GirlTech

Winter 2025-2026

Katherine Johnson and Mary Jackson

Cover Art by Rielle Reyes '27 and edited by Isabelle Jiao '26

HIGHLIGHTS

Letters from the Editors

Dear reader,

We are Isabelle and Emma, the head executives of GirlTech Magazine, and we are ecstatic to publish our winter issue of the 2025-2026 cycle, which focuses on highlighting women, both past and present, who have been underrepresented.

Examples of women that we chose to highlight include Katherine Johnson, Mary Jackson, and Dorothy Vaughn, all women who contributed significantly to the development of mathematics in NASA operations. You can also see more recent figures such as Bridget Mendler, the previous Disney star, or Charitie Ropati, a young scientist who bridges science with indigenous culture. Some of the contemporary issues we address are the lack of women in game development fields, the increased chance of of autoimmune diseases in females, and the effects of microplastics on the female body.

With our plethora of topics, we are extremely excited to present our newest catalogue of student-written works and creative art that recognizes not only the work but also the modern-day impact of female figures in STEM. A huge thanks to all the student writers, editors, layout and graphics team, GirlTech club, and our faculty advisor, Ms. Healey, for making this all possible. And a huge thanks to you for picking up this magazine and helping us expand the scope of women in STEM. We invite everyone to join us in this goal, one publication at a time.

Go GirlTech!

Isabelle Jiao ‘26
Editor-in-Chief

Emma Wang ‘26
Managing Editor

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Empower women and other people of marginalized genders in STEM through recognition, education, and advocacy.

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Katherine Johnson, Mary Jackson, and Dorothy Vaughan: The Three Women Who Redefined Mathematics

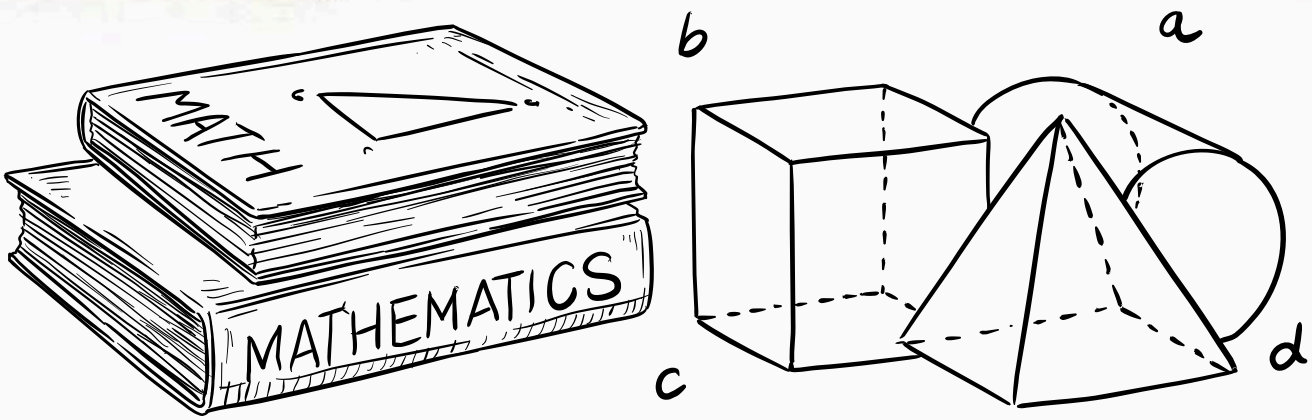
BY ISABEL BARNES '28

Dorothy Vaughn, Mary Jackson, and Katherine Johnson were mathematicians and pioneers. Known as "human computers," they calculated complex mathematical equations for various airplanes and space flights, and broke down barriers as African-American women in STEM.

These women first crossed paths in 1952, working as researchers in the West Area Computing section of the Langley Memorial Aeronautical Center at The National Advisory Committee for Aeronautics (NACA), predecessor to the National Aeronautics and Space Administration (NASA). Their work consisted of analyzing the aerodynamic properties of wings, propellers, and whole airplanes. Engineers used their calculations to select trial shapes for scale models to be tested in wind tunnels. Being a human computer requires skill and judgement; Vaughn, Jackson, and Johnson knew how to organize computational work and how to do so quickly without making mistakes. At the time, this knowledge was unique to them.

Dorothy Vaughan came to Langley in 1943, during the height of World War II, leaving her position as a math teacher to take what she believed would be a temporary war job. However, after President Roosevelt signed Executive Order 8802 prohibiting discrimination in the country's defense industry, NACA began permanently hiring black women. Still, due to Jim Crow Laws, black women were segregated from the white female employees. Vaughan was assigned to the West Area Computing Section, later becoming in charge of the section, making her NACA's first Black supervisor.

Image Courtesy of NASA



Mary Jackson graduated from Hampton Institute with a dual degree in maths and physical sciences. She worked as a math teacher and held various jobs until she was hired at the West Area Computing Section in 1951, supervised by Vaughn. After two years, Jackson received an offer to work for engineer Kazimierz Czarneck. Czarnecki soon suggested that Jackson should enroll in a training program, after which she could be promoted to an engineer. However, the night classes were held at an all-white high school. Jackson had to obtain special permission from the City of Hampton to attend. After completing the program, she became the first black female engineer at NASA.

Katherine Johnson had a talent for mathematics from a young age. At 14, she finished high school and attended West Virginia State College, earning a double major in mathematics and French. In 1952, Johnson heard that the West Area Computing section at Langley was hiring. She and her family moved to Newport News, Virginia, and Katherine began working under Vaughan and alongside Jackson. Vaughan assigned Johnson to the Maneuver Loads Branch of the Flight Research Division, making her the first woman to be part of that division. She went on to conduct the trajectory analysis for the Freedom 7 mission, becoming the first woman to have her name on a research report in the Flight Division.

These women's work drew a path for future generations at NASA. Vaughn's legacy is long lasting. She continued her work in the West Area Computing Section for almost a decade, mentoring other successful mathematicians. Jackson also took on a mentoring role, becoming the Federal Women's Program manager at Langley. She worked hard to impact the hiring and promotion of the next generation of NASA's female mathematicians, engineers, and scientists. Johnson was also part of the pioneering; she advocated for women to attend the agency's scientific briefings, formerly closed-door affairs reserved for male staff members, and she succeeded.

Recently, their story was brought to light by Margot Lee Shetterly's book Hidden Figures, which was adapted into a film, shedding light on how they paved the way for future generations of women at NASA. Their legacy redefined the boundaries of minority women in STEM, and they opened previously closed doors with grit, courage, and prowess.

