

# ADVOCATING FOR STEM

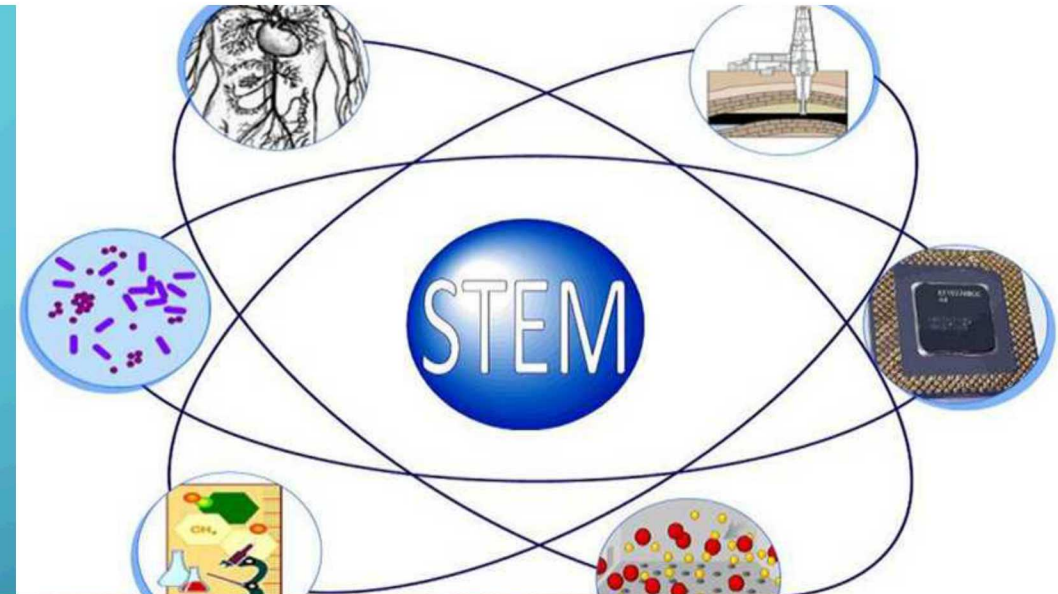
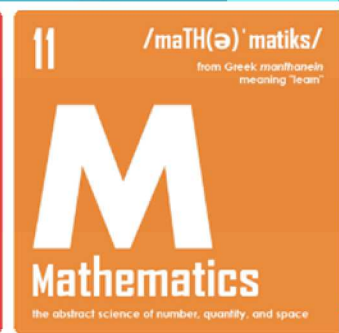
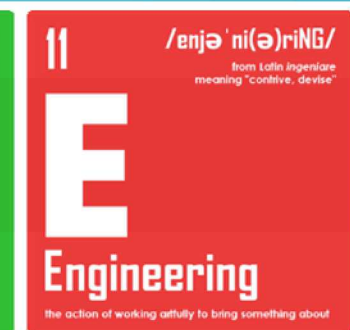
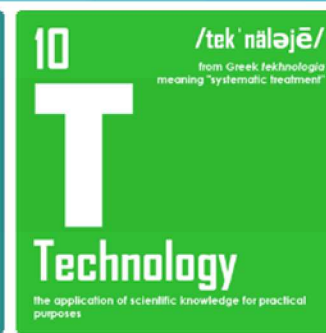
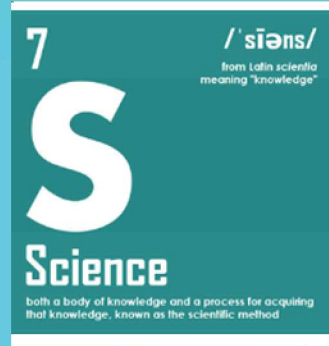
IT'S FUN, EDUCATIONAL AND IMPERATIVE FOR OUR  
FUTURE!

Jan Williams, F. SWE  
Sandia National Laboratories  
October 19, 2018

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# STEM ADVOCACY

- Promote education and training in science, technology, engineering, and math-related disciplines among students, teachers, parents, legislators, and the general public.
- Encourage more people to enter into STEM-related professions, including underrepresented groups such as women and minorities.



