



# Helping Youth See Themselves in Biotech



# Today's Speakers



**Lt. Governor  
Karyn Polito,**  
co-chair of the STEM  
Advisory Council



**Stephanie  
Couch, Ph.D.,**  
executive director,  
Lemelson-MIT Program



**Alazar Ayele,**  
manager of corporate  
responsibility &  
Cambridge Community  
Lab, Biogen



# Third Annual Mass STEM Week



The theme for Mass STEM Week is “**See Yourself in STEM,**” with a particular focus on the power of mentoring. Women, people of color, first-generation students, low-income individuals, English language learners, and people with disabilities are underrepresented in STEM industries and make up an increasing portion of the overall workforce, but the demographics of STEM fields have remained largely the same. We need more young people to see themselves in STEM.

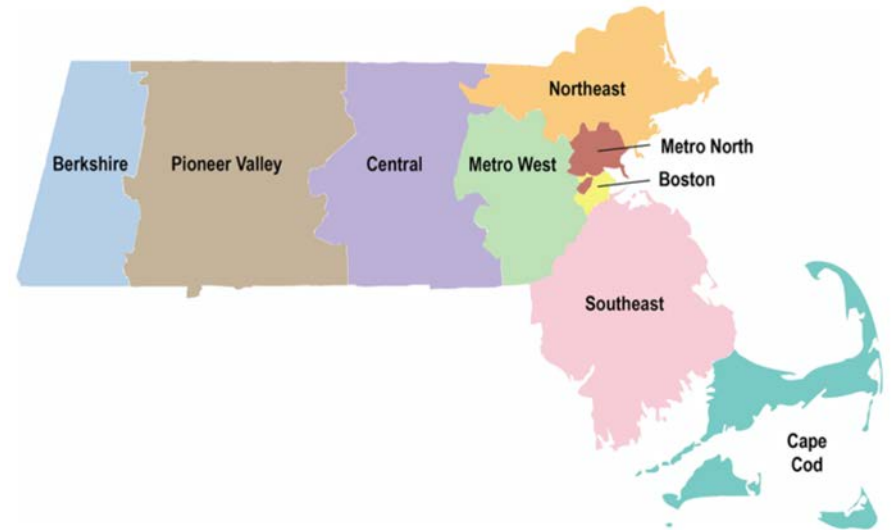
# Massachusetts STEM Advisory Council in Partnership with Regional STEM Networks

Advisory Council Co-Chairs

Karyn Polito, Lieutenant Governor

Joseph P. Kennedy III, Member of  
U.S. House of Representatives

Jeffrey Leiden, M.D., Ph.D.,  
President and CEO, Vertex  
Pharmaceuticals

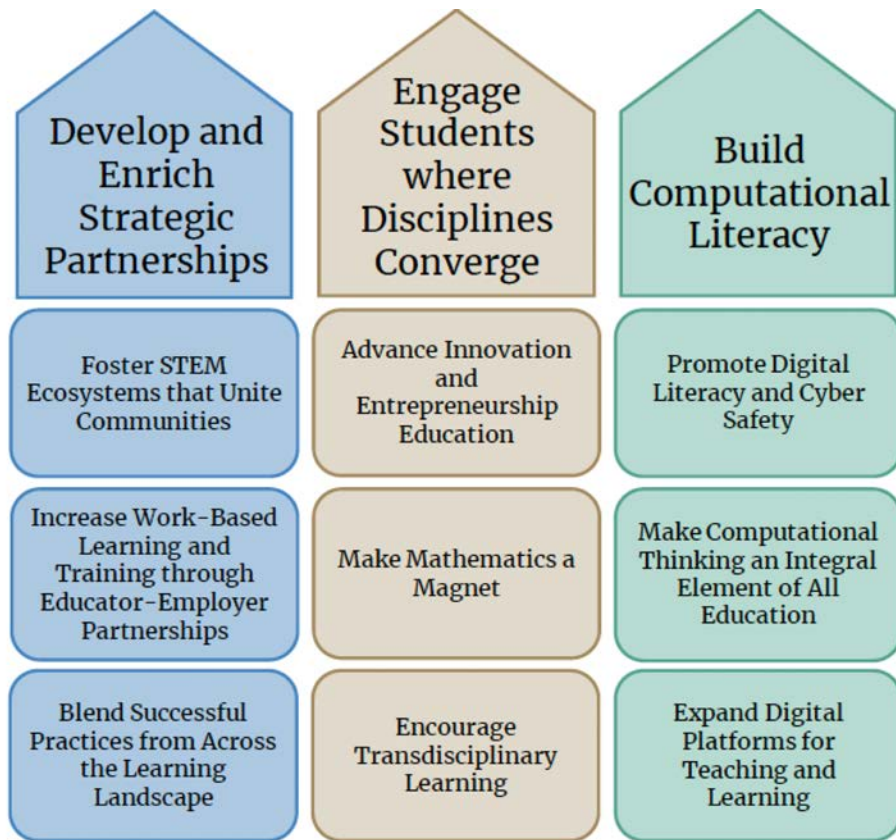


9 STEM Networks in Massachusetts

# Welcome from Karyn Polito, Lieutenant Governor



# Invention Education & The Federal STEM Plan



# Lemelson-MIT Program

- Located within the School of Engineering at MIT
- Over 25 years of celebrating mid-career and collegiate inventors
- 16 years of helping K-12 students across the U.S. learn to invent



