

# Liberatory futures for computing literacy

Amy J. Ko, PhD

Professor | The Information School | University of Washington, Seattle



Thank you all, for being here, and for your attention, and to the organizers, for inviting me to speak, and offering me this time to speak.

I'm going to speak broadly today. At times, you're going to wonder what any of this has to do with women and information technology. But I promise that if you listen closely, you'll see the threads I'm trying to pull together, and that we'll have plenty of time to talk about them after I say my piece.

## I'm Amy.

- I'm a Professor. I study and teach computing, information, and computing education
- Like you and everyone else, I'm **complicated**: I'm also a mom, a wife, a community organizer, a policy advocate, a youth volunteer, a software developer, an entrepreneur, a writer, and an inventor
- I'm also a trans, queer, biracial person of color who likes cats, tacos, puns, philosophy, economics, disorienting music and art, and micro-mobility





I'm joining from Seattle, from the University of Washington campus, where our cherry blossoms recently bloomed.

One of the things I love about Seattle, and the Pacific Northwest in general, is that wherever I am, there is natural beauty.

On the quad, we have these rescued cherry blossoms; down the street, an arboretum full of plants and trees from around the world.

Over the hill, a beautiful lake.

To the east, a mountain pass of hundreds of miles of trails.

And across the Snoqualmie pass in the Cascade range, we have the beautiful desert plains of central and eastern Washington, full of apples, eggs, grapes, and wheat, and hundreds of rural communities thriving and connecting.

This region's natural beauty is inescapable and unignorable. It is, if anything, why the Native people's of this land settled here, and why so many immigrants, refugees, and transplants came later to call this home.

Ultimately, it is the diversity of this beauty that makes it such a special place.



But there is another reason why people come to Washington state.

And it is because of the work that happens in this building, our state's capital of Olympia.

This is a place that in recent years has made college largely free for families below a certain income level; that has taxed capital gains on our billionaires to pay for schools; that has centered health equity and environmental justice in regulation of chemicals, pollution, noise, and carbon; that has recommitted to being a refuge for people around the world fleeing war and violence, but also safety and opportunity.

It has also been a refuge for me, as a queer and transgender person, in a country that is becoming increasingly hostile to me, and to the transgender youth that I teach, mentor, and support, and their families.

My state is not a perfect state by any means — we are far from achieving any real equity, despite our incremental efforts, and due to the immense demand for living here — but we are, relative to the country and the world, a place where people of all kinds can find basic respect, opportunities to thrive, and a chance at progress.



I share this context not only to give you a sense of *where* I am, and what I stand for, but as a point of contrast, to where you are, in Kansas City, Missouri, and what it stands for.

Now, I have been to Missouri many times; to Kansas City, to St. Louis, to many of its rural towns, as part of vacation, family visits, professional trips to conferences and universities.

And I've loved every visit. The food, the music, and the urban fabric of its cities can be amazing.

Everywhere I went, when I used to present as a man, I felt welcomed, and had a sense that everyone wanted it to be a great place.

But I do not *know* Missouri.

All I know is what I observe at a distance, about what happens in its state legislature.

So in case you haven't been following, here is what is happening.

Defines gender based on reproductive capacity, excluding people without capacity from law	Shields transphobic students, teachers, and faculty from discrimination lawsuits
Bans use of students' chosen pronouns and names in schools	Bans trans students from school sports
Bans gender affirming health care	Defines all government IDs of trans people as "fraudulent"
Forces teachers to out queer and trans students to parents and guardians	Bans health care education that requires learning about gender affirming care
Makes "female impersonation" around children a felony, effectively banning trans teachers	Bans state from educating people about diversity
Bans public restroom use by all trans people	Makes teachers, counselors, and doctors offering gender affirming care a felony
Bans public funding of organizations that support trans people	Bans teaching on gender identity and sexual orientation
Bans public retirement systems from investing in organizations that support trans people	Bans hiring and promotion processes from requiring writing about diversity, equity, and inclusion

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44 bills in the state house and senate this year, more than any other state in our union, all targeting trans youth and the people that care for them.

