


 The logo for SWENEXT, with 'swe' in a vertical blue font and 'NEXT' in a large, bold, blue font where the 'E' is yellow.


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What Is Biomedical Engineering?

Biomedical Engineering is a combination of Mechanical, Chemical, and Electrical Engineering disciplines with a focus in medical/health care applications. When you think of biocompatible prostheses, MRIs, regenerative tissue growth and pharmaceuticals, know that Biomedical Engineers developed and tested these innovative products and technologies.

[Learn more about Biomedical Engineering.](#)

Day In The Life Of A Biomedical Engineer

Eleonora Chakraborty is a Biomedical Engineer with ICU Medical. Find out how she got there, the type of projects she's working on and how you can #BeThatEngineer on [SWE's All Together Blog](#).



A Time Traveler's Reality: Emerging Technology Of The Future

December 8 is “Pretend to Be a Time Traveler Day”, a day when you can pretend to travel through time. You don't have to travel far in the future to witness emerging technology being used to solve problems in public health, telecommunication, and the environment. It is estimated that the following emerging technology will become a reality in the next five years:

- **Biodegradable Plastics:** Our civilization is built on plastics. The plastic industry has produced over 300 million metric tons of plastic in 2018, an amount that is expected to triple by 2050 according to the World Economic Forum. In order to break down plastics, the material must go through a mechanical or chemical recycling process. Currently, less than 15 percent of all plastics produced get recycled, with most of it either being tossed in landfills or accumulating in oceans. Biodegradable plastics would help ease the plastic waste problem by creating a true “circular” plastic economy in which plastics derive from and are converted back to biomass. Recent research confirms that plastics can be produced from cellulose (plant cell walls) and starch/lignin (dry matter in plants), which can be broken down naturally over time. [Check out more about biodegradable plastic and current research here!](#)
- **Holographic Telepresence:** Remember the talking holographic images used in Star Wars? The holographic telepresence technology is not far off reality as augmented and virtual reality paired with 5G networks are rolling out in near 2020. Telepresence will change the way we work and interact with each other as physical location becomes more and more irrelevant. What this could mean for future college students is the reality of attending university classes or office hours without entering the lecture halls. Future career professionals can make a sale to global clients or solve facility problems without traveling on site. [Learn more about holographic telepresence here!](#)
- **Blockchain for Food Safety:** Blockchain is a decentralized accounting system that records data, called “blocks”, which are linked using cryptography. The data blocks can be stored in multiple computers in different locations, making data tampering near impossible. The system is currently used as the transaction ledger of the cryptocurrency bitcoin. Recently, blockchain technology is being recruited to solve the growing food poisoning problem, which affects about 600 million people every year according to the World Health Organization. The system will allow investigators to locate the source of food poisoning and affected product in a matter of seconds rather than days or weeks with the current manual paper tracking system. [Learn more about how food markets like Walmart is trying to incorporate blockchain here!](#)

Activities To Do On Winter Break To Help With College Prep

As the holidays and winter break are just around the corner, there are many opportunities you can get involved in to prepare for college admissions or college courses. The following are activities to consider:

1. **Volunteer**

Volunteer experience is a great college application booster! You will gain teamwork and leadership skills, while helping a cause you are passionate about. Check out a couple volunteer websites/ search engines to get started:

- a. [STEM Volunteer Programs](#)
- b. [Do Something.org](#)

2. **Shadow an Employee in your desired field**

Job shadowing is a great way to learn about a field of interest, get involved in your community, and build your professional network. Ask your teacher or guidance counselor if your school participates in a job shadow program with local businesses. If not, check local company or professional organization websites for opportunities. Or reach out to your local professional SWE section. [Find your nearest SWE section on the SWE section map.](#)

3. **Apply for scholarships**

College is expensive and it's important to understand the requirements and deadlines for scholarships you might be eligible for. The following are a couple scholarship websites to help with your search:

- a. [Engineering Scholarships](#)
- b. [Engineering Scholarship Search Engine](#)
- c. [General Scholarship Search Engine](#)

4. **Visit Colleges**

Winter break gives you ample time to start visiting campuses or to confirm your college selections. When you see the school in different seasons and on a weekend rather than a week day, you can truly witness the campus culture and see if it is the right fit.

5. **Take an educational trip to a museum or national monument**

Many museums and educational centers offer discounts or free admission during the winter break. It is worth brushing up on your science and technology trivia knowledge. You never know when you need to use it during a college admissions interview!

SWENexter Feature—Madison Kenney

Madison Kenney is a high school Junior at Georgia Connections Academy and Dual Enrolled student at Kennesaw State University. She has a passion for STEM and aspires to become a Mechatronics Engineer.

At the age of nine Madison founded the RoboChicks Robotics Team that has competed in FIRST Lego League, FIRST Tech Challenge and Seaperch Underwater Robotics. She has led her team to winning many awards locally and nationally. As Madison competed, she discovered



that girls were underrepresented at competitions and wanted to change that statistic by working with younger girls.

At the age of thirteen, Madison began writing grants to cover the cost of coaching younger girls in underserved areas. She used the grant money to continue her work by starting RoboChicks 2G (Second Generation), a robotics team for elementary and middle school aged girls at the Andrew and Walter Young Family YMCA that competes in FIRST Lego League and Seaperch.

Madison is also an active member of the Women in Technology WIT Girls and WIT Campus Program. Through WIT, Madison had the opportunity to participate in the Behind the Scenes, Job Shadow, and Career Immersion Programs at some of the biggest Corporations in Atlanta. Madison was nominated as WIT Girl of the Year Finalist.

Madison also started a Girls Who Code Club at her online school signing up 135 new members with hopes of expanding the program nationally on the Connection Academy online platform.

