Computer Science, Coding & Solving 'Real World' Problems AfterSchool

WEBINAR | MARCH 22 10AM-11:30AM PST

LEMELSON-MIT CAN CSforALL

Welcome and Introductions

Heather Williams
Program Director, Policy and Outreach,
California AfterSchool Network

CAN
California AfterSchool Network
CONNECT. CONVENE. INSPIRE.

Introductions

Heather Williams
Program Director, Policy and Outreach, California AfterSchool Network

Chris Breazeale
Education Programs Consultant, CDE Expanded Learning Division

An-Me Chung
Fellow, CSforALL

Stephanie Couch
Executive Director, The Lemelson-MIT Program

Leigh Estabrooks
Invention Education Officer, Lemelson-MIT Program

California AfterSchool Network

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Purpose

The purpose of the California AfterSchool Network is to increase access to high-quality out-of-school time programs that support success for all children and youth.

Organization Goals:

CAN is ***"of the field and for the field",*** serving as a collaborative nexus for diverse out-of-school time stakeholders to collectively address significant field needs and advance innovation.

CAN is a ***catalyst for quality***, building capacity by promoting a shared vision of program quality and advancing a culture of continuous improvement.

CAN is a ***one-stop communication hub*** providing information on tools, data, resources, policies, and practices for all out-of-school time stakeholders.

https://www.afterschoolnetwork.org

2019 California Expanded Learning Summits

September – October 2019

Sacramento

Bakersfield

San Diego

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DEPARTMENT OF EDUCATION
STATE OF CALIFORNIA

Kids Code Overview

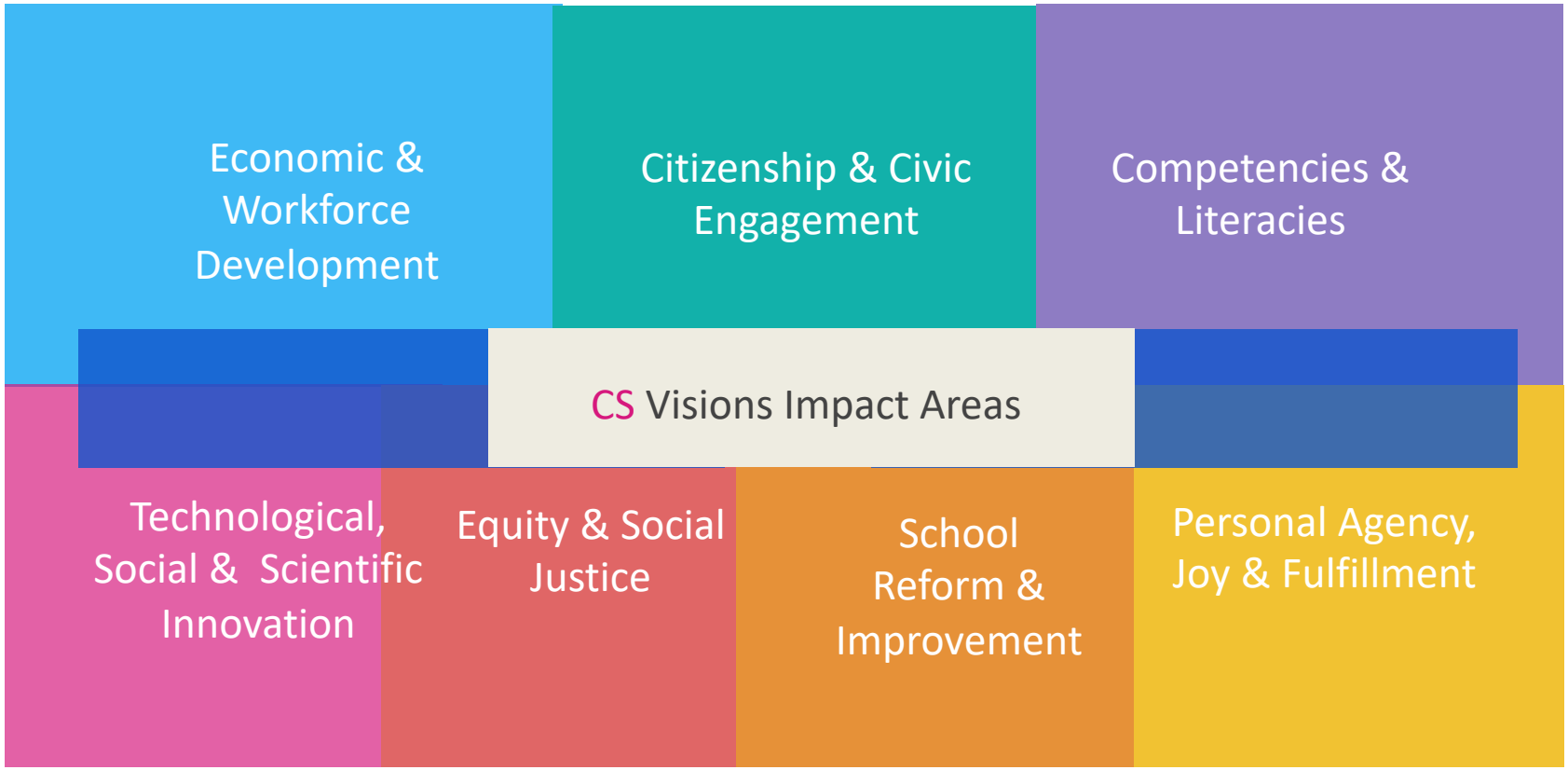
Chris Breazeale
Education Programs Consultant,
California Department of Education
Expanded Learning Division

