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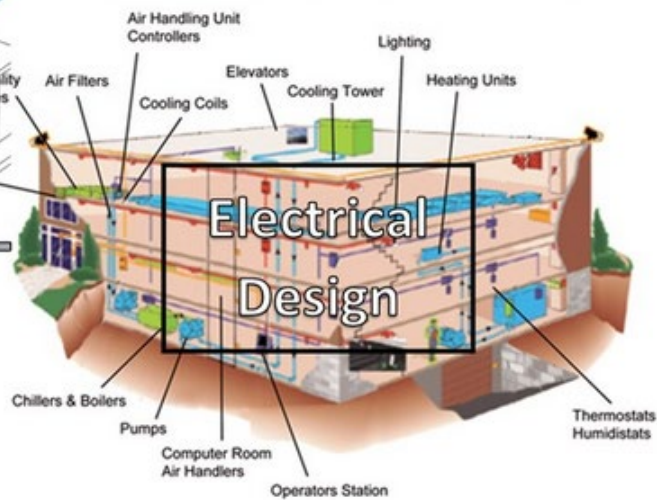
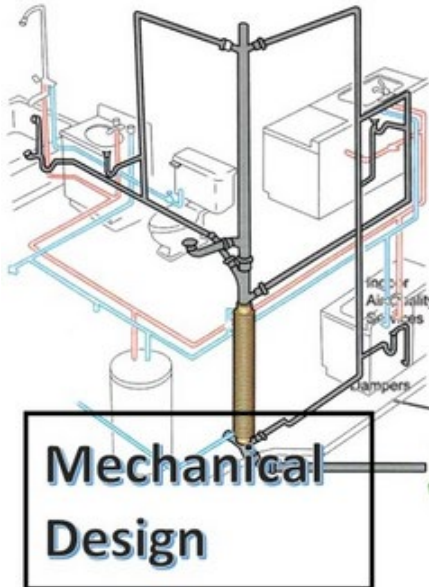
## **Architectural Engineering**

We build the world! Architecture is both the process and the product of planning, designing and constructing buildings and other physical structures. Major in Architectural Engineering, and you'll work on keeping buildings lit, plumbed and ventilated, as well as develop better construction methods. You'll have your work cut out for you with all the high-rise skyscrapers and other cool advances that have been pushing architecture to new heights.

Architectural engineers utilize multiple engineering disciplines like Structural, Mechanical, Electrical and Construction Engineering. Architectural engineers usually become licensed professional engineers in the state in which they practice their discipline. How cool does that sound to someday be an official "Professional Engineer!"

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## **What Industries can an Architectural Engineer work in?**



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## Meet Maria, Architectural Engineering Student

Maria is a junior at the University of Miami, studying Architectural Engineering. Her on-campus activities include the Society of Women Engineers (SWE), the Society of Hispanic Professional Engineers (SHPE), where she is the treasurer and the Chi Epsilon National Civil Engineering Honor Society.

### Why did you get into Engineering?

When I decided on a career in engineering, I often heard, "Engineering is for men." I was just ten years old then, and I loved building and designing different structures made of Legos and other household materials. My father is an engineer and, in a very unbiased way, he thought that maybe that's what I wanted to be, too, so he and my mom enrolled me in



drawing classes. If there were engineering classes for ten-year-olds, he surely wouldn't have thought twice about enrolling me.

I was born in a country where women have accepted very specific roles. In the Dominican Republic and in much of Latin America, even though men are taught that women come first, when it comes to jobs and advancement, women are paid considerably less than men of equal education and experience. Even though women's development and advancement are issues around the world, I feel fortunate to have been born at a time when these issues are at least recognized.

### **Why did you pick Architectural Engineering?**

When I graduated from high school, I decided to study abroad, another challenge for me. I got accepted at my first-choice university, University of Miami.

"Is the Architectural Engineering major in the Architecture School or in the College of Engineering?" "Why don't you study Civil Engineering or Architecture?" This was the usual exchange between my friends and me. Even some counselors over the years recommended I do one or the other. After three years into my career, this is my answer to these questions: Architectural Engineering studies the functionality of the building from the exterior to the interior of the structure. It gives you a big picture of the project. This revelation really helped me focus on the vision I had for a career in Architectural Engineering.