I'm going to read the impact of each of these, one by one, so you get a sense of the scale of state-sponsored oppression by Missouri's democratically elected representatives.

[read, pause]

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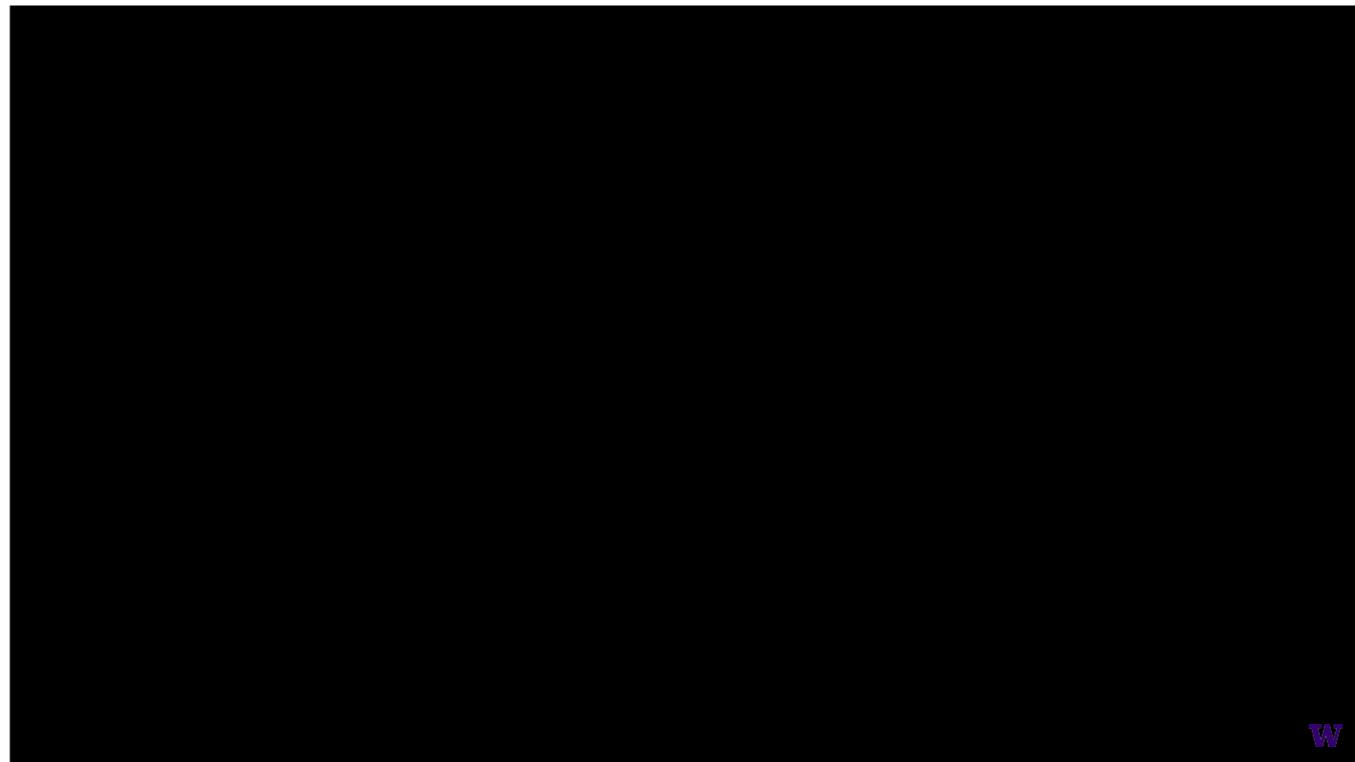
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The session ended last Friday, and to everyone's great relief, none of them passed.

But that was not because they lacked support. It was only due to a session of GOP hostility, disarray, infighting, and dysfunction that prevented these and countless other bills from passing this year, along with intense local organizing by trans rights activists to create so much noise, that the right decided to prioritize other things, like just barely passing a budget and some school, medicare, and farming funding.