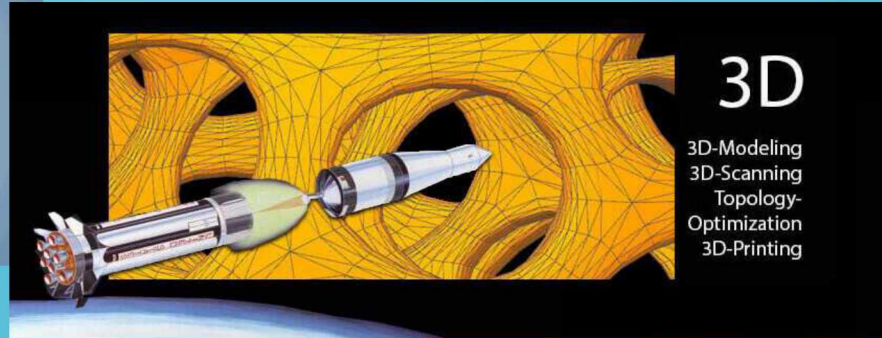
**STEM**  
**+ Art**  

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**STEAM**

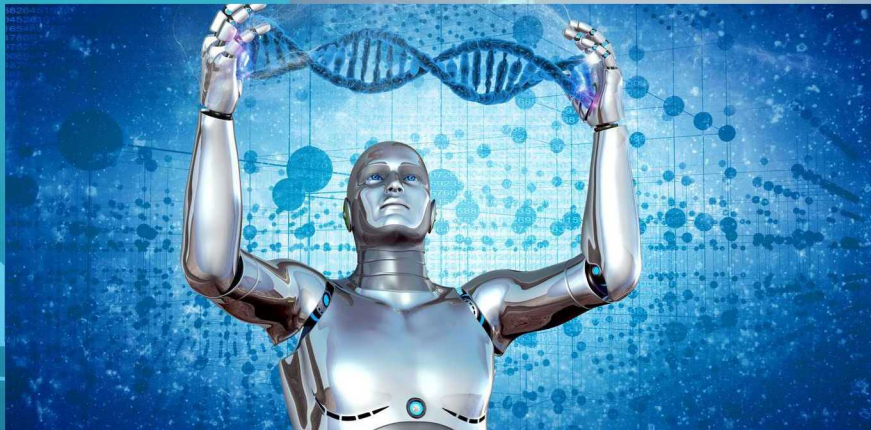


# STEM ADVOCACY – WHY SHOULD WE CARE?

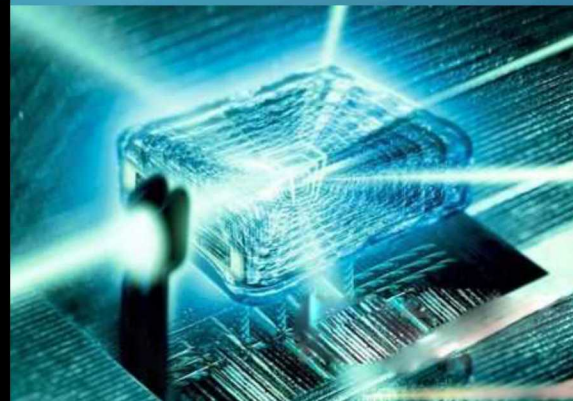
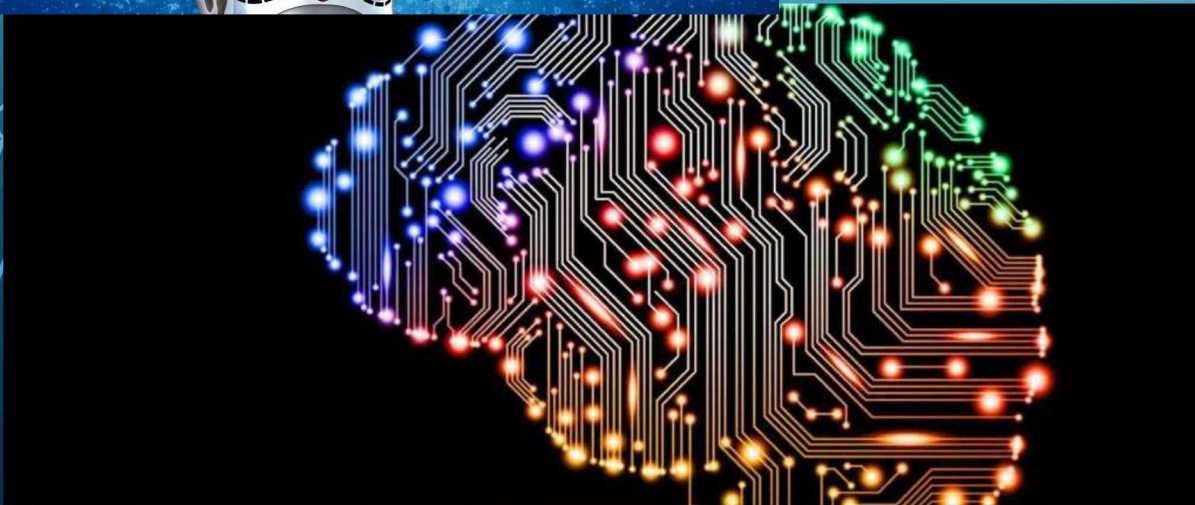


