

# reynoldscenter **TLC**

for teaching, learning and creativity

Dec 2018

## FabNY: Digital Design & Fabrication STEM Program TLC Grant Opportunity



We are delighted to announce an exciting grant opportunity, made possible by the Cisco Foundation, to help the Reynolds Center bring more meaningful STEM education to young learners (K-6) in Upstate New York. Through this funding, we are able to offer 5 elementary schools and 2 public libraries a fully-resourced Fab@School FabMaker Studio STEM program through June 2020.

### Goals:

- Increase the integration of STEM activities into core content areas
- Bring more meaningful STEM education to young learners (K-6)
- Introduce and expand awareness of STEM career paths at the elementary level

### Benefits:

- A site license for Fab@School Maker Studio web-based, digital fabrication software program - compatible with Mac, Windows, iPad, Chromebooks, and other mobile devices – through June 2020. *Note: Fab@School Maker Studio works with both desktop and tablets (however PC/MAC desktop/laptops are needed to send projects to the digital cutters).*
- Digital fabrication hardware (1 Silhouette Portrait - digital fabricator)
- One on-site, centrally-located PD workshop providing an overview of the software tools, as well as support for curriculum integration, featuring a keynote by Paul Reynolds
- Signed, personalized copy of *Going Places* STEM storybook for each site's library
- Reduced rate for ongoing annual renewals of the Fab@School Maker Studio software license after initial pilot

### Criteria:

- Two educators in the same school willing to collaborate on STEM-based learning activities
- Sign-off from school leadership and instructional technology leadership
- Site must be a NY public school serving students within grades K-6
- School qualifies for a Free Reduced Lunch (FRL) rate of 50% or higher
- Able to attend a one day face-to-face professional development session
- Join monthly check-ins with the Reynolds Center team (web conferences and/or email)
- Schools must participate in a teacher and student research surveys during the program
- Provide a 200-word case study of how FabMaker Studio was used, and its impact on STEM teaching/learning, as well as photos of teachers and/or students using FabMaker Studio, with appropriate permission for use in funding reports and blog post/social media.
- Existing partnership with your local public library a plus

### Deadlines:

- Applications are due by: **Friday, Jan. 11, 2019**
- Applicants will be notified by: **Friday, Jan. 18, 2019**

Interested district/schools should visit [www.ReynoldsTLC.org/fabnyapp](http://www.ReynoldsTLC.org/fabnyapp) for more details and to apply.

Through this collaboration, your district/school will be contributing in a substantive way in helping close gaps in student STEM learning, and increase career readiness and interest in STEM sector fields. This deployment represents a foundational building block in our efforts to reach 17 million students across the nation - and around the world - by 2025.

Grateful for your consideration,

A handwritten signature in black ink that reads "Paul Reynolds".

Paul Reynolds Co-Founder, Reynolds Center TLC

Contact: Andrea Calvin • 877-888-6752 • [andrea@reynoldstlc.org](mailto:andrea@reynoldstlc.org)  
308 Congress Street • Boston, MA 02210 • [www.reynoldstlc.org](http://www.reynoldstlc.org)

## About Fab@School

Led by the Fab@School Initiative research team at University of Virginia and with support from NSF and U.S. Dept. of Ed., Fab@School FabMaker Studio is the first digital design and fabrication program developed specifically to introduce elementary and middle school students to the excitement and power of engineering design. The focus on very young learners is informed by research that shows students' perceptions of STEM identity and self-concept are already forming by age 10-12. Therefore, there is an alarmingly short window of opportunity to expose students to personally meaningful STEM experiences in a way that could shape their futures.

While the maker buzz is often about more elaborate 3D printing (e.g. additive layer printers and laser cutters) Fab@School Initiative pioneered the Fab@School FabMaker Studio online program as a more practical, affordable onramp that features low-cost paper and cardstock, inexpensive digital cutters, and a range of activities that allows every student to iterate multiple designs, and walk away with a project at the end of a session. Featuring low-cost materials and easily accessible web-tools, the FabMaker program fosters STEM skills - including creative, higher-order problem solving through hands-on design, construction, and iteration. For more information: [www.reynoldstlc.org/fabschool-maker-studio/](http://www.reynoldstlc.org/fabschool-maker-studio/).

