Tapia Conference
September 16, 2016
Austin, TX

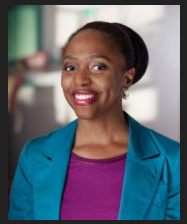
Engaging Underrepresented Students in CS

Welcome and Introductions

Frieda McAlear, Research Associate
Level Playing Field Institute and Kapor Center for Social Impact
@FriedaMcA

Solomon Russell, CS Professor
El Camino College, California
@SolomonLRussell

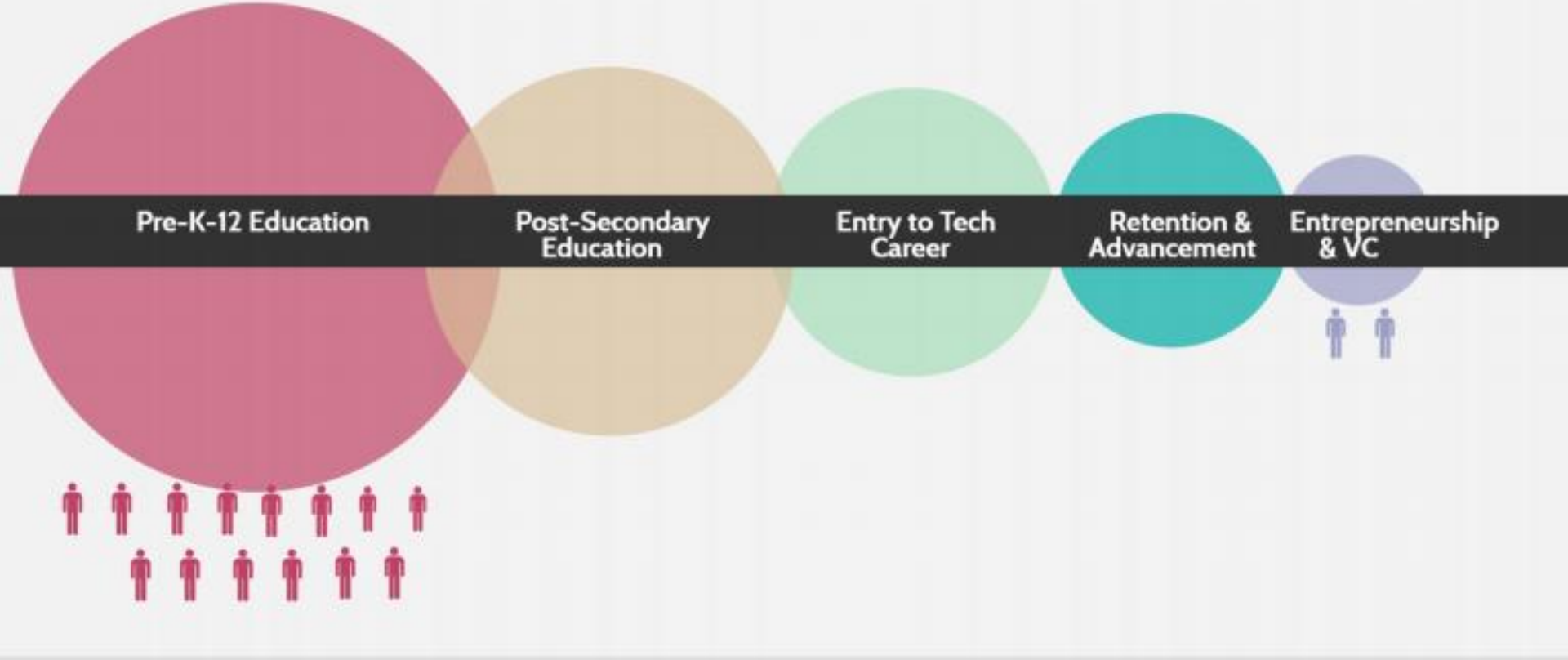
Dan Garcia, CS Teaching Professor
UC Berkeley
@CSPBJC



Tiffany Price, Community Engagement Manager
Kapor Center for Social Impact
@THoodPrice

Why do we need this panel?