### **What have you done so far as an Architectural Engineering college student?**

As a junior in Architectural Engineering, I can confirm that I have a passion for what I am studying, especially the engineering side of things. This passion grew out of the content I learned in a freshmen engineering class, Mechanics of Solids. I remember learning about the engineering behind bridges, and learning to calculate the equilibrium equations to keep the building from collapsing. I really felt like I was making sense of all this complexity, and this gave me the confidence to continue pushing my own limits within the field.

In the Summer of 2018, I had the opportunity to be part of the REU (Research Experiences for Undergraduates) program at the University of Houston along with 12 students from different universities across the country. This program consisted of working closely with faculty and graduate mentors. My research project was about 3D printing of Polyvinyl alcohol, which is the water dissolvable plastic used in the envelope of laundry detergent. For this project, we wanted to test the mechanical properties and water solubility for this type of plastic. It was an awesomely valuable experience!

For the time being I am learning as much as I can from my engineering classes, and I will be working in one of the most innovative and successful construction companies in the Summer of 2019.

### **What advice would you want to give to young girls?**

As a female student engineer, I believe that women should continue to seek careers in

STEM fields. It has been a highly rewarding experience for me, and I envision that I can make meaningful contributions to this field in the future.

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## **Middle School Girls – Apply now for a SWENext Community Award!**

Do you live near St. Louis, Denver, or Bellevue, Washington? Are you a girl in 6th through 12th grade who is actively interested in STEM and is out doing something in your community about it, for example participating in a STEM competition or a SWENext club, raising awareness or mentoring students?

If so, apply for a SWENext Community Award!

Winners will attend a SWENext event where they will meet and network with women engineers and engineering students, learn about how to get the most from your SWENext membership and about bias literacy, and receive a certificate of achievement and a commemorative shirt.

### **Deadlines for submitting your application:**

- St. Louis: Application due February 9, 2019 - [Apply here.](#)
- Denver: Application due February 23, 2019 - [Apply here.](#)
- Bellevue, WA: Application due March 16, 2019 - [Apply here.](#)

We can't wait to read about all the great things you are doing!

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## **Happy Black History Month!**

In honor of Black History Month, we celebrate black women engineers - past, present and future.

### **Mary Jackson, Aerospace Engineer**

In 1958, Mary Jackson became NASA's first black female engineer. She analyzed data from wind tunnel experiments and real-world aircraft flight experiments. Her goal was to understand air flow, including thrust and drag forces, in order to improve planes.

She also worked to help women and other minorities to advance their careers at NASA, including advising them how to study in order to qualify for promotions.



Jackson's story is featured in the book "Hidden Figures: The Story of the African-

American Women Who Helped Win the Space Race". She is one of the three black women featured in the movie "Hidden Figures", along with mathematicians Katherine Johnson and Dorothy Vaughan.

### **Mae C. Jemison, Chemical Engineer and Medical Doctor**

In 1992, Mae Jemison became the first black woman in space as part of a mission aboard the Endeavour space shuttle. While on the mission she ran bone cell research experiments and also conducted experiments on weightlessness and motion sickness on herself and six other crew members.



Jemison started college when she was only 16 years old. She earned a B.S. in Chemical Engineering from Stanford University, and earned her Doctor of Medicine (MD) degree at Cornell Medical College. After medical school, Jemison joined the Peace Corps for two years. And shortly after that, she joined NASA and became an astronaut.

Jemison wrote a book for children about her life: "Find Where the Wind Goes".

### **Kamisha Mason, Mechanical Engineer**

Kamisha Mason is a Senior Project Applications Engineer for Solar Turbines Inc. in San Diego, CA. She earned her B.S. in Mechanical Engineering from Tennessee State University and her M.S in Engineering Management from Lipscomb University.



Kamisha also held roles as a Test Engineer, where she coordinated and led a team of technicians and engineers to conduct research and development tests on components of a gas turbine engine.

Kamisha has been a SWE member for 10 years. She is a volunteer for the SWENext program. She is very active in her company's SWE Employee Resource Group, named the "Solar Women Engineers". She is also a long-time member of the National Society of Black Engineers (NSBE).

### **Makyia, Future Engineer**

Makyia is currently a senior at Pike High School in Indianapolis, Indiana. She has taken engineering courses since Freshman year of high school.

Her goals are to double major in Architectural Engineering and Civil Engineering and become a



registered architect. She is the president of the National Society of Black Engineers Jr. chapter at her high school.

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## Happy Engineers Week!

This month we celebrate Engineers Week, from February 17th through 23rd.



The theme for this year's Engineers Week is **"Engineers: Invent Amazing."** This is a reminder of all the amazing contributions engineers have brought to our world, from cars, to rockets, to medical technology and much more. What amazing inventions do you see in your daily life?

