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Continuing to grow

To our FEMMES parents, principals, teachers, volunteers, sponsors, and supporters,

Welcome the spring/summer FEMMES newsletter.

Another year of FEMMES has come to close, with great new leadership coming this fall. Check out the content in the newsletter for follow-up on our events from the past few months and other great stories. We have neat features on a few of our volunteers, a tasty take home activity using simple supplies, features on some cool careers in STEM, and the story behind Michigan-raised Dr. Alexa Canady, the first ever African American female neurosurgeon.

As usual, to stay up to date on FEMMES, check out our website (<http://femmes.studentorgs.umich.edu/>), Facebook page ([facebook.com/femmesatuofmichigan](https://www.facebook.com/femmesatuofmichigan)), and Twitter (@FEMMESatUM).

Thanks to all who made this year of FEMMES great!

Enhancing our STEM coverage

Now in our fourth year of existence, the FEMMES team has been looking to increase the diversity of the topics covered at our capstones and other outreach events. Traditionally, we have always had many activities that involved the chemical and biological sciences, engineering, physics, and technology, but we've always felt we were coming up a little short when it came to the number of math activities. Well, thanks to a great collaboration with Dr. Sarah Koch, a math professor at the University of Michigan, we can proudly say that we are growing in our coverage of all the areas of study that make up STEM!

On Saturday, March 19th, FEMMES put on their

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Our Mission

FEMMES (Females Excelling More in Math, Engineering, and Science) is dedicated to closing gender and racial divides in CS/STEM (Computer Science/Science Technology Engineering and Math) through hands-on activities led by female faculty, graduate students, and undergraduate students. Working specifically in diverse, under-served communities, FEMMES creates a collaborative environment that helps young girls build knowledge and self-confidence in CS/STEM and exposes them to great role models so that they may pursue their dreams without hesitation.

spring capstone event. With over 170 girls in 4th–6th grade on campus, the day was kicked off with an engaging speech and demonstration by our keynote speaker, Dr. Koch. While inspiring girls about her own path to math, Dr. Koch showed how fun math can be through a demonstration on soap bubbles, with the girls getting to blow their own bubbles at the end. After the keynote, the girls rotated through 4 of our 17 different hands on activities. They included topics regarding astronomy, industrial and operations engineering, mechanical engineering, construction engineering, computer engineering, biology, biophysics, math, chemistry, and the life sciences. Thanks to the

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Volunteer Highlights

This is Megan Connolly, a graduate student in the Program in Chemical Biology, pursuing her PhD doing research on creating electrochemical sensors to study hormone secretion from single cells to better understand how cells communications change with disease.



Check out more about Meg below!

1) Why did you choose your major?

I chose the Program in Chemical Biology because I love investigating the chemical processes in the biological system. The program allows me to do interdisciplinary research.

Growing up, my grandparents and parents were supportive of my love of science, renting books from the library full of experiments. My teachers at my grade school were great mentors that fostered my curiosity. My junior high and high school teachers were my role models and mentors. Because of everyone's support, I majored in science and continued my higher education.

2) What are your future professional plans?

I plan to become a professor at a small liberal arts college so I can teach students in the classroom as well as a research laboratory.

3) Why did you volunteer for a FEMMES event?

I love teaching young kids that STEM fields are a lot of fun. FEMMES is great because it shows the girls that STEM is part of everyday life and you can have a great time learning about it. I hope the girls learn a career in STEM is possible and is fun.

4) What impact would a FEMMES event had on you when you were younger?

I think if I'd had FEMMES event as a child I'd have still majored in a STEM field but I might have chosen a different field within STEM or double majored.

5) Any other insight or words of advice for young girls exploring their interests in STEM?

I am the first in my family to go to college and the daughter of an immigrant. The support I received from my family and teachers is the reason I was able to excel in science. I believe organizations like FEMMES provides young children with that same support. I would encourage any child to attend events like FEMMES because it is important to understand how scientific concepts are part of everyday life.



This is Renae Lyons, a freshman majoring in microbiology. Being a first generation college student, she clearly has an impressive level of grit, resiliency, and intelligence. Check out more about Renae below!

1) Why did you choose your major?

I'm majoring in microbiology because I love the small things in life. It's incredible to think all life came from a little microbial ancestor. I want to learn all about the unseen part of our evolutionary history.

My sister is a role model of mine and heavily influenced my decision. She was a biology major and is now earning her PhD from UC Berkeley. I didn't

have many STEM opportunity growing up so she was pivotal in my decision to pursue science.

2) What are your future professional plans?

My future plans are to go on and get a grad degree or MD. I enjoy the excitement that research brings, but also want to be able to give back in a very personal way. Thankfully I'm a freshman, so I have a few years to hone in on my interests!

3) Why did you volunteer for a FEMMES event?

I wanted to spend time with young girls who were interested in STEM! A lot of times it only takes one great experience to get people hooked on STEM, so I wanted to be a part of a group that provides girls with that opportunity.

4) What impact would a FEMMES event had on you when you were younger?