Starting Small: Carrisa Cabrera's Journey as a Female Ocean Conservationist

BY SOPHIE CHUNG '27

Our Diversity Day speakers, Carissa Cabrera, Sophia Kianni, CJ Nord, and Jerome Foster II were all once our age — in school, young, and seeking to fix issues they saw. On the panel, Kianni asked everyone to raise their hands if they've seen an issue in their community and made an effort to fix that issue. She was surprised to see that only a few people had raised their hands. When discussing this later in my class, we came to the conclusion that many of us had missed the point of the question; she wasn't expecting us to have started a nationwide nonprofit or an award winning community service project, instead she was trying to get us to realize that we've all done something in our community, whether it's seeing dirty dishes in the sink and doing them, or starting a new club. How did these accomplished young women in STEM get to be so impressive? They started small.

Sitting next to Foster and Kianni, was Carissa Cabrera, an Ecuadorian-American ocean conservationist, CEO, and seasoned content creator. However, her career started early. Since 2018, Carissa Cabrera has worked with nonprofits to create sustainable impact in ocean conservation. A year later, she secured sustained funding for an in-water marine debris removal program dedicated to fishing gear on Oahu.

Then, in 2020, the prospect of her local marine animal rescue going virtual due to COVID discomforted Cabrera. She was a volunteer there, and wondered how they could continue preserving the health of the Hawaiian marine animals they helped. In the advent of the pandemic, Cabrera watched the world turn virtual and conservation content exploded. The standstill of the world allowed natural spaces to reclaim what was once theirs: better air quality because of no industrial processes taking place and less impact from energy consumption that had been decreasing by more than 10% for most countries. Cabrera used this momentum as well as her discomfort to form The Conservationist Collective (now named Futureswell), a media company with the mission to conserve oceans through spreading awareness, education, and stewardship. Throughout the years, Cabrera and her team have worked on numerous projects to bring ocean conservation into the conversation of climate change. A few of these projects include Ocean Connections, a course that aims to increase ocean climate literacy; Sustainability and the Sea, a podcast sharing stories on different ways people have "made waves"; and Virtual Women Wavemakers Workshops, empowering young women to start careers in ocean conservation in the midst of COVID.

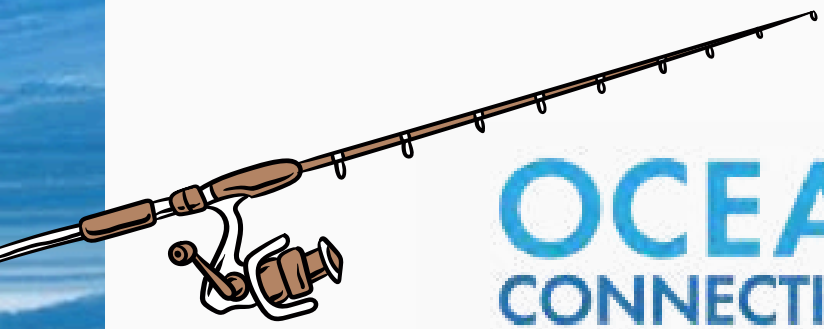
Futureswell and Cabrera started to work with external organizations to amplify their message, starting with National Geographic. The same year she founded Futureswell, National Geographic Society worked with her to build Ocean Literacy Curricula which is now being taught in classrooms today.

More recently, Cabrera's work has given her opportunities to join conservation expeditions as an educator; she has joined the National Geographic Society and Ocean Exploration Trust on the E/V Nautilus to study dolphin communication where she also built and distributed ocean lesson plans. Through the Lenovo Work for Humankind Program, she worked with the local organizations and government in Robinson Crusoe to implement effective conservation strategies to save their endangered species.

Within her own community of Oahu, Hawaii, Cabrera serves as the head of Development for Kuleana Coral Restoration, recently launching COAST, a program dedicated to building Pacific Islander conservation careers. Additionally, she has worked as a project manager for Hawaii's Green Fee, a conservation financing bill.

This seven year journey is only the start to Cabrera's career and impact. But as you can see, she started small by volunteering at her local marine animal rescue. She partnered with local organizations and nonprofits, slowly increasing in impact and scale. The discomfort that COVID brought her drove her to start Futureswell where she could execute her personal mission of ocean conservation independently. She has come so far with her mission that started as local partnerships, and is now a globally recognized leader in ocean conservation.

Graphics by Rielle '27



OCEAN CONNECTIONS

Image Courtesy of Ocean Connections

The Erasure of Rosalind Franklin from Genetics History

BY RACHEL FAN ‘27

Through her apparatus, the spiral staircase of existence became visible. Nobody thought to write her name in the history books.

A woman hunched in a basement laboratory at King's College London, machinery humming and clicking beneath her hands for a hundred hours without pause. What she was examining, a strand so delicate a breath might scatter it into nothing, drank in waves of energy while time stretched and contracted around her. Rosalind Franklin, though history would spend decades pretending otherwise.

When Franklin arrived at King’s around 1951 as a research associate, she immediately established toxic relations with Maurice Wilkins, a fellow biophysicist at the lab. Franklin ignored the hostility and got to work anyway, built herself an apparatus with control mechanisms nobody else had figured out yet. Her breakthrough arrived when she realized DNA lives two separate lives depending on moisture levels. Crank up the humidity or drain it away and the molecule shifts forms, each version spilling different secrets.

The photograph that ignited heated debate surfaced during May 1952: a stunning display of the double helix. Although she hid it secretly in her desk, Wilkins uncovered it by January 1953 and showed it to Watson, without asking Franklin first. Watson and Crick also obtained additional data Franklin had produced, information from a Medical Research Council report that Max Perutz handed over, assuming colleagues shared freely.

Franklin left King’s in 1953, pivoted toward Birkbeck College and started dissecting viruses instead. Within three years, she had unraveled the tobacco mosaic virus, stacked up twenty one publications while battling for grant money and basic professional respect. Cancer killed her in 1958, at just thirty-seven years old, likely the result of radiation exposure back when shielding seemed optional. Some dangers remain invisible until it is too late. Some forms of contempt do as well.

Four years after her burial, Watson, Crick, and Wilkins stood in Stockholm accepting the Nobel Prize. Franklin's name was barely spoken during those speeches. The absence spoke louder than acknowledgment ever could. In 1968, Watson published his memoir, portraying Franklin as obstinate and confused, a caricature that hardened into accepted truth for decades while historians excavated archives to reconstruct what had actually happened.

What Franklin left behind was discovery earned through stubborn patience: hundred-hour exposures, humidity adjustments, and calculation after calculation. Through her lens, the twisted ladder of inheritance became legible. Leaving her out of the story was a choice. It is our duty and our choice to make sure that these all voices are heard, even forgotten ones.

