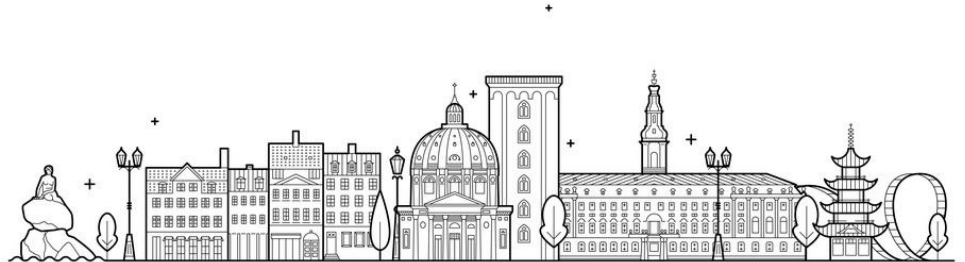


# Computing Education

## A Critical Time for a Critical Literacy

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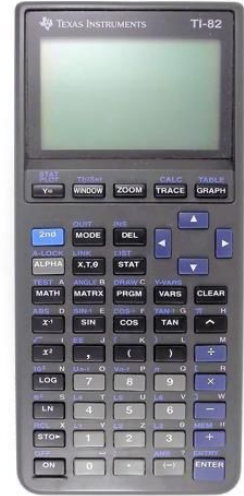


# I fell in love with computing early

My algebra teacher was to blame.

It was 1992; I was 12. He required us to buy TI-82 graphing calculators and showed us how to write (very boring) trigonometry formulas.

At the time, I was in love with my **Game Boy** and the game **Tetris**. The TI-82 looked much like a Game Boy, and so even though programming it seemed boring, I was intrigued by the device.



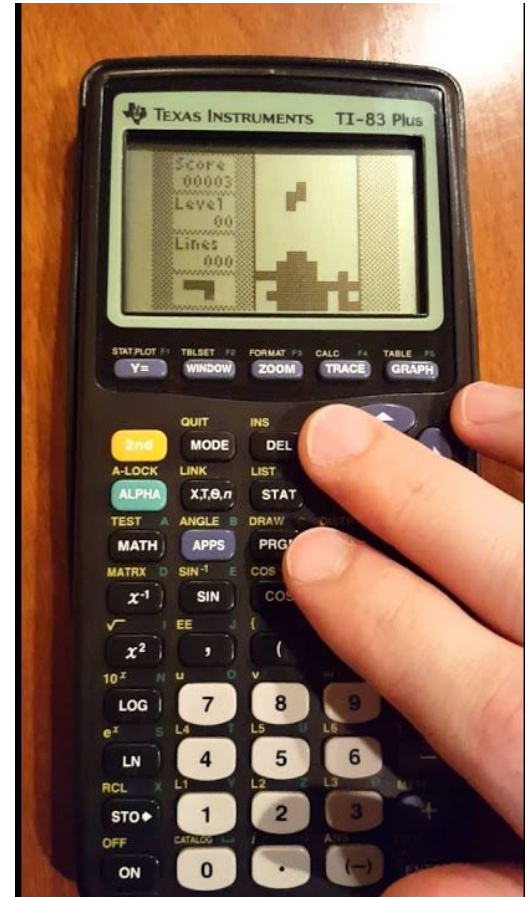
# The magical **PRGM** button

One day, my classmate showed me a version of **Tetris** running on his TI-82. Using a link cable we mail ordered, he transferred it to my device.

Alas, it was too slow to be playable. I pressed the **PRGM** button my teacher had showed us, and began to read the thousands of lines of code to find out why.

I've been addicted to code ever since...

Amy J. Ko, Ph.D.



