

The 28 Percent

Women make up only 28% of the STEM workforce. This newsletter aims to change that.



September 2024

Table of Contents

- 01 Who is the 28%?
- 02 Female Birds - the Unsung Heroes
- 04 Endangered Species Spotlight: Pangolin
- 06 Overshoot Day
- 08 Short Chats with a WIS: by the JMHS crew



Who is the 28%?

Women make up only 28% of the STEM workforce. This newsletter aims to change that.

The 28% is a monthly newsletter created by the women in STEM at PHS and JMHS. The goal of this project is to support girls/women in STEM and build community! Each month our subscribers receive a newsletter just like this one - that will feature relevant events, scholarship/program information, features on some cool women, and articles/artwork created by students.



This project started 4 years ago in the peak of the pandemic - with 7 girls over Cisco Webex. On November 1, 2020, we put out our first newsletter. We had 9 subscribers.

In the past four years since then, we have grown and been able to accomplish so much as a team. Today, we have two teams of girls at two high schools, spanning across all four grades. We have layout designers, writers, artists, and social media managers. We send the newsletter to over 150 subscribers. We've published dozens of issues. We have started traditions and hosted festivals, retreats, and events. We have developed a partnership and are funded through the GirlsBuild organization.

We are now looking to grow even more! If you are a student at PHS - of any gender - that is interested in earning service hours by supporting women in STEM - we want you to join us! We are looking for:

Writers! Artists! Layout Designers! Event Planners! Social Media Managers! Website Designers!

Join the Remind by texting or drop by a lunch meeting!
PHS meets Mondays in E208 @ Lunch - JMHS meets Fridays in A156 @ Lunch

Female Birds – the Unsung Heroes of Evolution and Survival

written by Paulina Mcconnell

Think of a bird.

Is it colorful? Maybe a bright red cardinal, or a mallard duck with an iridescent green stripe? Now: is it singing? Do you hear the complex melody of a finch, or the proud churr of a wren?

Well, I'm willing to bet ten dollars that the bird you're picturing right now is a male. Male birds are renowned for the stunning breeding plumages that they don each season. When you see paintings or pictures of birds, you're looking at the males. If you listen to recordings of their songs, it's the males whose voices are heard. Female birds, on the other hand, are not such superstars. You won't come across a female bird's picture unless you google "female" in front of it, and in nature documentaries and field guides, the females are usually dubbed the "duller" of the family. Come to think of it, can female birds even sing?

The answer is yes, they can. In at least 64% of species, female birds are proven to regularly sing, and this number will continue to grow as more research is done. Some notable species include female red-winged blackbirds, which offer a countermelody - tut-tut-tut - to their male counterparts' conk-a-reee, or Bullock's orioles, of which the females do more singing than the males. The species where female birds don't sing are mostly migratory. It comes down to evolutionary advantage: because migrating female birds needed their energy for long, crosscontinental trips - not to mention laying eggs - they evolved to conserve more energy by omitting singing. But to judge the capabilities of female birds only by their vocal proficiency would neglect the areas where they truly impress.

The truth is, female birds are essential to the evolution of their species

Nearly two hundred years ago, naturalist Charles Darwin - the father of evolution - was both fascinated and perplexed by how elaborate the plumage on male birds could be. He pored over samples of peacock feathers and wondered why - how - they became so... well, fancy. Darwin proposed an idea that complimented his theory of evolution: sexual evolution, the belief that female birds drove their species to prettier plumage by breeding only with the most fantastically feathered males. Of course, in 1860, British society wasn't too welcoming of the idea that females could hold power in anything - especially not in the evolution of an entire species.



Darwin's contemporaries were also doubtful that something so seemingly frivolous as beauty could be a driving force behind natural selection. So, Darwin's theory was thrown out and scolded.

However, around 1970 - right as the second wave of feminism swept through America, demanding equality in the workplace and a life outside the housewife's sphere - studies about sexual selection made a comeback. Evolutionary biologists realized that females were often not only selecting for males that were aesthetically superior, but that had more complex songs. At the same time, it was decided that additional environmental pressures also drove females to behave and evolve differently. Social selection, scientists realized, was a broader category of several factors that affected both males and females in different ways.

