

girlTech Women in STEM

Dec 2022 • Vol. 1 Issue 3

Winterlude Mini Issue!

**Dr. Amy
Lehman '91**

Pages 11-12

The Not-So-Jolly Side of the Holidays

Environmental Effects of
Holiday Celebrations

Pages 5



Rethink Your Makeup

Animal Testing in the Cos-
metics Industry

Pages 7-8

Amy Lehman

The Story of the Legendary Alumna

by Lauren Hsu '24 • Page 11-12

Happy Holidays

we wish you joy

Dear reader,

It's the season of joy, celebration, and reuniting, and the quest of empowering minorities in STEM never stops.

The *GirlTech* masthead is happy to present to you what was initially an experiment — a Winterlude “mini-issue” that consists of half of the number of pages in a normal issue (16 as opposed to 32).

We are grateful to our team for working diligently during this very busy time of the year, and we cannot thank our writers

enough for their incessant enthusiasm and high-quality contributions.

This mini-issue will hopefully give you a taste of the load of great articles that are to come. As you snuggle with your family in front of the fireplace with steaming hot chocolate in hand, don't forget about the continuous challenges that women and gender-non-conforming people face every day, and as always, think about ways to *empower, encourage, and educate*.

Happy holidays!

yoyo zhang

Yoyo Zhang '24, *Editor-in-Chief*

Semi

Semi Obayomi '23, *Managing Editor*

Table of Contents

The Not-So-Jolly Side of the Holidays

Syna Mathod '25 **Page 5**



A Guide to a More Eco-Friendly Holiday

Ann Song '25 **Page 6**



Rethink Your Makeup: Animal Testing in the Cosmetics Industry

Celeste Shattuck '25
Pages 7-8



Joan Clarke of The Imitation Game: Women in STEM Movie Review

Jenna Paczkowski '24
Pages 9-10

Healthcare on Water: Dr. Amy Lehman '91

Lauren Hsu '24
Page 11-12

Submit article ideas to
yozhang24@choate.edu or
sobayomi23@choate.edu!

Meet the Team

The Inagural Masthead (2022-23)



Yoyo Zhang '24
Editor-in-Chief



Semilola Obayomi '23
Managing Editor



Celina Wei '23
Head Copy Editor



Emily Son '23
Head Graphics Editor



Farah Kabbani '23
Head Layout Editor



Annika Lee '23
Photography Editor



Simone Johnson '23
Associate Copy Editor



Lauren Hsu '24
Associate Copy Editor



Erin Li '24
Associate Copy Editor



OUR MISSION

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

GET INVOLVED

Email any of us to join GirlTech Club's email list and sign up for an article! We welcome everyone.



Margarita Blackwood '23
Associate Graphics Editor



Sydney Kim '24
Associate Graphics Editor



Celeste Shattuck '25
Associate Copy Editor



Ava Persaud '25
Associate Layout Editor



Analy Vega '25
Associate Layout Editor

The Not-So-Jolly Side of the Holidays

by Syna Mathod '25



Gift-giving is at the core of the holiday season. The moment Thanksgiving ends, holiday gift shopping begins and rolls of wrapping paper, ribbons, and cards become household staples. Americans wrap almost every gift they give, but why?

For many, wrapping a gift conceals its identity and adds a personal touch, creating a more pleasant experience. Gift wrapping is widely normalized and an almost required part of the process. But once the time comes to open a present, the paper is ripped to pieces and ribbons thrown aside. While giving gifts cultivates kindness and improves morale, the disposable nature of consumer culture can have a strong environmental impact.

According to a study conducted by Stanford University, Americans produce 25% more trash between Thanksgiving and New Year's than any other period, resulting in 25 million tons of extra waste. The holiday months prompt Americans to buy in excess — from gifts to food to clothing. When people express love and appreciation for others, unwanted gifts,

packaging, and wrapping paper end up in the landfills. American gift-giving culture has become increasingly wasteful over the past few decades.

A common misconception surrounding holiday waste is that wrapping paper is recyclable, but that is not always the case. Most decorated paper is lined with a form of plastic, such as glitter or tape, meaning it must be thrown away in landfill. On top of that, the wrapping paper is fragile, making it difficult to reuse. The

glitter on the paper lining is microplastic and will cause danger to marine animals if it ends up in the ocean. The impact of a single piece of wrapping paper can be more than it seems.

