Infusing a Neighborhood with Science and Creativity

ASSEMBLE creates opportunities for young people to make things that inspire and empower.

As school budgets shrink, arts education is increasingly targeted as a place to cut funding. Yet as we prepare young people to join a workforce where creativity, collaboration, and critical thinking are essential to success, experiential learning that emphasizes imagination and design thinking has become more important than ever. Assemble picks up where schools leave off, offering free and open learning opportunities that integrate the arts, technology, and science in ways that blurs traditional boundaries between disciplines.

Part gallery, part art studio, part makerspace, Assemble offers a range of dynamic activities, from Saturday Crafternoons with make-and-take projects to monthly Learning Parties where kids can try their hand at art-making, conduct scientific and technological experiments, have conversations with experts, and more.

Assemble was founded in 2011 by Nina Barbuto, an architect and Pittsburgh native who returned home after working in Los Angeles, where she also participated in a research project focusing on arts and learning environments. Inspired by her West Coast experiences and committed

BY THE NUMBERS

In 2014, Assemble served more than **1,700** Pittsburgh youth through sustained programs and held more than **900 dedicated program hours**.

Collaborating with **20 local organizations**, Assemble worked with **35 makers**, **technologists**, and **artists** to directly serve students at **seven local schools**.

to increasing access to arts and technology opportunities for girls and underserved youth, Nina established Assemble in the Garfield neighborhood of Pittsburgh, a community in transition whose residents are predominantly African-American.

Assemble also reaches kids across Pittsburgh through its many partnerships. Working with more than 20 organizations, Assemble takes its STEAM and Maker educational programs on the road, sharing programming with kids in all corners of the city. Still, Assemble stays firmly rooted in its community, offering a safe and nurturing space to hang out, get free afterschool homework help, or try something new at the monthly Youth Maker Nights.

> "In informal learning spaces like Assemble, imagination drives invention. If you can dream it, you can make it."
>
> **TARA TIGER BROWN**, FOUNDER, LA MAKERSPACE

By teaching kids science and technology in hands-on—sometimes messy—ways, Assemble demystifies the creative process. Kids get their hands dirty while they learn, whether they're gluing LED lights to a cardboard bridge or spinning a clay pot on a pottery wheel. Assemble maintains a low barrier to entry for its programs: most require no pre-registration, and nearly all are free. In this way, Assemble works as an "on-ramp" to deeper learning and provides more opportunities to develop skills.

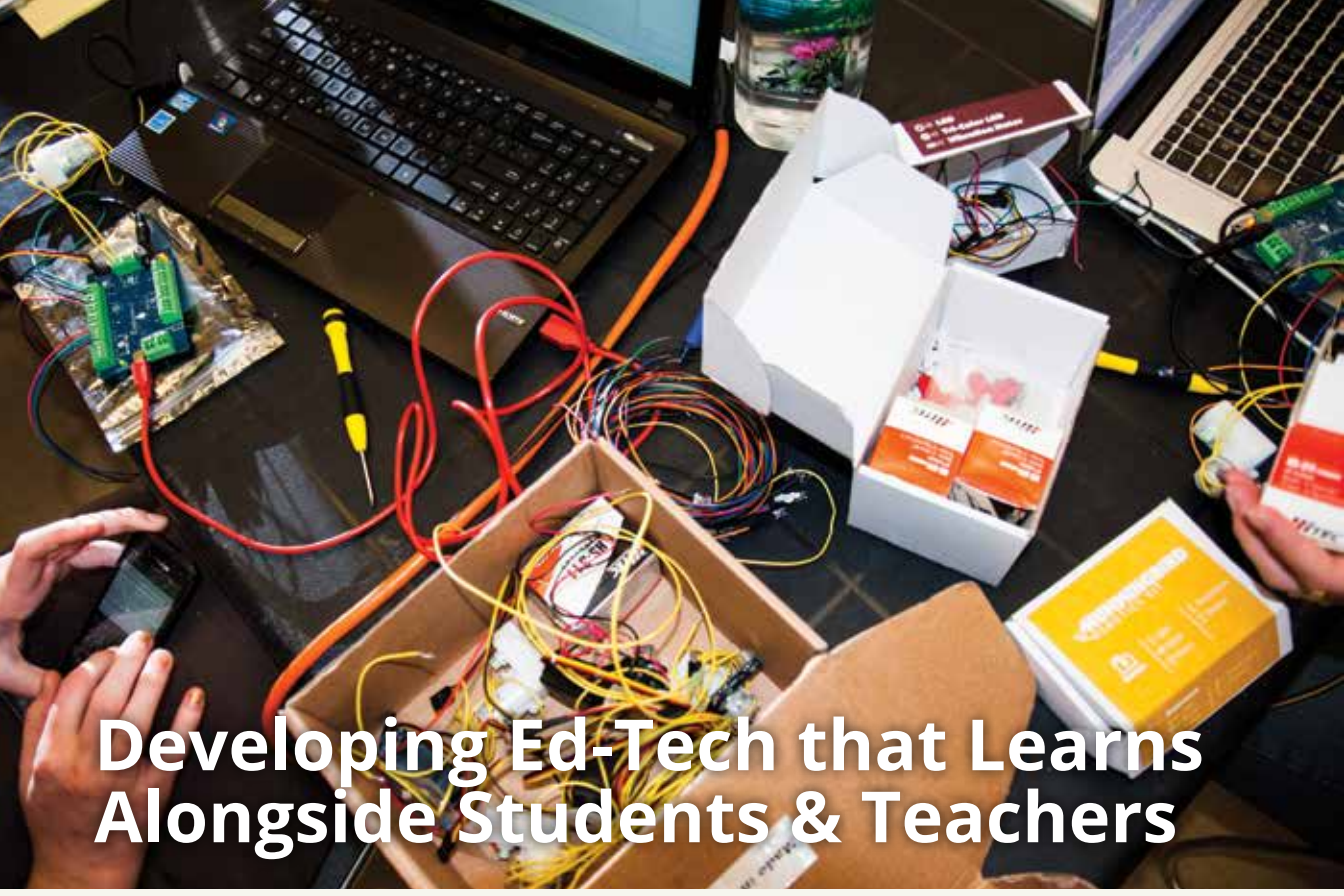
The organization runs its workshops by hiring educators, technologists, and working artists on a contract basis, relying on Maker Corps VISTA and Board members for institutional support, and even enabling teenagers to teach younger students as peer-mentors.