But the damage is already done. Last year, Missouri passed a bill penalizing schools by cutting funding if they acknowledged the existence of trans youth; they banned trans kids from playing sports; they banned health care for trans youth. In the past year, these laws have created tens of thousands of trans refugees, severely impacted youth mental health, and partly led to many teachers leaving K-12 schools — the exact problem the increased funding in the education bill passed this session was trying to address.

Legislators have already vowed to bring all of these back to the next session. And if the right takes the White House, Senate, and House in November, expect them to keep their promise.



The vision of Missouri's legislative majority, and a substantial proportion of its voting public, is one where trans youth cannot be in school, cannot be in public, are not supported, and are erased from law. It is a demand, by government, to disappear, to go back into the closet, to be less free, and indirectly, an encouragement to take our lives. It is also a future where I cannot go, cannot teach, cannot speak, cannot advocate, cannot exist.

This vision funded by Christian nationalist disinformation campaigns of lies, social media amplification, and exploitation of minority rule in service of keeping power, at the expense of our most vulnerable youth, including girls, boys, non-binary youth, disabled youth, neurodivergent youth, Black, Asian, Hispanic, Indigenous youth. And every imaginable kind of teacher who either shares these identities, or does not want to teach in a state that would commit such violence against its children.

For me, it's hard to describe this as anything but genocide. Alas, genocide is not hypothetical: trans people in Missouri in the past year, including trans youth, are regularly killed in prisons, in the cities, in the suburbs, by its citizens, by the police, and by the state. The laws that passed last week will only lead to more death.

As you can imagine, that is not a world I want. And it's certainly not a world that the trans youth I work with want. And it's not the world that teachers, school leaders, doctors, nurses, therapists, parents, or siblings want for the trans youth they support.



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But this is not a talk about death. And focusing on the constant assault on our kids is always at the expense of creating the world we actually want, as opposed to defending a status quo that doesn't work for them anyway.

So what *is* the world we want?

If we want a world that represents and serves *everyone*, we have to take "everyone" seriously.

And so I want share what I mean by everyone, by sharing some stories of youth and teachers I have encountered in my volunteer work, and their lives.

I want to make quite clear, however, that the stories I share are not of real youth and teachers. To protect their identities, I'm going to vigorously mix elements of their stories together. So while none of these stories are real in totality, they are *realistic*, and very much grounded in the lives of real youth and teachers.

So what does "everyone" mean?



