

CSCI111: Fundamentals of Programming I

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<https://cs.wlu.edu/~sprenkles/cs111>

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Survey Says...

- What year are you?
- Who has used a computer regularly?
- Who has used the Internet regularly?
- Who has made a web page?
- Who has written a program?
- Why are you taking this course?

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What is Computer Science?

“Computer Science is no more about computers than astronomy is about telescopes.”
--Edsger Dijkstra

- CS = Complexity Science

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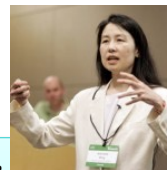
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Jeannette Wing

- Director of Data Science Institute at Columbia University
- Formerly at NSF, CMU, Microsoft



When people talk about the smart grid, smart vehicles, and smart buildings — what makes them ‘*smart*’?

Computer science.

When people talk about personalized medicine and personalized learning, how do you think personalization is possible?

Computer science.

We’re not there yet, but the next generation of computer scientists can help us realize these visions — with immeasurable *benefits* to *society* and the *economy*.

<http://www.nytimes.com/roomfordebate/2011/06/15/computer-sciences-sputnik-moment/writing-code-has-become-self-expression>

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(emphasis is mine)

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CS == Complexity Science or the Study of Complexity

- How can it be done?
 - Can you solve this problem?
 - Based on **information**
 - Managing, manipulating data
 - Can you create a process to solve such problems?
- How well can it be done?
 - How quickly can you find solutions?
 - Do you have the “best” solution (often in terms of time and/or space)?
- Can it be done at all?
 - Is every problem solvable?
 - Is there a way to tell?

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Computer Science Fields

Systems

- Architecture
- Operating systems
- Networks
- Distributed and parallel systems
- Databases
- ...

Software

- Compilers
- Graphics
- Software engineering
- Software testing and verification,
- ...

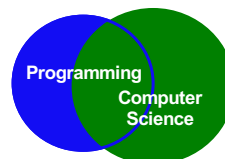
Theory

- Algorithms
- Theory of computation
- ...

Other

- Artificial intelligence
- Robotics
- Natural language processing
- Bioinformatics
- Visualization
- Data science
- ...

- Often research involves combinations of these fields
- Not just programming!
 - But programming is a tool to do much, much more!



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What I do **not** do as a Computer Scientist

- Fix hardware
- Fix Microsoft Windows (or other operating systems) problems
- Fix Microsoft Office (or other desktop applications) problems

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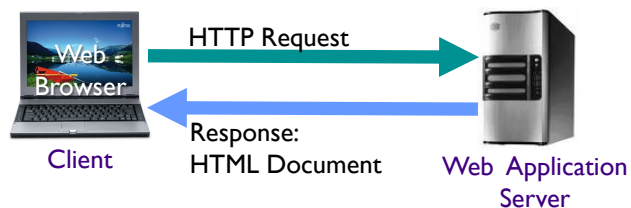
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What I Do as a Computer Scientist

- Interests: Software testing, empirical studies, distributed systems
- Focus: Automated web application testing



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What I Do as a Computer Scientist

Google Gmail Calendar Spreadsheets all my services »

Google Calendar BETA

Search My

Create Event Quick Add

Today Aug NaN - 27, 2006

August 2006						
M	Tu	W	Th	F	Sa	Su
24	25	26	27	28	29	30
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

0	1	2
7	8	9
14	15	16

Find the error(s)!

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Find the Errors

Dear SARA,

You've spent \$0 in total as of September, 2010.† You're almost there! Just spend \$0 more to receive your NY&C Reward!*

84 Items Sort By: Price: Lowest to Highest

Items per Page: 12 48 View all 1 2



Signature Collection
Shimmer Mist
Paris Amour
~~\$14.00~~ **Now \$4.00**
Limited Time Only! Save Over 70%



Signature Collection
Shimmer Mist
Moonlight Path
~~\$14.00~~ **Now \$4.00**
Limited Time Only! Save Over 70%



Signature Collection
Shower Gel
Exotic Coconut
~~\$11.00~~ **Now \$2.75**
Special Savings - Save over 60%



Signature Collection
Shower Gel
Cotton Blossom
~~\$11.00~~ **Now \$2.75**
Special Savings - Save over 60%

TOTAL
Subtotal: \$12.95
Shipping: \$6.95
Total: \$19.9



Qty: 1 Add to Bag

Qty: 1 Add to Bag


Qty: 1 Add to Bag

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We're having a really bad day.

