The Lion Ledger

Winter 2023 Page 1

Editor's Note:

Welcome to the Winter Edition of The Lion Ledger! The following pages contain various articles discussing everything from scone recipes to early childhood interventions from over fourteen different student contributors. We are incredibly proud of our student body and especially proud of all of our first-time contributors who made this a truly great issue. So cuddle up in a cozy blanket, sip on a warm beverage, and enjoy!
-The LTS Editors

Winter GSA and Harrisburg/ Hershey Events

Feb 14 - GSA Social Coffee Hour Heart Themed
Feb 20 - GSA Social Happy Hour at Lancaster Brewery (Harrisburg)
Feb 25 - "Mac and Motors" Macaroni & Cheese Festival, AACA Museum
March 2-3 - Graduate Student Forum
March 2-5 - PA Home and Garden Show, Pennsylvania Farm Show Complex
March 4 - Harrisburg Ice and Fire Festival
March 20 - GSA Social Coffee Hour Spring Themed
April 5 - GSA Social Ice Cream Sundae Bar
April 29 - GSA Social Hershey Gardens

Cover artwork by Arrienne Butic

The Lion Ledger

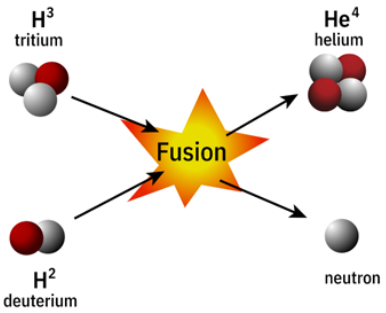
Featured Articles

Science in the News

A Hope for Clean Energy: Nuclear Fusion

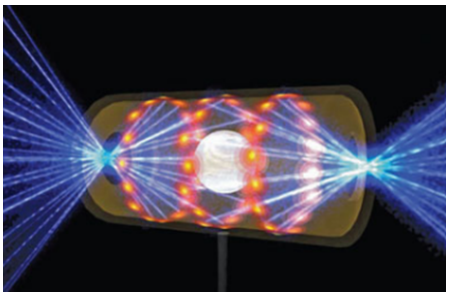
By Paige Bond

Achieving nuclear fusion has been a scientific goal for decades. It is important not to confuse nuclear fusion with nuclear fission, which creates large amounts of nuclear waste. Nuclear fusion, in contrast, has the potential to become a clean energy source. A simple way to explain nuclear fusion is to look at different isotopes of hydrogen. Tritium, an isotope of hydrogen with one proton and two neutrons, combined with deuterium, an isotope with one proton and one neutron, produces a helium atom and a lonely neutron when fused (pictured below). This



reaction, which is present on the surface of the sun, is unique in that it produces more energy than is put in. The long-term goal of fusion reactions is to utilize this clean energy to power our everyday lives.

In short, scientists achieved this reaction by utilizing lasers to shoot 192 beams of light to excite isotopes of hydrogen housed in a small golden container (pictured below).



Although this sounds relatively simple, getting two elements to combine and form another one is extremely difficult. Extremely high pressure and temperature is needed to overcome the repelling positively charged protons in the nuclei of the atoms. Despite these difficulties, achieving this monumental task late last year brings renewed interest and hope in this potential future energy source.

Unfortunately, the implementation of this technology is still decades away. The cost of the equipment largely exceeds what is necessary for a feasible power plant and the reaction needs to be sustained much longer in order to produce enough energy. Other engineering hurdles need to be overcome before this technology is available to power our homes, but this momentous experiment at least proves that the basic science does indeed work.

Behold, A Role for the Humble Anole: Little Lizard Inspires Supercapacitor Design Breakthrough

By Julia Simpson

There has been a major breakthrough in supercapacitor technology, and it was inspired by the breathing strategies of a lizard.

Put simply, supercapacitors are energy storage devices that are increasingly being integrated into a diverse range of innovations across the energy and industrial sectors,

from electric screwdrivers, to electric vehicles, to cutting-edge solar power. Supercapacitors offer several advantages over traditional batteries; for instance, they are more environmentally friendly due to a lack of heavy metals and they have extremely high cycle life. In the *Angewandte Chemie* (Applied Chemistry) publication describing the supercapacitor breakthrough, authors – a combined team of UK- and China-based scientists – explain that supercapacitors aim to provide the highest energy possible, while simultaneously achieving the highest power density (power output per volume of the device) possible. The barrier to progress lies in the fact that many avenues that successfully raise energy result in a decrease in power density, and vice versa. In search of strategies to overcome this barrier, authors turned to the natural world – specifically, to the Anolis lizard.

