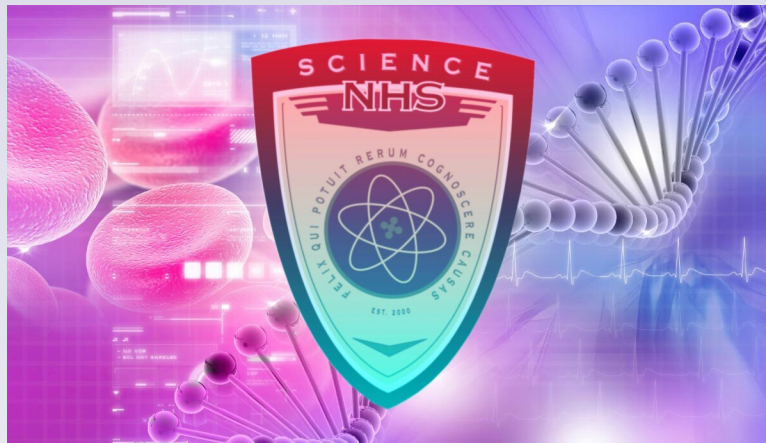


SNHS Newsletter

Volume II

August



In This Volume...

COVID-19 Update

Current Events

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Fun Science Facts!

Credits

In This Volume...

“We need to get started yesterday to ensure these important ecosystems are around to protect us into the future.” - Holly Jones, ecologist

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“Glaciers around the world are melting as a result of climate change.” -CNN

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“This structure is as big as the Sloan Great Wall and twice as close, and remained unnoticed, being hidden in an obscured sector of the southern sky[...].” - Dr. Daniel Pomarède

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“The Perseverance rover will seek signs of ancient life and collect rock and soil samples for possible return to Earth.” -NASA

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“153,152 confirmed cases in LA County” - Johns Hopkins University

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“I believe this is [the] time of the woman. We understand how strong we are; united we are even stronger.” - Maria da Penha

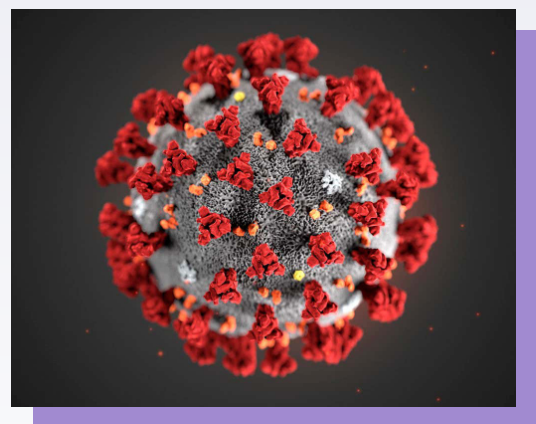
COVID-19 Update

As of August 9th, 2020, there are 19,739,897 reported cases of COVID-19 worldwide and 5,040,904 cases in the U.S according to John Hopkins University. Every day, there are approximately 60,000 additional cases reported in the U.S. Since our last newsletter in June, the numbers have increased dramatically, but it is important to not lose hope. Scientists and frontline health workers have been working hard to stop the increase of COVID-19 cases. New research has been conducted and new precautions have been put into action, but we as citizens must do our part in social distancing and wearing masks so that we are able to go back to our daily lives like before and reopen businesses.

New studies show that over 80% of people with COVID-19 aged 20 and under are asymptomatic (not showing any symptoms). Meanwhile, older people who have COVID-19 statistically have a higher symptom rate than younger people. Even though it may seem like good news that people are showing immunity to symptoms, this may also cause the infection rate to increase exponentially. Those who are asymptomatic are still able to spread the virus despite not showing any signs of illness. Many asymptomatic patients are not aware that they have contracted the virus and remain untested for the virus. Others may also travel to public spaces and consequently spread the virus to others. With these new reports and ever changing research, it is important to follow health regulations for the safety of yourself and others.

The Numbers*	
Worldwide 19.7M Cases 729K Deaths	U.S. 5.01M Cases 162K Deaths
California 556K Cases 10,299 Deaths	L.A. County 207K Cases 4,967 Deaths

