

STEM-E: STEM Outreach, Education, and Entrepreneurship for the Future Workforce of New Mexico

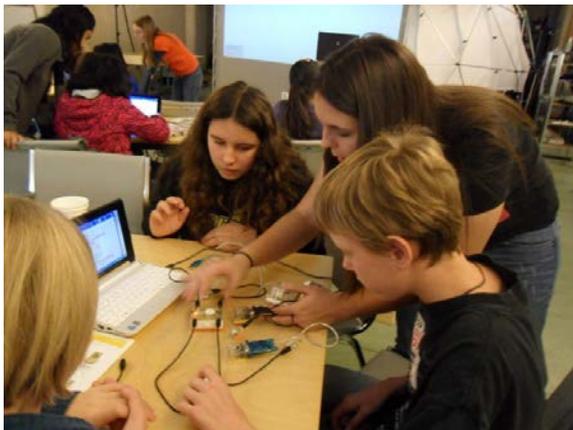


FY16 Actual:	New
FY17 Request:	\$408,600
FY17 Total:	\$408,600

STEM-E incorporates and will expand already successful statewide programs that train students to fill STEM careers, including:

- **Space, Engineering, Math and Aerospace Academy (SEMAA)** has served over 30,000 students, from 42 schools statewide in 14 years, through summer camps and after school programs
- **Young Women in Computing** has served more than 13,000 students from all over the state, improving engagement of women in computing, entrance in STEM programs (over 60% of summer campers entered STEM degrees), and transforming NMSU into a hub for women in STEM.
- **Arrowhead Center's Innoventure** is focused on developing entrepreneurial skills through teamwork projects and competitions open to K-12 students; over 2,000 students have been engaged to date.

Funding would allow the expansion of STEM programs that are already using best practices throughout the state.



STEM-E: Developing a STEM Workforce and Entrepreneurship Statewide

STEM-E, *Science, Technology, Engineering, Mathematics and Entrepreneurship*, is designed to provide engagement and training in STEM to meet state STEM workforce needs, and **integrating STEM learning with the development of entrepreneurial skills**.

STEM-E will develop a future workforce in New Mexico that is diverse in gender and ethnicity, skilled in the STEM fields with particular emphasis on the more technical and competitive areas (e.g., engineering and computing), and oriented in business skills and entrepreneurial outlook. Increased STEM skills promise future innovation, diversity guarantees growth, ingenuity and innovation, while entrepreneurship drives innovation towards economic development opportunities. **STEM-E** is unique in that it:

- (1) Builds on *decades* of research and experiences in STEM training, developed at NMSU and applied statewide;
- (2) Provides a *holistic* view of STEM as an integrated set of disciplines;
- (3) Integrates STEM learning with the development of *entrepreneurial* skills; and
- (4) Emphasizes broad participation, in terms of gender and ethnicity.

STEM-E will be a NMSU-based program, composed of diversity-targeted K-20 STEM recruitment, coordinated STEM after-school and summer programs, STEM-focused community events, and STEM entrepreneurial student experiences.

STEM-E will increase the number and diversity of students completing STEM degrees and gaining proficiency in STEM, while further encouraging job creation by teaching business and entrepreneurship skills and promoting innovation. Expected outcomes include:

- Engagement of at least 2,000 students statewide, with at least 40% of the students from underrepresented ethnic groups and at least 35% female;
- Development and deployment of at least 5 programs and 15 course modules;
- New STEM entrepreneurship programs, with at least 100 students participating;
- Development of at least 8 community events to promote STEM awareness, literacy, and engagement;
- **STEM-E** will use several metrics to assess impact, including measurement of participation of students, teachers, faculty, and performance in standardized tests.

Why Does New Mexico Need STEM-E?

The Department of Labor estimates at least **1.4 million new STEM jobs** in the US by 2020 (in the engineering and computing fields alone), with only 61% covered by projected trained workforce. In the last 10 years, New Mexico has demonstrated a fast growth in STEM jobs (14%, the 10th fastest growing state in STEM jobs in the country); **37% growth in STEM jobs in New Mexico** by 2022 (over 53,000 new jobs, the bulk in computing and engineering). Our state is constantly recognized for its potential and growth in STEM – Las Cruces was ranked 26th in the country as best city for STEM employment; Albuquerque ranks among the top 50 cities for STEM; Los Alamos is the county with the highest concentration of STEM jobs in the nation. In spite of this, less than 26% of degrees awarded by NMSU and UNM are in STEM – far below the national average (31%) and distant from what happens in other countries (e.g., in China this percentage is 51%, in Japan 61%). National statistics show a dramatic lack of interest towards STEM, with a skewed participation in terms of gender and ethnicity – only 12% of degrees in the technical areas of STEM are awarded to women, and only 8% of undergraduate STEM degrees are awarded to Hispanic students. Our program meets an urgent need to establish a creative STEM recruitment and training infrastructure, along a pipeline from K-12 to universities and technical schools.

NMSU is uniquely positioned to address the need. NMSU has demonstrated rapid growth and success in STEM training and outreach, through partnerships with higher education, public schools, businesses and the Arrowhead Research Park. Successful STEM efforts exist at NMSU, yet many are one-dimensional, tackling the STEM challenge through the lens of a single organization or discipline. STEM-E integrates these successful initiatives, challenging educators, researchers, and community stakeholders, to collaborate and address the globality of the STEM challenge, the overarching workforce and innovation needs of New Mexico.

How?

The STEM-E Program will tackle the STEM challenge directly, by increasing the number and diversity of students entering and competing STEM degrees (via outreach and recruiting), reinforcing STEM competence (through more dynamic, integrative, and project-based STEM learning) throughout the complete academic pipeline, and providing STEM graduates with **entrepreneurial and business skills** to make them uniquely prepared to succeed in the STEM workforce and energize the STEM economic landscape with innovation and creativity. The specific focus on diversity will ensure that the STEM-E program will create cohorts of STEM-trained professionals that are inclusive and ready to change the face of the STEM workforce. This will improve gender equity and enhance the presence of STEM professionals who are Hispanic, Native American and members of other underrepresented groups.



The funds requested will enable the following categories of activities:

- **Pathways** – focused recruitment of students into STEM activities at all stages of the K-16 academic pipeline, connected communities of learners and transition programs to sustain STEM interest as students move across grades.
- **Educational interventions** – to promote STEM mastery skills, through formal and informal learning programs (e.g., project-based after school programs, summer intensives).
- **Social capital** – fostering a group identity and creating dedicated social, familial and community networks of support
- **STEM Entrepreneurship skill** – through internships (e.g., Arrowhead), innovation bootcamps, competitions, and presentations by leading innovators.
- **The statewide expansion** of successful programs and best practices such as the *Space, Engineering, Math and Aerospace Academy (SEMAA)*, and *Young Women in Computing (YWiC)*.