Semi-aquatic *Anolis* lizards have terrestrial ancestry. This means, as the animals later adapted to stream ecosystems in the neotropics, they needed

Figure 1: a depiction of an Anolis lizard utilizing its narial air bubble re-breathing technique underwater.

to outmaneuver the limitations of those pesky things called "lungs" when diving for food. Evolution had to get creative. The solution: these lizards carry narial (nostril-associated) air bubbles with them when diving, allowing them to iteratively "re-breathe" the air, a system which permits prolonged submersion up to eighteen minutes (Figure 1).

Where herpetologists and other reptile-enthusiasts just see an imaginative evolutionarily adaptation, the authors of the *Angewandte Chemie* paper saw something more. Inspired by the re-breathing strategy of the Anolis lizard, the researchers envisioned a supercapacitor whose energy density was dramatically increased via the cyclic reduction/oxidation (redox) of a tiny bubble of chlorine gas upon an electrolyte-submerged, corrugated electrode surface – just like the anoles sustaining themselves underwater on their travel-size pocket of recyclable air.

To test their idea, the research team conducted a series of experiments on prototypes of their new supercapacitor system. Chlorine gas was selected for the redox reaction due to its favorable reaction kinetics, and is even more attractive for the feasibility of its use in future scaled-up supercapacitor production – chlorine is a highly available substance due to the incredible abundance of chloride in seawater. Researchers then studied a range of carbon materials with varying pore sizes to determine which combinations were more capable of generating and holding chlorine gas. Further experiments explored CR supercapacitor cycling performance, stability, versatility under various

temperatures, and the effects of different chemical additives in the aqueous bath on enhancing the supercapacitor's electrochemical performance. In the end, tests showed that several versions of the CR supercapacitor outperformed existing supercapacitors on the market in terms of power and energy performance.

What does all this mean? Well, should the CR supercapacitor design prove reliable and scalable, it could mean rapid advances across the disparate fields that utilize supercapacitor technology. As for the role of the anoles - this is not the first technological innovation inspired by natural phenomena, and it certainly won't be the last. If nothing else, let this story emphasize the importance of creativity and out-of-the-box thinking in the scientific process.



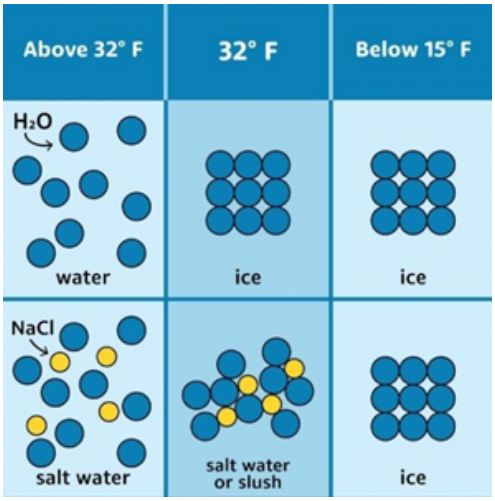
Science of the Season: Winter Edition

Ice Ice Baby: Science Behind Winter Ice Hacks

By Stephanie Baringer

1. Why does salt melt ice?

The most common solution to icy roads and sidewalks is road salt (NaCl) because salt reduces the freezing point of water. Water normally freezes at 0°C (32°F) when the hydrogen bonds between water molecules strengthen and the resulting crystalline structure becomes solid. When salt is added, it dissolves into sodium and chloride ions. Sodium and chloride disrupt and 'loosen' the hydrogen bonds between water molecules. The disruption of bonds prevents the formation of neat crystalline structures, and thus ice, from forming. However, the effects of salt on water freezing point are finite. If you traveled during the holidays in December 2022, you may have noticed that once temperatures drop below -10°C (14°F), road salt is ineffective. Other salt compositions, such as magnesium chloride ($MgCl_2$) or calcium chloride ($CaCl_2$) are able to further lower the freezing point of water because they are made of three atoms instead of two.



2. Why do you slip on ice?

Navigating icy terrain all comes down to how you distribute your weight. When you normally walk, each of your legs support your weight with each step, resulting in your center of gravity distributed between your two legs. Your foot steps forward and lands at an angle, which allows you to keep momentum and move forward with less effort. In fact, most bipedal organisms move this way because of its efficiency. However, this energy-saving

movement is the reason why we are so prone to slipping on ice. Penguins, on the other hand, have evolved to waddle while keeping their center of gravity more aligned with their moving foot. This removes the fluid distribution of weight that often causes falls on ice. So, if you want to reduce falls this winter, walk like a penguin and focus all of your weight to your forward flat foot with each step.