American holiday culture promotes consumerism, creates more waste, and harms the planet. Shopping and gift-giving affects the environment in ways that are not immediately obvious, thus, it is important to choose sustainable products, limit wasted wrapping paper, and be aware of the possible environmental consequences.



Graphic by Margarita Blackwood '23

How to Have an Eco-friendly Holiday

A Three-Step Guide

by Ann Song '25



While shopping for gifts, consider bringing a reusable tote bag. This will help eliminate the use of plastic bags during the

holiday season. When choosing gifts to buy, look for eco-friendly and long-lasting items. This includes stainless steel water bottles or recycled notebooks. Finally, when wrapping gifts, try an eco-friendly alternative to wrapping paper like reusable gift bags.



During parties and family gatherings, minimize food waste by approximating how much food you will need. Encourage guests to bring reusable containers for leftovers or donate remaining food to a local food bank. In addition, you can buy locally grown food to reduce your carbon footprint. Serving guests with reusable cups, plates, and utensils will further cut down on waste.



Graphics by Clip Art Library



A telltale sign that the holidays are around the corner is the decorative lights. There are many opportunities to be sustainable while decorating during the holiday season. For example, aim to use Energy Star qualified LED lights. They are 90% more energy efficient and last significantly longer than traditional lights. Old holiday lights can also be recycled. Additionally, avoid buying plastic decorations and consider using natural items for a biodegradable alternative. For instance, evergreen branches, berries, and flowers can all be used as decorative items around the house. Buy a real Christmas tree, which can be replanted and reused next year with intact roots, instead of an artificial one.

Rethinking Your Makeup

Animal testing in the cosmetics industry

by Celeste Shattuck '25

Over the past few years, the global cosmetics market has grown to over \$350 billion in value, with manufacturers employing over 50,000 people internationally. Even with the widespread availability of beauty products, we rarely think of the animals that may have been maimed or sacrificed to create our lip glosses and mascaras.

The worldwide practice of animal testing for cosmetics

first emerged in the late 1930s, when U.S. companies were tasked with evaluating their products to ensure that they met the requirements of the newly enacted United States Food, Drug, and Cosmetic Act.

This law, implemented in 1938, was created to institute guidelines for the safety and proper labeling of cosmetics products sold in the U.S.

For cosmetic brands at this time, testing products on

animals such as rabbits and mice was a relatively simple and practical way to establish the ostensible harmlessness of their products. Now, after more than 80 years of development in technology and ethics, public perception of cosmetic animal testing has changed drastically. Many animal rights organizations and activists are speaking out against the practice.



Graphic by Sydney Kim '24/GirlTech Magazine

Humane Society International estimated that roughly 100,000 to 200,000 animals are victims of animal cruelty in cosmetic animal testing annually. Oftentimes, this kind of testing involves evaluating effects like skin and eye irritation and toxicity using injection or substance application. NPR reported, “Most animals involved in research are killed at the termination of the experiment, are kept in conditions not conducive to their welfare, and are otherwise harmed in myriad and significant ways.”

Moreover, animals involved in cosmetic testing are typically not protected from abuse and cruelty by the Animal Welfare Act. This means that cosmetics companies are not legally obligated to protect the safety of their animal test subjects.

Although humans share approximately 95% of their DNA with mice, rodent animal testing is often inaccurate in predicting human reactions to ingredients included in cosmetic products. In fact, according to People for the Ethical Treatment of Animals (PETA), “a comparison of data from rabbit tests and four-hour human-skin patch tests for 65 substances found that 45% of classifications of chemical-irritation potential based on animal tests were incorrect.” Even so, companies continue to test animals with exceedingly variable experimental results.

While an increasing number of companies and countries are ridding them-

selves of cosmetic animal testing, 44 out of 50 of the largest global cosmetics brands continue to fund this practice. For the

most part, this phenomenon is because of the requirements for cosmetic testing in China, whose cosmetics market grew 13.8% in 2021. China has only recently partially lifted its animal testing mandate for all cosmetic products manufactured outside of the country. Thus, companies that want to take advantage of the booming Chinese market still practice animal testing in creating products.