The Leaky Technology Pipeline: A Framework for Understanding Disparities in Tech



(1) There are multiple leaks across the pipeline where we are losing talent.

BARRIERS TO ACCESS

•high-quality education and courses•peer, family, college networks•cultural capital•internship/mentorship/training•

PSYCHOLOGICAL BARRIERS

•stereotype threat•imposter syndrome•perceptions of the field and environmental cues• lack of same-race/gender role models•belonging and isolation•

BIASES (CONSCIOUS & UNCONSCIOUS)

•expectations and beliefs about ability•stereotyping and decision-making patterns•overt mistreatment and microaggressions•

(2) There is BOTH a pipeline problem AND a bias problem.

(3) Stakeholders must implement comprehensive solutions to increase diversity in tech.

“Culturally relevant teaching is a pedagogy of opposition that recognizes and celebrates Africans and African-Americans”

- Gloria Ladson-Billings

Culturally Responsive Computing:
Asset building
Reflection
Connectedness
Dr. Kim Scott, Compugirls

Session Flow

1. Panel presentations:
   Early exposure to career pathways

2. Peer learning and sharing out

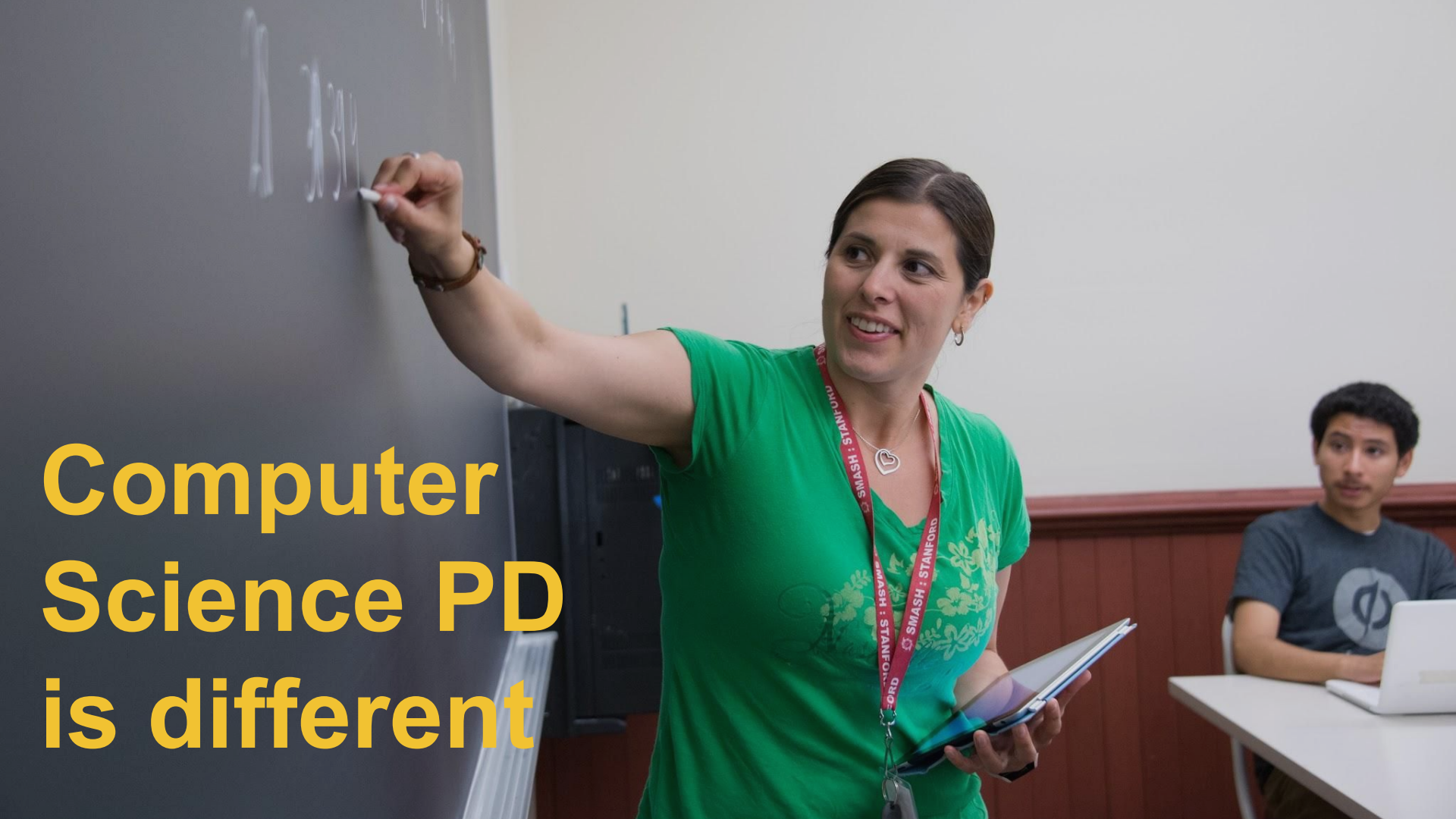
Who's in the room?

