

swe NEXT



Welcome Back!

Hello and welcome! My name is Allison Osmanson. I am the SWENext newsletter reporter this year. I want to show you how exciting the engineering field is! We'll be sharing some really cool information that can help you learn more about STEM – Science, Technology, Engineering and Math.

I grew up in many different places including Montana and Washington. I earned my Bachelor's Degree in Materials Science and Engineering from Washington State University. I later earned my Master's Degree in Materials Science and Engineering at the University of North Texas.



Now, I am studying to earn my PhD in Materials Science and Engineering at the University of Texas at Arlington. The kinds of materials I work on are used in computers and cell phones.

I study how the solder joints break and how to improve them. Hopefully improving them will make them last longer and keep from breaking. Sometimes I am running calculations and doing experiments on my computer. Some days, I am in the lab making a printed circuit board or soldering wires and microchips together. On other days, I get to use a machine called a scanning electron microscope to see broken solder joints at a very high magnification. You never know what your day will bring you!

Think about all the cool things you could do and the problems you could solve if you worked in electronics or materials science!

What is Civil Engineering?

Do you know a Civil Engineer in your life? What kinds of things do you think she does every day? Maybe one day, she will design buildings, roadways or bridges on a

computer. Another day of the week, she will be on a construction site wearing her hard hat. She might get to travel the world to work on projects in other countries, too!

Anyone who wants to become a Civil Engineer has to work hard to learn how to be a good engineer because the work she might do is very important for our world. She can choose to work on roads, water storage or buildings and bridges. The possibilities are endless for a Civil Engineer. A Civil Engineer makes possibilities endless for us!

Meet Elnaz, Civil Engineering Student

Elnaz is a graduate student studying Civil Engineering. She goes to the University of Texas at Arlington. She is interested in Construction Engineering and Management.



What do Civil Engineers do?

Civil Engineers design and manage the building of structures like buildings, tunnels, dams and highways. They use computers and special materials to design structures as cities grow. Civil Engineers are also careful about protecting the environment and preventing natural disasters like floods.

What made you decide to study Civil Engineering? How did you first become interested in a STEM field?

Civil Engineers help improve the lives of so many people. They are very important for society. Without them, we would have no roads, airports, buildings or dams. When I was a young girl, I learned that Civil Engineers are in charge of improving things that benefit everyone.

What did you know about Civil Engineering when you were a child?

When I was about seven years old, I was naturally curious, and that led me to technology and engineering. I liked building things with Legos, which helped me explore engineering.

What are some really cool things that people in your profession work on?

There are LOTS of interesting things that Civil Engineers get to work on! As a student, it is really neat to see relationships between what I am learning and what I see every day in the city. You could help build something that is still standing beyond your lifetime. That is a pretty cool way to leave your mark on the world.

Have you encountered any challenges as a woman studying engineering? How have you overcome them?

Sometimes it can be scary to take classes that have very few girls and many boys. This didn't stop me, though. I stayed focused and worked hard. The boys noticed, and I

was invited to join their groups. Other times, if there were other girls, I would work with them.

Do you have one piece of advice for young girls considering going to school for Civil Engineering?

It is very important to read about Civil Engineering and learn as much as you can about it. If you are truly excited about engineering, I believe that you can do it. One day, you might be working in your dream job!

National Hispanic Heritage Month

September 15 through October 15 is National Hispanic Heritage Month! Did you know that the Mayans were the first civilization to make rubber and use it to play a game called “Pok-A-Tok”?

While most people would say that rubber did not become useful until 1840 when Charles Goodyear vulcanized rubber, that might not be entirely accurate. The Mayans and other Mesoamericans discovered that mixing latex with vegetable juice would make the material bouncy. They would play the game for fun or to solve fights. This invention has been around for thousands of years and the Mayans were the first to think of it.

The Hispanic Heritage influence in STEM and engineering is very important to recognize. We are excited to introduce you to some amazing members of the Society of Women Engineers (SWE) who are engineers or who are studying engineering.

Margarita Chi-Miranda is a Civil Engineer at Jensen Hughes in Baltimore, Maryland. She has bachelor’s and master’s degrees in Civil Engineering from the University of Puerto Rico at Mayaguez. She is an active member of SWE and the US Women in Nuclear organizations. She volunteers as a mentor for students at the Center of Help, a Hispanic/Latino community center in Annapolis, MD.



Margarita’s advice to you: Be curious. Always look for opportunities to learn new things. Ask questions. Learning new things will show you what you like and what you don’t like. It will help you to shape your future.

Jasmine Erica Hernandez is a Computer Science student at the University of Texas at Arlington. Jasmine is head of Communications for the SWE section at her college.

You know how you have to practice writing with good



grammar so that people can understand you? Jasmine does that with computer program language so that computers understand what she is telling them. Jasmine is learning how to tell a computer what to do, and it's a pretty important job.

