

BioBuilder

SUMMER RESEARCH PROGRAM

Impact Report 2023

Taught by champion educators and PhD scientists from Harvard, MIT, and Boston University, the Summer Research Program is for high school students who want to engineer biology to make the world a better place.

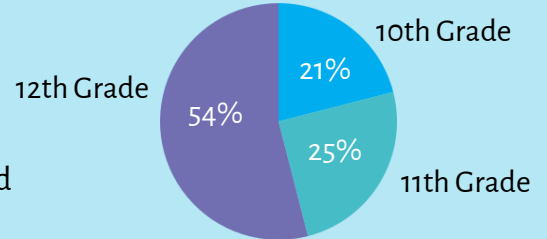


Over a two week period, students gained relevant scientific knowledge and technical training. Lessons emphasized problem solving through the application of technical content, creative thinking, data analysis, and research skills.



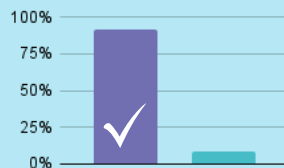
By the Numbers:

- 24 students
- 63% female, 37% male
- 7 states + Canada represented

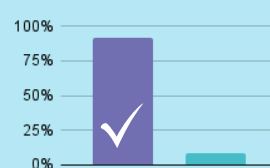


Learning Outcomes:

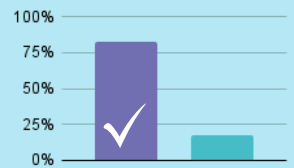
Increased interest in STEM education and careers



Desire to continue learning synthetic biology

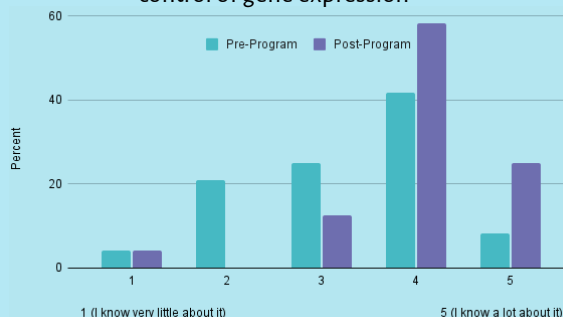


Improved understanding of synthetic biology



Increased student understanding of modern life science:

Including molecular and cellular biology and control of gene expression

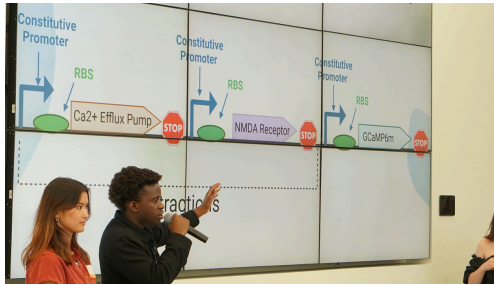


Percentage of students reporting confidence in STEM skills:

- 100%: Using a pipette
- 100%: Interpreting laboratory experiment results
- 100%: Using the metric system of measurements
- 96%: Growing microbes

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Students gained hands-on experience with DNA as a coding language for cells and then worked on a biodesign project, prepared a scientific talk, and presented their design to other students and scientists.

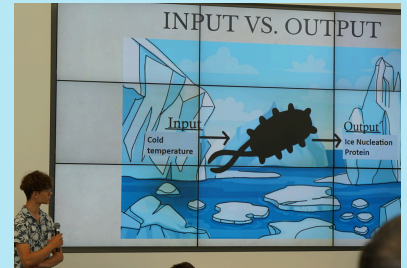


Pre-professional training included tours of biotech companies, guest speakers who are practicing bioengineers, and inclusion in our BioBuilder alumni network.



Biodesign Project Topics:

- Reducing ice loss due to climate change
- Treating stomach ulcers caused by *H. pylori*
- Eliminating food poisoning from rice
- Detecting ketamine-laced drinks
- Preventing garden damage caused by rabbits
- Improving wound dressings to prevent severe blood loss
- Designing a biopatch to treat chronic idiopathic urticaria



Highlights for Students:

“[I enjoyed discovering] how fun the lab is!”

“I was surprised by how doable everything ended up feeling. When I originally looked at the schedule [and saw] we were doing a ton of things I'd never heard of every day, it was pretty intimidating, but I ended up feeling like everything we did I could do myself now.”

“It was super helpful to hear [from the guest speakers] about their educational paths. As someone who doesn't know exactly what I want to do in the future, it was helpful to see I had so many options.”

“This was the first time I fully enjoyed and gained the benefits of working in a group.”

“I've never really done lab experiments or had a lot of lab experience, so it was all very different from anything I've done.”

“What surprised me was how quickly we learned to use lab equipment like micropipettes and spectrophotometers.”

“The field of synthetic biology is extremely diverse and there are a lot of things that are still left to be learned.”