



# CALL FOR MPACT FELLOWS

## Math and Computational Thinking Through 3D Making (MPACT)

### WHAT IS MPACT?

**Math and Computational Thinking Through 3D Making (MPACT)** aims to better prepare elementary and middle school youth for bright futures through creative STEM-rich activities.

MPACT's hands-on, minds-on projects engage students in using low-tech and high-tech materials—everything from cardboard boxes to 3D printers—in service of learning mathematics and computer science.

MPACT is flexibly designed to support teachers and students during uncertain times: projects can be implemented in classroom contexts using program-provided 3D printers or in distance learning environments using materials easily found around the house.

**For more information on the MPACT study, please contact:**

**Nicole Arshan, PhD**  
Principal Researcher  
SRI Education

[nicole.arshan@sri.com](mailto:nicole.arshan@sri.com)

650-859-5595

**SRI Education™**  
A DIVISION OF SRI INTERNATIONAL

**MPACT3D.ORG**

### THE CHALLENGES STEM EDUCATORS FACE IN 2020

- Too few students see the relevance of STEM in their daily lives or their futures.
- Students need to learn more about 3D modeling and printing, a growing field of work.
- Teachers need support building projects and career awareness into the school day while still addressing content standards.
- Today's teachers face an additional hurdle: keeping students engaged, intellectually stimulated, and on pace with grade-level standards in ever-changing learning contexts.

### MPACT'S SOLUTIONS

- Students engage in workplace-based design projects through carefully sequenced curriculum and materials.
- Students learn to design and fabricate beautiful, useful objects while learning mathematics and computer science aligned with grades 4–7 California state standards.
  - **In the classroom:** students engage in 3D modeling with computer-aided design (CAD) and printing used in careers ranging from engineering & manufacturing to animation and more.
  - **At home:** students engage in similar design cycles using materials commonly found around the house. A kit provides any specialized materials needed.
- Teachers receive the knowledge and skills they need to support students in either context through targeted professional development.
- Industry mentors give students advice about their designs and about the workplace.

The experienced MPACT team is led by Jennifer Knudsen, a veteran curriculum and mathematics professional development provider and former mathematics teacher. Knudsen works as a Senior Mathematics Educator at TERC, a non-profit made up of teams of math and science education and research experts, dedicated to innovation and creative problem solving in STEM.



# MPACT : Evaluation Study



Funded by the U.S. Department of Education and in partnership with TERC, SRI International (a non-profit research organization in Menlo Park, California) is conducting a study of MPACT to understand its effectiveness and support its continuous improvement through teacher implementation and reflection. We invite grade 4–7 math, computer science, and engineering teachers to participate in this study as MPACT Fellows. The study grant will fund approximately 35 MPACT fellows and 35 participating non-MPACT teachers in elementary and middle schools during the 2020–21 and 2021–22 school years. SRI researchers will learn from MPACT fellows through teacher and student questionnaires and (if conditions allow) visits to schools and classrooms.

## WHAT DO TEACHERS AND THEIR STUDENTS DO AS PART OF THIS STUDY?

### MPACT fellows will:

- Receive approximately 24 hours of MPACT professional development and a set of classroom materials, including a 3D printer, access to a web-based computer-aided design tool, and materials for 3D printing and other maker activities.
- Implement two supplemental modules in 2020–21 (approximately 10 lessons) and three supplemental modules in 2021–22 (approximately 20 lessons). Fellows may use classroom materials or at home materials, depending on where school is being conducted.
- Provide regular program feedback via questionnaires administered every two weeks (about 10 minutes).
- Take an assessment of mathematical knowledge for teaching geometry (about 30 minutes, 2 times a year)
- Administer a student survey about engagement with and interest in STEM and an assessment of geometry, computational thinking, and spatial reasoning (about 40 minutes, 2 times a year).
- May be asked to participate in an interview about MPACT implementation or coordinate a student focus group (e.g., supporting parental consent and school supervision).
- Will receive a stipend for their participation.

### Participating non-MPACT teachers will:

- Complete a brief, biannual questionnaire (about 10 minutes, 2 times a year)
- Administer a student survey about engagement with and interest in STEM (about 10 minutes, 2 times a year).
- Will receive a classroom library for participation.

## HOW DO SCHOOLS AND STUDENTS BENEFIT?

- MPACT fellows' schools will receive \$1,000 per year to support implementation.
- All teachers will have access to MPACT curriculum and a community support website at the conclusion of the project.
- Students will have access to curricular materials that pilot teachers described as engaging and culturally relevant.

**MPACT<sub>3D</sub>.ORG**

**SRI Education™**  
A DIVISION OF SRI INTERNATIONAL

*The study presented here is supported by the Office of Elementary and Secondary Education (OESE), U.S. Department of Education, through Grant U411C180070 to SRI International. The federal grant provides \$3,926,461, or 90% of the total project funds. Ten percent of project funds are provided by additional generous donors. The opinions expressed are those of the authors and do not necessarily represent the official views of, nor an endorsement, by OESE, the U.S. Department of Education, or our other donors.*