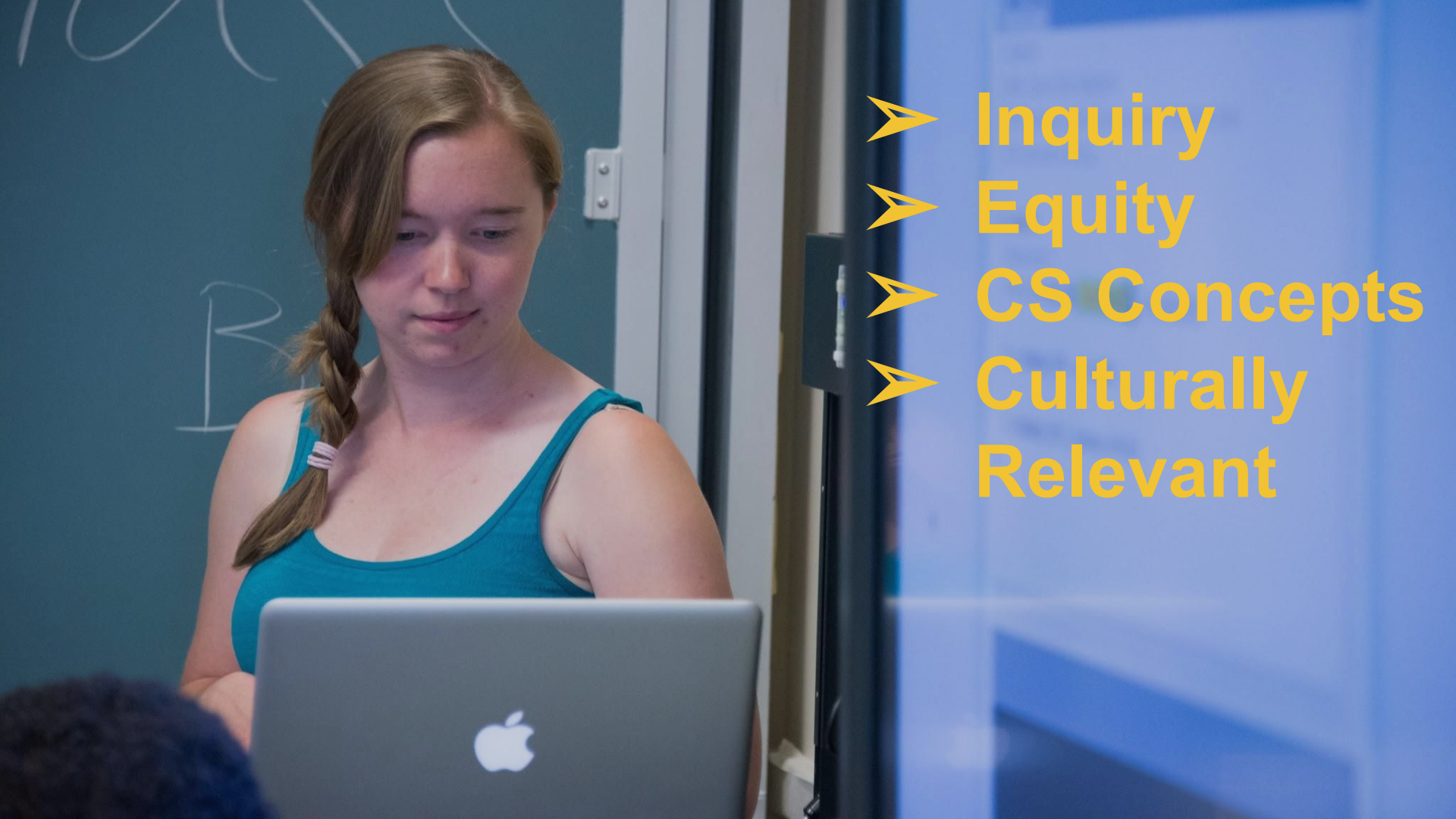
Ice Breaker

Level Playing Field Institute

Early Exposure: Hackathons

Solomon Russell


Computer
Science PD
is different

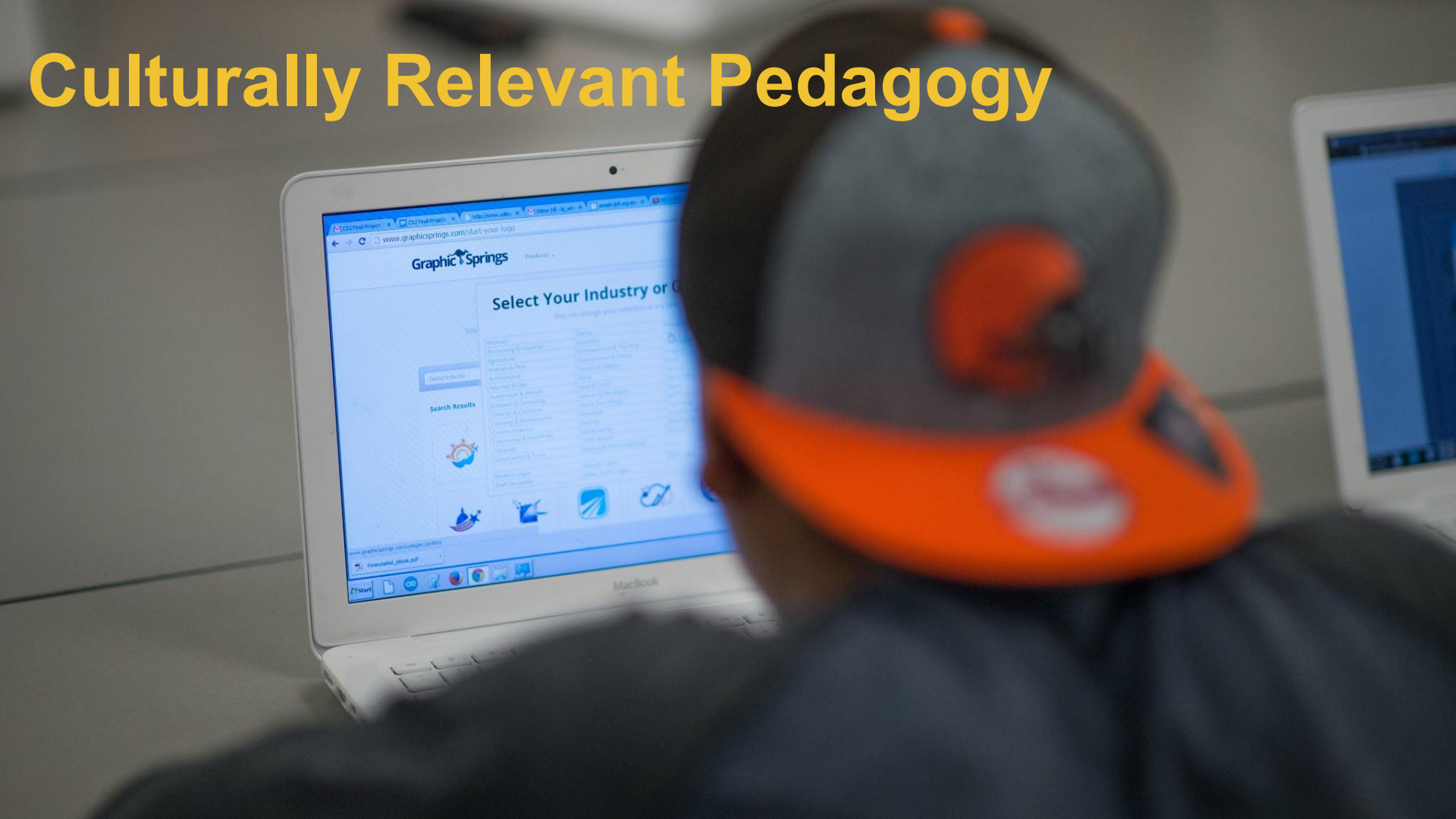

Inquiry
Equity
CS Concepts
Culturally Relevant

Creating a Culture

SMASH Core Values

1. Excellence in STEM Education
2. Community / Teamwork
3. Leadership
4. Social Justice
5. Sustainability

Culturally Relevant Pedagogy



Dan Garcia

CSTA Golden Gate chapter @ UC Berkeley

(we gather Bay Area HS Computing teachers monthly)

We hold regular workshops and share best practices to engage diverse students!