3D

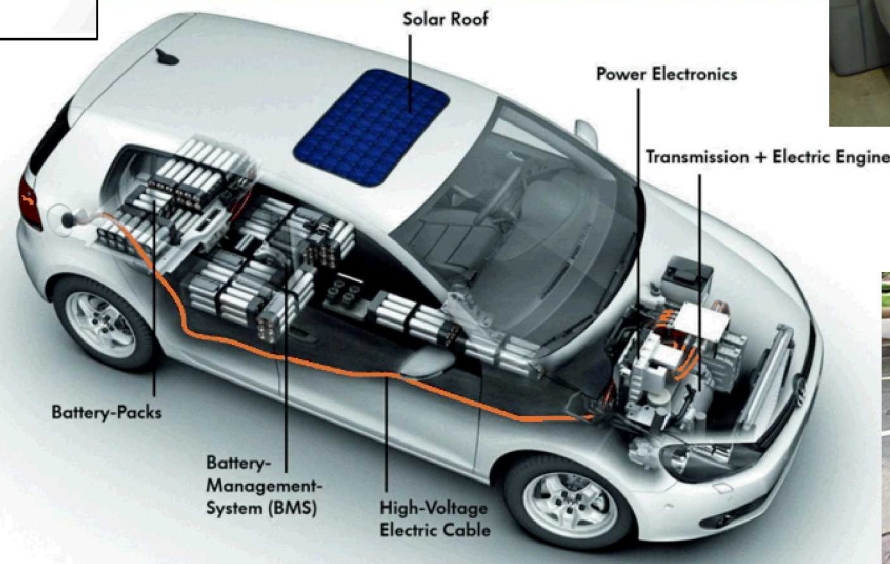
- 3D-Modeling
- 3D-Scanning
- Topology-Optimization
- 3D-Printing



Maintain global technological leadership/preeminence



# A FUTURE DOMINATED BY TECHNOLOGY



# NATIONAL SECURITY

## MASTER'S DEGREES BY RESIDENCY, 2016

Permanent Resident 58.1%

Nonresident Alien 41.9%

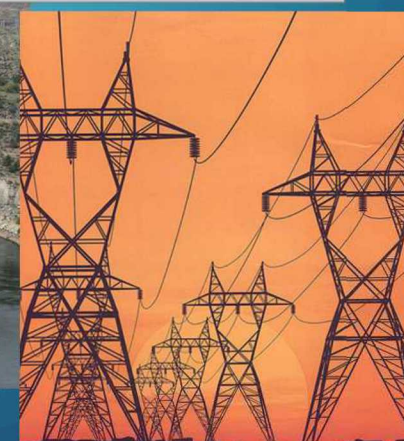
	2007	2008	2009	2010	2011	2012	2013	2014	2015	
Nonresident Alien	39.8%	38.7%	41.7%	44.1%	46.1%	44.4%	43.3%	45.3%	47.4%	47.0%
Permanent Resident	61.3%	58.3%	55.9%	53.9%	55.6%	56.7%	54.7%	52.6%	53.0%	