Image Courtesy of Britannica

Overrepresentation of men in game development

BY ZAHABIYA KHOKHA '27

Why is it that every time women are in a video game, a bikini is considered enough armor to protect them from swords or guns? In the gaming industry, it's hard to find a female character whose body type deviates from the idealized and often hyper-sexualized standard. This problem stems further than just plain sexism. It's due to a blatant lack of representation of women within the gaming landscape. When it comes to gender representation, men still make up over two-thirds of game developers (GDC 2024, 2025). Because women are unlikely to be able to contribute to decisions regarding game development, games are created by men for men, completely ignoring the large and growing number of female gamers.

Women in Games CEO Marie-Claire Isaaman stated, "It is disappointing, but not surprising, to see that women still make up such a small minority of the games development workforce – and there are even fewer who have enjoyed long stints in the industry and are senior level" (GDC 2024, 2025). Her sentiment is shared globally, as many women struggle to find characters that actually represent their looks or games that truly reflect their interests without also playing into sexist stereotypes. It is also important to note that when women are represented in video games, they are portrayed as housewives, bikini babes, or damsels in distress. Essentially, characters that need to be saved or add nothing to the gameplay.

It is also very unlikely to ever see female characters advertised alongside many games they are in. In a study done by Christopher Near in 2012 on box art for video games, he found that out of all of the game boxes included in the study, females were only shown in one-third of them. Out of the game boxes that did show women, 61 percent of them were sexualized (Connor, n.d.). Overall, many women find themselves struggling to ever find a character that truly represents them in all aspects. This problem could be fixed by allowing more women access to game development. By allowing women a platform to design games for women, removing old misogynistic thoughts, games can be open to all genders.

Graphics by Madeleine Osei '28

From Stardom to Outerspace: The Incredible Story of Bridget Mendler

BY ESHANA HORA '27

You may recognize Bridget Mendler from Good Luck Charlie or from her hit songs like "Hurricane," but you might not realize that this actress-turned-entrepreneur is making her mark in the space industry.

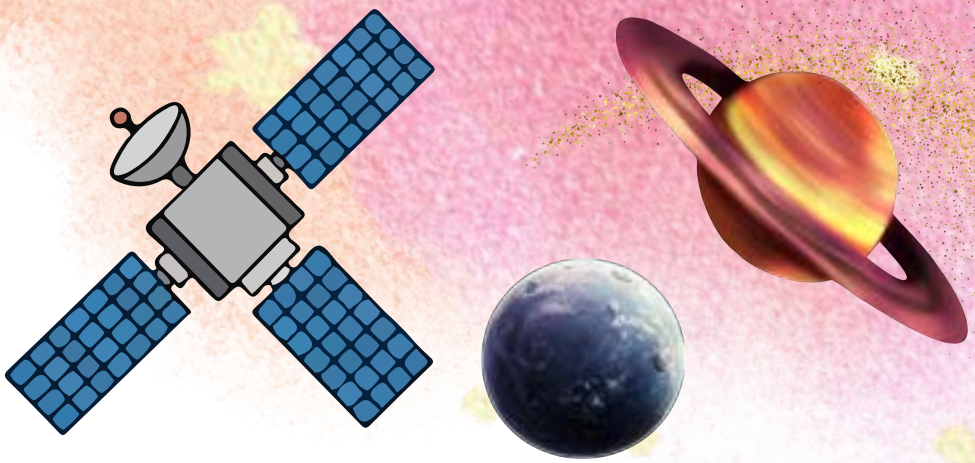
Mendler began her acting career after moving to the Bay Area, California, at the age of eight, starring in hit movies and shows such as Wizards of Waverly Place and Lemonade Mouth. She didn't come from a family of actors — her mother was an architect, and her father was an engineer. As her acting career took off, Mendler started experimenting with pop music. In total, she released 103 songs on Spotify over the course of six years, all while she was still acting in Disney's massive hits.

While she started her undergraduate degree in anthropology at the University of Southern California (USC), Mendler ultimately dropped out. However, in 2017, Mendler decided to apply to the Massachusetts Institute of Technology (MIT) graduate program at the Media Lab, where she and other researchers focused on social media to "promote deeper learning and understanding of human networks through data science."

Following her 2020 Master of Science graduation, Mendler enrolled at Harvard University in 2022 and earned her Juris Doctor (J.D.). She is also in the process of earning her Ph.D. at MIT, studying "technologies that support inclusive and collaborative governance and citizen engagement," but that has been put on hold.

While studying at Harvard, Mendler and her engineer husband, whom she had met in Los Angeles in 2019, began developing ideas for potential space satellites. Their ideation led the pair to found Northwood Space with Shaurya Luthra, a software engineer. She assumed the role of Chief Executive Officer (CEO), while her husband, Griffin Cleverly, is the company's Chief Technology Officer (CTO), and Luthra is the "Head of Software."

Northwood Space aims to address several pressing issues the group noticed in the space industry. Primarily, according to the company's website, Northwood Space "is building an efficient ground network to rapidly scale connectivity and resilience for space." Describing the current industry as a "ground bottleneck," Mendler has emphasized that Northwood's ground station work is vital to ensuring minimal data lags and sufficient storage to collect all data transmitted by satellites worldwide.



Across the world, Bridget Mendler has served as an inspiration to the generation of children who grew up watching her and listening to her music. In 2022, several students at Binghamton University came together to found the Bridget Mendler Association. As the name suggests, the entire club was centered around Mendler's achievements and impact on students.

Bridget Mendler's career is far from ordinary. Defying traditional expectations of celebrity careers, she has transitioned from entertainment to entrepreneurship in the space industry, proving that ambition and adaptability can enable individuals to make meaningful contributions across sectors.

Image Courtesy of the Hollywood Reporter

Design Made Simple: Melanie Perkins' Journey to Canva

BY LILY KAPP '27

Melanie Perkins is the creator and co-founder of Canva—one of the fastest-growing companies in recent decades. Although the website is a simple tool, the path towards building it was an arduous journey. Growing up in Perth, Australia, she was always an entrepreneur, starting her first small business at age fourteen by selling homemade scarves in shops throughout her hometown. She attended the University of Western Australia, where she met her future husband and business partner, Cliff Obrecht. During her first year, she was a tutor for graphic design students, where she noticed a need for a simpler app to create – this was the idea behind Canva. She started small, targeting a similar design problem – high school yearbooks. At 19, she dropped out to pursue this idea, later turning it into Fusion Books. It was a huge success, but that didn't stop Perkins from pursuing her dream.