However, as of 2021, 44 countries have banned the sale of animal-tested cosmetics, including all of the European Union (EU). The European Commissioner in charge of Health and Consumer Policy Tonio Borg said at the time of the EU decision in 2013, “This is a great opportunity for Europe to set an example of responsible innovation in cosmetics without any compromise on consumer safety.”

Many ethical objections to animal testing assert that these experiments act in accordance with an unjustified higher moral evaluation demonstrated by humans.



Image courtesy of ZeeVector

This feeling of superiority is often rationalized by a presumed greater emotional and intellectual intelligence over animals. However, recent technological improvements now allow companies to protect consumer safety while refraining from animal testing.

These new methods include human-like tissue models such as EpiDerm and Corrositex. According to PETA, “Instead of measuring how long it takes a chemical to burn the cornea of a rabbit’s eye, manufacturers can now drop that chemical onto cornea-like 3D tissue structures produced from human cells.”

In addition to these alternatives, many cosmetic companies, such as The Body Shop and Tarte, opt to use only ingredients that have already proven to be non-toxic and safe for humans in their products, removing the need for animal testing. With so much innovation in the cosmetics industry, companies have no excuse to test their products on animals.

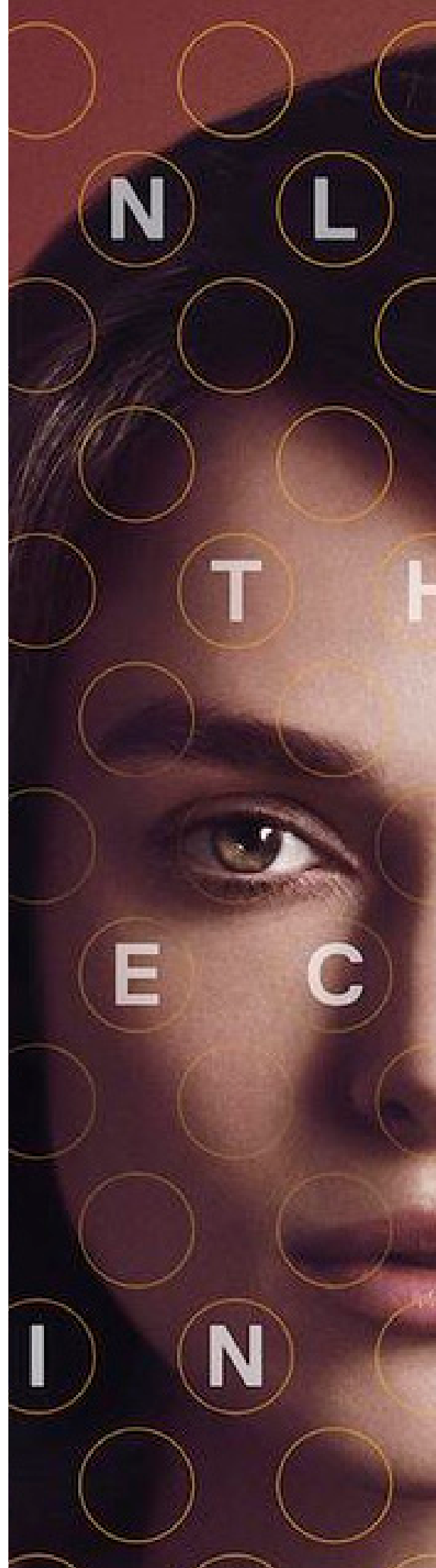
Joan Clarke: A War Hero Represented

by Jenna Paczkowski '24

The Imitation Game (2014) is based on the story of how Alan Turing, “Father of Computer Science,” cracked the infamous Nazi Enigma code. The Enigma code was devised by the Enigma machine, which the Nazis used as primary communication. These codes were thought to be impossible for any human to crack, as the Enigma had millions upon millions of combinations to work through.

While the film centers around Turing, it does include an unsung hero — Joan Clarke. Portrayed by English actress Keira Knightley, Clarke was a cryptanalyst whose work was instrumental in breaking the Enigma code. Before working at Bletchley Park, a British cryptanalyst establishment that operated during WWII, Clarke earned a double first degree in mathematics. However, she was denied a full degree because the University of Cambridge only awarded them to men at that time.