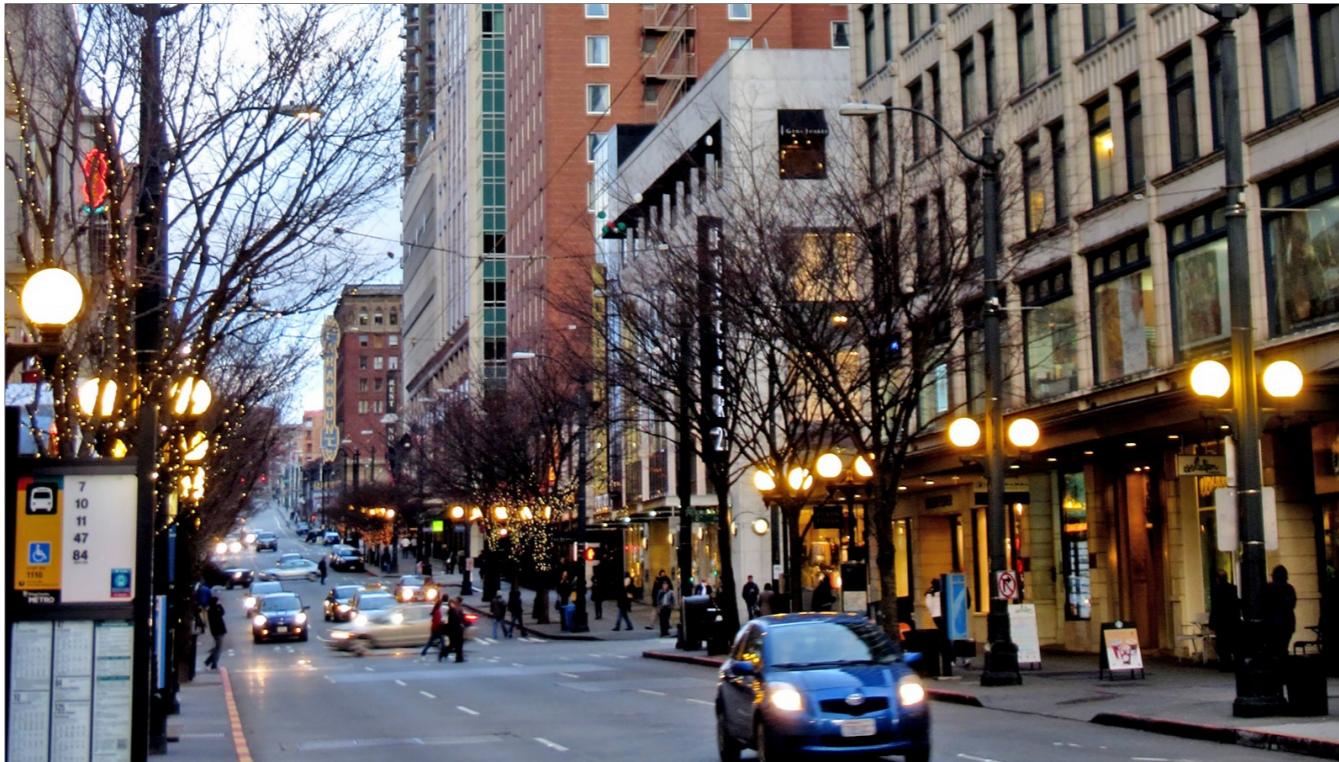
Everyone means a 14 year old non-binary student I talked to online on Zoom from Arkansas, who was whispering from their closet, so their parents wouldn't hear them. They'd been bullied at school, and the school had done nothing, so they had stopped going. Their parents didn't know they were trans, but they couldn't take the abuse at school any longer, and had started acting out. Their Dad had threatened to kick them out of the house unless they "straightened out".

They are autistic and like to program Minecraft worlds to share with their friends. They dream of moving to Brazil, which they learned recently passed some of the most trans affirming legal protections in the world, including free gender affirming care as part of the national health system. The future they want is one where they can create, make friends, be well, be loved, be safe.



Everyone means the 11 year old boy I met from eastern Washington. He's trans, he likes his pet hamster, and likes to draw pictures of animals in socially awkward situations. He wanted to take a coding course at his middle school to learn how to make digital hamster art, but he uses a wheelchair, and his wheelchair doesn't fit under the desks in the school's computer labs, so he decided to just stick to hand illustrations at home.

He wondered if he made the journey to Seattle to our youth center's house if we could do a class there some day. I told him the computer lab was up stairs, but we could bring a computer down to the living room and do a class some day. He wants a school with accessible classrooms.



