

Global Challenge Engages Diversity in STEM



Problem

Gender and ethnic diversity in engineering and science

Solution

Provide attractive and accessible opportunities for underrepresented minorities in STEM

84% of professionals in U.S. science and engineering jobs are white or Asian males
— National Science Foundation

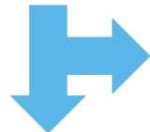
Strategy

Choose global challenge



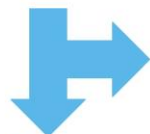
Water

1 in 10 people lack access to safe water
— World Health Organization



Engage

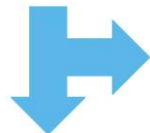
- Socially interesting
- Culturally important
- Economically valuable



Create

- Hands-on learning experiences
- Mentor relationships
- Diverse partner network
- Peer teaching opportunities
- Access to tools

Every \$1 invested in water and sanitation = **\$4 economic return**
— World Health Organization



Impact

Diversity in STEM workforce



National Science Foundation
Award #1348266

Result

- Increase STEM self-efficacy and participation for female and URM high school students in partner areas

Target Population

- Whole: Females and URM students in K-12
 - Regional Focus: Females and URM students in partner states
 - **Focused for Program:**
 - **females and URM students in partner high schools**

Model : 3 E's to engage URM-in-STEM students

- **Exposure**

- connecting with STEM professionals and STEM challenges
- demonstrating relationships among STEM challenges and student lives

- **Experience**

- access to science and engineering activities and tools
- enabling relationships with passionate mentors

- **Expectations**

- Set the bar high but offer relationships & resources to achieve –
- RISE UP!

RISE UP!

- I'm young, scrappy and hungry
And I'm not throwing away my shot
I'm 'a get a scholarship to King's College
I prob'ly shouldn't brag, but dag, I amaze and astonish
The problem is I got a lot of brains but no polish
I gotta holler just to be heard
- Come on, let's go
Rise up
When you're living on your knees, you rise up
Tell your brother that he's gotta rise up
Tell your sister that she's gotta rise up

Indicators SMART will measure

- Self-efficacy in STEM using existing assessments - Exposure
 - Include control group of program applicants
- Interactions STEM role models – Exposure, Experience, Expectations
- Strong relationships with mentors - Experience
- Knowledge of S&E of stormwater - Experience
- Fulfillment of program requirements - Expectations

Stakeholders Needed to Achieve Result

- K-12 Schools
 - Students & Families
 - Teachers
 - Administrators, School Board
- Higher Ed
 - STEM faculty and staff
 - Admissions & Financial Aid
- Sponsors
 - NSF, DOE, Local Business, Foundations
- Government
- Industry – Tech Companies with professionals in engineering, water, environmental science

NSF INCLUDES Collaborative: Creating a Diverse STEM Pathway with Community Water Research



PI: Mohamad Musavi, Univ. of Maine; Co-PIs: Venkat Bhethanabotla, Univ. of South Florida; Lola Brown, City College of New York; Cary James, Bangor High School; Vemitra White, Mississippi State Univ.; Senior Investigators: David Pugalee, Univ. of North Carolina, Charlotte; Jeffrey Wilhelm, Boise State Univ; Alex Friess, Univ. of Maine; Laura Wilson, Univ. of Maine, 4-H Program



Challenge

Gender and racial diversity in engineering and science

Vision

Provide attractive project-based learning opportunities for underrepresented K-12 minorities in STEM

Strategy

Choose global challenge



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Engage K-12 students in engineering and science practices

- Socially interesting
- Culturally important
- Economically valuable

Create

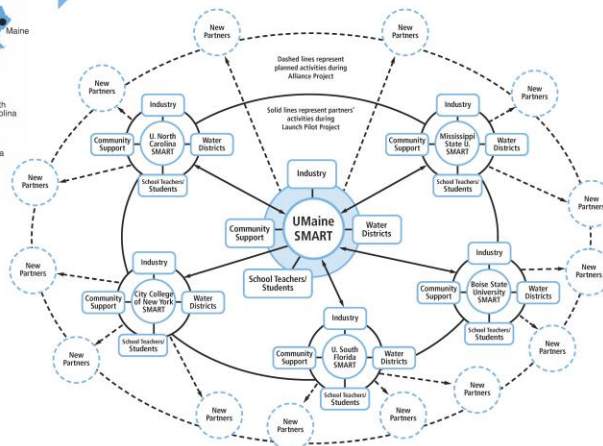
- Hands-on learning experiences
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- Peer teaching opportunities

Alliance

Broad participation



Evolving ecosystem for collective impact



SMART

Stormwater Management Research Team
NSF EPSCoR Track 3 #1348266
umaine.edu/smart

Evaluator: Casey Cobb, University of Connecticut
High School Partners: Bangor High School, Maine; Columbia Municipal School, Mississippi; L. Tom King High School and Jefferson High School, Florida and several other high schools
Other Partners: Maine Community Foundation; OXXX; Bangor Savings Bank; Bangor Area Stormwater Group; Maine EPSCoR; Silchester Environmental Engineering; Pleasant Point Restoration



Collective Backbone

