 percent or higher**
- **Median annual salary (2014): $95,510**

Interdisciplinary Computer Science

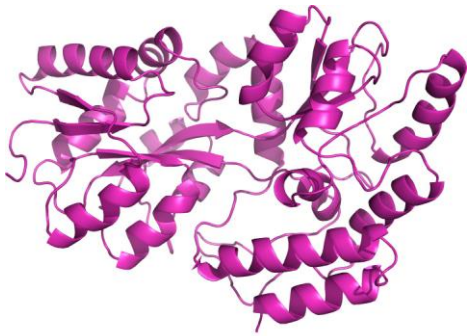
Learning to Program is for Everyone

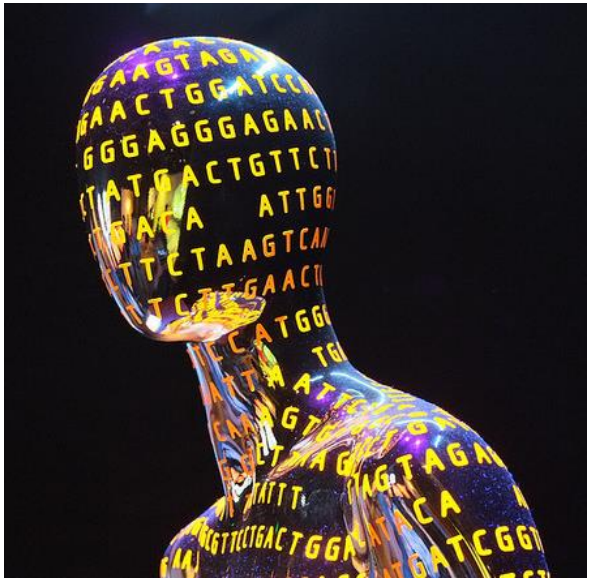
- In the Lost Interview with Steve Jobs, he said:

> "I think everybody in this country should learn how to program a computer because it teaches you how to think."

Computer Science and Biology

- Human Genome Project
- Tagging and tracking animals
- Protein folding



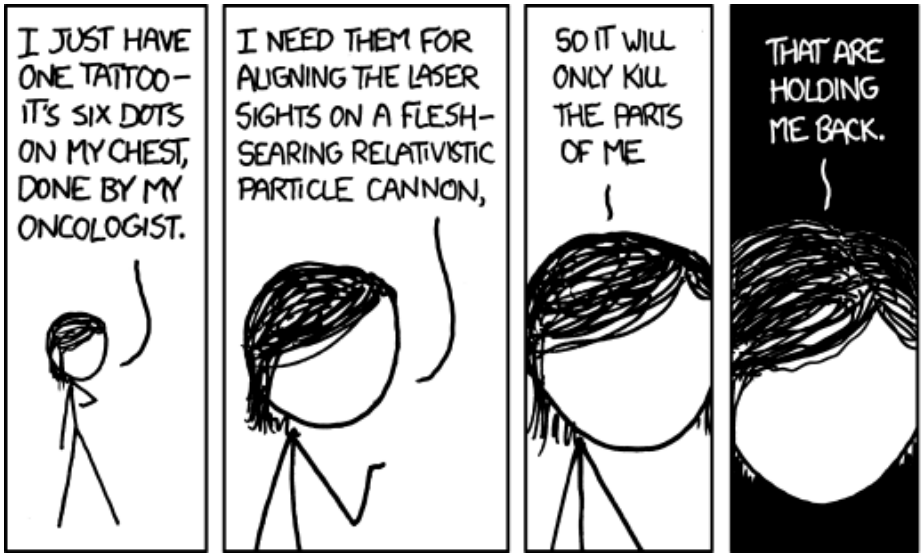


Computer Science and Film

- Animated films
- Motion capture
- CG special effects

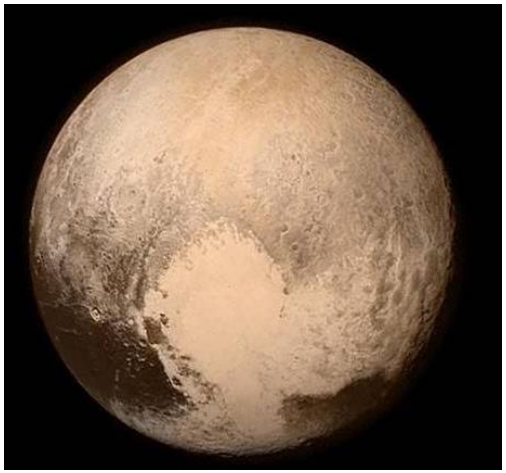
Computer Science and Healthcare

- Pharmaceutical manufacturing
- Predictive diagnostics
- Chemotherapy machines



Computer Science and Space

- Analyzing data from spacecraft
- Planning the Mars mission
- Programming landers, shuttles, etc.