These educators work with students like Daijah, Ashanti, and Cheyenne, middle school students from the neighborhood. Following a summertime shooting at a nearby playground, the girls found a safe and welcoming place at Assemble, where they've since become a fixture. The girls have yet to miss a Saturday Crafternoon event, and they recently built a prototype for an LED lighting system that could make their neighborhood parks safer places for kids.

NETWORK IN ACTION

CATALYZE: PROGRAM RESEARCH INFORMS PROGRAM DESIGN.

Through their participation in the Remake Learning Network, Assemble connected with the University of Pittsburgh's Center for Learning in Out-of-School Environments (UPCLOSE), an academic unit that studies informal learning programs. Through the support of the Grable Foundation, Marti Louw, then a design researcher at UPCLOSE, conducted a year-long fellowship at Assemble, working closely with staff and mentors to study how parents and adult caregivers seek and choose learning opportunities for young people, and then they co-designed strategies for improving family engagement in supporting youth interest in making and creative technology.



Developing Ed-Tech that Learns Alongside Students & Teachers

BIRDBRAIN TECHNOLOGIES creates affordable robotics tools that help teachers make coding and computer science accessible.

Robotics, coding, and computer science are increasingly important to the future career prospects of today's students. Yet classroom teachers and informal educators often face barriers in the cost of equipment and the perceived difficulty of the subject matter.

By providing flexible and affordable robotics products that are easy to use, Pittsburgh's BirdBrain Technologies introduces students to programming and robotics and cultivates their ability to think and work creatively with these 21st-century tools.

"The Finch helped me understand objects and their methods in a way that the textbook never could."

STUDENT
AT FRANKLIN REGIONAL HIGH SCHOOL

BY THE NUMBERS

Nearly **20,000 BirdBrain products** are in use in more than **1,000 classrooms**, reaching more than **50,000 students** nationwide.

In 2014, the PreK–12 education technology market had an estimated value of **$7.9 billion**.

Founded in 2010 by Tom Lauwers, who had just completed Ph.D. in Robotics at Carnegie Mellon University (CMU), BirdBrain Technologies originated from Lauwers' work with CMU's Community Robotics, Education and Technology Empowerment (CREATE) Lab, which promotes technological fluency through education.

BirdBrain's first product was a tool to motivate computer science students by giving them a tangible representation of their coding. The Finch is a durable, two-wheeled plastic robot that accepts computer science commands in a number of programming languages and gives students instant visual feedback. Shortly thereafter, Lauwers designed the Hummingbird Robotics Kit, which contains the basic components needed for a wide array of robotics, kinetics, and animatronics projects across disciplines.

The strength of educational products like Finch and Hummingbird lies in their ability to make learning something you can see and touch. For many students, these tools represent their first exposure to project-based learning. In particular, Lauwers says, "It's about doing something as a project that requires creativity and thinking—and it probably doesn't work the first time. Students have to do some engineering and some programming and some testing before they get it right."

The approach fits well with the demands of the project-based workplace of the future, which will demand employees with creativity and problem-solving skills.

"I would much rather see a student write a program that makes a multiplication table and autofills it than memorize a multiplication table," Lauwers says.

Lauwers partnered with educators in Pittsburgh-area middle schools, high schools, and community colleges to co-design and test products, integrating feedback to develop instructional resources that work both in- and out-of-school.

Supplementing these in-person collaborations are online forums where teachers post lesson plans for using BirdBrain products and share tips for engaging students.

Through these partnerships, Lauwers has built a regional "cluster" of Finch and Hummingbird users in the Pittsburgh region. It's a strategy that has built a market for BirdBrain products and enriched the community of educators and students using the Finch and Hummingbird Kit to expand opportunities for robotics and computer science learning.

NETWORK IN ACTION

CONVENE: PROFESSIONAL DEVELOPMENT BRINGS EDUCATORS TOGETHER WITH INNOVATORS.

Partnerships with professional development agencies in the Remake Learning Network has been instrumental in helping BirdBrain improve its products and expand its reach.

ASSET STEM Education hosts Hummingbird professional development on an almost monthly basis. The Allegheny Intermediate Unit hosts two-day training workshops in their trasnformED professional development space, a digital playground for teachers, exploring new education technology tools.

Working with the Carnegie Library of Pittsburgh (CLP) has helped Lauwers adapt his products for self-directed learning in out-of-school environments. Materials like comic book-style instructional guides were originally made by CLP librarians, and now they are used by BirdBrain in all their product kits.