Only a couple of years after Fusion Books launched, she decided to move on and start fundraising for her first idea – Canva. Securing investments for this start-up was a big feat with many setbacks. To accomplish this, she traveled to Silicon Valley, California, to pitch her idea around investors. In California, she met Bill Tai, a successful venture capitalist. Not only would he become one of her first investors, but he would also lead her to excellent other connections such as Lars Rasmussen, co-founder of Google Maps and Google Wave, and two different Google employees, Cameron Adams and Dave Hearnden. This would be the primary team for Canva, and after years of building, they received their first round of funding at 1.5 million dollars, along with 1.4 million dollars from the Australian government.

The following year, in 2013, Perkins, Cliff Obrecht, and Cameron Adams, launched Canva. Canva is a free, easily accessible, and timely graphic design application that can be used to create presentations, documents, videos, websites, and more. Canva, being the first of its kind, completely changes the way students, teachers, and workers design their everyday needs, saving time and money. It requires no prior knowledge of graphic design, as it uses drag-and-drop features. Many features that create sophisticated effects are now accessible with just a click, allowing room for endless, accessible possibilities. Today, Canva has helped create over 2 billion designs from 190 countries and is worth billions of dollars, all because of a girl who took action to create her reality.


Canva
Canva
Canva

Inside the Female Mind: the Science Behind How Women Think

BY AMIE MUKEKU '27

For decades, scientists believed that the male and female brains were identical except for their size. Recent research, however, suggests otherwise, shedding light on potential structural and chemical differences influencing how men and women think, feel, and respond to the world around them. It is important to understand that these differences do not imply superiority or inferiority, but rather reveal unique forms of intelligence and strength distinct to each gender.

One of the key distinctions lies in brain connectivity. In a 2014 study conducted at the University of Pennsylvania, researchers imaged the brains of 481 male and 521 female participants. The results showed that the female brain exhibited more coordinated activity between the left and the right hemispheres of the brain. In contrast, activity in the male brain was more tightly coordinated within individual regions. The researchers' findings suggest that the cross communication seen in the brains of women allows for outstanding multitasking skills, intuition, and emotional awareness. Meanwhile, men tend to perform better in tasks requiring navigation and mechanical problem-solving.

Graphics by Ameya Patel '28

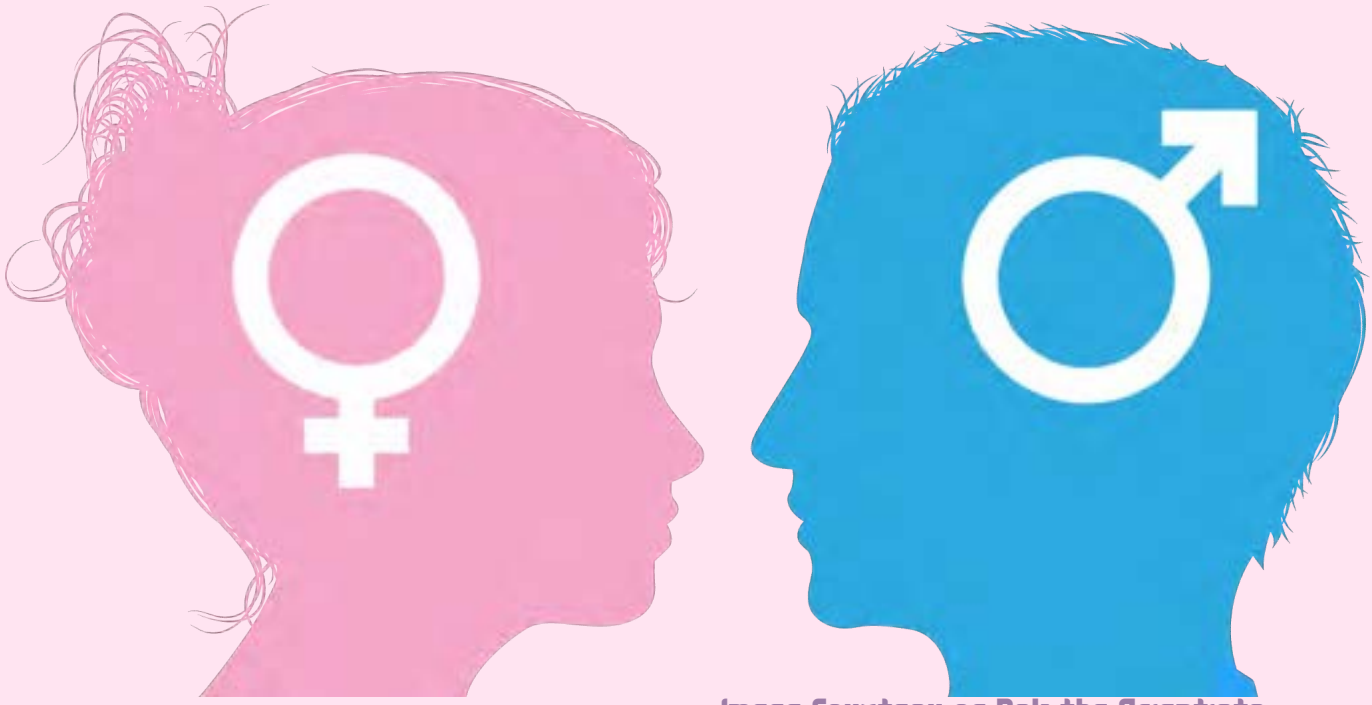


Image Courtesy of Ask the Scientists

Another critical difference involves gray matter and white matter. Grey matter, taking its name from its greyish-brown color due to the presence of unmyelinated neurons, refers to the tissue responsible for processing information and controlling muscle movement, memory, and emotions. Research has shown that women generally have a higher percentage of grey matter compared to men, suggesting that their brains can process information across multiple regions more effectively, support strong verbal skills, social awareness, and emotional regulation. Men, on the other hand, tend to have slightly more white matter than women. White matter, tissue appearing white due to the presence of myelinated neurons, refers to tissue associated with the faster transmission of signals between different parts of the brain through long-distance nerve impulses. More white matter generally ameliorates functions like improved learning and stronger sensation detection. These variations suggest that women's and men's brains may prioritize different kinds of efficiency rather than differing in intelligence.

Ultimately, neuroscience reveals that the brain is not just different but dynamically versatile between the two genders. Women's brains, wired for connection, communication, and compassion, give them an extraordinary ability to lead, nurture, and innovate. Recognizing these differences should not lead to comparisons defining one sex as better than the other, but to an appreciation of the unique strengths of the female mind and its empathy, adaptability, and depth, which enrich every aspect of human life. Through valuing these attributes, we can move beyond traditional notions of gender superiority and embrace a more nuanced understanding of intelligence that transcends sex.