Clarke then went on to work with a group at Bletchley Park nicknamed “The Girls” because it was composed mostly of women. With “The Girls,” Clarke intercepted Nazi messages in Morse code for the cryptoanalysts to decode until she was recruited to decode those messages herself. She worked with Turing in a group known as “Hut 8,” of which she became the deputy head of at one point. However, because of the rampant sexism at the time, she could not progress to a higher position and was paid less than her male counterparts.





In the movie, Clarke was almost turned away from a job as code-breaker at Bletchley Park because she was believed to be a secretarial candidate, a stereotype stemming from the belief that women could not do the same jobs as men. Turing, however, allowed Clarke into the room where she solved a difficult puzzle before everyone else, including Turing himself. Crossword puzzles were indeed an actual method used by Bletchley Park to recruit code-breakers in reality, but historical documents recorded that Clarke was recruited by her former academic supervisor.

In the movie, despite her incredible crossword puzzle performance, Clarke was, again, held back by her gender. Her parents did not want their daughter to work in decoding because she would be surrounded by men. Although this obstacle did not happen in real life, it was in fact taboo for women at the time to be in so-called “men’s spaces,” even if the woman was qualified.

In the few scenes that Clarke was in, her abilities were denounced due to her gender. Although these dramatic scenes were included for cinematic effect, they still represent a woman’s experience in a male-dominated academic space. Women had to continually prove themselves to even set a foot in the doors where men had easily walked through. Clarke herself put it best, saying, “I’m a woman in a man’s job and I don’t have the luxury of being an ass.”

Joan Clarke exemplifies a woman in STEM. She worked in a male-dominated profession with elevated expectations and pressure. *The Imitation Game* represents the obstacles women in STEM face when challenging social norms, which still exist today. The film embellishes some aspects of the truth, and in doing so, gives viewers a holistic depiction of the obstacles women in STEM continue to face today.

Image courtesy of *Twitter*



Photos courtesy of Amy Lehman

Lake Tanganyika is one of Africa's oldest lakes and the longest freshwater lake in the world. Bordered by Tanzania, the Democratic Republic of Congo, Burundi, and Zambia, it is home to millions of people as well as rich in natural resources and biodiversity. In this strategic location, Dr. Amy Lehman '91 founded the Lake Tanganyika Floating Health Clinic (LTFHC) in 2009. The organization provides health care and delivers medical supplies by boat, supports and trains local health centers, gathers data, builds communication between the local government and other organizations, and raises awareness of the significance of the Lake Tanganyika Basin.

From a young age, Dr. Lehman had an interest in medicine. After suffering from a serious illness as a child, she was dissatisfied with the way she was treated as a patient. While at Choate, she gravitated towards foreign languages, literature, and social sciences. After graduating, Dr. Lehman

attended the University of Chicago, where she realized her interest in medicine and science, saying, "The best thing that I could do was to become a medical doctor that I thought patients deserve to have, that I could treat my patients in the way that I thought they ought to be treated, instead of the way I had been treated."

Dr. Lehman went on to receive an MBA and MD from the University of Chicago, with hopes of becoming a thoracic surgeon. Afterwards, she trained in General Surgery at the University of Chicago Medical Center, and was also a senior fellow at the MacLean Center for Clinical Medical Ethics, a non-profit in Chicago.

Dr. Lehman's career took a turn after her right arm was injured by a surgery, making a path in surgical medicine less feasible. Around the same time, in 2006, Dr. Lehman visited the Lake Tanganyika area, where she saw that a large lakeside population was isolated from the rest of the world. Amongst other prob-

lems, the area had poor roads, supply chain issues, and inadequate public health. With the hope of improving basic healthcare and infrastructure for these communities that were only accessible by boat, Dr. Lehman came up with the idea of LTFHC. Dr. Lehman's injury compounded her drive to start a hospital on water, leading to the birth of the health clinic after three years of planning.

LTFHC, which began with delivering medical supplies by boat and transporting people to lakeside health centers, continues to expand its programs. Recently, the organization finished developing an app called Iroko Health. The app records community-level health data in the Democratic Republic of the Congo (DRC), where physical health records are easily lost in the turmoil of insecurity and weak infrastructure, but many health workers have limited experience with laptops and touch-screens. Iroko, which was created with

Healthcare on Water

Dr. Amy Lehman '91

by Lauren Hsu '24

feedback from health care workers on the ground, has the potential to be rolled out across the country and benefit millions.