## DOCTORAL DEGREES BY RESIDENCY, 2016

Permanent Resident 45.2%

Nonresident Alien 54.8%

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Nonresident Alien	61.6%	55.1%	55.1%	54.2%	54.2%	53.3%	55.1%	54.8%	54.7%
Permanent Resident	38.4%	44.9%	44.9%	45.8%	45.8%	46.7%	44.9%	45.2%	45.3%



NATIONAL POWER GRID SIMULATION CAPABILITY: NEEDS AND ISSUES  
 A Report from the National Power Grid Simulator Workshop,  
 December 9-10, 2008 - Argonne, Illinois  
 U.S. Department of Homeland Security, Science and Technology Directorate



Who will protect our nation?

# HOW THE US STACKS UP AGAINST OTHER FIRST WORLD COUNTRIES



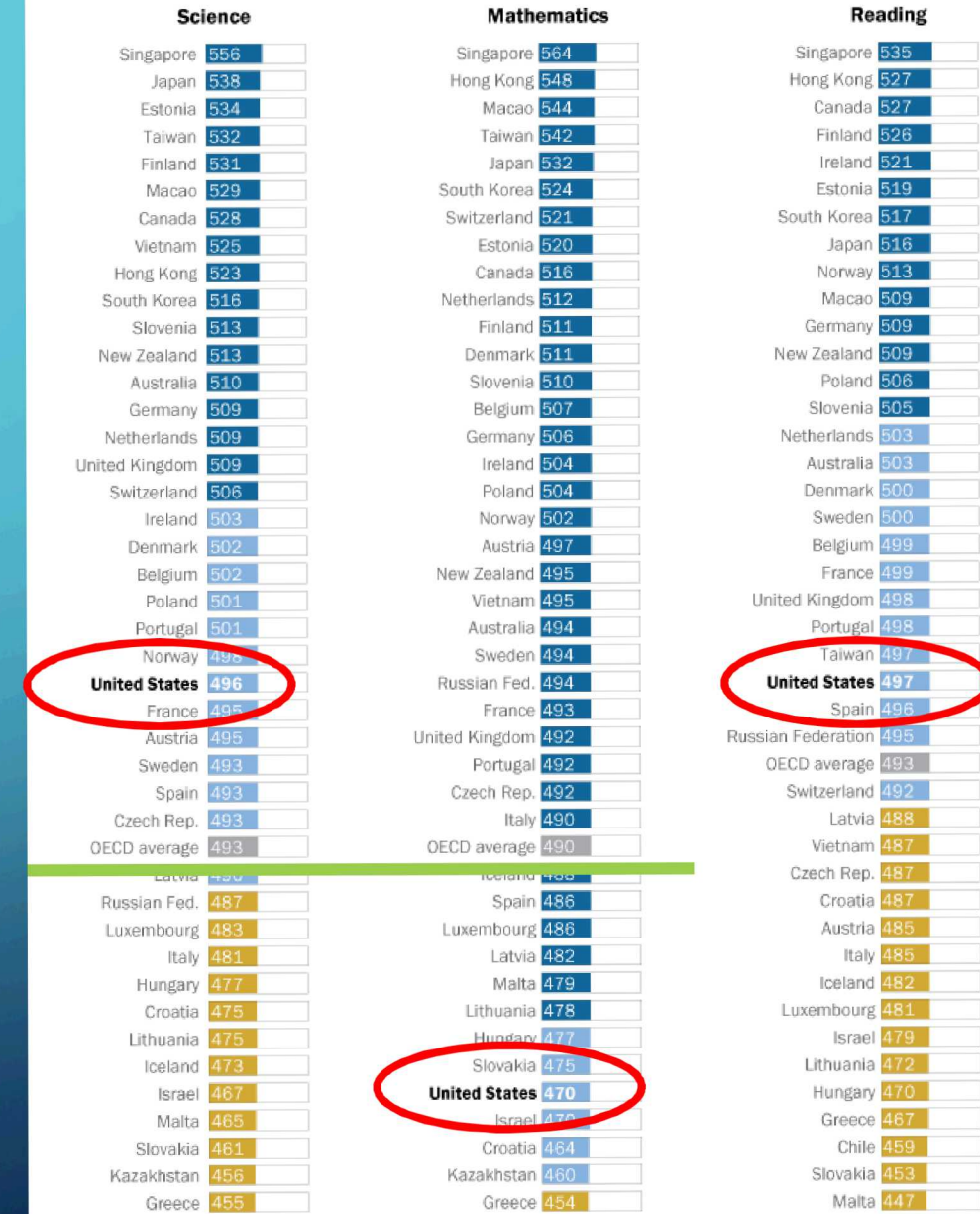
- “Internationally, US stands in the middle of the pack in science, math, reading scores” - 38<sup>th</sup> in math, 24<sup>th</sup> in science among 15-year olds.