Overview of CSforALL

An-Me Chung
Fellow, CSforALL

CSforALL Mission

Make high-quality computer science an integral part of the educational experience of all K-12 students and teachers in and out of school, and to support student pathways to college and career success.



NEW YORK UNIVERSITY

CSforALL CONSORTIUM

The Challenges

High-quality: most students don't have access to quality courses and learning opportunities that form coherent pathways.

Integral: CS is not yet established as a discipline.

All students and teachers: we don’t yet have the capacity to serve them all.

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Projects and Programs

Support Local Change

- SCRIPT - resources and process to aid school systems and local education agencies in strategic planning for CS education
- CS Visions - research project to define the values that drive K-12 CS adoption
- Office Hours - CSforALL members can schedule opportunities to receive consultation and support
- Supporting NYC CS4ALL - CSforALL grew out of CSNYC and still supports the NYC CS4ALL programs and implementation

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Projects and Programs

Increase Rigor and Equity

- Pledges to support CS Education - CSforALL helps move the community forward by calling on school and district leaders in the United States to commit to expanding CS access to all students.
- RPPforCS - CSforALL leads a working group of currently funded NSF Research Practice Partnerships focused on CS education.
- Knowledge Forum - convening of researchers to define and address key issues in K-12 CS education.
- Home4CS - NSF funded project to identify opportunities for schools of education to increase their capacity to prepare teachers to teach computer science.
- Expanding Computing Education Pathways - NSF funded Alliance that seeks to increase the number and diversity of students in K-16 computing and computing-intensive degrees by promoting state-level computer science education reform.
- CSforALL and Out of School Time - Work with out of school time educators and programs to identify opportunities to include computer science education and participate in the CSforALL community.

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Projects and Programs

Grow the Movement

- CSforALL Membership - the directory for the national CSforALL community, with more than 500 members representing 40 states and nearly 200 content providers
- CSforALL Summit - annual convening to mark progress on the national CSforALL movement
- Community Calls - monthly open calls that feature the work of CSforALL members and address topics of common concern
- CSforALL Slack - communication platform for CSforALL members
- Social media - Twitter and Facebook engagement of the general public

Coding to Invent Solutions to Problems

Power & Promise of Technology in OST

Stephanie Couch
Executive Director, Lemelson-MIT Program

Leigh Estabrooks
Invention Education Officer, Lemelson-MIT Program

LEMELSON-MIT
Celebrating invention, inspiring youth

- The Lemelson-MIT Program is funded by The Lemelson Foundation and administered by the School of Engineering at MIT.
- 15 years of experience working with educators and students developing ways of thinking and skills needed to invent.
- Students develop technological solutions to solve real-world problems.

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Differences in Opportunities for Learning and Views of Self

Student	Identity: Inventor	Identity: Innovator	Identity: Engineer	STEM @ Home	STEM @ School	STEM in Out-of-School
Alec			X	X	X	X
Jacob	X		X	X	X	X
George			X	X	X	X
Chelly		X				
Magdalena	X	X			X	X
Celaena	X	X		X	X	

Gender Differences in Perceived Strengths Brought to Team Problem Solving Efforts

Female InvenTeam members		Male InvenTeam members	
Self-descriptor	Number and % of respondents	Self-descriptor	Number and % of respondents
Leader	39 (63.9%)	Engineer	41 (51.9%)
Innovator	31 (50.8%)	Leader	35 (44.3%)
Creator	29 (47.5%)	Maker	35 (44.3%)
Maker	26 (42.6%)	Creator	33 (41.8%)
Engineer	25 (41.0%)	Scientist	33 (41.8%)
Scientist	22 (36.1%)	Innovator	31 (39.2%)
Inventor	21 (34.4%)	Technologist	30 (38.0%)
Technologist	10 (16.4%)	Inventor	26 (32.9%)
Entrepreneur	16 (26.2%)	Entrepreneur	18 (22.8%)
No response	4 (6.6%)	No response	8 (7.6%)
Total	223	Total	288