Since 2016, LTFHC has been collecting data in areas of South Kivu, a province of the DRC located on the shore of Lake Tanganyika. In early 2022, the organization recorded extensive data on households, wild fisheries, water quality, mosquitoes, and conducted interviews with local chiefs and fishers. The research will inform further action around malaria (the number one cause of death in the area) as well as around fisheries and the natural environment, which are important sources of food and income for the community. The data from South Kivu has been used in collaboration with the University of Chicago Booth School of Business since 2018. Operations management researchers and LTFHC are developing a supply chain model to distribute spatial mosquito repellent to households.

Combining their own substantial knowledge and connections in the area with Booth's help in examining the supply chain, LTFHC hopes to utilize local workers and businesses to deliver import-



ant products, such as spatial mosquito repellent, to those in need.

Tackling the multidimensional issues the way LTFHC does requires knowledge across many disciplines. Dr. Lehman explained, "Some-

thing that's really important about attacking problems is knowing what you know and knowing what you don't know, as well as having a certain amount of humility about knowing what you don't know about, and seeking out that information and seeking out people with expertise in these other areas." She further emphasized the need for multidisciplinary learning, saying, "When one looks at complex problems in the world, there isn't a magic solution that usually exists only in one field ... to be a truly responsible participatory member of society, I think we all need to have a certain baseline across multiple disciplines."

Dr. Lehman said that although her work is hard, it is never boring, and she enjoys the challenge. She reflected, "I get to immerse myself in fascinating and also really consequential problems. I'm trying to contribute in a positive way."

References

Holiday Season Sustainability

(2022, October 7). This Living Composter Is the Perfect Eco-Friendly Gift Idea for Anyone on Your List. Good Housekeeping. <https://www.goodhousekeeping.com/holidays/gift-ideas/g30188103/eco-friendly-gifts/>

(Accessed 2022, November 21). Sustainable Housekeeping. Sustainable Holidays - NYS Dept. of Environmental Conservation. <https://www.dec.ny.gov/chemical/8829.html>

Animal Testing in the Makeup Industry

Animal testing & cosmetics. (1999, May 31). U.S. Food and Drug Administration. Retrieved September 25, 2022, from <https://www.fda.gov/cosmetics/product-testing-cosmetics/animal-testing-cosmetics>

Cruelty in animal testing laboratories. (2022, February 9). PETA. Retrieved September 26, 2022, from <https://www.peta.org/issues/animals-used-for-experimentation/cosmetic-household-products-animal-testing/>

de Pauliny, C. (2021, November 19). Animal testing for cosmetics. Impakter. Retrieved September 25, 2022, from <https://impakter.com/what-is-animal-testing-in-cosmetics/>

Full EU ban on animal testing for cosmetics enters into force. (2013, March 11). European Commission. Retrieved September 26, 2022, from <https://ec.europa.eu/commission/presscorner/detail/en/IP13210>

Garner, S. (2016, February 14). The 'necessity' of animal research does not mean it's ethical. NPR. Retrieved September 25, 2022, from <https://www.npr.org/sections/13.7/2016/02/14/464265210/the-necessity-of-animal-research-does-not-mean-it-s-ethical>

Global cosmetics market trends, share, size, growth, opportunities and forecast 2022-2027. (2022, February 22). Business Wire. Retrieved September 25, 2022, from <https://www.businesswire.com/news/home/20220222005701/en/Global-Cosmetics-Market-Trends-Share-Size-Growth-Opportunities-and-Forecast-2022-2027---ResearchAndMarkets.com>

Meredith, J. (2022, February 16). Is animal research ethical? Understanding Animal Research. Retrieved September 26, 2022, from <https://www.understandinganima.org.uk/news/ethics-of-animal-research>

Rose, S. (2021, October 4). 88% of top beauty brands fund animal testing (Animal testing statistics). Cruelty-Free Kitty. Retrieved September 26, 2022, from <https://www.crueltyfreekitty.com/news/animal-testing-statistics/>

Skin irritation and corrosion. (2021, May 25). PETA. Retrieved September 26, 2022, from <https://www.peta.org/issues/animals-used-for-experimentation/skin-irritation/>

Timeline: Cosmetics testing on animals. (n.d.). The Humane Society of the United States. Retrieved September 26, 2022, from <https://www.humanesociety.org/resources/timeline-cosmetics-testing-animals#:~:text=1938%3A%20The%20United%20States%20Food,testing%20their%20products%20on%20animals>

