

The **Teaching STEM with Robotics DR K-12** project at New York University provides a professional development opportunity to middle school science and math teachers. Funded by the Division of Research on Learning in Formal and Informal Settings at the National Science Foundation, under its Discovery Research K-12 (DRK-12) program, the project aims to enrich education in middle school classrooms through professional development of science and math teachers by using robotics as the curriculum focus. With teachers as design partners, the project is creating hands-on curricula such that science and math content inherent in robotics and related engineering design practices are learned. The project is:

- developing and refining curricula that promote project-based, hands-on, instruction to ensure that students learn, understand, and apply the underlying science and math content while doing age-appropriate robotics activities
- deepening teachers' technical, pedagogical, and content knowledge, contextualized in and reinforced through robotics design experiences
- fostering teachers' skills and attitudes for integrating robotics-based learning in the required science and math classes
- enabling teachers to use their students' interest in robotics to engage them to learn the required science and math content
- using robotics as a means to expose teachers to tools, techniques, and models of authentic engineering design

BENEFITS TO TEACHERS

- Deepen teachers' learning of science and math contextualized in robotics
- Allow teachers to discover the science and math inherent in doing robotics activities
- Teachers will understand how to address the engineering design content of the Next Generation Science Standards
- Teachers will develop viable models to incorporate essential elements of robotics in STEM learning

BENEFITS TO SCHOOLS

After successfully completing the project, teachers will be able to:

- Use robotics to construct new and varied representations of disciplinary content that is accessible to students
- Employ robotics as a pedagogical tool to support active, collaborative learning for standards-aligned, middle school physical science and math courses
- Address the classroom challenge of motivating and engaging students in their own learning
- Leverage science and math lessons, contextualized in robotics, to promote STEM engagement

ELIGIBILITY

- Regular teaching appointment at a middle school located in New York City (all five boroughs)
- Three years of full-time teaching experience in science or math disciplines
- Endorsement by the school principal

DURATION

- Three weeks: July 10, 2017—July 28, 2017
- Schedule: Monday to Friday, 8:30 A.M.—5:00 P.M., on NYU Tandon School of Engineering's 6 MetroTech campus
- 40 additional hours during the academic year

STIPEND

Project participants who successfully complete all requirements will receive a stipend of \$4,000. Income tax obligations are the responsibility of the teachers.

RESPONSIBILITIES

To receive a full stipend, participants are required to:

- Attend all training, research, and presentation activities
- Complete assigned curriculum design activities, oral presentation, and report
- Participate in academic year follow-up activities
- Conduct assessment of project impact in their classrooms and provide the results for reporting to NSF

SELECTION

Each school must submit a complete application package for a pair of science and math teachers. A complete application package consists of the application form, résumé, essay, and reference letters. Applications may be hand delivered, mailed, or e-mailed. Finalists for the 2017 project will be announced on the project web site by June 1, 2017.

APPLICATION DEADLINE:

May 15, 2017

Online: <http://engineering.nyu.edu/k12stem/educators/>

Project Open House:

Information Session on May 2, 2017 @4:30pm

CONTACT INFORMATION

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Teaching STEM with Robotics DR K-12 Project

APPLICATION

Type or print neatly

Date: _____ Gender: M/F

Name: _____
Last First Middle

Position: _____

Department: _____

School: _____

Mailing Address: _____
Street

City State ZIP

E-Mail: _____

Phone: _____

Fax: _____

Home Address: _____
Street

City State ZIP

Principal's Endorsement/Signature

APPLICATION CHECKLIST

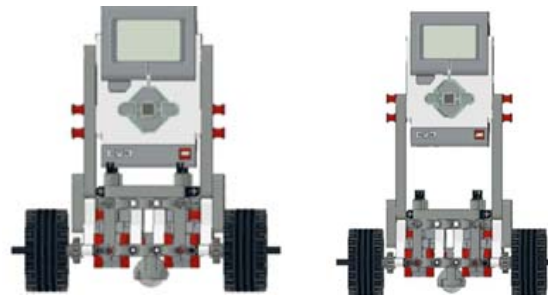
- Résumé which includes information stating your
 - Education
 - Professional experience with relevant teaching history
- Essay (300-500 words)
 - Based on your experience, what STEM concepts do you wish to demonstrate to your students with the aid of robotics? How will this create an exciting learning activity for students?
 - What robotics learning resources do you use at your school for hands-on learning activities? How have you developed an engaging curriculum using these resources?
 - Detail how you will incorporate robotics in your instruction to enhance STEM education after participating in this project.
- Two reference letters from your
 - Principal
 - Assistant-principal, department head, or a senior colleague who can comment on your professional background and future outlook

Online submission link:

<http://engineering.nyu.edu/k12stem/educators/>

Detach ✂

Teaching STEM with Robotics



NYU Tandon School of Engineering
Brooklyn, NY
Mechanical and Aerospace Engineering Department
Mechatronics and Controls Laboratory
<http://engineering.nyu.edu/mechatronics/DRK-12>



NYU

**TANDON SCHOOL
OF ENGINEERING**

The **Teaching STEM with Robotics DR K-12** project provides a professional development opportunity in the areas of science, technology, engineering, and mathematics (**STEM**) to middle school science and math teachers. Forty four teachers will be selected during the three project years, 2015—2017 (Year 1: 4, Year 2: 20, and Year 3: 20). We will conduct design-based research, with teachers as design partners, to develop and test practical, effective, and sustainable models that engage, educate, and support teachers in the design, implementation, evaluation, and refinement of curriculum modules to integrate robotics in science and math learning in formal school contexts. Use of robotics will expose teachers to tools, techniques, and models of authentic engineering design, which can capture the imagination of students for STEM learning. The project will consist of a three-week (120 hours) summer program and 40 hours of academic year follow-up activities. The project will recruit pairs of science and math teachers from NYC schools. During the summer workshop, teachers will perform hands-on learning activities from our curriculum, to gain confidence in integrating robotics in science and math teaching, and collectively refine it to form the basis of their classroom lessons. During the academic year, we will use twice a month follow-up meetings, to identify teacher needs, obtain feedback, learn teachers' implementation practices, and refine the project model. Experts in robotics, engineering, education, curriculum design, and assessment—with experience in K-12 education, training, and outreach—have formed an interdisciplinary team to make robotics central to and sustainable in science and math classrooms.



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**Center for K-12 STEM Education, NYU
School of Engineering**

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