If I'd had FEMMES growing up, I think I would have

Famous FEMMES, from the state of Michigan First Female African American Neurosurgeon!

Growing up in Lansing, MI, Dr. Alexa Canady loved math and thought someday she'd be a mathematician. When she enrolled at the University of Michigan for college, those interests evolved, kick-started by her joining the debate team. Discovering joy in the analytical components of debate, her excitement for it grew while her excitement for math and academics in general shrunk. After letting debate take over her time and letting her grades plummet in her second year of college, she did some soul searching and switched



things up, going from debate to editor of the Michigan Daily newspaper. Upon finding out about a paid summer health sciences program that worked with her evening newspaper job, she jumped on the opportunity and discovered she ultimately loved medicine. With new

motivation, she finished up her undergraduate studies and went to Univ. of Michigan Medical School.

Having found her passion, Dr. Canady thrived in medical school and especially gravitated towards topics in neuroscience. Ultimately, she decided that within the neuroscience field, she was particularly interested in neurosurgery. Dr. Canady went on to graduate from medical school with honors. After neurosurgery residency and a pediatric surgery fellowship, she joined Detroit's Henry Ford Hospital and then

Children's Hospital of Michigan, where she became Chief of Neurosurgery. Her specialties include craniofacial abnormalities, brain tumors, hydrocephalus, and spine abnormalities.



Now retired, Dr. Canady led an impressive career that included many professional awards and induction to the Michigan Women's Hall of Fame. Throughout her educational path, she highlights the importance of mentors at every stage. From a junior high science teacher, a demanding high school English teacher, and a high school math teacher who allowed her to independently take advanced math classes, to her mentors in medicine, Dr. Canady recognizes their importance. She has continued to pay it forward in her own career, mentoring many young women and neurosurgeons.

Despite the struggles in convincing herself she could do it, Dr. Canady looks back on the academic troubles of her second year of college and is glad they forced her to really stop and think about what she wanted to do with her life and the kind of world she wanted to live in. She is grateful to have had both an intellectually and emotionally satisfying career, one that just happened to break barriers and be the first female African American neurosurgeon!

Take FEMMES Home: Bringing STEM to the kitchen

Continue hands-on STEM activities with your kids in your own home

Summer Fun: Ice Cream in a Bag

Supplies (per person):

- A 1 gallon ziplock bag
- A smaller (1 pint) sized ziplock bag
- Ice, plus a little water
- 6 Tablespoons rock salt (table salt can work)
- ½ cup cream
- ¼ teaspoon vanilla
- 1 Tablespoon sugar



Directions:

- 1) Fill each gallon bag half full of ice. Add the salt and water to dissolve the salt. Do your best to dissolve as much of the salt as possible. Seal the bag and set to the side.
- 2) Pour the cream, vanilla, and sugar in to the pint-sized bag. Seal the bag and mix the contents.
- 3) Place the small bag inside the large one and re-seal the large bag. Shake and massage the

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work of Dr. Koch and colleagues and university math students, 6 of those activities were math activities!

Since our last newsletter, we also had the fall capstone occur, which was on November 14th, where we had a record 296 girls attend. A little bit overwhelming for a student run organization, but we made it and fun was had by all. Just like previous capstones, each group of girls rotated through 4 age-appropriate activities and provided the girls

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mixture against the ice until it becomes ice cream (approx. 5 minutes)

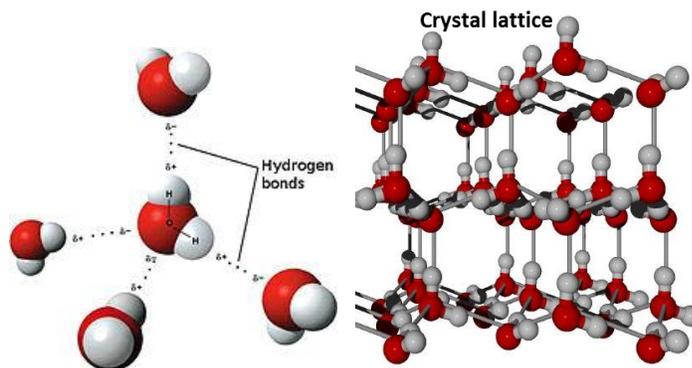
- 4) Take out the small bag, wipe it off, open it up, add any desired toppings (M&Ms, oreos, sprinkles, chocolate sauce, etc.) and enjoy 😊.

How does it work?

The thought behind how this works is similar to why we put salt down on the icy roads in the winter. The salt on the ice actually lowers the freezing point of water. This means that even when the temperature is cold enough for pure water to freeze, it does not because the salt in mixed with the water can prevent that. So at 32 °F, when water would normally freeze, the salt water does not. The salt water can lower the freezing point of the

with an interactive experience in the same classrooms and labs that college STEM students learn in.