Is this the profile of a powerhouse of technology innovation?

## How the U.S. compares on science, math and reading scores

Average scores of 15-year-olds taking the 2015 Program for International Student Assessment

● Score is significantly higher than U.S.   ● Score is not significantly different from U.S.   ● Score is significantly lower than U.S.



# PAY IT FORWARD!



# WHY IS STEM ADVOCACY SO IMPORTANT FOR WOMEN?

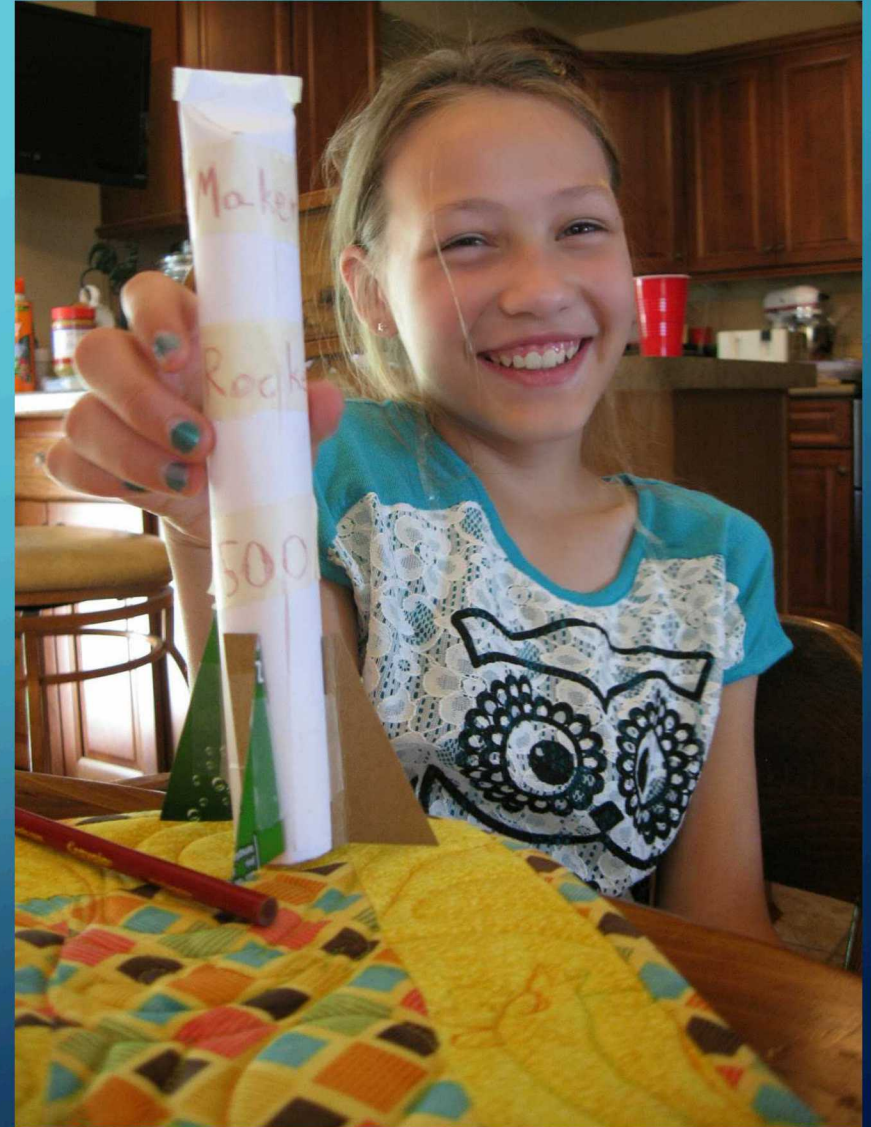


Girls who know a woman in STEM are much more likely to understand how STEM is relevant in their lives.