Source: Lemelson-MIT Program *Technology and Innovation,* Vol. 19, pp. 735-749, 2018 "Addressing the Gender Gap Among Patent Holders Through Invention Education Policies"

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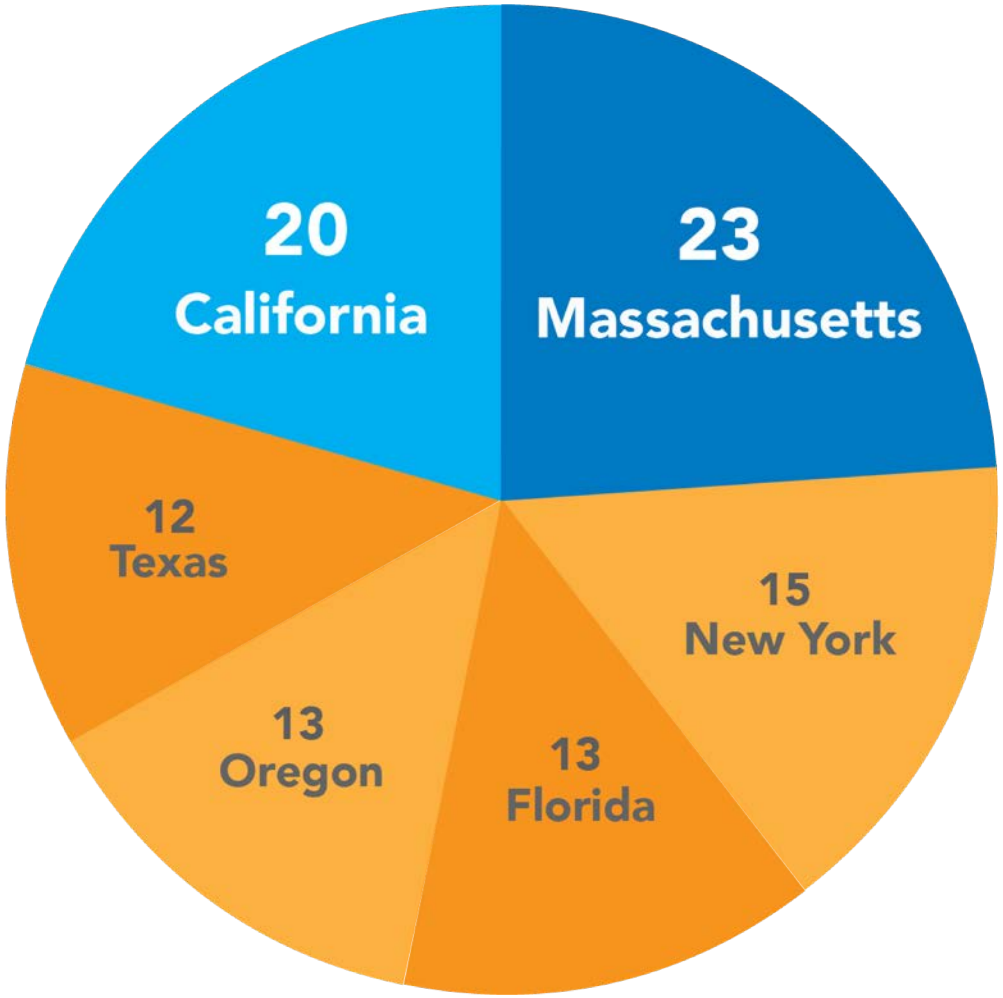
Teaming up to get past the digital divide



InvenTeam grants:
$10K in grant funding for teams of high school students, educators, and mentors nationwide each year to solve real-world problems

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Free Resources for Teachers and Students

JV InvenTeam activity guides available at http://lemelson.mit.edu/resources

Wearable Technology

Design and Pattern Transfer

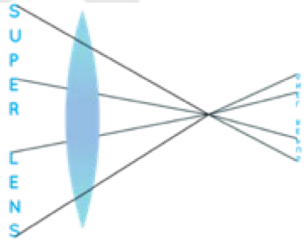
Human Power and Energy

Urban Hydroponics

Speakers and Instruments

Heating and Cooling

Simple Machines



Optics

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JV InvenTeam Guide Example

MEETING 4

KEY TERMS

Short circuit (n) Accidental contact between two points in an electric circuit that have a potential difference.