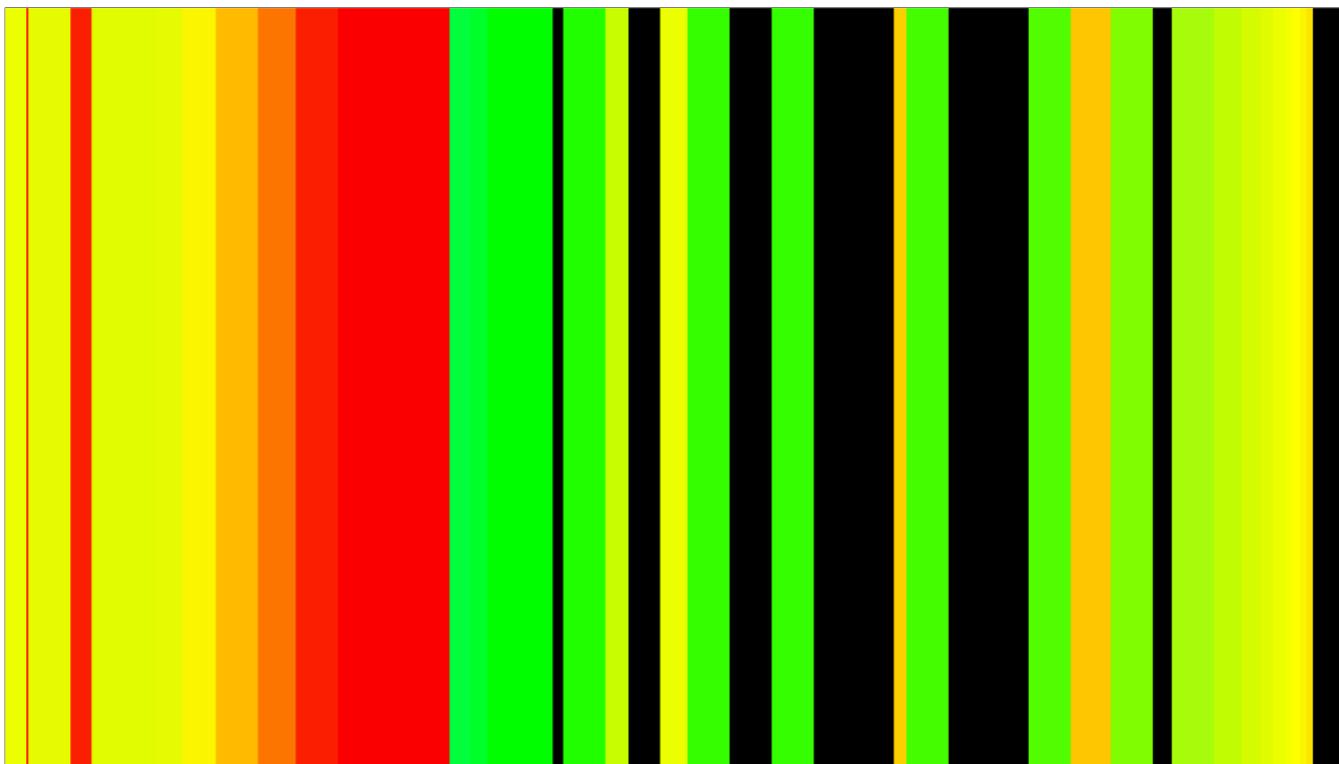
Everyone means the Black trans man, 21, looking for community with other Black trans men in college, not constantly getting flagged on dating apps and Discords as a fraud, and free to roam the streets in his city without worrying about police violence. He wondered if we had any tips on how to find private supportive communities online, free of harassment, hate speech, and racism. The rest of our group that night, mostly young adolescents, was all white that night.

He was studying political science and information diffusion, and dreams of a career doing social network analysis to study bias.



Everyone means the 14 year old Ukrainian refugee I met, recently blind from an IED explosion last year set by Russian troops outside her home. She was an English learner, and trying to learn how to use screen readers, but her schools didn't have the knowledge to help her. She missed the dumplings in Ukraine, and found some recipes online, but the screen readers supported at the public library and the local refugee resettlement not-for-profit won't accurately read Ukrainian aloud to her. She wanted to learn how to train a speech synthesis model on Ukrainian, so she could read the recipes and share them with others who could help her make them. She wasn't out to her parents, but she was out to some of her teachers, because some of them had trans pride flags in their classrooms.

She doesn't know what she wants, other than to be settled after immigrating, to have friends, and to find ways of staying connected to Ukrainian culture, and to share it with the people in her life.



Everyone means the non-binary art teacher at a private school trying to create safe spaces for their students' self-expression. They had one student who wanted to create interactive art, and were asking me for tips on how to teach coding in their art class, and if I knew of any professional development opportunities that focused on art. Their principal has been misgendering them for years, and seemed to be threatening to ban them from using their gendered restrooms. They were also wondering if I knew of any schools that had more trans affirming leadership and needed an art teacher.