Beyond the X-Chromosome: How Technology Can Address the Female Autoimmune Bias

BY SOPHIE LIU' 29

Imagine the immune system as the body's defense force, trained to hunt down invaders such as bacteria and viruses. Yet sometimes, this system malfunctions. Instead of protecting the body, it identifies the body's own cells as foreign invaders and launches attacks on healthy tissues and organs. These internal "rebellions" within the body are known as autoimmune diseases, or chronic conditions that cause symptoms ranging from inflammation to severe chest pain, intense headaches, and sudden shortness of breath (Autoimmune Diseases, 2025).

While autoimmune diseases affect 24-50 million Americans, they do not strike everyone equally. In fact, women account for up to 78 percent of all patients (Fairweather & Rose, 2004). In autoimmune diseases such as Sjögren's syndrome and lupus, which damage joints, skin, and organs, the female-to-male ratios are 19:1 and 9:1, respectively. This imbalance makes autoimmune disorders one of the most gender-biased diseases in modern medicine.

One factor contributing to this disparity lies in the XX chromosome complement in females. According to Dou et al. (2024), Xist, a long noncoding RNA (lncRNA) molecule, is exclusively expressed in female somatic cells. By binding directly and indirectly to over 90 proteins, Xist forms a ribonucleoprotein (RNP) complex that randomly coats and silences one of the X chromosomes, a process known as X-chromosome inactivation (XCI), which equalizes gene dosage. Without XCI, females would produce twice as many X-linked genes, disrupting cellular function (Goldman, 2024). However, several Xist-binding proteins have been identified as autoantigens, or normal proteins within the body that the immune system mistakenly targets. After cell death or tissue injury, these immunogenic RNP fragments are released extracellularly, triggering autoimmune responses (Dou et al., 2024b).

Fluctuations during endocrine transitions also contribute to the strong female bias of autoimmune diseases. Puberty, pregnancy, postpartum, and menopause can dramatically alter estrogen levels, thereby altering immune regulation (Desai & Brinton, 2019). Other mechanisms include the overexpression or hyperactivation of the TLR7 receptor encoded on the X chromosome. According to Mishra et al. (2024), endosome dysfunction can lead to uncontrolled TLR7 signaling, sufficient to break immunological tolerance to nucleic acids. Moreover, fetal microchimerism (FMc) (the presence of fetal cells in maternal tissues) may further confuse the immune system, leading to autoimmune diseases in female patients (Adams & Nelson, 2004).

While autoimmune diseases disproportionately affect women, recent advances in biotechnology and artificial intelligence are beginning to reshape how these conditions are diagnosed and treated. Because gender differences influence both the onset and severity of autoimmune responses, timely diagnosis and treatment are critical. Traditional diagnosis methods, such as the antinuclear antibody (ANA) test, are often inaccurate. Many patients test positive, but only some develop autoimmune diseases. To improve accuracy, the Yale School of Medicine proposed using artificial intelligence software to analyze data from electronic health records and develop algorithms that identify ANA-positive patients at higher risk of developing autoimmune diseases (Crawford, 2024). Additional research suggests that while generative AI cannot substitute for human expertise in healthcare, it holds significant potential to transform rheumatologic practices (diagnosis and nonsurgical treatment of autoimmune diseases) toward greater precision and efficiency (Mahajan et al., 2025).

Beyond diagnosis, emerging technologies are also transforming how autoimmune diseases are treated at the molecular level. The CRISPR-Cas system is a revolutionary gene-editing technology that consists of a Cas protein and a guide RNA to target and modify specific DNA sequences in living organisms. Recent studies suggest that advances in CRISPR technology could enable highly personalized therapies for patients with autoimmune diseases. For example, scientists have explored macrophage-specific CRISPR-Cas9 plasmids targeting the RhoA gene to cure rheumatoid arthritis (RA), an autoimmune disease characterized by chronic synovial inflammation and articular bone erosion (Chen et al., 2025). Furthermore, Chimeric antigen receptor (CAR) T cell therapy has also been used to treat severe autoimmune disorders. This approach removes pathologic B cells and has produced long-term remissions in serious, chronic autoimmune diseases such as systemic lupus erythematosus (SLE) and systemic sclerosis, also known as scleroderma (SSC) (Autoimmune, 2024). Moving beyond traditional treatments, these emerging therapies transform treatment from short-term symptom management to a long-term “reset” of the immune system, with the potential to induce remission or cure.

Biology is not destiny. As technologies such as artificial intelligence, gene editing, and immunotherapy continue to evolve, they provide new ways to understand, anticipate, and ultimately rebalance the gender-based inequality embedded in autoimmune diseases. However, these advances must be accompanied by careful consideration of safety, ethics, and equitable access.

Graphics by Leah Han ‘27

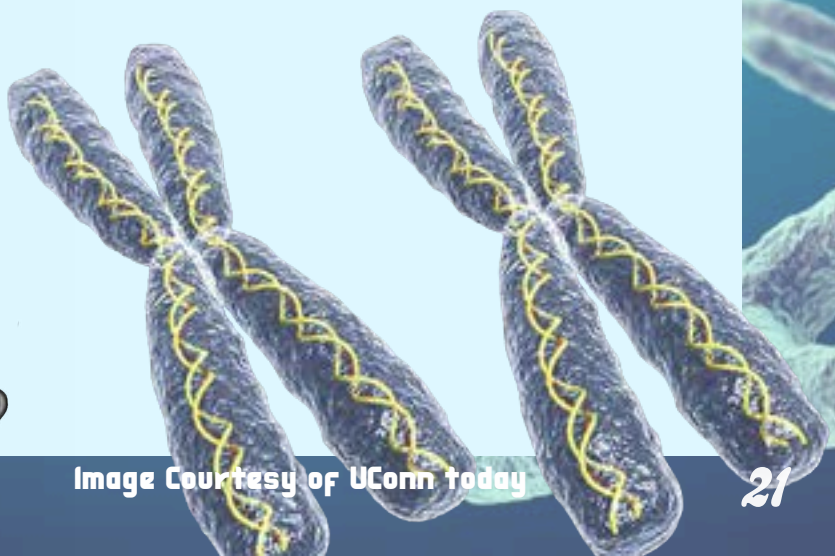


Image Courtesy of UConn Today

Margaret Ingels: A Pioneer in Air Conditioning and Engineering

BY ELIZA PFEIL '27

During the sweltering summer days on break, one of the most satisfying feelings is lying down in an air-conditioned room. But have you ever thought about the origins of air conditioning? You have female engineer Margaret Ingels to thank.