Trace (n) Thread connections between electronic components.

EDUCATOR NOTE

Note on Meeting 3
Learning how to sew takes time. It's possible that the majority of this meeting will be spent on learning how to sew. Ideally, students will at least get started on their textile during the end of this meeting. If needed, they can be encouraged to continue at home.

SAFETY

Sewing needles have sharp ends so use caution as you learn how to thread a needle and sew. Threaders are provided to help you get started.

Electronic Textiles
Meeting 4: Sewing & Electronic Textiles

Tools

- Scissors
- Sewing needles
- Threaders

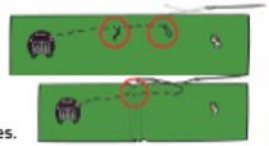
Materials

- Student Guides
- Projector and computer to show video
- Regular thread
- Conductive thread
- Coin cell batteries (3V)
- Coin cell holders
- LilyPad LEDs
- Felt
- Fabric glue
- Self-Assessments

Procedure

- Introduction to Sewing
- Sewing practice
- Decide on a design
- Create wearable electronic textiles
- Self-assessment

8. Students should pause after every few stitches to check for loose or tangled threads. They should check both the front and back of the felt to make sure there aren't any tangles, knots, or wrinkles.

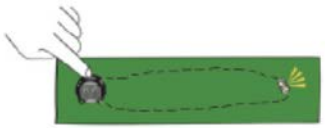


9. Once they reach the LED, have them make at least 3 tight loops around its (+) tab in the same way they attached the battery holder.

10. They can tie a knot to complete this trace. Have them make sure their knot is on the back side of the felt so it won't obscure their design.

11. Instruct the students to repeat the same steps as above to sew the (-) side of the battery holder to the (-) side of the LED. Remind them not to let the (-) trace touch or come close to the (+) trace while they're sewing. They should also beware of loose ends or knots.

12. Students should test the circuit to make sure it is complete. Have them slide the coin cell battery into the holder with the (+) side of the battery face up as they put it in. Then have them flip the switch on the holder from off to on to test it out. Hopefully it lights up! They should keep troubleshooting if it doesn't.



Sewing Note

Students will want to avoid the knots and wrinkles shown in the images to the left. Have them check their work carefully after every stitch to ensure you are keeping the thread and fabric smooth.

INVENTOR PROFILE

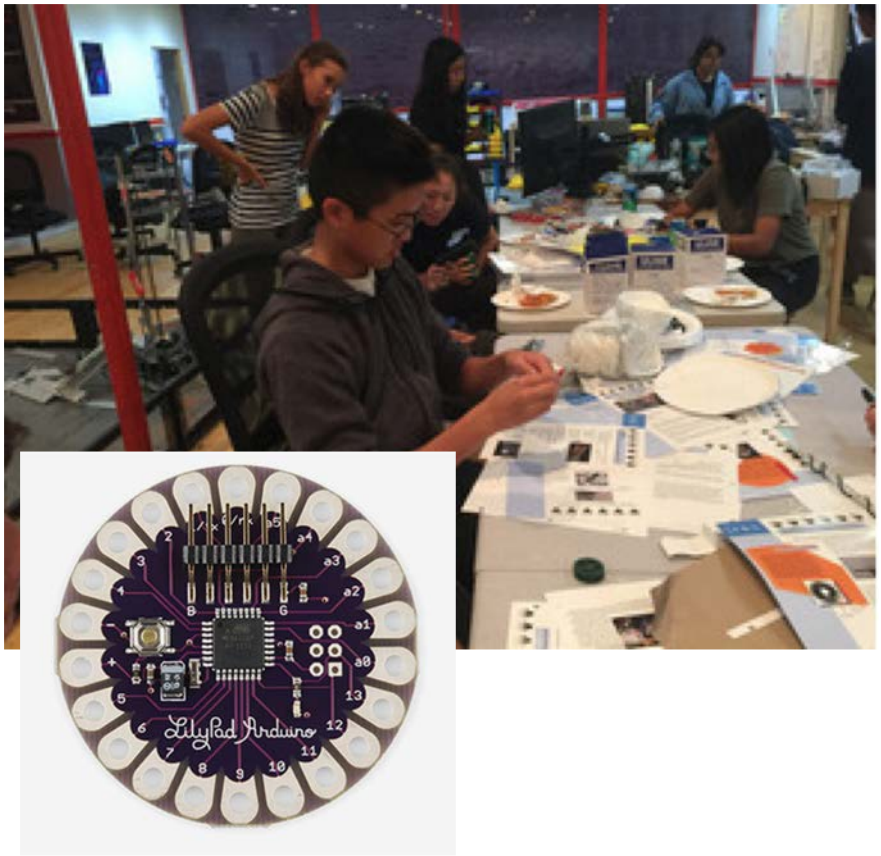
Limor Fried is an MIT alumna who turned her passion for tinkering with electronics into a highly profitable business called Adafruit Industries. Would you want to turn any of your hobbies into a business?

