



## The 2019 Tuskegee BUILDERS Program

### June 10 – 28, 2019; 9AM – 2:30PM CST

#### Program Information

#### Introduction

Tuskegee University, Oakland University (MI) and the Macon, Montgomery and Phenix City school systems have developed a year-long program called “Building Unique Inventions to Launch Discoveries, Engagement and Reasoning in STEM (BUILDERS),” with support from the National Science Foundation (NSF). At the core of this program, is the **BUILDERS Academy**, a rigorous 3-week summer Academy for rising 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> graders enrolled at the Macon, Montgomery and Phenix City school systems which launches the year-long activities. The program’s goal is to help students build 21<sup>st</sup> Century skills in the context of Science, Technology, Engineering and Mathematics (STEM) disciplines. The BUILDERS Program will recruit 35 students (Scholars) from the target grades in each district and will immerse them in far-reaching STEM experiences through collaborative and interdisciplinary activities to discover the technology that drives various products of potential impact to their communities. The BUILDERS Academy will be held **June 10 – 28, 2019; 9AM – 2:30PM CST**. A half-day teacher planning session is being planned for **April, 2019; 9AM – 12PM CST (Date TBA)**. All activities will take place on the campus of Tuskegee University.

Scholars at the Academy will work in teams to identify a problem that is affecting their communities and bring together their STEM knowledge to make prototypes of products that have the potential to serve as solutions to the problems they identified. Teachers, BUILDERS faculty members, and peer-mentors will provide mentorship and support. We anticipate that because the students are “Learning STEM through Making”, they will gain a better appreciation and understanding that STEM concepts can be made to interact with one another to make products for the betterment of society. The STEM concepts that Scholars will learn at the Academy through the “Learning through Making” approach will be selected from the **Alabama Course of Study for Math and Science** so as to maximize the benefits of the program to the Scholars.

By the end of the summer Academy, student groups will have begun working on their prototype and function well as a group. Completion and testing of the prototype will continue through the subsequent school year. Thus, teachers must commit to continue mentoring the Scholars (such as after school, a few times during the year) to ensure that each team has a working prototype by the end of the 2019-2020 school year. Tuskegee University faculty mentors will make school visits to assist as needed. Near the end of the school year, each team will present their inventions at a ceremony at Tuskegee University in front of family and district and University officials. Supplies needed for the prototypes will be identified by the Scholars and provided by the program.

### **Benefits for Participating Students**

The Academy will create a work environment similar to that found in the STEM workforce. Much like STEM professionals in industry settings, this environment will lead to Scholars gaining critically important peripheral STEM-related experiences, including:

- Discovering how STEM concepts come together to make a product that solves a problem
- 21<sup>st</sup> Century skills (e.g. critical thinking, problem solving, collaboration, teamwork, communication, and leadership)
- Working collaboratively using cloud-computing
- Learning best practices in the use of technology

These activities and practices are commonly advocated in American STEM businesses and industries. Thus, the Scholars will think, collaborate and discover like STEM professionals do when collaboratively working on a project. Increased levels of knowledge, interest and motivation for STEM among Scholars amongst Scholars are expected as a result of Academy activities.

### **Goals of the BUILDERS Program**

- To provide 35 students annually with technology-rich, interdisciplinary experiences through the “Learning STEM through Making” approach in order to develop the STEM knowledge and practices, critical thinking, reasoning skills, and communication skills needed for studies in STEM.
- To use the BUILDERS partnership with the Tuskegee University Engineering Alumni Association (TUEAA) to foster Scholars’ awareness of the full spectrum of STEM-related occupations, from technicians and mid-level STEM specialists to scientists, technologists, engineers, mathematicians, and to chart pathways for Scholars to these professions.

### **Eligibility:**

- Be a certified Math or Science teacher.
- Be currently on faculty at the following high schools: BTW, Notasulga (Macon), Robert E. Lee (Montgomery) or Central (Phenix City).

### **Professional Development Benefits for Teachers**

The BUILDERS program is designed to provide teachers with innovative strategies to teach challenging STEM concepts and do so in a fun and engaging manner. Potential benefits to teachers include:

- Learning how to incorporate in their classes novel teaching tools through the use of makerspaces
- Learning how to make STEM more than a buzzword to inspire students to discover STEM and link it to their daily experience
- Learning new ways to interact with students and student groups
- Gaining experiences that will be consistent with **Next Generation Science Standards** (claim-evidence-reasoning).
- Participation in the training workshops and the Academy will lead to Professional Development Credits.

### Expectations for Teachers

- Commit to attending each day of the BUILDERS Academy full time, **June 10 – 28, 2019; 9M-2:30PM CST.**
- Participate in a teacher planning workshop at Tuskegee University to be held in **April, 2019 9AM – 12PM (Date TBA; teachers only).**
- With assistance of faculty mentors, implement Academy activities.
- Commit to mentoring each team of Scholars during the school year as the teams continue to build the prototypes that they started developing during the Academy,
- Identify Math and Science concepts from the **Alabama Courses of Study** that can be taught during the regular school year using resources and techniques used at the Academy.
- Prepare lesson plans publishable on the Alabama Learning Exchange (ALEX) and infuse them in the classroom during the regular school year to teach the identified concepts (1 lesson plan per teacher). The idea is to impact students beyond those that participate in the BUILDERS Academy. Teachers will receive full support from participating Tuskegee University faculty in the preparation of lesson plans and their subsequent implementation in the classrooms. Supplies will be provided to the teachers to implement the makerspace projects.
- Maintain a journal consisting of daily reflections.
- Assist Scholars in the dissemination of their prototypes at local events, such as the Science and Technology Open House at Tuskegee University.

### Financial Incentives for Teachers

Each teacher will be eligible to receive up to \$3,500 for meeting project expectations and completing the designated activities. Payments will be made as follows at \$100 per teacher per full Professional Development day:

- An initial payment of \$1,500 will be made at the completion of the Academy.
- A payment of \$1,000 will be made at the end of the Fall 2019 semester and another payment of \$1,000 will be made at the end of the Spring 2020 semester.
- All travel (mileage and meals) will be covered by the project during the planning workshops and Academy. Travel will be paid according to Federal Government travel policy.

**APPLICATION DEADLINE IS MARCH 29, 2019**