Ski Resorts and Artificial Snow

By Paige Bond

Ski resorts rely on artificial snow to upkeep slope conditions for longer despite fluctuating weather patterns. The basic design of the first commercially successful snowmaking machines has been pretty constant since the 1950's. The machine creates many tiny droplets of water by pushing water and compressed air through a nozzle. The tiny droplets forced into the environment experience a sharp drop in pressure, turning them into "snow seeds". Combined with a fine mist, these snow seeds start to accumulate freezing water. This creates little spheres of ice that fall onto the ground, creating artificial snow.

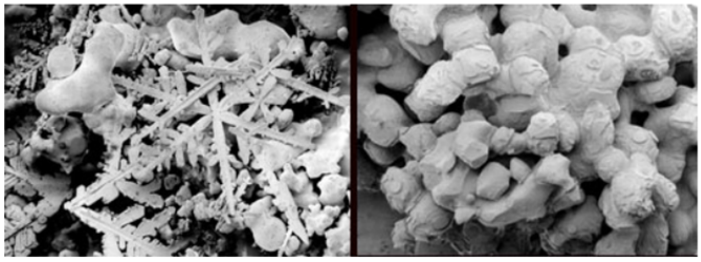


Image: Structural differences between natural snow (left) and artificial snow (right).

The most notable evolution in the history of snow machines was the discovery of Snowmax. In 1975, Steve Lindow discovered a nucleating agent present on plant leaves that protected them from frost damage. This nucleating agent, now called Snowmax, attracts water molecules to help them crystallize. Snowmax is now commonly produced from freeze-dried bacteria commonly found on the leaves of plants.

Many skiers cannot tell the difference between artificial snow and natural snow. Artificial snow can be icier than natural snow, but it is less fragile. This allows skiers to gain more speed while going down the mountain, but the harder surface makes crashes more dangerous. Regardless of these miniscule differences, ski resorts rely on artificial snow and snow making to stay open longer. With increasing temperatures globally, this technology is going to be an integral part of ski resort operations.

Dehnel's Phenomenon: Honey, I Shrunk the Shrews!

By Laura Odom

Hibernation is an overwintering technique commonly used by several species, especially mammals like rodents and bears, to preserve energy stores until

spring comes back around and food is plentiful again. During hibernation, an animal's metabolic rate slows, and its body temperature drops, causing it to essentially take a season-long nap. However, one family of mole-like critters approaches overwintering a bit differently: they shrink!

Recent research on the shrew subfamily *Soricinae* has shown that these little mammals exhibit a remarkable decrease in whole body and internal organ size and mass during the winter months followed by a subsequent period of regrowth in the following spring. This process is called Dehnel's phenomenon, a reference to the biologist August Dehnel who first reported these morphological changes in shrews in 1949. According to a recent study by researchers Lázaro and Dechmann in *Cell Current Biology*, a summer juvenile shrew's body mass will decrease 21% from summer to winter and increase 82% in spring as it becomes an adult. The most notable organ transformation can be seen in the brain, and subsequently, the skull: the brain's mass shrinks by 21% in winter and only increases by 10% in spring (Figure 1). Most shrews only live to the following summer, so this dramatic change is observed only once in each individual. Shrews have extremely high metabolisms, requiring them to feed several times per day or face starvation. Upon downsizing their bodies and internal organs, shrews can reduce their metabolic costs and remain active in colder climates during the winter when food is scarce.

Figure 1. Sketches of seasonal variations in the skull and body size of the common shrew, *Sorex araneus*. From left to right are depictions of a summer juvenile, winter subadult, and spring adult shrew. (Illustration by Javier Lázaro)

This phenomenon also presents researchers with potential avenues for applied research. A 2018 study by Lázaro and colleagues found that juvenile shrews exhibit superior spatial recall compared to winter subadults, and that spatial recall is recovered in spring adult shrews. These cognitive changes are likely a result of the concurrent alterations in brain mass and connectivity during these developmental periods. Therefore, findings from studies on Dehnel's phenomenon can inform research efforts in topics such as neurodegeneration and plasticity, degenerative bone and joint diseases, and metabolic disorders. You never know where new insights may arise in health science – they may just be from a tiny critter that gets even tinier!



Current Student Feature: Christopher Kendra

By Victoria Pearce

Christopher Kendra, or Chris as most know him, came to the College of Medicine in 2017 from snowy Binghamton, New York. Chris has an incredibly unique background with his undergraduate degree in Nanobioscience. He found his passion for microbiology when he started graduate school. In fact, he is looking to enter the world of Clinical Microbiology and can regularly be found at plate rounds in the clinical microbiology lab at the med center. Dr. Elizabeth Garrett, the Associate Director of Microbiology at Hershey Medical Center expressed, "*Chris has a true passion and enthusiasm for microbiology. In addition to being a great scientist and budding clinical microbiologist, he's a wonderful person as well*". Further, Dr. April Bobenchik, the Director of Microbiology says "*As a mentor I couldn't be happier with Chris' progress towards a career in clinical microbiology, I truly admire his dedication and commitment to the field. I am confident that one day he too will be a diplomat of the American Board of Medical Microbiology*". He surely will become a fantastic clinical microbiologist after graduation.