They want a place where they can teach and empower youth to express themselves through interactive art.



And everyone means scholars and activists like me being able to join you in places like Missouri, without facing felony charges for being a “female impersonator” engaged in an “adult cabaret performance”, using the gendered restrooms, and trying to use my “fraudulent” driver’s license to return home on a flight. It means being able to be there, with you, in person, to have rich conversations over dinner, to imagine how our coalitions might be able to build the futures these youth and teachers dream of. It means not being mired down by the heaviness of civil rights loss, but instead working together to create joyful spaces where youth, teachers, and the advocates that support them can imagine liberatory futures of computing.



And everyone means you, who will inevitably be ensnared by this nationwide legislation too, either because *you* are queer, trans, gender non-confirming, or because people will *assume* that you are, based on how you look, dress, or behave. In fact, many cis people in Missouri have already been harassed in restrooms and schools, even by elected representatives, for not conforming to 21st century conservative gender norms. You can't do the good work to broaden participation in computing in computing if you're being harassed because you don't fit into some arbitrary box of gender presentation.

I'm sure you have dreams of a freer world as well, one where you can dress how you like, speak how you like, teach what you want, have basic respect, celebrate your cultures and communities. These are the same things that our youth and teachers want.



So how do we build this  
liberatory future?

part of creating this liberated  
world is resisting hateful  
**legislation**



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If we're not even free to be in public without harassment, violence, and imprisonment, it's going to be hard to collaborate on building this better world. And so some attention to these hateful laws is necessary, as they only make our work harder.

but most of creating this liberatory world is reinvention — of **systems, culture, and community**



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We cannot spend all of our time being defensive, trying to resist the oppressive world the right wants to create to maintain dominance.

Rather, we should be spending most of our time **actively creating** the world that we all deserve, where everyone is free and thriving, without shame and fear.

So what does building that world mean? Let's talk about 5 possibilities.

(1)

empower and resource those on  
the margins of computing lead  
change

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First, I want you to reckon, deep down in your soul, with what work you are positioned to do. Are you marginalized in computing? How? What are the limits of your knowledge? Who has knowledge that you don't have? None of us knows everything about the world we need to make, because none of us are marginalized in all possible ways.

Pay close attention to who is leading your work, and what knowledge that is missing. How is your power structured to ensure that those marginalized viewpoints are at the center of your priorities, not on the margins? And if they're not, how could your work possibly build the world we need, when the world we have is so utterly broken?

(2)

## equitable **computing** education requires equitable **education**

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As you heard in some of the stories I shared, there is no way to create *computing* education that works for everyone if schools are not working for everyone. We need accessibility, language inclusion, sufficient resources, protection from abuse parents and peers, in every school, in every classroom in the U.S. We cannot do our work on technology in a silo; we must partner with nationwide efforts for equitable public education, combining our efforts with those in STEM education, and education in general. Uncoordinated work is too often piecemeal, and sometimes, conflicting. Let us build this future together.

### (3) connect computing education to rights in **health, employment, disability**

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Youth who are not healthy and well cannot learn computing.

Teachers who are banned from working because of their identity cannot teach computing.

Youth and teachers with disabilities who cannot access classrooms, computers, computing itself, cannot create this future with us, and we can't create one that includes them without them.

Ignoring the connections to these broader visions of an equitable United States means ignoring essential, structural necessities for literacy and participation.

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## Connect computing education to **digital divide** efforts

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While there is much youth can learn about computing without computers, there is much they cannot. And more than 40% of youth in America don't have devices or stable internet access. And while public schools and libraries can bridge some of these gaps, they are far from sufficiently funded to be able to bridge all of it, particularly when youth are at home. We have to meaningfully link equitable computing education efforts to internet rights efforts, and that means engaging in hard questions about funding, infrastructure, sustainability, and the politics that obstruct these needs.