[Check out this article](#) to learn more about how Madison empowers young girls through STEM.

2020 SWENext Awards Season – Apply Now



Do you live within a couple of hours of **San Diego, Buffalo or Des Moines**? Are you willing to travel to one of these cities early next year with your friends? If so, read on!

We are excited to announce the 2020 SWENext Awards and the DesignLab Community Engagement Challenge.

The **SWENext STEM in Action Award** recognizes girls in **grades 6-12** who are actively interested in STEM and doing something in their community about it (for example, raising awareness, mentoring students, participating in SWENext, etc.). STEM in Action Award recipients will attend the DesignLab event where they will meet women engineers, learn about careers in engineering, learn how to be a role model and watch the DesignLab presentations. They will also receive a certificate during the awards ceremony.

Juniors and seniors who apply for the **STEM in Action Award** will have an opportunity to be deemed a **Local Innovator**. They will also attend the DesignLab event where they will receive a SWENext trophy and a mentoring session with a SWE member. To be considered for the Innovator award, juniors and seniors must submit a three-minute video with their STEM in Action application discussing their involvement with STEM and what they are doing in their community.

These are rolling applications which means we will review your application and determine the award within two weeks of your application. Apply early so you can save your seat at the DesignLab event! Learn more and apply today!

The DesignLab Event in San Diego will be held on February 1, 2020.

STEM in Action Award Application Deadline: January 5, 2020 - [**STEM in Action Application**](#)

The DesignLab Event in Buffalo will be held on March 28, 2020.

STEM in Action Award Application Deadline: March 1, 2020 - [**STEM in Action Application**](#)

The DesignLab Event in Des Moines will be held on April 18, 2020.

STEM in Action Award Application Deadline: March 22, 2020 - [**STEM in Action Application**](#)

The **DesignLab Community Engagement Challenge** will happen at the same time in the same cities as the STEM-in-Action Award. The Challenge asks teams of high school students to create a hands-on engineering activity for younger students that will help resolve a local issue. Teams who enter the challenge will gain experience with STEM outreach, project implementation and leadership.

The teams will present their proposal to a panel of women engineers at the **DesignLab Event for a chance to win \$1,000 to implement their project**. Winning teams then implement their project and create a video about it. The winner of the best project and video will **win an all-expense paid trip to SWE's annual conference, WE20, in New Orleans, Louisiana**.

The DesignLab Challenge provides students with:

- The opportunity to make an impact on your community using engineering.
- Serve as a role model and inspire the next generation of women in STEM.
 - Engage with a woman engineer who will serve as the teams SWE Challenge Mentor to assist the team with program development and connect you to other SWE resources.

The first step is to let us know that you would like to enter the Challenge.

[Read the Proposal Brief Here.](#) This will give you an overall understanding of the challenge objectives and requirements.

Then, assemble your team and submit an Entry Form. Your team must consist of 5 to 15 high school students and one faculty member. At least 50% of your team must identify as female. Once an Entry Form is submitted, your team will be paired with a SWE Challenge Mentor. **[Click here to view the Entry Form.](#)**

The deadline to submit an entry form varies by site:

- Buffalo's deadline: January 12, 2020
- Des Moines' deadline: January 26, 2020

[Learn more about the DesignLab Challenge!](#)

If you have any questions, email swenext@swe.org.

Congratulations to the Northrop Grumman Community Award Winners!

The SWENext Northrop Grumman High School Community Award Program emphasizes the impact SWENexters can have in their communities to solve real-world problems. The award also stresses the interconnectedness of the SWE Community and gives awardees a chance to interact with SWE members, companies and colleges. In fall 2019, SWENexters in grades 9-11 were asked to create posters that answered the questions: "How do we get more female middle school and high school students involved with STEM? How do we encourage these students to stick with STEM as they plan for college?"



Ananya Bahugudumbi, Aishwarya Balaji, Nikita Bharati, Ashley Chan, Geetika Chitturi, Angela Choi, Mimi Clot de Broissia, Shayne Conner, Anastasia Cook, Sarah Eckert, Katherine Farrell, Julia Garland, Alyssa Ho, Meghana Karthic, Madison Kenney,

Megan Kojima, Ava Landen, Gabrielle Muniz*, Gianina Ndiaye, Alayna Nguyen, Tomi Oladeji, Shelby Scott, Lavanya Sharma, Ayannah Tinsley, Helena Usey

[The winning posters can be viewed here.](#)

**Congratulations, also, to Gabrielle Muniz, a Northrop Grumman Community Award winner who was selected to be the SWENext Influencer. The SWENext Influencer role included doing interviews of participants and winners at WE19.*

Congrats to our SWENext Club Challenge Winner!



Congratulations to our SWENext Club Challenge winner **LionsNext** from Peachtree Ridge High School in Suwanee, GA!

SWENext Clubs across the country created a 5 to 7-minute video that addressed the ‘WE Live, WE Learn, WE Lead’ theme of WE19. The video also had to show a hands-on demonstration that could be done during the Invent It. Build It. event at WE19.

[Watch the winning video here.](#)

The winning team received an all-expense paid trip to WE19 in Anaheim, California for 4 students and one adult chaperone.

#SWENextChallenge - December Edition!

What do you think you will be doing 10 years from now? Share a picture or drawing that represents where you think you’ll be.

To enter this month’s challenge:

1. Make sure to follow @SWENext on Instagram (if you're not already!)
2. Post a photo or video to your account with a caption that explains your submission/answering the question.
3. Mention us (@SWENext) and use the hashtag #SWENextChallenge in your caption.

Make sure to post before the challenge ends on December 27th (12pm midnight Central). Winner will be announced by the end of the month!



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