Outside of lab, Chris has a true passion for service as he has served in numerous positions throughout GSA including President and Vice President where he exemplified a devoted student leader. In fact, Jordan Chang says "*I have known Chris for several years and he is one of the most hardworking people I know. He excels in his academics while still making time for his friends and family. Not only is he an advocate and representative for the student body, but he is also not afraid to tell you how it is. His presence in this program has truly made it for the better*". Additionally, recent graduate Dr. Rebecca Fleeman says "*Chris is one of those rare individuals who is extremely smart, humble, and also kind, willing to help you day or night. He has the ability to make you feel heard, and always encourages others to be themselves. Chris is a workaholic that has poured his heart out for both his research and his peers and I highly respect how well he understands his field.*" As someone who has the pleasure of interacting with Chris on a daily basis, I could not agree more with these statements.

Additionally, if Chris' brains or passions haven't intrigued you,

one of his hobbies is leatherworking. He has taught himself how to make a number of different items and hospital staff members have even sought him out to put in custom orders for his work! You can check out his work on Instagram @exploreleather!

Chris continues to amaze me with his knowledge, passion, and desire to learn new things each day. He is an invaluable member of the student body and an amazing friend.



Winter Recipes: Drinks

Boilo

By Alexis Scudder

The coal region in Pennsylvania is known for three things: its coal production (of course), The Office, and its cold, snowy winters. What better way to keep warm in these terrible winters than with a warm cocktail?

Coal Region Boilo – or just Boilo – is a yuletide drink

native to the coal region and has been enjoyed by folks in this area for over a century. Traditionally, it was thought of as "the Anthracite miner's cure for everything" and was often used as a remedy for colds, the flu, and general aches and pains. Many miners who populated this region would take to drinking this warm drink after a cold day in the mines. As time passed, people of this region transitioned to bringing it around for holiday celebrations and many still drink it today.

Ingredients:

1 bottle (750 mL) whiskey
4 whole oranges
4 whole lemons
2 cups honey
2 cinnamon sticks
2 tablespoons dark raisins (optional)
1 teaspoon caraway seeds
1 teaspoon whole allspice berries
12 whole cloves
1-liter orange juice

Instructions:

1. Cut the whole oranges and lemons into quarters. Squeeze to release juices into a pot and then add the unpeeled fruit to the pot. Add orange juice and all remaining ingredients EXCEPT whiskey.
2. Bring to a boil.
3. Reduce heat and slowly simmer, stirring frequently for around 20-25 minutes.
4. Strain the liquid to remove all solid pieces from the mixture.
5. Allow the mixture to cool slightly (adding alcohol to a boiling mixture will cook off some of the alcohol, which defeats the purpose)
6. Away from the heat, add a bottle of whiskey. Stir to blend.
7. Serve warm.

Apple Cider Margarita
By Laura Odom

Margaritas are usually associated with warm weather, but this recipe is for those cold, snowy days when you're stuck inside and craving something tangy, sweet, and festive.

Ingredients:
1 ½ oz tequila (blanco or reposado)
2 oz apple cider (store bought cold or chilled)
¾ oz triple sec or Cointreau
¾ oz lime juice
1 lime
Optional:
Cinnamon powder
Granulated sugar
Star anise or cinnamon stick garnish (optional)
Instructions:
Add liquid ingredients to shaker and fill with ice
Add 1-3 dashes of cinnamon powder (optional)
Shake until cold and strain into glass with ice and cinnamon sugar rim
Cinnamon sugar rim:
Add equal parts cinnamon powder and sugar on a plate
Cut a small slit in a lime wedge and rub it on the rim of the glass
Press rim onto cinnamon sugar plate, rotating the glass to evenly coat the rim
Gently knock off excess and garnish with lime wedge and star anise or cinnamon stick if desired

Hot and Cold Drinks for the Winter Season
By Paige Bond

In the season of cold and flu, nothing boosts your immune system more than fruit-packed fruited tea. *(Disclaimer: fruited tea provides no protective or curative measures against colds or the flu).* What I like about this recipe is that it satisfies both my need for a caffeine boost and my love of citrus.