(5)

## Connecting computing education to **anti-bullying** and **anti-racism** efforts in schools

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Youth cannot learn in classrooms, or in school in general, if they do not feel physically or emotionally safe from their peers or teachers. Safety is a fundamental resource. It is a promise we make to children that is too often broken, because we do not take it seriously, or resource known solutions. And as we all know, many computing classrooms are places with all kinds of students do not feel safe, with teachers, or the white and Asian cis, straight boys that tend to take up those spaces.

# What does any of this have to do with **computing**?

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Computing isn't merely a subject area to add to already full school curricula. I believe it can be a source of transformation in schools. A place unencumbered by a hundred years of stale pedagogy, warped parent expectations, infrastructure, and curricula. And not only that, but a place of creativity, community-building, of multicultural, ability-diverse celebration.

If we can show what kinds of learning is possible in schools by harnessing this rare moment of educational transformation, we might not only transform computing education, but education broadly.

# How?

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So what might this look like?

I am hardly the person to ask.

My work and ideas, for all its engagement with criticality, has failed to imagine how these liberatory futures of computing literacy might work.

Instead, I want to point you to the work of others who I think are doing a much better job of imagining these worlds.

And then I'll end with some of the work we're starting at the University of Washington.



Roque, R. (2023, June). Imagining Alternative Visions of Computing: Photo-Visuals of Material, Social, and Emotional Contexts from Family Creative Learning. In Proceedings of the 22nd Annual ACM Interaction Design and Children Conference (pp. 68-81).

Pay attention to the work of Ricarose Roque at the University of Colorado, who is imagining learning spaces that center family, family relationships, family learning, and the myriad ways that love, identity, culture, language, and creating interplay. Her work points not just to liberatory futures, but ones where youth and their families find joy together, and the moments of learning inherent to joy.



Vakil, S. (2020). "I've always been scared that someday I'm going to sell out": Exploring the relationship between political identity and learning in computer science education. *Cognition and Instruction*, 38(2), 87-115.

Look to the work of Sepher Vakil, who imagines futures of computing literacy that weave together youth's political identity, engaging them in wrestling with power, culture, civil rights, but in the context of engineering, both because of engineering is a center of power in the world, but also because of its commitment to making and realizing our imagined futures.



Etim-Andy, M., Erete, S., & Rankin, Y. A. (2024, March). "Their religion is yoga": Understanding the Role of Spirituality for Black Women in Computing. In Proceedings of the 55th ACM Technical Symposium on Computer Science Education V. 2 (pp. 1638-1639).

Listen to Yolanda Rankin, who is leading intersectional inquiries into the many ways that identity, culture, and spirituality interact to shape learning and teaching in computing, with her collaborators Sheena Erete and Jakita Thomas.



Tseng, T., King Chen, J., Abdelrahman, M., Kery, M. B., Hohman, F., Hilliard, A., & Shapiro, R. B. (2023, June). Collaborative Machine Learning Model Building with Families Using Co-ML. In Proceedings of the 22nd Annual ACM Interaction Design and Children Conference (pp. 40-51).

Learn from my colleague R. Ben Shapiro, who imagines computing literacy as emerging from families going deep into the heart of data, algorithms, and AI, understanding how it beats, and pumps, and brings computing to life, helping them see the futures they might create together through data to meet their own needs, their families' needs, and the needs of their communities.



Ryoo, J. J., Morris, A., & Margolis, J. (2021). "What happens to the Raspado man in a cash-free society?": Teaching and learning socially responsible computing. *ACM Transactions on Computing Education (TOCE)*, 21(4), 1-28.

Study Jean Ryoo's work, which examines liberatory futures in classrooms, and how youth and teachers can work together to imagine those futures together, deconstructing ideas like "responsible" and "social" in culturally responsive terms that connect to the broader structures of teacher education, school policy, and leadership.

These leading voices and their scholarship are showing us the futures we need to build. I'm doing my part by trying to support future leaders to do the same.