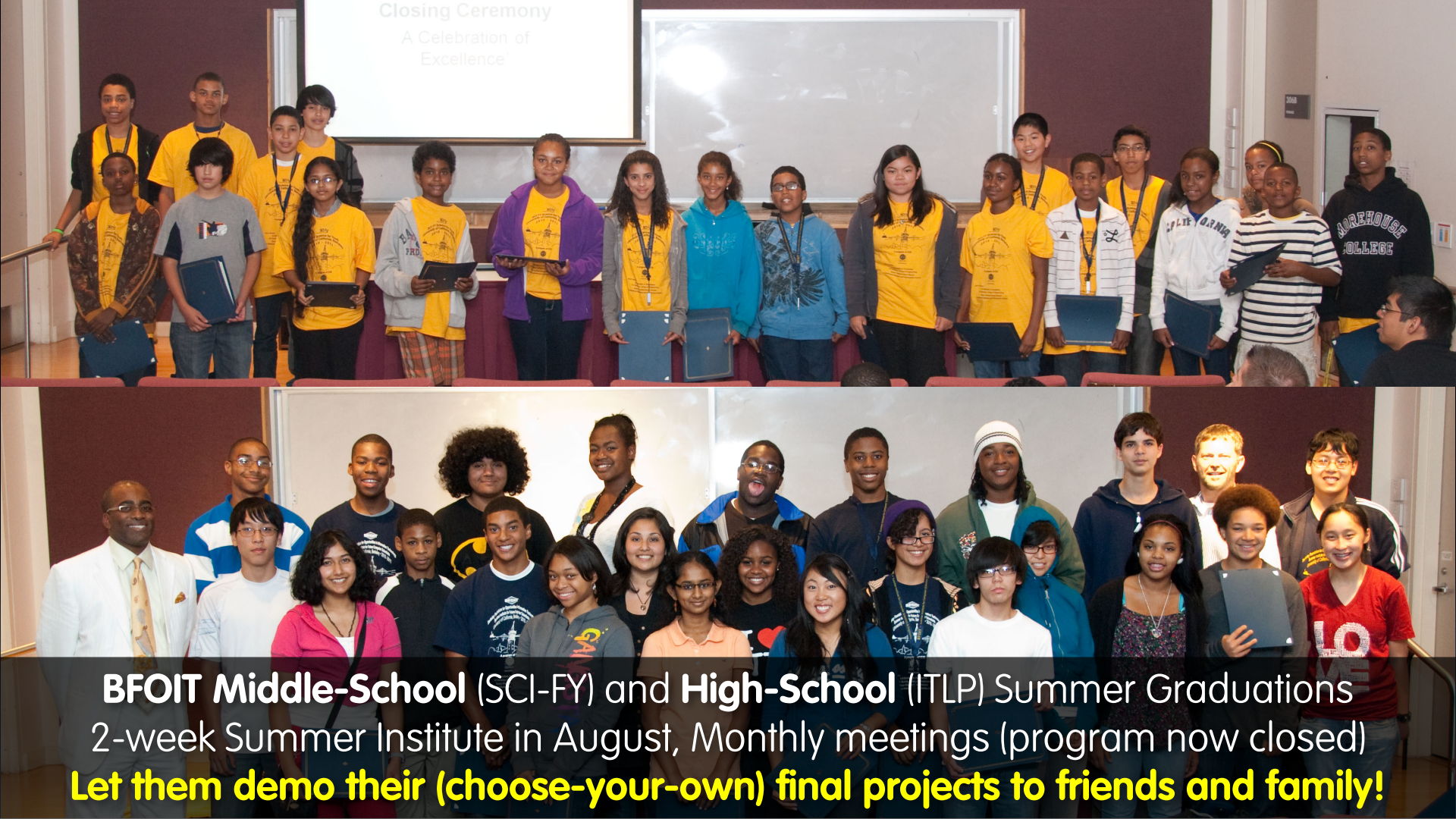
CS Education Day @ UC Berkeley

(500 Jrs and Srs visit campus during CS Education Week for talks and hands-on CS!)

We choose the schools to invite based on their % of diverse students!

BJC Award-winning Projects being demonstrated at **CS Ed Day**

Let older students show younger students great examples of what can be done!



BFOIT Middle-School (SCI-FY) and **High-School** (ITLP) Summer Graduations

2-week Summer Institute in August, Monthly meetings (program now closed)

Let them demo their (choose-your-own) final projects to friends and family!

CS Scholars Program follows a cohort model; these students take the same courses and are placed in the same discussion sections in our CS program.

Keep a cohort together so folks never feel isolated; selected according to need…

One way to get computing into K-12…

- New Course: "Computer Science : Principles"
  - **Engaging, accessible, inspiring, rigorous**
  - Focused on the fundamental concepts of computing (Computational Thinking)
  - An impetus for college curriculum reform
- SINGLE SOURCE OF NATIONAL LEVERAGE!

Garcia 2014 © UCB

what is CS Principles?

7 big ideas

- computing is a Creative activity.
- Abstraction reduces information and detail to facilitate focus on relevant concepts.
- Data and information facilitate the creation of knowledge.
- Algorithms are used to develop and express solutions to computational problems.
- Programming enables problem solving, human expression, and creation of knowledge.
- the Internet pervades modern computing.
- computing has global Impacts.

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what is CS Principles?

6 computational thinking practices

- connecting computing
- developing computational artifacts
- abstracting
- analyzing problems and artifacts
- communicating
- collaborating

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d artifacts

Two Performance Task Assessments

- **Explore PT**
  - "…you will explore a computing innovation of your choice"
- **Create PT**
  - "This performance task requires you to develop a program on a topic that interests you."

Garcia 2014 © UCB

From the Curriculum Framework…

- EK 7.4.1A The innovation and impact of social media and online access varies in different countries and in different socioeconomic groups.
- EK 7.4.1C The global distribution of computing resources raises issues of equity, access, and power.
- EK 7.4.1D Groups and individuals are affected by the "digital divide" — differing access to computing and the Internet based on socioeconomic or geographic characteristics.