We could not put on so many impressive activity rotations were it not for the many amazing faculty and their students who design and execute the activities. THANK YOU to all who donated their time and expertise! As always, check out our facebook page as well as page 6 for photos from the event.



mixture all the way down to 0 °F. This property is called freezing point depression. In ice, water hydrogen bonds with itself where the oxygen atom of one water molecule interacts with the hydrogen atoms of other water molecules, forming a crystal lattice. This lattice is what gives ice its rigid structure. The salt gets in the way and breaks up this lattice, causing the ice to melt.

Cool Careers in STEM – You never know where STEM can take you!

Prosthetics

Whether they like math, robotics, neuroscience, coding and computer science, engineering, physics, biology, or just building and working with your hands, the one thing prosthetists have in common is they thoroughly enjoy helping people live more independent, functional lives. If you like any of those areas and want to have an impact helping people, a job as a prosthetist is a hidden gem of a career worth checking out. By now you might be wondering, what do they do?

While the stereotype is veterans coming back with war injuries needing artificial limbs, in reality,

they make up the minority of amputees. Some lose limbs due to car accidents, lawn mower accidents, severe infections, diabetes, birth defects, and many other reasons. Prosthetists are professionals who treat all these people and build artificial arms, legs, knees, elbows, braces, and more. It is this “more” part where the field is particularly growing and where creativity, innovation, and intelligence are at the



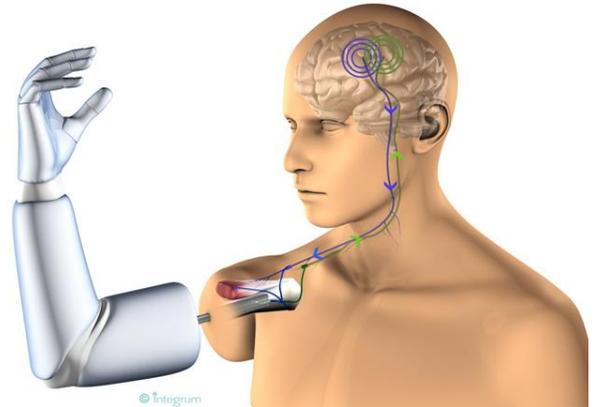
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forefront. As we learn more about the brain and develop better technology, the integration of robotics, engineering, neuroscience, and biology are leading to new kinds of limbs that are more responsive and life-like. For the field to grow though, the need for women to become prosthetists is of equal importance. In a field traditionally dominated by men, women make up only 18% of the field. This career imbalance reveals itself in the bias of the design of new prosthetics. Many of the hands and feet are made too big, clunky, and cumbersome for a woman because they were developed with a man in mind. Additionally, some of the knee and ankle mimicking mechanisms built in to legs were designed with a man's weight and strength in mind so a woman is not able to adequately flex or use these inventions as they were intended. To read

more about the problem about the lack of women, read here: <http://motherboard.vice.com/read/man-hands>.

If you like to build, tinker, and think creatively in the context of many of the STEM fields all while working to benefit human health, you should definitely consider a career in prosthetics!



STEM + Art = Movies



Although she loved math and science growing up, Danielle Feinberg originally wanted to be an artist. She also loved Legos and how she could make anything she wanted from a few basic building blocks. It turns out computer coding is very similar to Legos where she could use the small pieces of commands, variables, and procedures to make anything she wanted. It is these interests – math, science, art, legos, and coding – that have taken to her an amazing career at Pixar as the Director of Photography for Lighting.

It wasn't always easy though for Feinberg. Throughout her education and career path she has often been the only or one of very few women in the room. She had to learn how to not be intimidated by to develop confidence and to just follow her own voice on her interests. While majoring in computer science in college, a professor showed her class a

few of the first ever animated short films, made by a new company called Pixar. Mesmerized, Feinberg had found her passion. After graduation, she joined the Pixar company when it was still in its early days. At Pixar, she uses math, science, and code to create an amazing 3D world. She then uses storytelling and art to make that world come to life. She has worked on bringing at least 9 different Pixar movies to the screen: Finding Nemo, Brave, A Bug's Life, Toy Story 2, Wall-E, The Incredibles, Ratatouille, Monster's Inc., and Inside Out. In a perfect mix of her interests and passions in life, Danielle Feinberg has combined coding, physics, art, and photography in to an amazing job. Check out her awesome TED talk here to learn more!

https://www.ted.com/talks/danielle_feinberg_the_magic_ingredient_that_brings_pixar_movies_to_life.



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been less afraid to be inquisitive. The girls we worked with were so creative and smart. Events like the capstone encourage them to think critically and be confident; that would have been great as a kid!

5) Any other insight or words of advice for young girls exploring their interests in STEM?

As a first generation college student, I think FEMMES is really valuable in that it shows girls they can be anything regardless of their circumstances. As someone with rural upbringing, I didn't have

many opportunities to experience science; my circumstances could have kept me from pursuing science, but luckily I had the support of my family in both going to college and pursuing a STEM degree. Not all young girls have the same support from their families in getting a higher education, and I feel as though FEMMES not only drives home the fact that women can excel in science and math, but they can go to college, no matter where they come from or whether their parents did or not.

Photo Collage: Photos from the Spring Capstone