Zuazua, R. (2017, March 9). Cosmetic animal cruelty: The good, the bad, and the ugly. Fine Magazine. Retrieved September 26, 2022, from <https://www.finehomesandliving.com/featured/cosmetic-animal-cruelty-the-good-the-bad-and-the-ugly/article~22f3191b-8ef2-50a6-962a-c540748a9b43.html>

A War Hero Represented: Joan Clarke

Dockterman, E. (2014, November 28). The True Story of The Imitation Game. Time. Retrieved November 27, 2022, from <https://time.com/3609585/the-true-story-of-the-imitation-game/>

Joan Clarke. History of Scientific Women. (n.d.). Retrieved November 27, 2022, from <https://scientificwomen.net/women/clarke-joan-158>

Lewis, R. (2016, October 5). Bletchley Park. Encyclopaedia Britannica. Retrieved November 27, 2022, from <https://www.britannica.com/place/Bletchley-Park>

Moore, G. (2014). Imitation Game. Netflix. United Kingdom; The Weinstein Company. Retrieved November 24, 2022, from Netflix.com.

Moore, K., W, E., Dean, J., & Williams, C. (2016). Enigma machine. Brilliant Math & Science Wiki. Retrieved November 27, 2022, from <https://brilliant.org/wiki/enigma-machine/>

V, M. (2018, July 11). Innovating for Victory. The National WWII Museum | New Orleans. Retrieved November 27, 2022, from <https://www.nationalww2museum.org/war/articles/innovating-victory>

Williamson, T. (2022, January 25). History of computers: A brief timeline. LiveScience. Retrieved November 27, 2022, from <https://www.livescience.com/20718-computer-history.html>

Holiday Harms

Frequently Asked Questions: Holiday Waste Prevention | Land, Buildings & Real Estate. (2022). Stanford. <https://lbre.stanford.edu/pssstanford-recycling/frequently-asked-questions/frequently-asked-questions-holiday-waste-prevention>

Bratskeir, K. (2018, December 23). It's Officially Time To Ban Gift-Wrapping Paper. HuffPost. https://www.huffpost.com/entry/ban-gift-wrapping-paper_n_5c1d5c12e4b0407e907af36c/amp

Parker, L. (2017, November 30). To Save the Oceans, Should You Give Up Glitter? National Geographic. <https://www.nationalgeographic.com/science/article/glitter-plastics-ocean-pollution-environment-spd>

Amy Lehman '91

Amy Lehman of the Lake Tanganyika Floating Clinic [Film]. (2012). NextBillion.

Dr. Amy Lehman, founder of the Lake Tanganyika Floating Health Clinic. (n.d.). Doctorpreneurs. Retrieved November 28, 2022, from <https://doctorpreneurs.com/dr-amy-lehman-founder-of-lake-tanganyika-floating-health-clinic/>

Georgie. (n.d.). 7 facts about Lake Tanganyika you might not know. True Travel. Retrieved November 28, 2022, from <https://www.true.travel/lake-tanganyika-facts/>

Lehman, A., Dr. (2022, September). [Online forum post]. Mailchimp. <https://mailchi.mp/2abbc363cb4b/tales-from-the-field-what-we-are-learning-on-ubwari>

Lehman, A., Dr. (2022, October 10). [Videoconference interview by the author].

Programs. (n.d.). Lake Tanganyika Floating Health Clinic. Retrieved November 28, 2022, from <https://www.floatingclinic.org/>

Spotlight on Amy Lehman, founder of the Lake Tanganyika Floating Health Clinic. (2021, March 24). Open Institute. Retrieved November 28, 2022, from <https://openinstitute.africa/spotlight-on-amy-lehman-founder-of-the-lake-tanganyika-floating-health-clinic/>

HAPPY
Holidays!

Word Search

GirlTech Scavenger Hunt!

by Ava Persaud '25 & Annika Lee '23

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

medicine
animals
gender
holidays

cosmetics
abortion
education
research

healthcare
equality
testing
wrapping

science
technology
engineering
math

Anyone can write for *GirlTech!*
yozhang24@choate.edu
sobayomi23@choate.edu

Cover art courtesy of Deutsche Bank