[Click here to learn more about Engineers Week >>](#)

Here are two things you can do from your own home to celebrate Engineers Week:

- Girl Day Capitol Hill Briefing: Hear from a panel of role models, college students, and girls about messages that inspire, and learn why young women persist in engineering. **Date: Wednesday, February 13th from 12:00 to 1:00pm (ET, USA) - [RSVP today!](#)**
- Future City's 2019 Finals: Tune in and watch the top five teams compete for the championship. Be inspired by the teams' creative solutions to this year's challenge: Powering Our Future. You'll be amazed by their clever ideas and compelling presentations. The winners will be announced at approximately 12:00pm. **Date: Tuesday, February 19th from 8:30am to 12:30pm (ET, USA) - [RSVP today!](#)**

[Check out some of the cool events going on in your area >>](#)

Find even more events by going to the website: [TheConnectory.org](http://TheConnectory.org).

The world needs more engineers! Help invent the future of amazing. #BeThatEngineer

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## SWENext Clubs Corner

From time to time, we feature a Middle School SWENext Club in the newsletter. This month, we are featuring the FrostE SWENext Club.

*“Two roads diverged in a wood, and I -- I took the one less traveled by, and that has made all the difference.” – Robert Frost*



The FrostE SWENext Club from Robert Frost Middle School in Rockville, Maryland, are making all the difference by exposing 6th to 8th graders to the engineering mindset. It was founded and is supported by the University of Maryland, Baltimore County SWE Section.

Starting in July 2018, students began solving real-world problems by participating in hands-on activities like the Tallest Tower. During this activity, SWENexters built the tallest tower they could using uncooked spaghetti and limited resources to support a marshmallow. Obstacle challenges were introduced to simulate budget cuts, communication barriers, and more! The students learned how to navigate and work with their teammates to complete the challenge.

Students have also been exposed to different types of engineering, problem solving, conducting experiments and applying classroom knowledge. During their activity, Erupting Year, SWENexters hypothesized different types of candy to predict which would result in the greatest reaction in a 2-liter bottle of soda. They looked at Mentos, Mentos minis and Frost mints. In addition, students were introduced to the importance of scaling up for manufacturing sites.

We can't wait to see where the road leads this SWENext Club!

Interested in having your SWENext Club highlighted in the monthly SWENext Newsletter? Email Haley, the SWENext Clubs Reporter, at [hla37@cornell.edu](mailto:hla37@cornell.edu)!

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## How to Start a SWENext Club

Many of you may be wondering how you can start a SWENext Club in your area, and we want to make that easy for you. [Check out SWENext Clubs 101 to learn more.](#)

To register a SWENext Club, you must have a SWE member as an advisor. Your teacher can serve as an advisor by joining SWE for a reduced rate as an [Educator Member](#). Or find your [local SWE section](#) to contact SWE members near you.

Questions about SWENext Clubs? Contact us at [outreach@swe.org](mailto:outreach@swe.org).

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## SWENext Engineering Challenge with a Chance to Win a Freebie!

Architectural Engineers apply their technical knowledge to design safe and sustainable buildings. They work closely with architects and construction teams to make sure buildings are structurally sound and energy efficient. Their day-to-day tasks can range from designing a building's heating system to choosing fireproof materials for building construction.



This month, we're challenging you to **think like an Architectural Engineer by figuring out the best way to build a tower structure that can withstand earthquake-like shaking!**

You'll need the following materials:

- Spaghetti, fettuccine or a similar pasta to serve as beams.
- Gum drops, marshmallows and/or tape to serve as beam linkers.
- A piece of cardboard, poster board or similar to be the "earth".

Once you have all of your materials, follow this procedure:

1. Grab a pencil and piece of paper to sketch out your tower design. Every good Architectural Engineer must start with a blueprint!
2. After you've designed your tower, start building.
  - a. Use the pasta as beams for your tower. Feel free to make them smaller sizes with your hands or scissors if needed.
  - b. Use the candy and tape as linkers. Remember that your choice of linker might need to vary depending on what part of the structure you're making.
3. Place your tower on the "earth".
4. Lightly shake the earth back and forth until the tower falls or collapses. Record how many shakes it took for your tower to fall.



5. If you'd like, try building another structure. See how tall you can go!

Once you're done, send us a picture of your tower and your results. **Please email your entry to [swenext@swe.org](mailto:swenext@swe.org) by March 5th. 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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