Ingels grew up as a curious child, always questioning the science of the world around her. Her love of the field led her to major in engineering at the University of Kentucky in 1916, making university history. Upon graduation, she was hired by the traffic engineering department of the Chicago Telephone Company. However, a year later, she accepted a position at the Carrier Lyle Heating and Ventilation Corporation, where she began her studies in "conditioned air." After discovering this passion, she returned to the University of Kentucky for her master's degree, becoming the first woman in the entire country to earn a graduate degree in mechanical engineering.

In 1921, Ingels began her career at the American Society of Heating and Ventilating Engineers research lab, where she developed a machine that measured germ-laden dust in the air for schools. This invention led to her promotion in 1926 because of its role in developing the Anderson-Armspach determinator, used for air filtration.

Graphic by Mariana Regalado '28

She also contributed to the design of the sling psychrometer, a tool that measures atmospheric relative humidity and is still used today.

Throughout her life, Margaret Ingels was a leader and inspiration for female engineers, speaking out in support of women in engineering while developing and promoting her own invention. So next time, when you sit in any air-conditioned space, make sure to think of Ingels's grit and determination that led her to the creation we appreciate even today.

In the 1930s, air conditioning units were primarily used for industrial purposes, but Ingels saw their potential. She believed that smaller residential AC units would be beneficial for individual homes, so she led the campaign to educate the public on this matter. She often used speeches to spread her ideas and gain more support for her idea. As a result of her work, air conditioning systems were popularized during the post-WWII boom.

Ingels not only spoke out about her engineering work, but also about her experience as a female engineer. In her most famous speech, "Petticoats and Slide Rules," Ingels shared her belief that female engineers's "task is to widen the trails blazed for her —and more. She must build them into great highways for women engineers of the future to travel, free of prejudices and discrimination." It is each woman's responsibility to fight the prejudice in the field by establishing her own career as an engineer, especially in this time.

Image Courtesy of Greater Bedford Regional Vocational Technical Highschool

The "Man Flu": Why Women Have Stronger Immune Systems than Men

BY HIYAB MEBRAHTU '27

You've probably heard "Man Flu" thrown around before, maybe regarding a man who seems to be overreacting to a cold. The term, often used in a humorous or derogatory manner, turns out to have some truth behind it; recent research has pointed out genetic and hormonal factors that may give women an advantage when it comes to dealing with sicknesses.

A study from Ghent University in Belgium has uncovered an intriguing theory: that microRNAs, or tiny pieces of genetic material, may factor in sex-based differences in immune responses. MicroRNAs are highly concentrated in the X chromosome. This microRNA has been associated with immune system function and controlling cell growth, contributing to lower cancer risk. In addition, microRNA levels were lower in patients suffering from sepsis, a condition caused by an overreaction of the immune system.

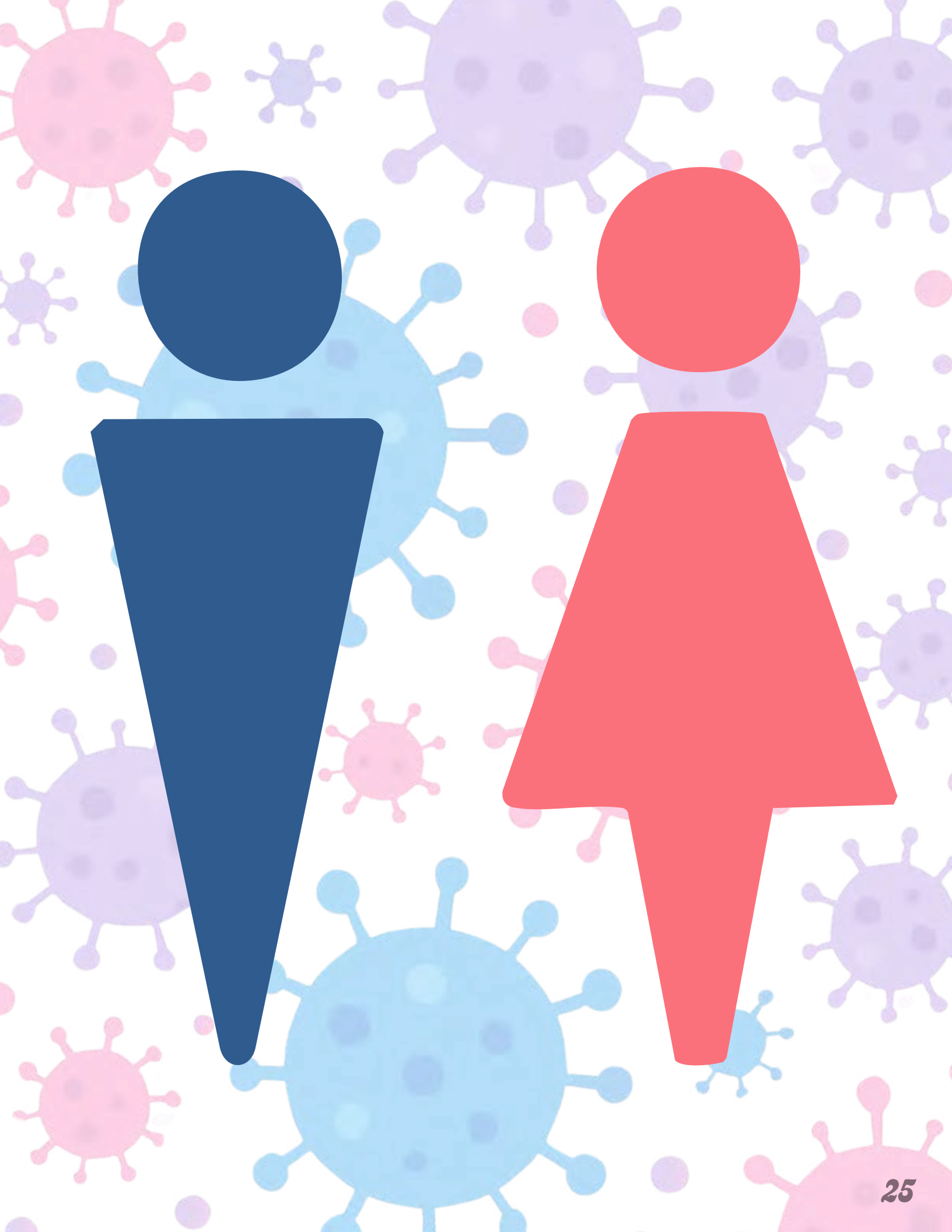
Since women have two X chromosomes, while men only have one, researchers have found that women could have twice as much microRNA.

Hormones also play a role in immune responses. Testosterone, a hormone more commonly found in men, suppresses immune responses, while estrogen, a hormone more prevalent in women, has been shown to enhance immune function.