FRUITED TEA

Ingredients:
2 cups of water
15 regular size black tea bags (or 5 family size)
¼ cup of mint leaves or ¼ tsp of dried mint leaves
2 cups sugar
8 T lemon juice
Twist of lime (optional)
1 12-ounce can of frozen orange juice concentrate-thawed

Instructions:
Bring water to a boil. Remove from heat, add tea bags and mint leaves. Cover and steep for 6 minutes. Discard tea bags. Combine tea mixture and remaining ingredients in a gallon sized pitcher. Fill rest of

volume with water. Mix well and let sit overnight in the refrigerator.

If fruited tea has more ingredients than you bargained for or you want a nice warm drink, I recommend Red Hot Apple Cider. This simple recipe produces a nice cinnamon-spiced cider perfect for cold winter days.

RED HOT APPLE CIDER

Ingredients
Red Hots 6 oz box
Honey crisp apple cider- 89 oz
Splash of whiskey (optional for extra warmth)

Pour cider into crock pot, add Red Hots, stir. Cook on high for 2 hours, stir, decreases temperature to warm. Serve.

Winter Recipes: Pastries and Sweets

Lemon Blueberry Scones (Vegan)

By Jackson Radler

Yield: 8 scones

Ingredients:
Dough
2 cups AP flour
1 Tbsp baking powder
1 Tbsp ground flax seed
1/2 tsp salt
1/2 cup sugar
1/2 cup coconut oil (or cold plant butter)
3/4 cup plant milk
1 tsp vanilla extract
1 cup blueberries

Glaze
1/2 cup powdered sugar
1 Tbsp plant milk
1/2 tsp lemon extract
Zest of 1 lemon

Instructions:
1. Preheat oven to 400F
2. Combine flour, baking powder, flax, salt, sugar.
3. Add coconut oil, use hands (or pastry cutter) to work in until coarse crumbs form.
4. Add milk and vanilla, stir.
5. Add blueberries, fold in.
6. Line a baking sheet with parchment paper. Lightly flour counter. Knead dough a few times. Flour outside of dough ball if it's too sticky to work with. Flatten into a circle, 1" thick. Cut into 8 pieces (like a pizza).
7. Bake 22-26 min, until lightly golden brown on top.
8. While baking, combine glaze ingredients. Let scones cool before drizzling on glaze.

Eggless Christmas Cookies

By Gayatri Karadkhedkar

"Christmas is here bringing good cheer to young and old meek and the bold"

The Christmas "Carol of the Bells" rightly says that Christmas brings a lot of joy and happiness all around us. Christmas is one of the happiest times of the year as you get together with all your loved ones and spend the holiday having fun with them.

During this time of the year everything lights up and

everyone is cheerful as the shops, cafes, and houses are beautifully decorated. The best part of Christmas is when you get to spend this time with your family and friends in the warmth of your house. This time spent with loved ones would definitely be incomplete without some hot chocolate and some cookies to go with it to fill everyone with joy.

So, here is a fun recipe for making eggless sugar cookies which you can make with your family and friends. These cookies are light, tender, and melt in the mouth. These can be perfect treats during Christmas and can be a fun activity for the kids and the adults to bring out their inner artist. You can decorate these cookies with sugar, icing, sprinkles, or a combination of these. This simple recipe is also great if you are a newbie at baking. So, let's just get baking.

Ingredients:

For the cookie:

Powdered sugar (1.5 cups),
Milk (4 tablespoon),
Baking powder (1.5 tablespoon),
All-purpose flour (3 cups),
Salted butter (1 cup),
Vanilla extract (1 tablespoon).

For the frosting:

Powdered sugar (2 cups),
Vanilla extract (1/2 tablespoon),
Milk (4-5 tablespoon or according to the thickness of your frosting),
Food colouring (of your choice).

Instructions:

Making the cookie dough:

1. Take a bowl, add the salted butter in it, then add the powdered sugar and cream using a whisk or a hand mixer. First start on low speed and when they have mixed well with each other you can mix on medium speed for 2-3 mins.

2. Add vanilla extract and milk to the bowl and mix it well. This mixture should still look fluffy.

3. In another bowl mix the dry ingredients. Sift the flour and add baking powder to it.
4. Add the dry ingredients to the wet ingredients bowl. Mix until the dry ingredients are incorporated but do not over mix them.
5. You will now have a dough which is soft but firm at this point. It should not be dry and crumbly. If so, add a tablespoon of milk and mix it well.
6. Now transfer this dough to a clingwrap, give this dough a shape of a block and then seal wrap it.