InvenTeam students showcase their invention at EurekaFest, the Lemelson-MIT Program's annual event

# Lemelson-MIT Program

- 11 high school InvenTeams have been granted U.S. patents
  - 10 utility patents
  - 1 design patent
- Biogen-MIT Biotech in Action launched in Summer 2020 to bring invention education together with Biogen Community Labs programming

2018 SOAR Early College High School InvenTeam  
(Lancaster, CA)



2017 Poolesville High School InvenTeam  
(Poolesville, MD)





# Working definition of Invention Education (IvE)

*facilitation of educational  
engagement in which people  
find and define problems and  
design and build new, novel,  
useful, and unique solutions  
that contribute to the  
betterment of society*

RESEARCHING  
INVENTION  
EDUCATION

A White Paper

# Student Outcomes From Invention Education

- STEM interest fueled by:
  - Inventing solutions to problems that improve the lives of others
  - Application of STEM subjects to real world problems students care about
- Develops STEM interest, confidence, and capabilities
- Students learn to create their own businesses after high school



As part of an invention team, Aracely Chavez worked on solar panels. She also took charge of the team blog.

Credit: Cricket Media, Feb. 2019

# Other Benefits of Invention Education

- Addresses lack of diversity among patent holders in the U.S.
- Potential solution to the diversity challenge in STEM disciplines – particularly engineering and technology that are fields most prone to patenting
- Addresses workforce needs of companies like Biogen – STEM intensive industries driving invention & innovation



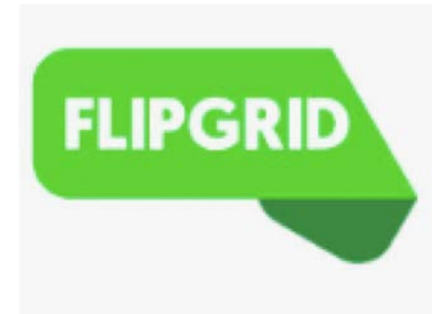
Member of 2020 Francis Tuttle Technology Center InvenTeam (OK) working on an invention to sanitize airport security bins

# Biotech In Action: A Virtual Summer Lab

- Spring 2020 required a major change in teaching and learning
- Biogen and the Lemelson-MIT Program collaborated on Biotech in Action
- State-of-the-art virtual program to inspire and empower a new generation of young scientists and inventors
  - 400 students/80 per week
  - 28 hours of synchronous instruction



Labster




# Biotech In Action: Topline Student Outcomes

- 94% completed the one-week summer program
  - High level of engagement is possible with virtual labs
- Students enjoyed meeting others, talks from mentors, and the virtual laboratory simulations
- Students increased their *knowledge* of biology and life sciences, lab techniques, STEM careers, and career-related skills
- Students Increased their *interest levels* in biosciences
- Gains were highest among underrepresented minority students

# March 2020

- Planning for the 18th year of the Community Labs' Summer programs was underway
- High school students were enrolling
- Enrollment focused on students from underrepresented populations
- Cancelling the program was not an option



Our Mission

### The Biogen Community Lab

Our mission is to ignite and foster student interest in science and increase awareness in biotechnology-related careers through hands-on lab experiences and interactions with scientists and biotech professionals.

When students visit one of our Community Labs, they experience a real-world workplace setting and use the same equipment many of our scientists use. Students dress like real scientists, feel like real scientists and act like real scientists!

Science can be done anywhere, including your own kitchen! By sharing videos of our employees and other organizations doing experiments with materials that can be found around your house, we want to emphasize to students that science is all around us, not just in laboratories!

# April 2020

- Two programs joined forces
- Biogen-MIT Biotech in Action: Virtual Summer Program
- Free, fully on-line immersive scientific experience
- Mentors from MIT & Biogen communities
- Neurodegenerative diseases w/ a focus on Parkinson's Disease



Students at RTP Community Lab, July 2019

# May – June

Transitioning for engaging, in-person lab to engaging, virtual lab in two months!



Students at RTP Community Lab, July 2019



MJ at his computer for a virtual lab



# July – August by the numbers

- Students from NC and MA
- 5 sessions, each 1-week long
- 80 students per session; 400 students total
- 8 instructors
  - 4 full-time
  - 4 college interns (NC, MA)
- 2 researchers from LMIT
- 1 LMS specialist
- Support staff from LMIT



Students engaging with one course instructor, Amanda Marvelle, Ph.D. (top, center)

# July – August by the stories



MJ, rising 11<sup>th</sup> grader and a BIA student

“I first loved astronomy and then got interested in biology and now it’s biomedical engineering.”

“I found out new friends, um, I am contacting like right now after even the course...The instructors were funny and we had fun times together....I love the presentations that we did as groups and the discussions that we did.”

BIA Student

“The Labster was pretty cool. I thought it was interesting doing my own stuff with Labster ‘cuz I’m heavy into lab type of work and stuff.”

BIA student

“I learned that it [biotech] existed and that ... you can be an engineer. You can be a research scientist, you can work in HR right because Biogen is like this big corporation...”

BIA student

# Questions and Answers...

# For More Information

Reach out to learn more!

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