The Unicorns have taken over. We're doing our best to get them under control and get GitHub back up and running.

[Contact Support](#) — [GitHub Status](#) — [@githubstatus](#)



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My Research Interests

- **Emails**

Review Your Recent Purchases

o
[write a review](#)

a
[write a review](#)

u
[write a review](#)

From Kroger <noreply@kroger.com> ☆
Subject Your null Comments Have Been Received
To Sara Sprenkle ★

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Digital Humanities

The screenshot shows the homepage of the Ancient Graffiti Project. At the top, there is a navigation bar with 'AGP', 'Browse', 'Interactive Maps', 'Featured Graffiti', 'Resources', and 'About the Project'. A search bar is located on the right. Below the navigation is a large banner image with the title 'The Ancient Graffiti Project' and the subtitle 'A digital resource for studying the graffiti of Herculaneum and Pompeii'. On the left side, there is a vertical list of filters: City, Insula, Property, Property Type, Street, Drawing Category, Writing Style, and Language. In the center, a search results summary shows '2124 results found' and 'Page 1 of 11'. Below this are options to 'Export as EpiDoc', 'Export as JSON', 'Export as CSV', and 'Print'. There are also sorting options ('Sort by Relevance') and a view count ('View 200'). A pagination bar shows numbers 1 through 7. On the right, there are two map thumbnails: a floor plan of a building and a street view of a building. Below the maps, there is a list of search results for the term 'Graffito':
Graffito: Mus nequa(m)
Translation: Mus never(?)
City: [Herculaneum](#)
Findspot: [House of the Wooden Screen/Partition \(III.11\)](#)
At the bottom of the page, the date 'Jan 9, 2023', the website 'ancientgraffiti.org', the user 'Sprengle - CSC111', and the page number '15' are visible.

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The screenshot shows the ChemTutor website. The header features the 'ChemTutor' logo and the tagline 'A PLACE TO PRACTICE CHEMISTRY'. A search bar is on the right. The navigation bar includes 'Home', 'My Progress', 'Tutorials', 'How to Succeed in Chemistry', and 'Login'. The main content area is titled 'Practice: Introduction to Stoichiometry'. It contains a question: 'Question 1 of 10: For the following reaction: $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$, what mass in grams of H_2O is needed to react with 652.42 g of CO_2 ?'. Below the question are four multiple-choice options: a. 1593.81 g, b. 267.066 g, c. 1594 g, and d. 267.07 g. At the bottom of the question area, there is a progress indicator (a row of circles) and two buttons: 'View Feedback' and 'Next →'. At the bottom of the page, the date 'Jan 9, 20', the website 'chemtutor.wlu.edu', and the page number '16' are visible.

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MEET SOME MORE COMPUTER SCIENTISTS

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W&L Alumni at **amazon**

Software Engineers



Rinn Joireman '21



George Barker '20

More alumni: Tom Wadlow '99, Jamie White '17, Alex Cantrell '19

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Patrick Ozark '17



MD/PhD Student at
University of Utah School of Medicine
Formerly: Bioinformatician at St. Jude Children's Research Hospital

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PhD Students



Hammad Ahmad '19
Michigan: Software Engineering

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Sarah Anne Troise '19
CMU: Engineering and
Public Policy

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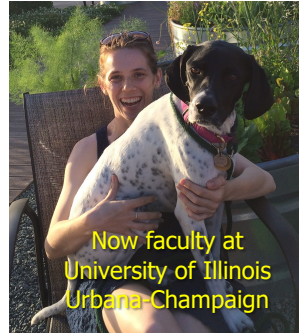
Lucy Simko '11 and Camille Cobb '12



Worked for the Dept
of Defense on
Cybersecurity



SECURITY & PRIVACY
RESEARCH LAB
UNIVERSITY of WASHINGTON



Now faculty at
University of Illinois
Urbana-Champaign

Example publications:

- Defensive Technology Use by Political Activists During the Sudanese Revolution
- What Makes People Install a COVID-19 Contact-Tracing App?
- Would You Rather: A Focus Group Method for Eliciting and Discussing Formative Design Insights with Children

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Computer Science and Law



Christyann Pulliam

- CS and Political Science major
- Law Degree - Wake Forest
- Patent Examiner at the US Patent and Trademark Office

Jan 9, 2023 > Focus: AI, DB apps



Julianne Campbell '18

- Computer Science Major
- Law Degree – Vanderbilt '21
- patent litigation support in electrical and computer technologies

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Samantha O'Dell '15

- Computer Science and English double major
- Technical Writer at Google



Laurie Lee '22
Tech Writer at
Salesforce



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And many more!

- You can see where our graduates have gone after graduation:

<https://my.wlu.edu/computer-science-department/after-graduation>

- Microsoft, AT&T
- Fulbright Scholar
- Allstate, Capital One
- Red Ventures
- ...

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Erich Geist **FEEDING AMERICA** food banks

We use data analytics, computer systems, servers, programming, network and database administration all the time to provide the data necessary to inform our donors, government officials, advocates, and the general public about our mission to feed the hungry.

Without good computer science...there is no food.

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Personal Correspondence

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My Bio

- From Dallastown, PA
- Education:
 - B.S., Gettysburg College
 - M.S., Duke University
 - Ph.D., University of Delaware
- For fun: pop culture, gardening, Rockbridge Animal Alliance



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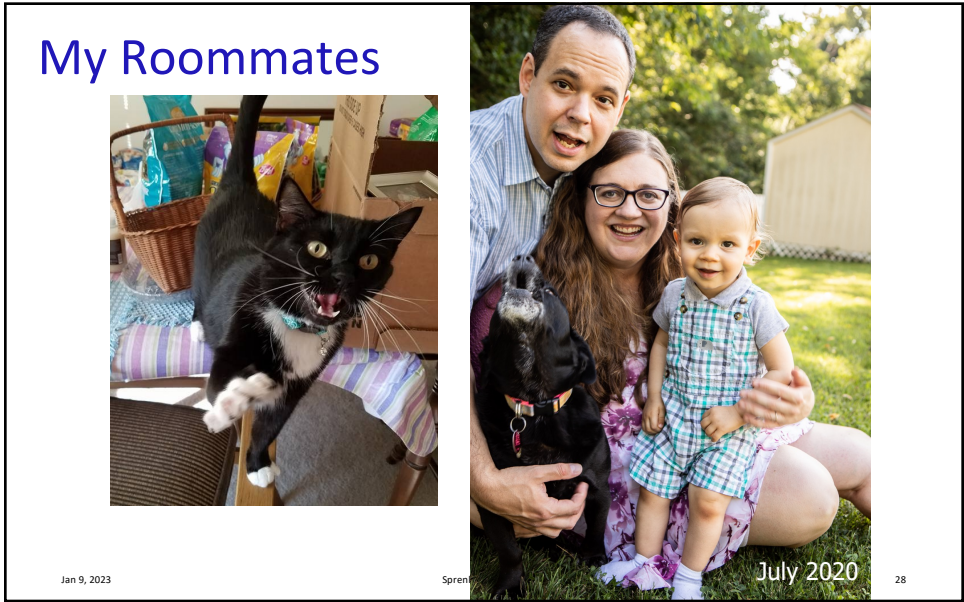
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Your Bios

- Where you're from
- Your year
- A fun fact

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Hilary Mason



- Founder of Fast Forward Labs
 - ▶ a machine intelligence research company
- Formerly Chief Scientist at bitly
- “Teaching someone to program is like giving them a **superpower.**” quote in *Glamour*, November 2011

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What This Course Is About

Problem Solving!