Another long-standing assumption about female birds was that they were more often the victims of multi-pairing males. While females stayed home on the nest, it was thought that males would often dash off in pursuit of other females to mate with. Some males could have parented up to a dozen different broods, or batches, of chicks in a single season.

In recent years, however, ornithologists like Bridget Stutchbury of York University have proved that there's another side to this story. By carefully studying the day-to-day routines of parenting hooded warblers, small yellow songbirds of the Northeast, Stutchbury recorded the females leaving their nests up to three times a day to seek out other males. What's more, when the fathers of their chicks left the scene, they would project their mating calls to other males in the area. These females were screaming "I'm available, right over here!" and actively seeking out other partners.

It's easy to read these behaviors and think that mother birds messing around with eligible bachelors isn't exactly "girl power". But as with selecting the most capable males, everything these females do has a purpose.

What Stutchbury and her colleagues discovered is that not only did the females mate with these other bachelor males, but they enlisted them to bring food to their nests. One male would arrive at the nest carrying a worm for his female's chicks, and minutes later, another male would drop by with the same grub. The ornithologists also noticed that this pattern was most prominent in areas where food was scarce. These observations suggest that female birds intentionally breed with more or less males depending on the availability of food in their nesting habitat. In effect, female birds create a safeguard against starvation for their children, ultimately playing the males off one another to ensure the survival of their species' next generation.

Girl bosses, indeed.

And as with most sciences, every player in the field of ornithology - the study of birds - has the power to change the whole. In this case, a fuller understanding of female birds will benefit the entire field of birding. How? Sure, it combats patriarchy in the world of field science - and who doesn't love that? But mainly, it enhances scientists' abilities to correctly interpret what they see in birds. It's impossible to understand a species by just looking at half its population. Moreover, because male and female birds often have distinct behaviors or even habitats, grasping the need to study both is essential to successful conservation efforts. These efforts are often vital to the survival of critically endangered species. In this way, addressing both male and female populations will lead to more successful protection that can save bird species on the brink.

Endangered Species Spotlight: Pangolin

written by Kaley Simkins

There's a pretty good chance that you've never learned about pangolins or even know what they are, so it may very well be a shock to hear that they are the most poached and illegally traded mammal in the entire world. Found in Asia and Africa, these primarily nocturnal animals share similarities with species you've most definitely heard of, like anteaters and armadillos. They have long snouts and big claws that help them dig into the ground to eat ants, termites, and larvae. They lack teeth but have long tongues, and they produce mucus from large salivary glands to ensure bugs will stick. Additionally, they have the ability to constrict their ears and nostrils while digging to prevent their dinner from crawling inside and have a muscular stomach adapted for grinding food. They have large, firm scales that cover their entire body and makeup 20% of their weight. When threatened, they'll roll into a ball for selfdefense and expose their sharp scales to potential predators, as well as emit an unpleasant odor from their glands. The pangolin is a solitary mammal and will only be around others when mating or raising their young, who will go off on their own after a few months of relying on their mother. It is hard to know for certain how many of these scaled critters are left in the wild because of rampant illegal trade, but researchers estimate there are about 10,000

According to recent data, over one million pangolins were poached over a ten-year period for their meat, scales, and skin. Predominantly in China, pangolin meat is considered a delicacy and their scales are used for luxury items as well as medical remedies that treat a myriad of conditions including arthritis, rheumatism, and menstrual pain - all of which have been scientifically proven false. In America, there is a high demand for leather products like boots, bags, and belts that use pangolin skin.

As the pangolin rate of extinction grows higher every year, so does the effort to protect the species. The World Wildlife Fund, which raised over \$433 million for a multitude of endangered species last year, is partnering with TRAFFIC, a wildlife trade monitoring network, to protect pangolins from wildlife crimes, help governments mount strong defenses against poaching, and reduce the demands for illegal wildlife products in Asia and Africa. A similar organization, the American Wildlife Fund, is making efforts to bring awareness to illegal trade with campaigns featuring celebrities like Jackie Chan and Yao Ming. This work aims to educate the consumers of wildlife products about the damages of pangolin poaching and the truth about medicinal products. Through their Canines for Conservation program, they have deployed trained sniffer dogs to active wildlife tracking hubs like seaports and airports to intercept illegal trades across the continent. Lastly, AWF works with communities near vulnerable species to provide them with tools and incentives for sustainable agriculture that can wane them away from hunting endangered animals.