Jasmine's advice to you: Everybody makes mistakes. When I fail, I give myself a full day to just be sad and upset because failing isn't fun. It hurts when I can't reach a goal. Then I call my dad because he is my #1 cheerleader. My dad always knows how to make me feel better. He gives me the courage to try again.

Stephanie Marie Quiles-Velázquez is a Mechanical Engineering student at the University of Puerto Rico at Mayagüez. She decided to study Mechanical Engineering after attending a Mechanical Engineering Summer Camp in high school. During that camp she learned about all the things that a Mechanical Engineer can work on: renewable energy, aerospace, pharmaceutical, medical devices and automobiles. She believes that Mechanical Engineers can do anything!



Stephanie says that she always liked having multiple options and possibilities. This summer, she had the opportunity to participate in a NASA internship, where she decided to pursue the Aerospace industry.



Claudia Pacheco is an Industrial Engineer at Boeing in Seattle, Washington. She went to Rutgers University. She became interested in STEM after noticing that she preferred math and science. Although she enjoyed reading as a kid, she also enjoyed solving math problems because it was very satisfying to find a solution. Engineering is a great path for people that are curious and want to be part of the creation of many cool things people use, like airplanes!

Claudia decided on Industrial Engineering since almost any company would be able to use her skills. This discipline also makes you understand the whole process of how something is made and how to make enough to satisfy your customers. Claudia has to understand how a piece of an airplane wing is made and improve the processes to

build it so they make enough for the customer demand. The processes can be done by machines, people or even software.

Amanda M. Meléndez Maldonado is a Chemical Engineering student at the University of Puerto Rico at Mayagüez. She is in her junior year of college. She is the President of her college's SWE section

Since she was little, she was interested in STEM fields. In fact, she wanted to be a veterinarian because she wanted to help people. Later, in high school, she developed a special curiosity about chemistry and how different elements could be mixed to create new compounds. Her high school chemistry teacher motivated her to study Chemical

Engineering, because she was a disciplined student who loved to learn new things day by day. After she graduates, she hopes to focus her career in the environmental area, to help develop a system to decrease water pollution.



Sophie la Científica

Meet Sophie Paradi, a senior at Evanston Township High School. She is bilingual, fluent in both Spanish and English. Sophie saw a need to teach science in Spanish, so she created her own YouTube channel: **[Sophie la Científica](#)**! Her goal is to reach elementary-school-age students underrepresented in STEM, due in part to the lack of available resources.

Check out her channel to learn some really cool things about STEM and engineering – en español! We hope you subscribe to her channel and click the “like” button on her videos.



Register for Invent It. Build It. Middle School Girls Program in Anaheim This Fall

If you live near Anaheim, California, and will be in grades 6, 7 or 8 in the fall, check out the Invent It. Build It. Middle School Girls Program and Outreach Expo on Saturday, November 9th. You'll get to meet women engineers and work on a hands-on project with other girls interested in STEM.



Seating is limited, so be sure to ask your parent or guardian to sign you up soon. [Learn more and](#)

[register here.](#)

Hope to see you in Anaheim in November!

SWENext Engineering Challenge with a Chance to Win a Freebie!

Civil Engineering is one of the oldest engineering fields. It deals with the design, construction, and maintenance of the physical and naturally built environment. Civil Engineers are responsible for roads, bridges, canals, dams, water and sewer systems, pipelines, structural components of buildings and any number of other things we take for granted in our daily lives.

This month's activity has us thinking like Civil Engineers to design and construct a bridge using nothing but a single sheet of paper and a few paper clips that holds 100 pennies.



A bridge must support its own weight (the dead load) as well as the weight of anything placed on it, like the pennies (the live load). Your paper bridge must be designed to span 20 centimeters (about 8 inches). The sides of your bridge will rest on two books and cannot be taped or attached to the books or the table.

What You Will Need

- plain paper
- 5 paper clips
- ruler
- 2 books or blocks
- at least 100 pennies or other small weights
- scissors

How do you think the bridge should be constructed? We suggest you look at pictures of bridges and brainstorm ideas. What can you do to the paper to make it stronger?

How will you keep it from slipping off the supports (books) without tape?

When you have decided on a design, construct your bridge and set it up so it spans between two books and load it with pennies one at a time, until it collapses. Record how many pennies your bridge supported.

How did you do? Was the bridge as strong as you thought it would be? Where did it fail?

Redesign your bridge and test it again, using a new sheet of paper. How does your second attempt compare? How can engineers test their plans for building a full-size bridge?

Is there a difference in the load your bridge can hold if you put the load in the center of the bridge compared to spreading it out along the bridge? Make a prediction and test it.

After your challenge is complete, we encourage you to share a picture of your bridge and tester. Let us know how many pennies it could support before collapsing!

Email your entry to swenext@swe.org by October 4th. Each month, a lucky winner will be selected from the submissions to win a SWENext freebie. Don't miss the chance! All it takes is a few minutes.



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