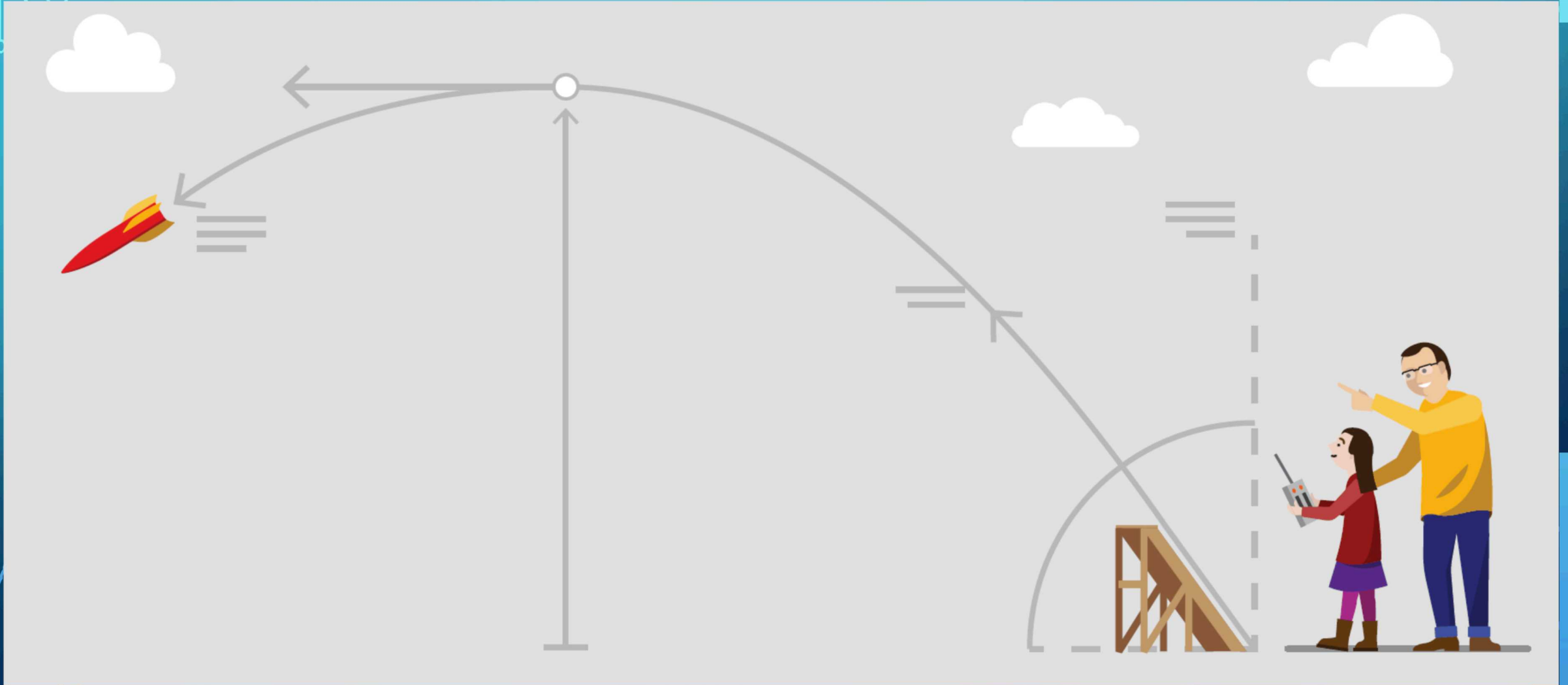
# WHY IS STEM ADVOCACY SO IMPORTANT FOR WOMEN?

"My teacher is making me build a rocket ship with some other students, so that got me interested in STEM a little bit because I like to build and create."