Overshoot Day

written by Mallika Sheshadri

The Earth, our beautiful planet, has long provided us with a bounty of resources allowing us to expand and reach great technological heights. But the Earth has its limits. Earth Overshoot Day marks when our demand for ecological resources and services in a given year surpasses what Earth can regenerate in that year. Since 1971, the Global Footprint Network has been tracking the annual world overshoot day and calculates each country's overshoot day. In the 1970s, Overshoot Day consistently fell in December, but since then, it has steadily fallen earlier and earlier in the year. The 2023 Overshoot Day fell on August 2nd, 2023, meaning that humanity's demands are 1.7 times what the Earth can produce. The Global Footprint Network calculates Overshoot Day by determining the biocapacity (what the environment's population can produce in a year), and the ecological footprint (what the population uses in a year). By finding the difference between these two numbers they find the Overshoot Day of each country and average it out to determine the global Overshoot Day.

Although World Overshoot Day fell in August this year, the Overshoot Day of the United States of America, Canada and similar first-world countries happened far earlier, on March 13th, meaning these countries used up all of the resources their country could naturally restore in one year in a little over three months, meaning that these countries' use of resources is nearly four times what it should be.

Even though Overshoot Day is reached before the end of the year, society keeps operating as normal with the same greed for natural resources. But how? Now that the Earth's budget of resources for the year has been exceeded, we have officially encroached on 2024's resource budget. Actually, if you add up the resources used up past the allotted yearly budget from the last fifty years, we are now using natural resources from 2035. Because of the fact that we keep reaching into the future to sustain our inefficient system, we are unable to see the immediate effects of overshooting; rather, we are chipping away at the end of our life on earth, ripping pages out of the back of the notebook so to speak.

This bears the question; what can an individual do to help? Unfortunately, not much., but educating yourself on the topic is a good start. Commit yourself to a couple of environmentally-conscious habits (ie; replace plastic water bottles with a metal one), and more importantly, encourage the people around you to do the same. Adopting the habit is great, but it makes little difference unless you're loud about it. Writing letters or emails to your local legislative representatives is another way be proactive about the climate crisis. Being environmentally aware can make you a target for bullying, and it can be emotionally taxing to stand your ground. Some habits are a difficult undertaking and may be hard to keep up with; others may feel like a financial burden. Whatever habits you may take on, I encourage you not to give up, for the sake of the only planet we have.

A Greener New York City

written by Ariana Soto JMHS Chapter

New York City is one of the most populated areas in the US, with a population of around 8 million people. In order to be able to inhabit so many humans within the city space, there had to be lots of industrial changes to the natural landscape. Various buildings were created to act as housing, attractions, and businesses.

By now, NYC has changed so much that it's unrecognizable from how it was before its urbanization. That being said, its drastic change has brought along a hoard of tourists with it. This is both a positive and a negative thing. The city's high population density makes public transportation a major method of getting around. This means less car use, AKA less greenhouse gas emissions.

As of a study published in 2007, New York City's annual greenhouse gas emissions are at 7.1 metric tons per person. This is less than a third of the US's average of 24.5 tons. However, that doesn't erase the fact that for the same reason (high population density), NYC has a high concentration of pollution. Not only that, but excessive tourism leads to overcrowding and costly living expenses.

In light of all these inefficiencies, there's got to be some kind of solution to them. A rule that the government can implement to help mitigate the negative impact that humans in NYC have had on the environment is to relocate pollution sources more evenly throughout the city to lessen the disproportionate amount of air pollution in certain areas, which results in higher crime rates in those areas. This could partly be attributed to the fact that intense, prolonged exposure to air pollution is shown to cause asthma and induce aggressive behavior in humans.