7. Refrigerate this dough for 30 mins to chill.

Cut and bake cookies:

8. When your 30 mins are done, remove the dough from the refrigerator. Unwrap the dough and cut it into halves.
9. Start with one of your halves while you refrigerate the other.
10. Cut a parchment paper and place the half of the dough in between two parchment papers so that your dough does not stick to your counter.
11. Roll the dough to a 1/4th inch thickness, keep in mind

do not roll out the cookies very thin as they might turn out to be hard after you bake them.

12. After you get a cookie sheet, cut out the shapes you desire with a cookie cutter or just use a glass to shape your cookies round.
13. Prep a cookie tray with parchment paper and place these cookies on the tray.
14. You can roll out more cookies with the other half to any shape you want.
15. Now, bake these cookies at 350˚F for 7 mins if you want soft cookies. Check the cookies, if they are not done then cook them for 8-10 mins if you want crispier cookies.
16. After the cookies have baked, remove the cookies from the oven and let them sit on the tray for 2 mins. Use a spatula to transfer the cookies

to a cooling rack.
17. Let the cookies cool down completely before you start your frosting.

<u>Frosting the cookies</u>:

18. Take a bowl and mix powdered sugar, vanilla extract, and milk to form a thick but flowy paste.
19. Take care not to make it too flowy or it would run down from the cookies.
20. If you want to add colours to your frosting, you can add drops of the food colour of your choice.

To frost your cookies, you can either dip your cookies in the frosting or you can fill your frosting in a piping bag and then decorate them. If you do not have a piping bag you can also use a zip lock bag.

You can also add sprinkles, sparkles, and make various designs on your cookies. Cookie decorating can be a fun activity to do with kids or your friends and family.

Now your eggless sugar cookies are ready!! Enjoy!

A Non-Comprehensive Review of the Coffee Shops in the Hershey/Harrisburg Area

Kincheloe G, Radler J, Urbanik L

Introduction

Coffee has long aided students and faculty through the hardships of professional school. In its most formidable form, leaded with caffeine, it enhances alertness, cognition, and, for many others like ourselves, pleases the palate unlike any other liquid. Now, those who live in the Hershey/Harrisburg area often face two choices: Do they go to Starbucks or do they go to Dunkin? Herein, we raise the question of, what if there were other options? Are there local cafes not owned by giant corporations that roast and brew a better cup of joe in a more comfortable environment? Unfortunately, most people don't have the time (or overconfident self-styled coffee tasting prowess) to sample all of the local options. So, how can an average bean enthusiast know which places are worth it? In this literal review paper, eight coffee shops were evaluated based on five metrics for the readers in an attempt to identify alternative warm bean water in the surrounding area.

Methods

When designing this study, five metrics were determined to evaluate each coffee shop. Four of these metrics are evaluated on a five-point scale (1-trash, 2-not happy, 3-neutral, 4-very happy, 5-flawless) and are as follows:

1) Price: Prices of each of the three test drinks were numerically recorded and standardized to the cheapest coffee shop's prices. The cheapest coffee shop was set at five stars and every other coffee shop was rated based on this scale.

2) Distance from Penn State College of Medicine (COM): This metric was set by taking the average of the three evaluator's scores on a five-point scale. Due to each evaluator (and thus the readers) having different views on what denotes a long drive, the average of each subjective score was taken to better encompass this view.

3) Taste: In order to properly evaluate the quality of the heated bean product, a panel of three evaluators each tasted the drip coffee, espresso, and cold brew (CB) (or latte if cold brew was unavailable) and rated it on a five-point scale. All drinks were prepared black (except for the latte, don't be ridiculous). These ratings were averaged for the final rating of that particular bean product. While it would have been preferable to have this study utilize blindfolds for the evaluators to avoid bias, this was an unavoidable limitation to the study due to the fact that the evaluators still had to drive.

4) Ambiance: Three evaluator scores for ambiance were averaged for a final five-point score. Qualities considered were seating, artwork, music, wi-fi connection, wall outlets, and various other *je ne sais quoi*.

5) Notables: Anything that did not fit into the above metrics was mentioned in a notables section.