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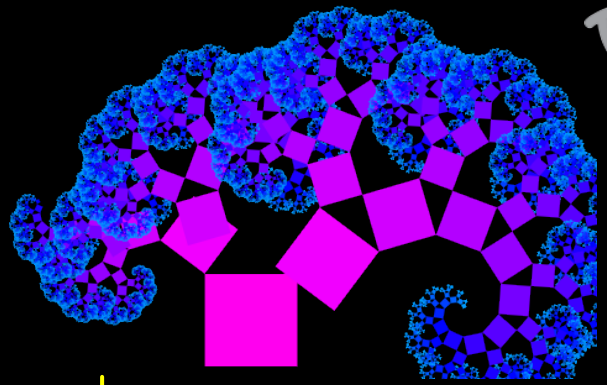
UC Berkeley's BJC

The Beauty and Joy of Computing



What we've found works

- Make "**Fun**" a learning objective!
- Name your course accurately
- Pair Programming throughout
- Read & comment about each others work
- Make the class free (no barriers to entry)
- Awesome TAs as role models (50-50)
- Lab-centric instruction, enthusiasm!
- Program powerful ideas with blocks
- Have open-ended projects

bjc.berkeley.edu

SMASH + BJC Academic Year Program @ UC Berkeley, near Stanford, UCLA

Every Saturday from 2015-2016 they gathered, a local teacher taught them BJC…

We reached diverse students who had no access to a high school CS course!

EDITION US

THE HUFFINGTON POST
INFORM • INSPIRE • ENTERTAIN • EMPOWER

COLLEGE

UC Berkeley Professor Drops Pre-Final Computer Science Rap (VIDEO)

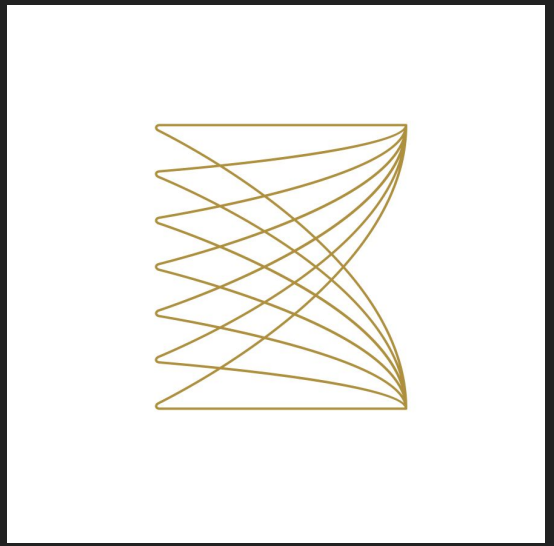
UC-Berkeley professor Dan Garcia recently laid down a full-blown “Gin & Juice” remix to help get his students ready for a final.

Don’t hesitate to show your flavor, and share your interests with your students!