Read more about Limor here: Inventor Profile: Limor Fried.

Source: wired.com

JV LEMELSON-MIT InvenTeams

Invention Education Continuum



Rolling Robots Outreach InvenTeam
Rolling Hills Estates, California

JV LEMELSON-MIT InvenTeams → LEMELSON-MIT InvenTeams

Support Available & Opportunities to Work Together

- Free webinar for an in depth discussion on the JV InvenTeam guides & ways educators have combined them with coding on April 29, 2019 from 1-3pm ET
  - Register at http://lemelson.mit.edu/events
  - Guides available at http://lemelson.mit.edu/resources
- Contact us to be a development partner for our “Making and Coding for a Purpose” initiative
- Register for our workshop in Tustin California, July 22-24, 2019 at http://lemelson.mit.edu/events
- Host a workshop in/for your region!

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Playful Invention Company

Paula Bontá and Brian Silverman are the Playful Invention Company (PICO).

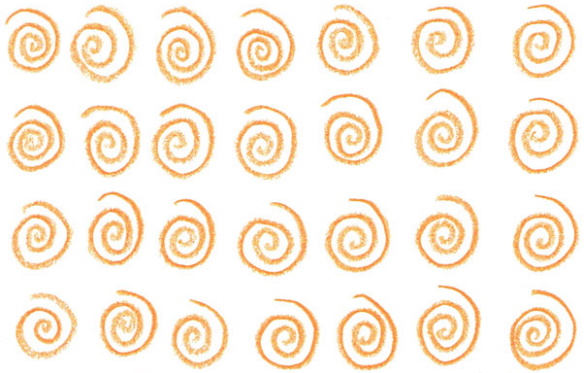
- Based in Montreal and collaborate with people all over the world
- Co-founder Paula Bontá contributed to the design of several award-winning products for children and is a consultant for the Lifelong Kindergarten group at the MIT Media Lab, and for the LEGO company.
- Brian Silverman has been involved in the invention of learning environments for children since the 1970s. Consulting scientist at MIT Media Lab.

PICO Projects

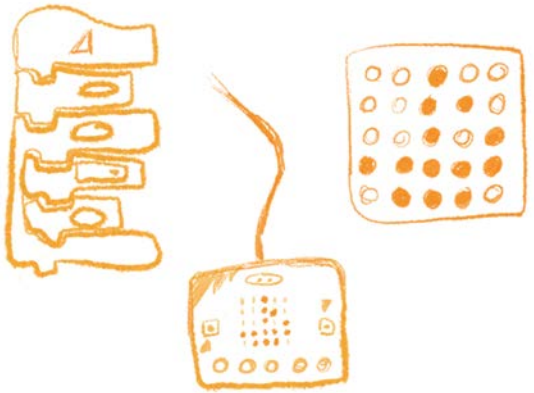
Playful Invention Company

ScratchJr: Intro Programming language for children age 5-7

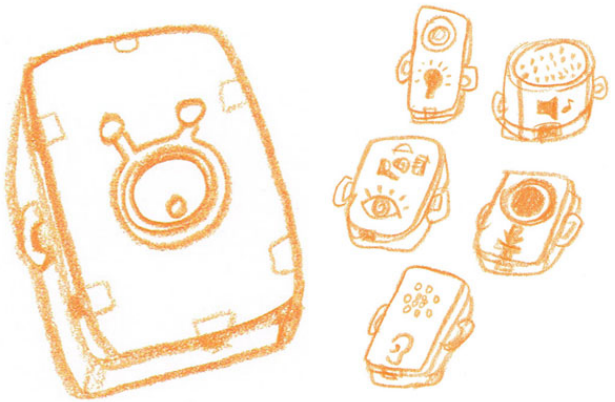
TurtleArt: Design images while exploring geometry and programming



Art: bit: Teaches the basics of programming and animation



PicoCricket Kit: Integrates art and technology to spark creative thinking



MIT App Inventor is an intuitive, visual programming environment that allows everyone – even children – to build fully functional apps for smartphones and tablets.

Those new to MIT App Inventor can have a simple first app up and running in less than 30 minutes.

Learn more and try MIT App Inventor at http://appinventor.mit.edu

Open Discussion and Q&A