Therefore, the hormone differences may explain the disparity between men and women in immune responses.

Thus, microRNA could play a role in stronger immune function in women, thereby giving the term some merit. However, while women may be able to recover more easily from sickness, they are also more prone to autoimmune diseases, such as rheumatoid arthritis and lupus, where the immune system is overactive and attacks the body's cells and tissues.

So the next time you hear someone joke about the "Man Flu," remember: science suggests that there may be some differences between sexes regarding immune function. Ultimately, this difference comes from a mix of genetics and hormones. The insights from this research could lead to more effective treatments for illnesses, taking into account the unique immune responses of men and women.



Charpentier and Doudna: Pioneers of Gene Editing Research

BY RIELLE REYES '27

In 2020, the scientific community achieved two historical milestones that both reshaped perceptions of women in science and advanced DNA manipulation research. Scientists Emmanuelle Charpentier and Jennifer Doudna were awarded the Nobel Prize in Chemistry for their research on CRISPR-Cas9, a system that enables the manipulation of genomes in various organisms. Charapientier and Doudna were the first all-women team to be awarded the Nobel Prize for Chemistry in its 125-year-long history, a prestigious award to scientists who have made a significant impact through their research, benefiting humanity. Along with this honor, Charpentier and Doudna became the sixth and seventh women to ever receive a Nobel Prize in Chemistry.

Charpentier is a French researcher in microbiology, genetics, and biochemistry. She attended the Pasteur Institute and has dedicated her life to researching the molecular mechanisms of bacterial infections and the immune system. Doudna is an American biochemist and geneticist who attended Harvard Medical School. At the beginning of her professional career, she worked as a researcher and professor at Yale University and at the University of California. Charpentier and Doudna crossed paths at a 2011 American Society for Microbiology conference in Puerto Rico. They shared an intense interest in researching the active protein Cas9, an enzyme that protects the body from viruses by cutting foreign DNA, and started an international partnership that would soon change the world.

Through Charpentier and Doudna's partnership, they invented the biological technology CRISPR-Cas9 gene editing system. The technology acts as a pair of genetic scissors that can intentionally manipulate genes to cure life-threatening diseases, develop virus-detection tests, and modify embryonic cells. Charpentier and Doudna built their technology off of existing research on the CRISPR-Cas9 system, a natural immune mechanism. After becoming knowledgeable about CRISPR-Cas9, Charpentier and Doudna developed the system and simplified it, allowing a single protein to find and cut specific DNA. In doing so, they created a tool popular among genetic researchers.

Today, Charpentier and Doudna's research has enabled advances in modifying plant and animal cells. This system of genome editing has opened scientific avenues in immunology, enabling faster development of treatments and diagnostics, and possibly the eradication of previously incurable diseases caused by rare genetic mutations. Additionally, Charpentier and Doudna's work has not only allowed more scientists to pursue research in gene modification, but also inspired young girls to enter traditionally male-dominated research fields and not let societal expectations of women hinder their passion for STEM.

Image Courtesy of Nature

Image Courtesy of The Philidelphia Inquirer

Image Courtesy of New York Times

Ecofeminism: Redefining Feminism through an Ecological Lens

BY ARUSHI KRISHNAN'27

As the author and former professor at Macalester College, Karen Warren, wrote, "nature is a feminist issue." Warren and other activists have advanced the ecofeminism movement, which examines the connection between patriarchy, women's oppression, and environmental exploitation. Coined by French feminist Françoise d'Eaubonne, ecofeminism claims that patriarchal societies objectify women and undermine their value by merely associating them with reproduction and nurturing, with low regard for their opinions, intellect, or skills. Further, these same patriarchal norms exploit nature and its resources with a blatant disregard for environmental preservation.

Some critics argue that ecofeminism risks "essentializing" women by connecting them too tightly to nature and incorrectly assuming that both women and nature share the same set of characteristics. However, ecofeminists focus on promoting women's profound, sacred connection to life and nature, as well as highlighting the need to contradict previously established yet unjust patriarchal social, geopolitical, and environmental systems.

Along with gender, ecofeminism also relates to the oppression of other marginalized societies in the context of environmental hardships. For example, research shows that women in marginalized societies face the harshest climate impacts and are exposed to more pollution and toxic waste. Among the marginalized societies, such as within indigenous communities, natural disasters and climate change are much more likely to negatively affect women. This highlights the phenomenon of intersectionality, the compounded disadvantage for an individual when belonging to more than one marginalized group, and the interdependent nature of environmental and social justice.

Ultimately, the goal of the ecofeminism movement is to raise awareness and promote compassionate, ethical, and equitable care to society and the planet. Renowned ecofeminists, including Indian scholar Vandana Shiva, American historian Carolyn Merchant, and Kenyan activist Wangari Maathai, are leading this global movement through various protests and campaigns. In the 1970s, the Chipko Movement in India was a nonviolent uprising where Indian women hugged trees to protect them from being indiscriminately felled. The movement was one of the first ecofeminist projects that inspired ecofeminists from other countries to follow suit. In the late 1970s in Kenya, Maathi led the Green Belt Movement, which empowered rural women with agricultural skills to address their food crises. In the 1980s, Katsi Cook, a Mohawk Native American, and other members of her tribe created a documentary titled The Akwesasne Mothers' Milk Project to discuss the pollution of the St. Lawrence River and its impact on the production and quality of breast milk.

As Warren argued, nature is a feminist issue that calls for action. By confronting the systems of oppression that impact women, marginalized communities, and the environment alike, we can not only care for the world around us, but we can also aim for a future of equity and respect.

Graphic by Leah Han '27

Charitie Ropati: Bridging Indigenous Culture with Science

KATE WAI '28

Due to Alaska's Arctic climate and poor sanitation systems, its water infrastructure is among the worst in the United States. However, climate change advocates, such as Charitie Ropati, have been actively working to find solutions. Born in Anchorage, a small coastal community in southwest Alaska, Ropati was immersed in Alaskan culture. Whether practicing Yuraq, a traditional Central Yup'ik dance, or learning subsistence fishing from her parents, she held a deep connection to her heritage. However, after witnessing the tragedy that her people faced due to the consequences of climate change, Ropati decided on her main goal: to support Indigenous communities by integrating her culture into climate and infrastructure research. To pursue this goal, Ropati earned both a Master's and a Bachelor's degree from Columbia University, specializing in civil engineering on the water resources track. Afterwards, she gained experience through fieldwork by working as a design engineer in New York City and later interning with the Alaska Native Tribal Health Consortium (ANTHC), which strives to provide health services to individuals in Alaska.