Leaders like my postdoc Max Skorodinsky, who is examining the worlds that queer and trans teachers on the margins of CS have created for themselves, in the absence of personal and professional community, and the presence of exclusion.



Everson, J., Kivuva, F. M., & Ko, A. J. (2022, February). "A Key to Reducing Inequities in Like, AI, is by Reducing Inequities Everywhere First" Emerging Critical Consciousness in a Co-Constructed Secondary CS Classroom. In Proceedings of the 53rd ACM Technical Symposium on Computer Science Education-Volume 1 (pp. 209-215).

Leaders like my PhD student Jayne Everson, who is examining the myriad ways that deconstructing and co-constructing classroom spaces can free youth to find themselves and their futures through materiality and its links to computation in media like embroidery and robotics.



Mara Kirdani-Ryan, Amy J. Ko, and Emilia A. Borislova (2023) "Taught to be automata":  
Examining the departmental role in shaping initial career choices of computing students,  
Computer Science Education

Leaders like my PhD student Mara Kirdani-Ryan, who is deeply examining how to create cultures and communities in computing learning spaces that center love, identity work, and liberation from the constraints of social norms, family systems, and academic epistemologies.



Davis, K., Slovak, P., Landesman, R., Pitt, C., Ghajar, A., Schleider, J. L., ... & Kuhn, N. S. (2023, June). Supporting Teens' Intentional Social Media Use Through Interaction Design: An exploratory proof-of-concept study. In Proceedings of the 22nd Annual ACM Interaction Design and Children Conference (pp. 322-334).

Leaders like my PhD student Rotem Landesman, who is discovering ways to help youth become what Sepher calls “philosophers of technology” by deeply linking computing and philosophical argumentation skills



Kivuva, F. Megumi, Keith O'Hara, and Amy J. Ko. "Exploring Identity through Computing Integration in a Spanish Language & Literature Class." IEEE RESPECT 2023.

Leaders like my PhD student Megumi Kivuva, who is weaving together liberatory dreams of refugee and immigrant youth, their languages, cultures, and first homes, with the expressive possibilities of programmable media.



Walker, R., Sherif, E., & Breazeal, C. (2022, May). Liberatory computing education for african american students. In 2022 Conference on Research in Equitable and Sustained Participation in Engineering, Computing, and Technology (RESPECT) (pp. 95-99). IEEE.

Leaders like my PhD student Eman Sharif, who is examining the dreams that Black students have for how teaching, learning, and assessment might be designed to center liberatory tools to empower students to create computing education contexts free of racism.



**wordplay.dev**

And emerging leaders like my undergraduate research assistants Isabel and Rayana, who are helping me to create a student and teacher led open source community for exploring justice-centered educational programming languages that radically reposition who creates the power to create at the intersection of ability, language, and class.



[computinged.uw.edu/stepcs](http://computinged.uw.edu/stepcs)

And leaders like the more than 30 teachers who have joined our STEP CS K-12 CS education pre-service pathway, who are combining computing with language arts, social studies, mathematics, science, and art in middle schools and high schools across the country in ways that respond to and sustain the complex racial tapestry of Puget Sound's white, Asian, Hispanic, and Native communities, and the thousands of refugee and immigrant families from around the world.



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We do all of this work together, with many other faculty and postdocs, in our new **Center for Learning, Computing, and Imagination**, which brings together faculty, postdocs, graduate students, and undergraduates from the The Information School, Computer Science & Engineering, the College of Education, and Human-Centered Design and Engineering, to understand how learning about and with computing through the lens of imagination can transform not only individual lives, but communities, schools, systems, and society.

# So what can you do?

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I don't know. I'm not you. But you can ask yourself this question. Who are you? What do you bring to this work? Who can you partner with? Is the work you're doing now working toward these liberatory futures of computing literacy? If not, what can you stop, and what can you start? I'm happy to be here with you, to think and brainstorm, and imagine how we can be free together, to imagine futures of computing that work for everyone.