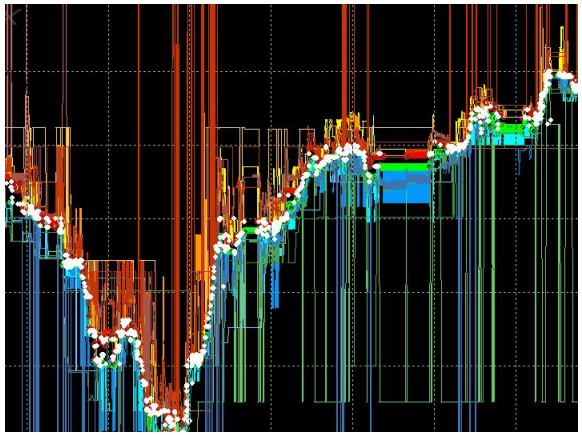
Margaret Hamilton &
her Apollo 11 code

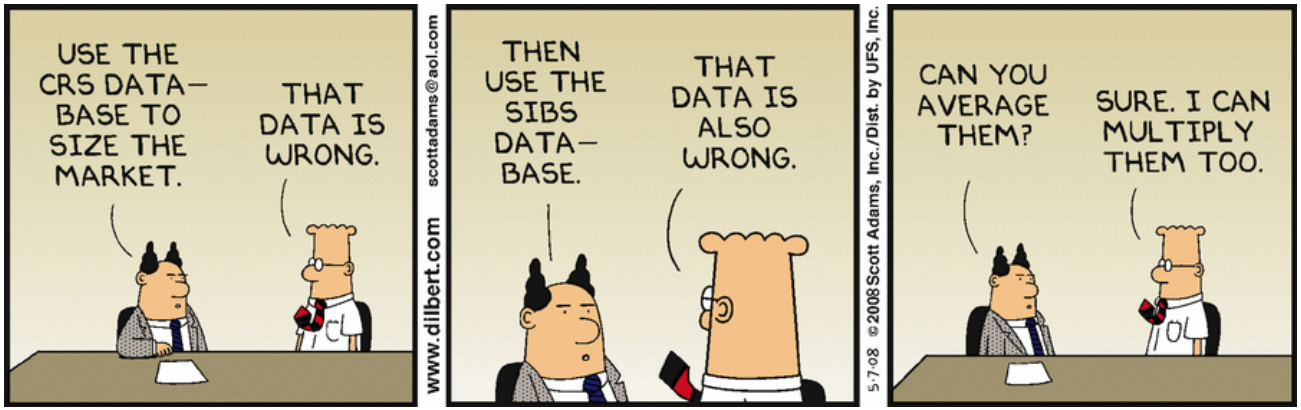
Computer Science and MechE

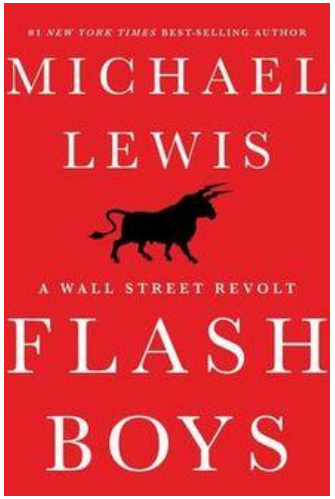
- Google's self-driving car
- Automated factories
- Robots!

Computer Science and Finance

- High-frequency trading
- Computational finance
- Risk analysis







Job Listings and Descriptions

Job Descriptions

- Generally made up of the following:
  1. Company Description
  2. General Job Description
  3. Required Skills
     1. Minimum education
     2. Minimum years of experience
  4. Desired Skills
  5. Other comments

Example Job Listing

- **Application Developer (Entry Level)**
  - Required Skills:
    1. B.S. degree or higher in Computer Science, Computer Engineering, or Electrical Engineering.
    2. Programming skills in PHP
    3. Experience in development of web applications
    4. Experience in SQL
    5. Experience with the software development lifecycle to include requirements definition and unit testing

Example Job Listing

- **Application Developer (Entry Level)** ???
  - Job Requirements:
    - Bachelors Degree in Computer Science, Engineering or a related technical discipline, or the equivalent combination of education, technical training, or work/military experience.
    - 2-5 years of related software development experience.
    - Must have a minimum of a Secret security clearance; TS/SCI is preferred

Grad School
(Master's and Ph.D.)

Why (or Why Not) Grad School?

- Reflect --think about your education so far
  - What are your passions?
  - What are your goals in life?
  - What excites you?
  - What lifestyles might you want?
- Avoid listening to what others tell you to do; think about what you want

Why (or Why Not) Grad School?

- An **MS** is basically a technical degree that gives you more interesting job opportunities
- A **PhD** is basically a research degree, which opens up a host of advanced and research-oriented opportunities

- In industry, MS and PhDs are often a ticket to eventual upper-level management

How Long is Grad School?

- MS
  - 1 to 2 years is typical
- PhD
  - 4 to 6 years is typical
  - It can take longer! (8 years or more)
    - Many schools have a limit to how long you can take

What Is It Good For?

- MS is essentially a technical degree
  - Open up a range of much more interesting jobs
  - More responsibility, creativity, flexibility, and income

- PhD is basically a research degree
  - Research today is collaborative (interdisciplinary!)
  - No “lonely hacker toiling away alone in the night”
  - Many become professors and also teach classes

Paying for Grad School

- MS
  - Vast majority require you pay tuition and fees
  - Companies may pay for their employees to get an MS, either part-time or with a year off to go to school
- PhD
  - For most STEM fields (including CS), the school pays you to get your degree, as long as you're full-time
  - Tuition, fees, and normally a (small) stipend

Applying to Grad School

- Start early!
  - Fall of senior year, or even the summer before that
- Write to departments and request informational brochures and application materials
- Ask professors who know you well for reference letters
- Take the GRE in October (or December), and have the scores forwarded directly to the schools you applied to
- Send in your application well before the deadline
- Follow up on everything! (Be paranoid about the mail)

Announcements

- Your Lab 2 is an online lab again this week!
  - Due by this Thursday (Sept 10th) at 8:59:59 PM
- Homework 1 is out
  - Due by **TONIGHT** (Sept 8th) at 8:59:59 PM
- Homework 2 is out later today
- Both of these assignments are on Blackboard
  - Weekly Agendas are also on Blackboard