Another thing that can be done as a sort of damage control would be to encourage the widespread use of solar panels on buildings (funded by state/federal taxes). A third incentive that can be started to help mitigate the negative effects NYC has had on Earth's health is for more large companies based there to put effort and profits towards lessening the air pollution they produce/finding renewable energy sources to replace it. This way, companies can continue manufacturing products without damaging Earth's atmosphere with excess greenhouse gasses.

New York is a city with boundless potential as the face of ecological policies in the US.



A Cool Woman: Natalie Gedeon: User Researcher at Netflix Games

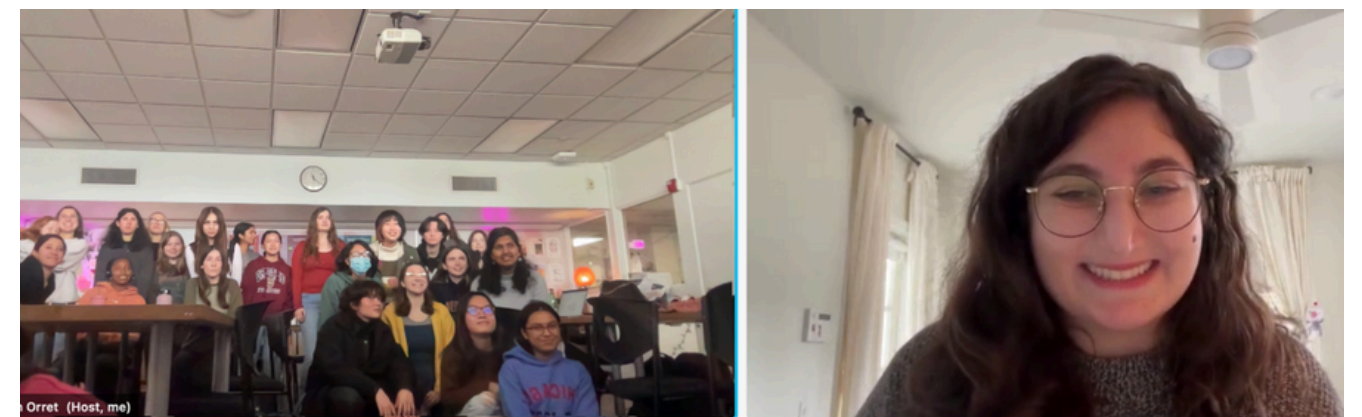
written by Madelyn Wilson

This past month The 28% Women in STEM team got to meet and hear from Natalie Gedeon, to talk about her career in Netflix games. Currently she works as a game researcher and designer at Netflix, bringing her expertise to Netflix's new and improving gaming industry. Prior to working at Netflix, Natalie worked at Riot Games and EA, working on big titles such as The Sims and League of Legends.

Natalie comes from a background in English literature and has a strong passion for 19th century literature and British literature. During her undergraduate studies those things created the foundation for a career that would bring together both art and technology. As a Games Researcher, Natalie relays what's best fitting and desired by players to the developers, similar to an analyst or market researcher. She observes players' experiences, engages with them through surveys and interviews, and researches to present onsite to developers and coders. Her role is important to identifying areas for improvement and change, as well as making the gaming experience more appealing to a more diverse audience. Natalie's favorite part of her job is working on games that she has been playing since she was a little girl. Growing up as a gamer, she now is able to bring her own unique and personal perspective to her work. While becoming a game developer, Natalie also became the first in her family to pursue a postgraduate degree. Her interests include psychology and the social sciences, which provided her with a well-rounded understanding that betters her work as a gaming researcher.

Navigating the landscape of her industry as a woman, Natalie has endured mainly positive experiences. Through her years of work, she has occasionally found herself in predominantly male dominated meetings, but over time she has witnessed a positive shift with increased diversity in both genders and ethnicities entering the field. Natalie mentioned how she makes a great effort to ensure that everyone, regardless of gender, feels welcome at the table. Reflecting on her career, Natalie holds a special place in her heart for the game "The Sims", which is her favorite game she has worked on. Through her dedication and passion

Natalie continues to move forward in the world of game development, and being an inspiration for younger generation



Short Chats – Women In STEM: Future MD., Kissia Repalda

written by Ariana Soto, John Muir HS Chapter

October is Filipino History Month! It celebrates the arrival of the first Filipinos to the US in 1857. There's no denying the major influence and impact they've had in American history. Thus, we've set up an interview with a Filipino student aspiring to major in STEM for more insight into her life and how she feels regarding her culture and career path.