From
30 Rock

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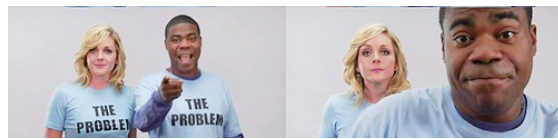
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Computational Problem Solving 101

- **Computational Problem:**
A problem that can be solved by logic
- To solve the problem:
 1. Create a **model** of the problem
 2. Design an **algorithm** for solving the problem using the model
 3. Write a **program** that *implements* the algorithm



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Computational Problem Solving 101

- **Algorithm**: a well-defined, step-by-step process for solving a problem
 - Has a *finite* number of steps
 - Completes in a *finite* amount of time
- **Program**
 - An algorithm written in a **programming language**
 - Also called *code*
 - As code base grows, becomes an *application*

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What to Expect from this Class

- First programming course
- Lots to learn!
 - Introductions to a lot of new ideas
- Different way of thinking
 - Similar yet different from math
 - May get stuck but ask for help!
- Writing some basic programs
 - Foundations for more complex, sophisticated code
- Great power, great responsibility

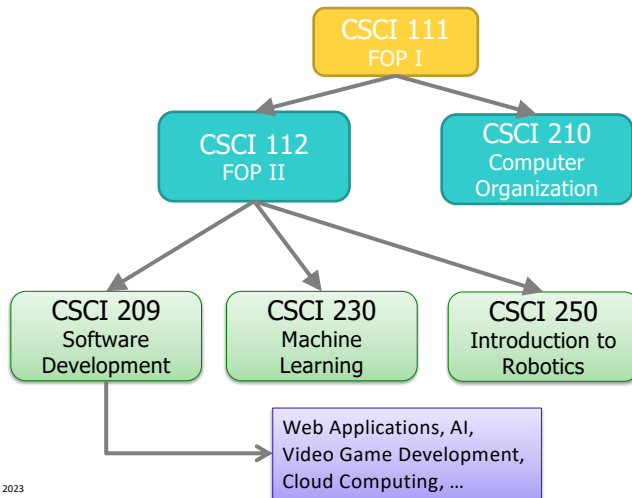
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Where You Can Go From Here



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Class Details

- Course web page
 - <https://cs.wlu.edu/~sprenkles/cs111>
 - Check schedule frequently for updates
- Monday, Wednesday, Friday classes
 - Slides posted after class, in PDF format
 - Don't copy down slides verbatim
 - A lot isn't on the slides
 - Use PDF slides later to review
- Tuesday labs
 - "Pre-lab" assignments in the textbook, due *before lab on Tuesday*
 - Programming projects due at the *beginning of class on Friday*

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Classtime

- Classes are in-person
- Classes will be recorded on Zoom and posted in Yuja on Canvas
- If you're not feeling well, you can attend the class on Zoom **BUT** that should not be a frequent occurrence

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Class Details

- 3 Exams
 - 2 Exams (see schedule online for dates)
 - Final Exam
- Discussion of broader issues in CS
 - Articles about computer science's effect on everything
 - Get big picture of CS
 - Write up on Canvas, due **Thursdays by 11:59 p.m.**
 - Discussion Friday
 - Opportunities for extra credit for finding, reading, summarizing additional articles

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Instructor Responsibilities

- Keep your interest in CS
- Prompt, constructive feedback on assignments
- Office hours: Zoom and in-person
 - Wednesdays: 2-4 p.m.
 - Thursdays: 10:30-11:30 a.m., 3-4 p.m.
 - Email for appointments at other times
- Goal: respond within 24 hours to emailed questions

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Student Responsibilities

- Outside of class:
 - Review entire syllabus online
 - Check W&L email and course web page frequently for updates
- During class
 - Attend and participate in class and lecture
 - Mandatory attendance
 - Be respectful to other students
 - Arrive promptly to lecture/lab
 - Bring your notes and handouts
 - Turn off cell phone

**Be patient, flexible, and
learn from mistakes**

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Textbook

- Online textbook
- Supplement to the material
 - Different perspective, additional practice problems
- Register for the class
 - Instructions on course schedule page

Consequence: my lecture slides and handouts and your notes are very important

- Reference *frequently*
- **Bring with you to lab!**

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Looking Ahead

- Tomorrow is our first lab!
 - We'll get you started for the semester

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