Middle School Girl



# WHY IS STEM ADVOCACY SO IMPORTANT FOR WOMEN?

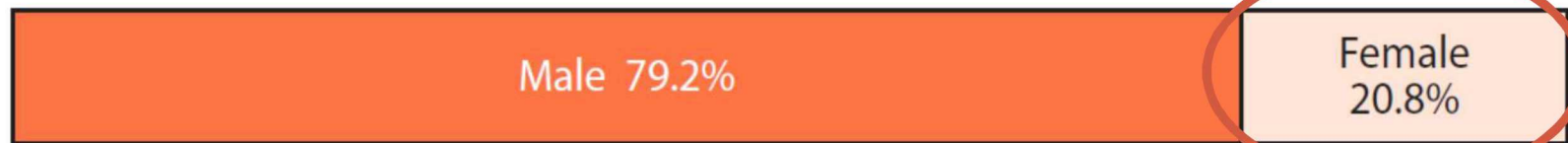


# WHY IS ADVOCACY SO IMPORTANT FOR WOMEN AND MINORITIES?

:Percentage female among all 4-yr. college grads over 25 in the US is ~50%

## BACHELOR'S DEGREES BY GENDER, 2016

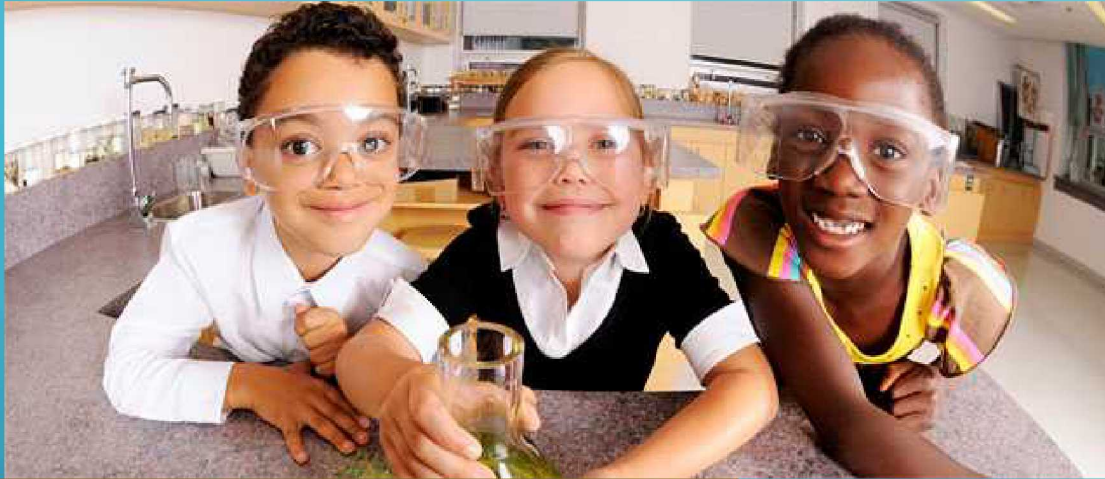
Granted in engineering in the US



	2007	2008	2009	2010	2011	2012	2013	2014	2015
Female	18.1%	18.0%	17.8%	18.1%	18.4%	18.9%	19.1%	19.9%	19.9%
Male	81.9%	82.0%	82.2%	81.9%	81.6%	81.1%	80.9%	80.1%	80.1%

Women are still *significantly* underrepresented in engineering!

# STEM ADVOCACY – HOW CAN WE GET INVOLVED?



## WHY DIRECT ADVOCACY?

Top 4 occupations of the 115<sup>th</sup> Congress: 438 reps,  
100 senators:

- Politics/public service
- Business
- Law
- Education

43/538=

8%

MOCs with  
STEM  
background

Members of Congress with STEM background/education:

- 14 physicians, 4 dentists, 1 veterinarian
- 3 psychologists, an optometrist, a pharmacist, and two nurses
- One physicist, one microbiologist, one chemist
- 8 engineers
- 6 software company executives

# TAKE OUR STEM MESSAGE TO YOUR LEGISLATORS!



U.S. Congressman Raja Krishnamoorthi (D – IL) and Paul D. Tonko (D – NY) – both engineers- with SWE President Jonna Gerken