*Numbers accurate as of 8/9/20

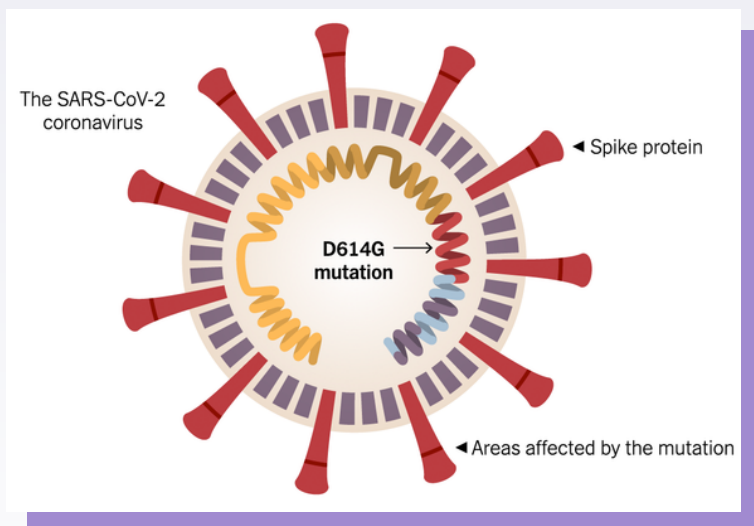


COVID-19

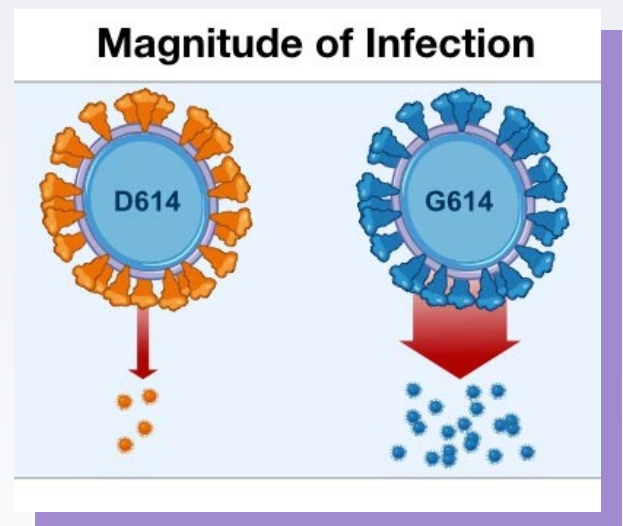
COVID-19 Update

In addition, a new variant of Covid-19, has been discovered and has become the most common form of the virus. Since the coronavirus is an RNA virus, it is highly susceptible to mutations when copying its genetic material. According to studies, a certain mutation called D614G alters the spike protein in the virus (the part of the virus that attaches to the host). In the new mutation, the spike's 614th amino acid has been mutated from D to G, causing the spike to be more stabilized and facilitating host infection. With this new mutation, the infection rates have and will continue to increase.

On a lighter note, scientists have been hard at work looking for potential cures and vaccines. New findings show that one particular vaccine has had promising results in monkeys. Scientists at Harvard Medical School have been testing a new type of vaccine called DNA vaccines. These vaccines introduce ideal DNA molecules into the body and help your immune system fight the virus. In practice, these different DNA vaccines are designed to incite your immune system to fight the protein spikes previously mentioned. Out of the 6 vaccines that were tested on the monkeys, one provided promising results. According to the research, the monkeys did “develop mild symptoms” but also produced “neutralizing antibodies” that would help fight the virus. With this in mind, scientists now have a new lead in the race for a vaccine that could be developed and improved for human use in the (near?) future.



D614G Mutation



Magnitude of Infection

Current Events

The Protectors of the Coast are Under Attack

[Click to See the Original Story](#)

As sea levels and temperatures continue to rise due to human activity, many coastal ecosystems are being threatened. Tropical reefs (particularly the Great Barrier Reef, the largest of them all) are being bleached. Even plants that are more inland are being affected by the rising salinity levels in their soil. However, there is another coastal ecosystem that you may have heard of but are not familiar with: mangrove forests. Mangroves are tough, salt-resistant trees with twisty roots that grow along the coast. Not only do mangroves help lower greenhouse gas levels in the atmosphere, but they also provide a safe space for tropical fishes to breed and shield human coastal communities from erosion, battering by tides, and storm surges.

Unfortunately, mangroves will not be able to continue providing these benefits for long; although they are resilient, they still have their limits. Mangroves will not be able to survive if sea levels rise higher than 7 millimeters per year. Although sea levels are currently only rising at around 3.4 millimeters per year, this measurement is bound to change with time as humans continue to pump greenhouse gasses into the atmosphere and worsen the already detrimental effects of climate change. Neil Saintilan, a biogeographer at the Macquarie University in Sydney, found that mangroves could only grow if sea levels rose below 6.1 millimeters per year using carbon core samples and a computer simulation. However, sea levels are estimated to rise between 6 and 7 millimeters per year over the next 30 years. Based on these predictions, Holly Jones of Northern Illinois University says we must act “quickly and aggressively” if we want to save the mangroves, and “quickly and aggressively” we must act if we want to continue to protect coastal communities and an ecosystem that both sucks carbon dioxide out of the air and provides an ecosystem for many animals.