Ropati's mother, Elizabeth Lozano, taught her that the indigenous traditional ways of life were rooted in science and engineering. Shaped by her culture, Ropati was able to connect aspects of her traditions with her acquired engineering knowledge. "Doing this [climate and infrastructure] research means a lot to me because I'm able to interweave things that my grandmother taught me with my work in the lab here at Columbia," Ropati said in an interview.

Through her reflections, Ropati soon realised the importance of education in indigenous people's lives and how it influences their ability to help others. As a result, she set her sights on implementing a more culturally relevant curriculum in her school district. Through her efforts, she cofounded a nonprofit called lilnativegirlinSTEM, which aims to foster equality in STEM for all indigenous women.

Although Ropati is young, she has already received the World Wildlife Fund's 2023 Conservation Leadership Award and was named a Future Rising Fellow from Girls Rising in 2023. Her ability to integrate aspects of her culture with scientific knowledge from contrasting perspectives makes her a unique researcher and inspires many young girls pursuing STEM today.

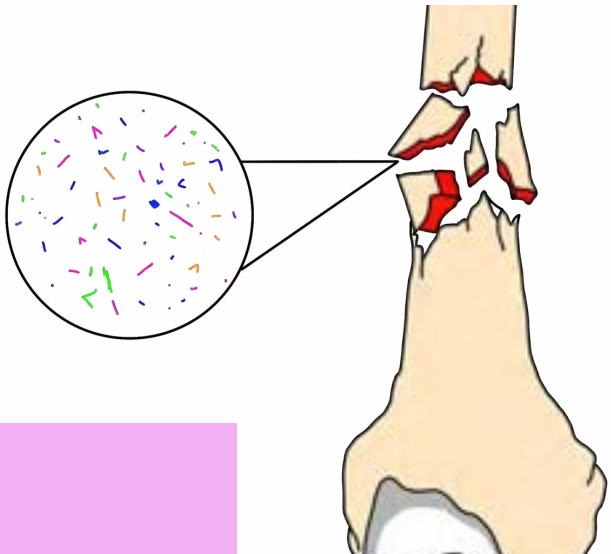
Image Courtesy Of Forbes

Microplastics: The Invisible Threat to Women's Health

OLIVIA WANG '28

When most people hear the word "microplastics", they imagine tiny plastic fragments drifting through polluted oceans or accumulating in the fish we consume. In reality, microplastics are far more pervasive. They have been detected in the water we drink, the air we breathe, and increasingly, inside the human body. Although they are invisible to the naked eye, microplastics can have serious effects on human health. Their widespread presence has raised growing concerns among scientists, particularly regarding the potential long-term consequences on women's health.

Recent research has revealed that microplastics can accumulate in skeletal tissues, including bone and bone marrow, marking a new frontier in understanding their biological impact. Studies analyzing human donor samples have detected microplastics in bone tissue, suggesting that these particles can travel through the bloodstream and lodge deep within the skeletal system. Once present, they may disrupt the function of bone marrow stem cells and trigger inflammatory responses. Such changes can stimulate osteoclast activity, the cells responsible for breaking down bone tissue, potentially tipping the delicate balance of bone remodeling toward more breakdown than formation.



Graphic by Katelyn Nguyen '27

This emerging evidence is especially significant in the context of osteoporosis, a condition in which bones become weaker and more prone to fracture over time. Osteoporosis is already more common in women than in men, particularly after menopause, because lower estrogen levels accelerate bone loss. If microplastics increase osteoclast activity and inflammation, they could make bones more fragile, adding a previously unrecognized environmental risk factor to an already serious health issue.

Beyond bone health, microplastics may also affect women through chronic inflammation and immune system stress. Once inside the body, these particles can irritate tissues and transport harmful chemicals or pollutants. Persistent inflammation has been linked to several conditions that disproportionately affect women, including autoimmune disorders.

Women may also face higher levels of microplastic exposure through everyday products. Personal care items such as makeup, skincare products, and synthetic hygiene materials can contain or release microplastics. Synthetic clothing can also shed plastic fibers into the air and water.

In conclusion, microplastics represent a growing concern for women's health due to their potential effects on skeletal integrity, immune system function, and many other parts of the body. While further research is needed to fully understand their long-term consequences, mounting evidence suggests that reducing plastic use and increasing awareness could help protect women's health in the future.

Cleo Abram: Video Journalist Exploring Optimistic Science

LAVEENYA SEENIVASAGAM '27

In a world where newsfeeds are filled with a variety of content, ranging from climate collapse to political news and economic changes, Cleo Abrams brings her own unique perspective to social media: possibility. What if, instead of focusing on what's broken, we looked at what might work? What if we could harness the power of technology to tackle our problems? Cleo, a rising star in digital journalism, tackles and discusses difficult topics, but what sets her apart is her optimistic approach. Through her videos, Cleo provides her followers and the public with the foundation for a "better future," one built on science, creativity, and hope.

Cleo's approach to journalism is all but regular. After working at Vox, an American news and opinion media, and helping create 'Explained', a Netflix show, she moved on to a more personal project, 'Huge If True'. On this project, she explores fascinating discoveries in science and technology. Rather than focusing on the problems, Cleo is determined to share solutions. She discusses topics such as the breakthroughs in clean energy, the potential of AI, and the promise of genetic engineering. By framing these topics with the idea of hope, rather than naive optimism, she presents a genuine belief that these innovations could change the world for the better.

A talented narrator, she explains complex topics such as quantum computing in an accessible yet not oversimplified manner. Through visuals and storytelling, Cleo makes complicated science feel relevant and exciting, engaging a larger audience. With every video she makes, she asks the key question: What if this technology could actually help us? It's a simple question that is rarely seen in mainstream journalism, which mostly highlights challenges rather than positive outcomes.

Image Courtesy Of Shutterstock

Cleo Abram's work shows that the most important role of journalism today is to encourage hope in progress. She proves that complex science doesn't have to be negative or confusing. This enables everyone to feel a connection with science, removing the stigma of inaccessibility. Her work demonstrates that optimism, combined with research and effective storytelling, is precisely what journalism needs now.

Image Courtesy Of Youtube

Image Courtesy Of Axios

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GirlTech Word Search

CREATED BY ISABELLE JIAO ‘26

Words may appear forward, backward, horizontal, vertical, or diagonal. Good luck!

F M P G T Q T D P V P X W K G T U T D M Z G
G N I T I D E E N E G F O L A K P P P U H E
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V A Y N X K I O E S O C T I R M F Z V A D C
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CONSERVATION
DESIGN

GENE EDITING
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VIDEOGAMES
AIR CONDITIONING

MICROPLASTICS
SOCIAL MEDIA

BONUS: ?