Tiffany Price

Kapor Center for Social Impact

Tech Diversity & Inclusion



~ Caveats ~

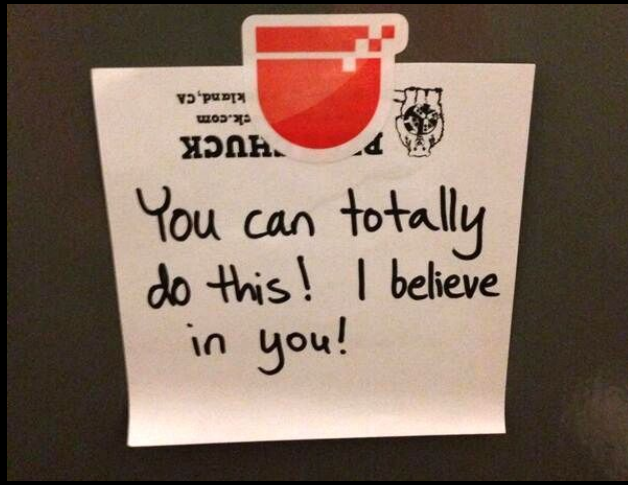
Environment Matters

Aesthetics & Themes

Hackbright Academy
The Engineering School for Women

HELLO
LINH
HELLO
MARINA

Do No Harm
Take Nsh;t
Begin Man's Pardon

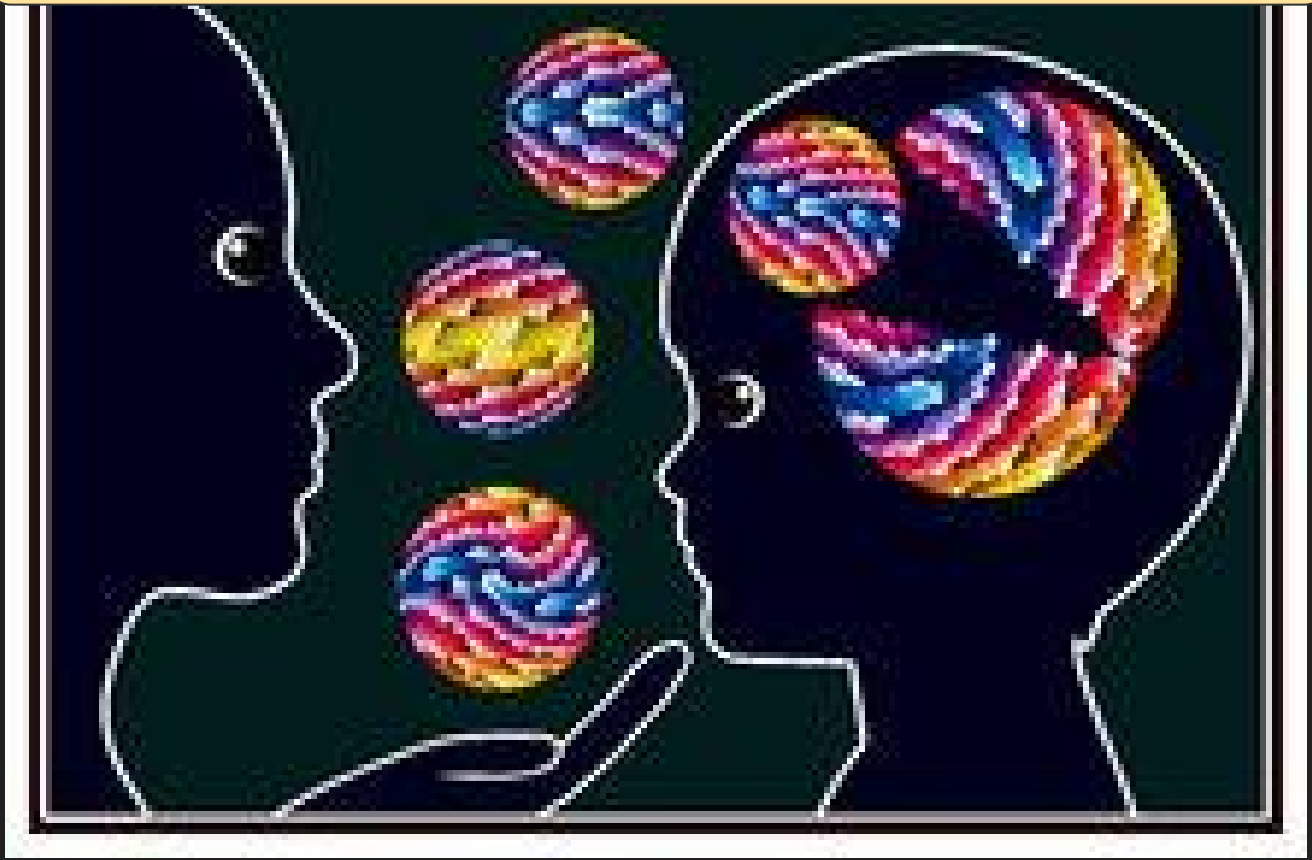

You can totally do this! I believe in you!

#WomenInTech

Power of the Cohort Model

Gender-Specific Models

Pedagogy Matters



Culturally Relevant?

Problems that Matter

Support That Matters

The Extras Matter: Know the Landscape

Conferences

Hackathons & Competitions

Networks

Slides & Resources

http://bit.ly/2cbMsM6

Questions

Is there a time in CS where you felt disengaged or ‘shut down’?

Questions

What are the most engaging pedagogies and curricula that you've experienced or designed?

Questions

What are the barriers to engagement? How do you overcome those?