COMMITTEE ON  
**SCIENCE, SPACE, &  
TECHNOLOGY**  
Lamar Smith, Chairman



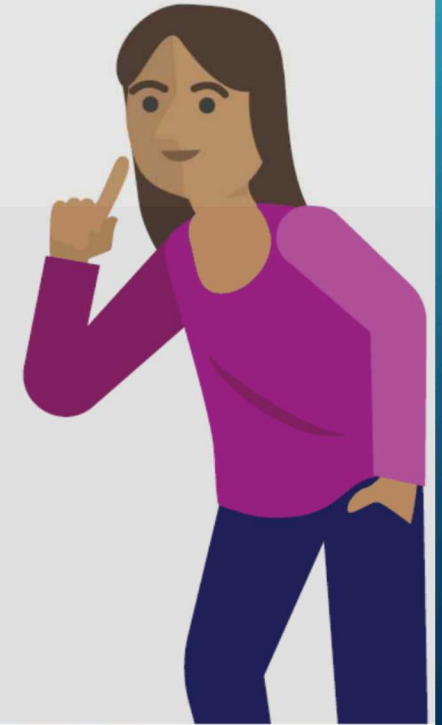
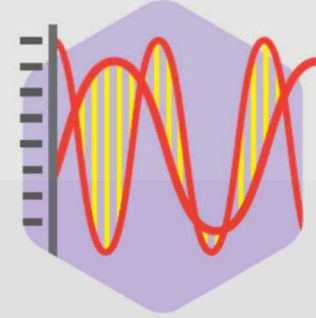
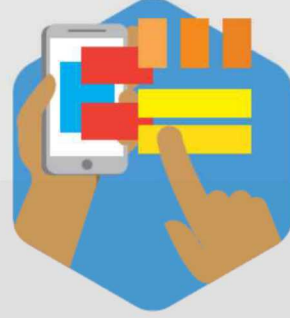
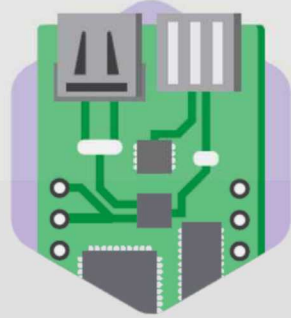
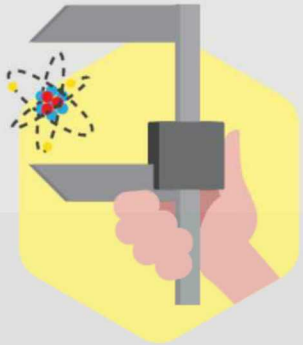
ational Science Foundation  
E DISCOVERIES BEGIN



# WHAT IF YOU CAN'T GO TO WASHINGTON?

## Act at home!

A screenshot of the U.S. House of Representatives website. The top navigation bar includes the U.S. House of Representatives logo, a search bar, and links for HOME, ABOUT, SERVICES, ISSUES, LEGISLATION, MEDIA CENTER, and CONTACT. The main content area is divided into two columns. The left column contains a 'Contact' section with links for 'Send Michelle an Email', 'Office Locations', 'Newsletter Signup', 'Request a Meeting', 'Facebook', 'Twitter', 'Teletown Hall Signup', and 'Website Problem'. Below this is a 'Quick Links' section with a dropdown menu. The right column features a 'Send Michelle an Email' form. The form includes a 'Your Information' section with fields for Prefix, First Name, MI, Last Name, and Suffix. It also has fields for Street Address, City, State, Zip Code, and +4 Extension. There are fields for Email and Phone Number, and a Twitter Handle field. A 'Text of Message' section has a large text area. At the bottom of the form, there is a checkbox for 'Check this box to sign up for my E-Newsletter' and a dropdown for 'Would you like a response?'. A reCAPTCHA widget is located at the bottom right of the form. The bottom of the page shows a Facebook social media widget for Congresswoman Michelle Lujan Grisham, including a 'Like Page' button and a 'Learn More' link. A social media post from Congresswoman Michelle Lujan Grisham is also visible, mentioning an 'Our Military Service Academy information night'.



Stem advocacy is **fun**, **educational**,  
and **imperative** for our future!