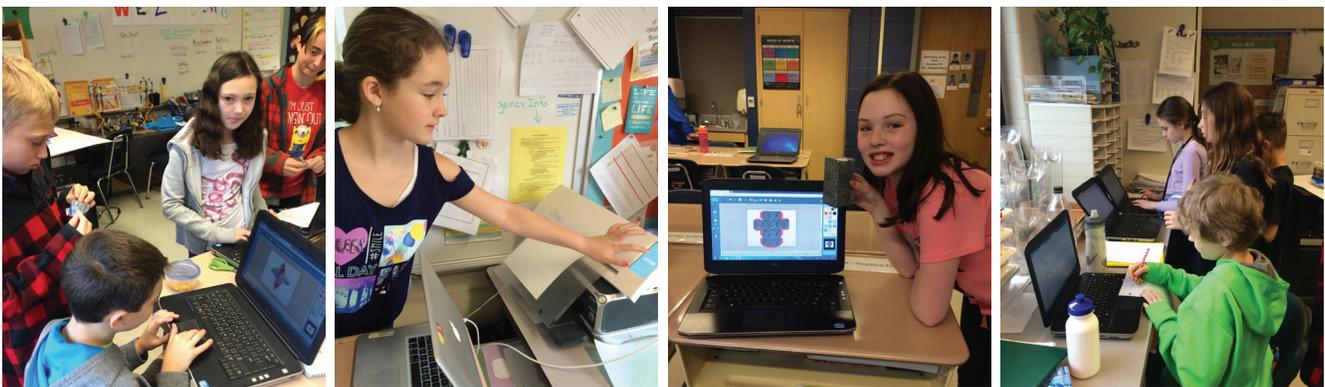
## Research

Initial Fab@School research pilots using Harvard University's PEAR Institute Common Instrument Suite (CIS) demonstrated efficacy in shifting students' attitudes about STEM education and careers, including an initial 30%+ increase in interest in STEM learning after 8-weeks of the program.

In June 2018, MaSTEM students in grades 1-5 in three school districts in Massachusetts participated in the evaluation using the PEAR CIS. Overall, of the students that completed the CIS at Fab Schools in Spring/Summer 2018:

- 96.9% of students reported positive gains in STEM Interest
- 82.1% in STEM Identity as a result of participating in their programming
- 84.6% of students reported positive gains in Relationships with Adults
- 61.5% in Relationships with Peers
- 87.2% in Perseverance
- 87.2% in Critical Thinking

The Reynolds Center team is moving forward to add teacher-focused research metrics to its evaluation efforts. During the final phases of MaSTEM, we researched and evaluated North Carolina State University's NSF-Funded MISO (Maximizing the Impact of STEM Outreach) T-STEM Teacher Evaluation research instruments. The Reynolds Center hopes this evaluation tool will demonstrate teacher's enhanced comfort level teaching STEM, which will provide yet another tool to increase adoptions by school districts across the U.S. and beyond.



## From the FabTeachers

“There are many reasons why I love working with the Fab@School Maker Studio in the first grade. There is no substitute for teaching solids than by students actually creating 3D shapes. Not only were they planning their designs in the software, but also strengthening their spatial relations skills while putting the physical shape together.”

**Karen Wolff, Digital Learning Coach, Walpole Public Schools (MA)**

“Briggs Elementary School joined the ‘maker’ movement, an effort to emphasize learning through doing and develop skills such as invention, creation, exploration, and problem solving. We are very excited to add Fab@School Maker Studio to our students’ ‘maker toolbox.’ Fab@School Maker Studio offers a kid-friendly and inexpensive prototyping solution for a variety of engineering design challenges. SO much faster and more reliable than our 3D printer!”

**Tiffany Davis, Briggs Elementary School, Ashburnham Public Schools (MA)**

“I was amazed to see that the students could create something within a 2D virtual world, and then change it to a 3D platform. The creation level is endless for students. The Fab@School Maker Studio cooperates and assists the students with basis CAD operations, makes them think critically and problem solve in such an inexpensive way.”

**Natalie Breen, Westminster Elementary, Westminster Public Schools (MA)**

“Who says learning has to be dry or boring? Or even end with the school bell? Well I do not think that ever has to be the case! In fact, I run an amazing STEM club after school thanks to my school parent organization and Fab@School Maker Studio that say different. In the past my STEM clubs were always enjoyed by all the students who attended, but this year I stepped it up by adding the use of Fab@School Maker Studio. In the club’s conclusion project students designed, developed, and created balloon powered cars. Students had a wide range of tools and supplies at their disposal. The only requirement was the car had to move by balloon power!

Students quickly went to work developing a sketch, or basic blueprint, and a supply list. From their printing, cutting and building noises filled the room with laughter and smiles. When testing day came no one was nervous because at that point they felt that failure was their learning opportunity.

I highly recommend trying this with your students as you explore several science and engineering standards in your classrooms. If you want to connect to multiple subject areas you can have students do a formal written piece about their experience, or develop a descriptive writing piece for their design. If you are looking to integrate more math, calculate distances or movement times, FabMaker Studio is a great option. As a matter of fact the possibilities are only limited by your own creativity!”

**Monica Carty, Blackstone-Millville Regional School District, Augustine F. Maloney Elementary (MA)**

“Designing with the FabMaker Studio software was a simple and straightforward concept to learn for all three grade levels. In addition, the cutters proved faster and more efficient than was expected. Best of all student engagement was very high and we observed a high level of student interest and growing self-confidence. We’re excited about the implications this base of knowledge will have in future grades when we ask them to use more complex CNC equipment for larger projects.”

**Nathan Pritchett, Executive Director, Hardesty Center for Fab Lab Tulsa (OK)**