Results

Name and Total Score	Price Score	Distance from COM	Overall Taste	Taste Breakdown	Ambiance	Notable
Cocoa Beanery	3.75	4.83	2.65	Drip: 2 CB: 3.6 Espresso: 2.3	2.66	Large outdoor patio, high tempo jazz almost always playing.
Folklore	3.33	1.66	4.11	Drip: 4.3 Latte: 4 Espresso: 4	3.5+	The experimental visit took place in the middle of renovations. Ambiance is expected to improve. Open at later hours.
Elizabethtown Coffee Co.	5.0	1.66	2.99	Drip: 2.6 CB: 3.8 Espresso: 2.5	2.0	Connected to a public library, which could be either good or bad, depending on the reader.
The Tiger Eye	3.33	2.0	3.22	Drip: 2.5 CB: 3.6 Espresso: 3.5	4.5	Small tables and ice cream. Open later in the day.
St. Thomas Roasters	3.75	1.0	3.43	Drip: 3.5 CB: 3.3 Espresso: 3.3	4.0	Open later in the day. Outdoor walled patio also has heaters.
3J's Coffee	3.0	2.0	3.71	Drip: 3.3 CB: 4.1 Espresso: 3.6	2.66	3J's now has a drive-through window.
Little Amps	3.33	1.33	3.38	Drip: 3.0 CB: 4.0 Espresso: 3.1	3.66	May have to pay for parking.
Elementary Coffee Co.	3.33	1.33	3.66	Drip: 3.5 CB: 4 Espresso: 3.5	3.66	May have to pay for parking.

Discussion

This unscientific, unblinded, and overall uncontrolled experiment tested eight coffee shops in the surrounding area and subjectively ranked them on five metrics. A notable limitation to this study is the absence of reviews for coffee shops such as Good Brotha's Book Café, Denim Coffee, The Midtown Scholar, Cornerstone Coffee House, and Brew Crumberland's Best, all of which are just as deserving of your business as the above choices. However, time and funding limitations held the authors to only eight locations. It should also be noted that some locations were evaluated without an appropriate washout period. This experimental design was not able to control for the psychological and physiological effects of consuming 3 or 4 coffee drinks in the span of a few hours.

Though some scores may seem harsh, the taste scores followed a fairly normal distribution, with nearly all locations falling in the 3-4 range. In addition, a total score (eg: an average score including all four scored metrics) was avoided in this study due to the disproportionate weight assigned to the category of "Distance from the COM." Because of this, these scores would have given the Cocoa Beanery a higher score than any other test location, which the authors will simply not stand for. Any further inquiries may be addressed to the authors if you run into one of them in a hallway somewhere.

Acknowledgements

The authors would like to thank The Lion Ledger for publishing this nonsense, as well as Gabriel Davis, who helped in an evaluation.



Layman with Lions: Summaries of Recent PSCOM Papers

By Gaelyn Lyons

As of 2020, diabetes affects 463 million people world-wide and will continue to grow each year. People with diabetes often develop diseases that affect blood vessel growth and development including diabetic retinopathy. Diabetic retinopathy (DR) is characterized by abnormal growth of and damage to blood vessels in the retina of the eye and can cause vision loss. Previous studies identified that the high concentration of glucose that is seen in diabetes plays a role in the damage to the blood vessels, however how this occurs is still unknown. Many studies have shown that a stress-response process, called oxidative stress, influences the development of diabetic retinopathy. Oxidative stress happens when there is an imbalance of unstable oxygen-carrying molecules, called reactive oxygen species (ROS), with antioxidants in the cell. ROS can damage the cell, which is why it is important for the cell to be able to regulate ROS levels. However, many diseases, like diabetes, can disrupt the cell's ability to regulate ROS and cause complications like diabetic retinopathy.

The Michael Dennis lab here on the Penn State College of Medicine campus studies what events in the cell contribute to the development of diabetic retinopathy and how these events occur. One protein they study is the stress response protein REDD1. Previous labs, including the Dennis lab, identified REDD1 to play a role in oxidative stress-related development of diabetic retinopathy, with increased levels of the protein present in the retina. In December 2022, Dr. William Miller, a recent alum of the Dennis lab, published a study that investigated what caused the increase in retinal REDD1 protein in diabetic models. He used molecular, animal, and computational studies to investigate the mechanism.

In Dr. Miller's study, he observed that the high glucose levels seen in diabetes, called hyperglycemia, increased the

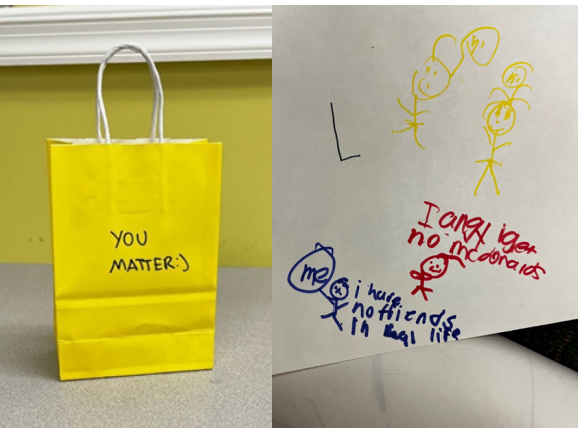
presence of REDD1 and the levels of ROS. Using both molecular and computational methods, he found that a hyperglycemic environment promotes the formation of a bond between two closely located cysteine amino acids in REDD1. To observe how this bond affected REDD1, Miller collaborated with PhD student Congzhou Sha, a member of the Dokholyan lab, to perform a computational method that predicts how particles within a molecule interact with each other. This method, called a discrete molecular dynamics (DMD) simulation, predicted that a valine at the 178th position in the protein chain (V178) interacts with the bond, as well as binding site within REDD1 that interacts with another protein, called a chaperone protein, that plays a role in protein degradation. Miller showed that in the presence of the bond, V178 blocks the binding site of the chaperone protein and prevents the degradation of REDD1, leading to the accumulation of REDD1 and increased levels of ROS in diabetic retinopathy. By uncovering this mechanism, Miller identified a new potential target that can be used to treat diabetic retinopathy and help prevent the progression of the disease in diabetic patients.If you're interested in learning the details of this study, you can find the paper here! And if you are interested in learning more about the Michael Dennis lab, you can find the lab website here!

