Beauty and Joy of Computing

Future Female Techmakers Conference
March 4, 2017

Prof. Jo Atlee
Computer Science
University of Waterloo
careers in computing
software is changing the world

- e-health
- robots
- 3D printing
- social activism

Future Female Techmakers Conference
meaningful careers in computing

- educational support software
- e-learning software
- CS education
- electronic health records
- medical devices/equipment
- medical imaging
- telemedicine
- medical diagnostic systems
- consulting services
- data analytics
- science modelling
- energy-optimizing devices
- digital forensics
- fraud detection
- cyber security
- protecting personal data
- government digital services
- accessibility of Web services
- e-activism
- arts
25 best jobs for work-life balance

1. Data Scientist
2. SEO Manager
3. Talent Acquisition Specialist
4. Social Media Manager
5. Substitute Teacher
6. Recruiting Coordinator
7. UX Designer
8. Digital Marketing Manager
9. Marketing Assistant
10. Web Developer
11. Risk Analyst
12. Civil Engineer
13. Client Manager
14. Instructional Designer
15. Marketing Analyst
16. Software QA Engineer
17. Web Designer
18. Research Technician
19. Program Analyst
20. Data Analyst
21. Content Manager
22. Solutions Engineer
23. Lab Assistant
24. Software Developer
25. Front End Developer

computing is a team activity
programmers
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female students in CS at Waterloo (20%)
why so few women?

Men are innately better programmers than women are?

Women are much less interested than men in computing?

“no gender differences in quantitative measures of students’ abilities and performances”

early female “computers”

early female computers performed astronomical calculations
“computers” in World War II

women were recruited in WWII to compute bomb trajectories
“computers” in World War II

75% of the codebreakers at Bletchley Park were women
“computers” at NASA

NASA human computers processed flight and wind-tunnel data to assess and improve the performance of airplanes and rockets.

Female computers were deemed faster and more accurate than males.
“computers” at NASA

Mary Jackson  Katherine Johnson  Dorothy Vaughan
the first programmers were women
the first programmers were women
programmers at NASA
Admiral Grace Hopper

“Women are naturals at computer programming.”

Programming requires planning, patience, and attention to detail.

Adm. Grace Hopper
15,000 @ Grace Hopper Celebration
15,000 @ Grace Hopper Celebration
men’s and women’s experiences are different
gap in pre-university CS experience

- Female students (on average) start university with less programming experience
- Report nearly equal mastery of programming concepts in intro courses
- Have equal GPAs
gap in pre-university CS experience

VS.

playing songs

formal music lessons
want computing experience?

Waterloo offers free computer science online courseware:

• Python from scratch
• Language-independent programming lessons
• Web basics
• Web programming

http://courseware.cemc.uwaterloo.ca
self-confidence gap (imposter syndrome)
**micro-aggressions**

Social exchange in which a member of a dominant culture says or does something, usually without intended malice, that belittles and alienates a member of a marginalized group.

**Women just aren’t interested in CS.**

**Really? You don’t look like a CS major.**

**Why do you want to hang out with geeks?**

**Why would you want to study CS?**

**The guys will be better than you.**

**You only got into UW CS because you are a girl.**

**Want me to help you with your CS homework?**
some advice
where would you sit?
#1 sit at the table

It can be hard to feel confident—and research shows it’s even harder for women. But when you push past your insecurities and go for it, you gain more confidence.

leanin.org/grads
#2 dream big

Shoot for the moon. Even if you miss you’ll land among the stars.
#3 don’t beat yourself up if you fail

"Failure doesn't even really exist. If something doesn't go the way you planned, and you learn from it, that's just called learning. That's not really failure.

Failure is if you keep doing the same wrong things over and over; then you're not really making progress.

Otherwise, it's just learning –
And learning is good!

So, if your goal is to learn as much as possible, rather than not to fail, then you can keep going, going, going."

Hank Leber
CEO, GonnaBe
#4 technical girlfriends

Cultivate a network of technical girlfriends

- UW CS guys are great
  - They will be your best friends, study partners, project partners
  - But their experience is not the same as yours

- Girlfriends (who aren’t in STEM) are great
  - But their experience is not the same as yours
#5 self-promotion

It’s not what you know, and it’s not who you know. It’s who knows what you know.

Nora Denzel, former SVP at Intuit, HP, EMC
parting words

• Don’t be discouraged by micro-aggressions. They reflect weaknesses in the speaker, not in you.
• Nurture your own social network of technical women.
• Be yourself. You are what a computer scientist looks like!