# My path was stereotypical for an academic in computer science

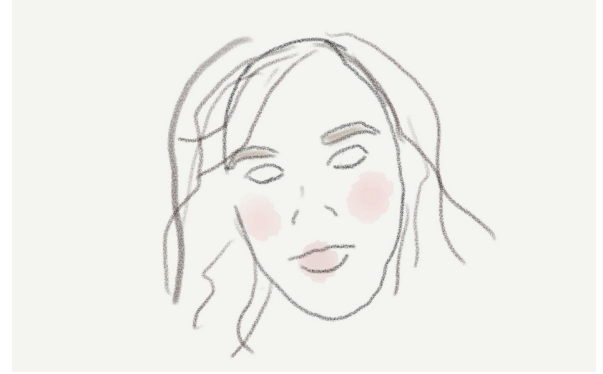
- I had a personal computer
- I taught myself Pascal, C, and BASIC from print books.
- I had no teachers, but I was lucky to have many informal mentors: a Dutch exchange student who knew C and a 2-year college student who shared his homeworks from his college classes.



*This is a story of **privilege**, as most people have no such access, even today.*

# In other ways, my path was quite different

- I was a closeted **transgender girl**, using code to escape from gender dysphoria and bullying
- As a **biracial** Danish and Chinese teen, I didn't fit in with the white or the Asian kids and was often isolated
- Others who liked to code **boasted** about their obscure technical knowledge, which I found annoying. I just liked sharing my procedural art with friends.



*This is a story of **exclusion and oppression.***

For me, computing was  
never about algorithms  
and data, but  
**expression and refuge**

# The duality in my story mirrors the duality in computing in society

Computing is...

- Powerful
- Transformative
- Empowering
- Connecting

It's reshaping markets,  
connecting us globally,  
unlocking knowledge for all.

Amy J. Ko, Ph.D.

Computing is...

- Destructive
- Divisive
- Exclusionary
- Oppressive

It is reinforcing racist, sexist,  
ableist, transphobic, and  
homophobic ideas in society.

It is a threat to humanity  
that a technology this  
powerful and perilous is  
understood by a less than  
1% of us.



# We need every person to understand...

That computing can transform our ability to analyze *data*

That *people* give computers their intelligence, not magic

That computers, just like people, can amplify *progress*

That computers, just like people, can amplify *oppression*

# How do we ensure this critical literacy?

We need **computing educators** that can inspire youth to learn it and use it in constructive, just, and mindful ways.

They need resources, time, support, and respect to prepare future generations to use computing in ways that help us all.



*Without teachers, we have no literacy*

# How do we ensure this critical literacy?

We need **teacher education programs** that prepare inspiring, skilled computing educators.

These programs need faculty, resources, respect, and integration with other subject areas such as math, science, social studies, and humanities.



*Universities need to prepare teachers*

# How do we ensure this critical literacy?

We need **computing education research** to inform those programs and these educators about what works and why.

This research needs funding, doctoral students, and recognition in both CS and education disciplines.



*The 2018 ACM International Computing Education Research Conference*

# How do we ensure this critical literacy?

And we need **centers** like this one that catalyze, amplify, and accelerate this research, shaping how future generations will understand the powers and perils of computing.

These centers need resources, leadership, and support, like this inauguration.

Amy J. Ko, Ph.D.



*Claus receives the 2020 Education prize.*

# Situating this center

Computing education research is a **global** endeavor, with hundreds of scholars across North America, Europe, Australasia, Asia, and even Africa.

However, few universities have **any** faculty with such expertise, and those that do only have one.

IT University of Copenhagen has the opportunity to change this status quo, shaping computing education not only in Denmark, but across the world.



Together, we can  
investigate some of  
the most pressing  
questions about  
computing literacy

# How can we connect computing to the lives of youth?

Amy J. Ko, Ph.D.





How can we help everyone understand the risks and benefits of computing to society?

Amy J. Ko, Ph.D.



How can we  
educate engineers  
to resist creating  
unjust software?

Amy J. Ko, Ph.D.



If we can answer these questions, we will create a world in which computation empowers and respects *all* of us.

Congratulations to IT  
University of  
Copenhagen, and  
*held og lykke!*