Kissia Calyn C Repalda is a sophomore at John Muir currently in the Engineering and Environmental Science Academy (EESA), studying to become a surgeon. She's known as amiable, communicative, and eager to learn by those around her. Kissia was born in Pasay City, Philippines. Her favorite cultural dishes include adobo, sinigang, and sisig. When asked about cultural norms, she noted respect was a big thing and that people are usually really friendly and have a strong sense of community.

What's an accomplishment you're really proud of?

"I'm really proud of having made it safely to the US to continue my education and pursue my career. My journey to the US had a lot of ups and downs, it was a sudden change and I had culture shock. My surroundings were different, the people were different. It's not at all the same for how I grew up."

What have been your biggest challenges and how do you deal with them?

"My biggest challenge is having the discipline to get things done because I struggle with time management. Additionally, being involved in multiple activities stresses me out because I get overwhelmed with all the work."



I cope with challenges by sorting my tasks from most to least important. I tend to work independently because I know I'll get distracted if I study with others."

When asked why she remained in several extracurriculars despite the stress, she stated it was because "it can help me get future jobs that I want and help me develop new skills as well as [build connections] and network with more people."

What motivates you now academically/personally? Do you have any ideals on contributions to the STEM field?

"A lot of people, especially in the Philippines, don't get the health care they need at costs they can afford, so I want to help change that. I want to give them the help they need without them worrying about money. Thinking about that makes me want to be better at school and improve my skills. My [ideal] contribution would be making surgical discoveries that would aid people all around the globe."

Are you in any clubs?

"Yes, I'm the secretary of the AANHPI Club, Asian American and Native Hawaiian/Pacific Islander, at our school and part of the Upward Bound Math/Science program. In the AANHPI Club, we're currently sending letters to the students affected by the Maui fires. I like this activity because we're able to reach out to others and let them know they're not alone."

Kissia is one of many young women aspiring to build a career in STEM and contribute something beneficial to the world. Uniquely for a teen, she's incredibly self-aware and has devised strategies to keep charging towards her path. A study by the Philippines' Science Education Institute (SEI) stated that from 1990 to 2015, there's been an increase in women taking up careers in science, engineering, technology, and ICT. Of the 3.7 million people with a bachelor's degree in STEM accounted for in the study, around 45% of them were women. That's almost half! However, it's important to note that the Philippine Business Coalition for Women Empowerment (PBCWE) finds that the gender gap between Filipino individuals pursuing careers in STEM in particular has seen an increase over these past 25 years. Given this, it's imperative now more than ever for the Filipino community to continue supporting girls and women that show interest in this field.

To all the Kissias in the Philippines and those here in the United States, remember that you are the change necessary in STEM. Just like Fe Del Mundo, a Filipino pediatrician and the first woman to get accepted into Harvard University, you too can be the "faith of the world".

Credits & Contacts

Pasadena High School Team

Paulina McConnell	Jadyn Addicott
Maxine Scott	Avery Aldoroty
Mallika Sheshadri	Gianna Gullon
Kaley Simkins	Emma Thatcher
Hudson Zortman	Olivia Lopez
Maliha Syeed-Miller	Madelyn Wilson

Ms. Orret, Advisor

John Muir High School Team

Ariana Soto Cara Martinez Imani Duran

Ms. Beverly, Advisor

Alumni

Margaret Matthews	Madeleine Lees	Jaidyn Carroll
Chloe Vuong	Celeste Acosta	Violet Chandler
Tracey Willard	Adeline Peterson	Ruby Chew
Makenna Morrissey	Alissa Santana	Morgan Gaskell
Emma Hungerford	Cecelia Bichette	

Check out our website:
www.the28percent.com

Follow the PHS and JMHS teams!

@28_percent

@jmhs.girlsbuild