Mangrove Forest



Rising Sea Levels

Current Events

The Italian Alps' Colorful Problem

At first glance, you would probably be delighted to see pink snow, but it's not as good as it seems. An Italian glacier's snow is turning pink, and scientists say that it will make the ice melt at a faster rate. The Presena glacier in Northern Italy is turning pink due to an overwhelming bloom of snow algae. After further research, scientists believe that the alga named *Chlamydomonas nivalis* is the culprit for the change in snow color. This past spring and summer have produced low rainfall and high atmospheric temperatures, resulting in the perfect conditions for the algae to bloom. This so-called "Watermelon Snow" may seem refreshing and cool, however, it is not a good sign for the glaciers, as it increases the rate of melting due to the fact that darker snow absorbs more heat. This anomaly has been increasingly common this year, and scientists plan to find the concentration of algae as well as mapping the algae blooms using satellite data. This will give scientists a better indication of where denser blooms are located, and these blooms could be added to climate models to give us a better understanding on how these blooms could further negatively impact global warming. Given the ever-increasing rate by which this planet is heating up, these blooms are not likely to stop anytime soon. Additionally, this type of alga has been found in the Andes Mountains, Himalayas Mountains, and Southwestern Greenland.



"Watermelon Snow"



Presena Glacier

In recent years, glaciers have been melting at an extraordinary rate due to climate change. Glaciers in Switzerland have diminished by 10% in the last five years, a rate that has never been seen before in over a century of careful observations. A recent study says that over half of the Alps' could vanish within this century as temperatures continue rising. In Antarctica, the Denman Glacier has withdrawn upwards of three miles in the past 22 years. Researchers say that sea levels could rise about five feet if the glacier was to completely melt. This would create irreversible effects such as coastal erosion, elevated storm surges, increased temperatures, and habitat loss.

Current Events

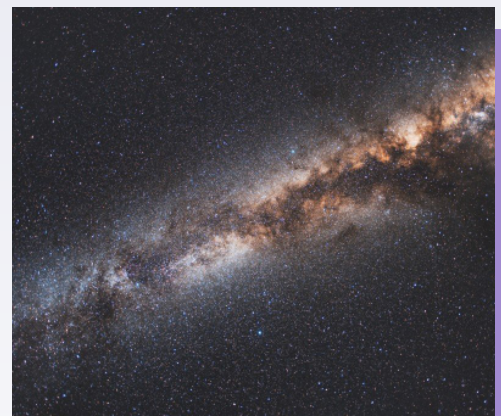
The Great Wall of Chi-...Our Universe!

How big is the largest structure that you have ever seen? 1 foot? 1 meter? 1 mile? Well recently, using 3D maps of the Universe, astronomers have discovered a wall extending to an almost unfathomable 1.4 billion light-years (for reference, one light-year is about 6 trillion miles). The wall is so colossal that it contains hundreds of thousands of galaxies inside of it. The reason that the South Pole Wall, as it's dubbed, has remained hitherto undetected is because much of it is over half a billion light-years from our galaxy. While findings like this are rare, they are by no means unprecedented, with the South Pole Wall being tied with the Sloan Great Wall as the sixth-largest cosmic structure ever discovered. In comparison, the largest cosmic structure ever discovered, the Hercules Corona Borealis Great Wall spans an almost inconceivable 10-15 billion light-years in length.

So how exactly are cosmographers able to so accurately ascertain the size of these enormous structures and their distance from the Earth? Cosmographers typically measure distance using redshift, the speed at which an object is receding from the Earth due to the expansion of the Universe which depends on the distance between the object and Earth. However, recently, astronomers and cosmographers have also begun to take into account the gravitational forces that galaxies exert on each other in their calculations. An advantage of the latter method is that it can actually be used to detect mass hidden from sight such as that of the South Pole Wall. However, even this method has limitations and astronomers acknowledge that it is likely that they haven't even mapped the whole structure and that it could be even bigger than they measured it to be.



