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
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

**Develop and Enrich Strategic Partnerships**
- Foster STEM Ecosystems that Unite Communities
- Increase Work-Based Learning and Training through Educator-Employer Partnerships
- Blend Successful Practices from Across the Learning Landscape

**Engage Students where Disciplines Converge**
- Advance Innovation and Entrepreneurship Education
- Make Mathematics a Magnet
- Encourage Transdisciplinary Learning

**Build Computational Literacy**
- Promote Digital Literacy and Cyber Safety
- Make Computational Thinking an Integral Element of All Education
- Expand Digital Platforms for Teaching and Learning
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
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.
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

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

MJ, rising 11th grader and a BIA student

“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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