Sloan Great Wall



Hercules Corona Borealis Great Wall

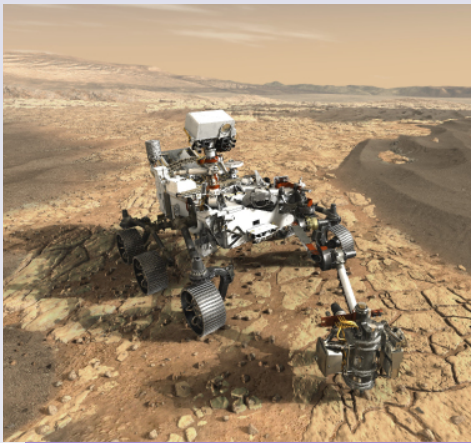
Current Events

Life Beyond Us

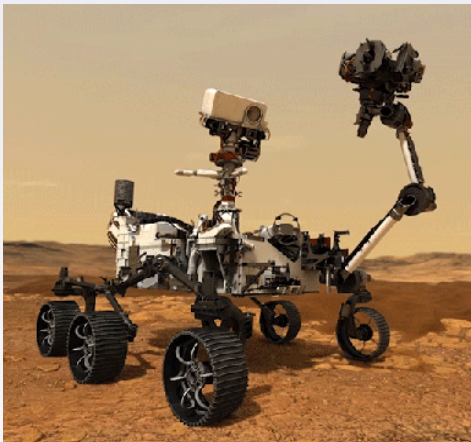
The question of life beyond Earth has always drawn from each of us, a child-like fascination with the seemingly impossible. Stories of aliens and extraterrestrial life invading Earth, taking over our cities, has become a classic tale in many movies and literature. But all this speculation begs the question as to whether we are actually basing our little stories on something that holds any merit. The Mars 2020 Perseverance mission aims to address these unanswered questions in the search for extraterrestrial life. The rover is set to launch on July 30th, 2020 from the Cape Canaveral Air Force Station and land in the Jezero Crater on Mars on February 18th, 2021.

The mission has four primary objectives: determine if Mars ever supported life, understand the processes and history of climate on Mars, understand the origin and evolution of Mars as a geologic system, and prepare for human exploration of the planet. In regards to their first objective, recent discoveries by NASA show that Mars was not always the cold, desolate planet it is now. In fact, it seems to be that Mars was once subject to wetter conditions billions of years ago. It is speculated that this state of environment was capable of supporting the development of microbial life. By taking samples of rocks and minerals around and in the landing site, the Mars 2020 mission aims to find signs of ancient microbial life in the rocks' biosignature.

Although this new information sounds promising, it is important to note that Mars is relatively close to Earth, in comparison to other planets or galaxies, so it is possible that traces of life on Mars could have just originated from Earth. Nevertheless, possible signs of life on Mars could open a whole new realm of research and discovery for human kind. More updates will be posted in regards to the mission when it lands in February 2021.



Rover Collecting Samples



Mars Rover

Women in STEM

As the famous saying goes “If you choose a job you love, you will never have to work a day in your life.” However, finding a job that you love is often one of the most difficult challenges in life. For women, this challenge is only accentuated with the social stigma of feminine inferiority that continues to persist in today’s society. Within the past several years, numerous studies have shown that many people still believe that women have an inferior intellect compared to men. Today, women make up approximately 52% of today’s college-educated workforce; however, only about 16% of today’s engineers, 27% of computer and mathematical scientists, and 29% of physical scientists are women, according to a figure in The State of U.S. Science and Engineering 2020 by the National Science Foundation. From these statistics, it is clear that female underrepresentation lies largely in STEM careers. But, even though there is a minority of women pursuing careers in STEM, this does not mean that there is a shortage of accomplished women. To commemorate women and their amazing achievements, here are four extraordinary women who have proven that women are capable of anything.

Hayat Sindi

Dr. Hayat Sindi is the co-founder of Diagnostics for All, a nonprofit organization that creates inexpensive disease diagnosing devices for people in developing countries. One of her many innovations includes the Magnetic Acoustic Resonance Sensor (MARS), which is used to portably diagnose diseases. Sindi has also founded the Institute for Imagination and Ingenuity (i2 institute), which prides itself on providing innovative fellowships and educational opportunities for youth in the Middle East. Among her many innovations, she was also the first woman from the Persian Gulf to receive a doctorate in biotechnology as well as the first Saudi woman to be accepted into Cambridge University to study biotechnology.



Art by Lidia Tomashevskaya

Women in STEM

Juliana Rotich

Juliana Rotich is the co-founder of BRCK Inc, a tech company based in Kenya. Currently, BRCK Inc aims to make the internet accessible to everyone in Africa, especially in low-infrastructure environments. According to Internet World Stats 2020, approximately 39.3% of Africa has access to the internet compared to the global average of 58.8% and the 62.9% average compared to the rest of the world. One of their key products is a wi-fi router/modem that lasts 8 hours without electricity. Today, BRCK provides internet access to over 150 countries, making it one of the largest internet providers in Sub-Saharan Africa. Rotich is also the co-founder of Ushahidi, a nonprofit tech company that was initially founded in response to violence in Kenya post the election of 2008. Ushahidi uses crowdsourcing and mapping to track violence, which thereby allows for the media to report these incidents to pressure government action. They firmly believe that by educating marginalized people, the people who represent them will then be able to better understand and respond effectively to their needs: allowing for global awareness and immediate action to take place.



Art by Thandiwe Tshabalala

Mae C. Jemison

Many people recognize Mae Jemison as the first African-American woman to travel into space; however, most people are not aware that Jemison received a Doctorate in Medicine at Cornell Medical School and even served as a medical officer in the Peace Corps prior to applying into NASA's astronaut program. Growing up, Jemison had watched Apollo airings on TV and always frowned upon the fact that no female astronauts were ever aboard. Jemison excelled in her studies, graduated from highschool at the ripe age of 16, before pursuing a bachelor's in Chemical Engineering and African & African-American studies. She then pursued her Doctorate in Medicine, worked as a medical officer in the Peace Corps for two years, and finally opened her own private medical practice. When she heard news of Sally Ride, the first American woman to travel into space, Jemison decided to apply for NASA's astronaut program. After applying twice, Jemison was finally selected for NASA Astronaut Group 12, which was the first group chosen after the Challenger explosion in 1986. On September 12, 1992, Jemison made history by becoming the first African-American to travel into space aboard the Endeavor.



Art by Karina Perez

Women in STEM

Tu You You

Tu You You is best known for receiving the Nobel Prize in Physiology and Medicine in Physiology on her treatment of malaria. Malaria is known to be caused by a single-cell parasite and causes a severe fever. In the early stages of testing, Tu You You knew that she could uniquely fuse Traditional Chinese medicine and western medicine in her search for a cure. After 240,000 substances were tested, Tu You You's team searched through ancient Chinese texts and found that sweet wormwood was used to treat intermittent fevers, a common symptom of malaria, around 400AD. With this information, Tu You You proceeded to study many traditional herbal medicines and discovered that artemisinin(青蒿素 qinghaosu) and dihydroartemisinin, which are both extracted from sweet wormwood, were able to inhibit the activity of the parasite. She tested her cure on both monkeys and mice with a 100% success rate, before testing it on herself and two other colleagues. She and her colleagues all recovered, along with the 21 patients who were treated with the cure after Tu You You and her two colleagues were treated. She is the first Chinese Nobel Laureate in physiology or medicine, as well as the first female citizen of the People's Republic of China to ever receive a Nobel Prize in any category. In addition to the Nobel Prize, she is also the first Chinese recipient of the Lasker Award, given to those who have made major contributions to medicine. Tu You You was born, educated, and carried out her research exclusively in China, despite contracting tuberculosis when she was sixteen years old.



Art by Xu Hui

Conclusion

Make no mistake about it, women are paving the way for the future in STEM. The women mentioned above are only a brief glimpse of the countless women who have revolutionized their respective fields. These incredible women serve as assurance to young women all over the world that their dreams are entirely attainable and not merely a figment of their imagination. Inspired by our predecessors, SNHS aims to expose youth to science early on to instill the same sense of curiosity and wonder in kids that will persist into their future and beyond.

Stay tuned for four more revolutionary women and their achievements in the September issue of the SNHS Newsletter.

Fun Science Facts!

Biology - Babies have around 100 more bones than adults.

Chemistry - Some metals are so reactive that they explode as soon as they come into contact with water.

Physics - If you traveled at the speed of light, time would stop.

Psychology - Convincing yourself you slept well tricks your brain into thinking it did.

Environmental Science - Each gallon of fuel releases 20 pounds of carbon dioxide into the air.

Computer Science - 01000101 01110110 01100101 01110010 01111001 00100000 01101101
01101111 01101110 01110100 01101000 00101100 00100000 01101111 01110110 01100101
01110010 00100000 00110101 00101100 00110000 00110000 00110000 00100000 01101110
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01110011 00100000 01100001 01110010 01100101 00100000 01110010 01100101 01101100
01100101 01100001 01110011 01100101 01100100 *

Engineering - The word “engineer” comes from a Latin word meaning “cleverness”

*Every month, over 5,000 new computer viruses are released

Credits

Articles:

The Protectors of the Coast are Under Attack - Jeffrey Chen

The Italian Alps' Colorful Problem - Jeffrey Gong

The Great Wall of Chi-...Our Universe! - Sritaran Bondada

Life Beyond Us - Cindy Chen

COVID-19 Updates - Allison Yuh

Women in STEM - Katelyn Hsu

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