Strengthening the Mental Health of Future Generations

By Christopher Almeda

My name is Christopher Almeda, I am currently an MPH student studying Epidemiology and Biostatistics at the Penn State College of Medicine. Over the summer I interned at Mental Health America of Lancaster County, a non-profit organization attempting to educate Americans about mental health conditions and reduce barriers in treatment and services. Through my internship, I created an educational program aimed at children age's 5-12, which was

implemented at summer camps across Lancaster County. The program entailed a fun hands-on mental health activity called "Doodle Your Emotions." During this time, I would ask a series of questions regarding specific emotions. For example, I would ask "In your guy's mind what does happiness look like and what color represents it for you?" The children were then allowed to draw their representation of the emotion on a long sheet of construction paper that I provided and were free to use whatever colors they pleased. After the activity I would then pass out a gift I made for them. I created "Positivity Baggies," which were yellow gift bags that had



items to reinforce positive mental health habits. For example, each bag had a stress ball, calming strips (sensory strip for anxiety), headphones, and words of affirmation stickers. Each bag also had a handwritten message stating "You Matter." I explained to the children why I chose that message and encouraged them that they have a purpose, regardless of what others might say.

To be honest, this whole experience was emotionally draining at times, especially after losing my father during the internship but I am proud of what I accomplished. I am not sure if the children were impacted by my work, but I hope I at least helped save one life. I know that I was impacted, especially by a little girl who resonated with my experience with depression, as she drew me a heart telling me she loved me. I loved the drawing so much that I went and got it tattooed. It was also amazing to see each child's emotional intelligence and creativity. Due to the popularity of the program, Mental Health America of Lancaster County plans to incorporate it again this coming summer. Anyone interested in getting involved or if you have a passion for mental health awareness should contact Executive Director Kim McDevitt: kmcdevitt@mhalancaster.org. They are excited to add new members to the team and although I am no longer interning at the organization, they still make me feel a part of the MHA family!

Transcending Boundaries

By Shivani Godbole

"What is the purpose of your visit, ma'am?"

"I'm here to get my master's in biomedical science". If only it were as easy as giving the answer to this question. Little did I know, my life would take a 180 degree turn when the immigration officer at the IAX, Houston asked me that question. And thus, my journey started in the highly anticipated US of A.

My first impression of the US was, "This is straight out of my television screen." It felt surreal to finally be somewhere I had dreamt of all my life. What brought me back to reality, though, was the speed of the cars. In India, I had never driven more than 30 miles/hour, and suddenly, I was going as fast as the airplane I had just disembarked. My first meal in the US was the highly coveted vanilla shake from Sonic, which felt like heaven after 20 hours of travel. After almost a week and a half in Texas, I

finally made it to Pennsylvania and thus started my journey of being "single in the city."

My first impression of PA was beautiful. I am not saying this just because I prefer mountains to beaches, but PA is truly serene. Then I arrived to Hershey, the town I now call my home. Being a city girl all my life, I was not thrilled to be in a small town, but it grew on me, especially due to the people. When I first arrived, I felt like an alien, just as my visa status (legal alien) says, I was unsure if I would be accepted for who I am, but I was pleasantly surprised. The kindness given to me really rekindled my faith in humanity and made me realize that humanity does transcend all boundaries.

My journey so far has been a learning curve. I'm still getting accustomed to gallons, miles, and Fahrenheit, along with driving on the opposite side of the road. I have experienced social adjustments as well. Even though Indians treat their guests as Gods - we literally have a phrase for that *'Atithi Devo Bhava'* – the sleepy town of Hershey, PA rivals my home with its hospitality. While I was not used to making small talk with a complete stranger, greeting people on the street now gives me a certain sense of belonging.

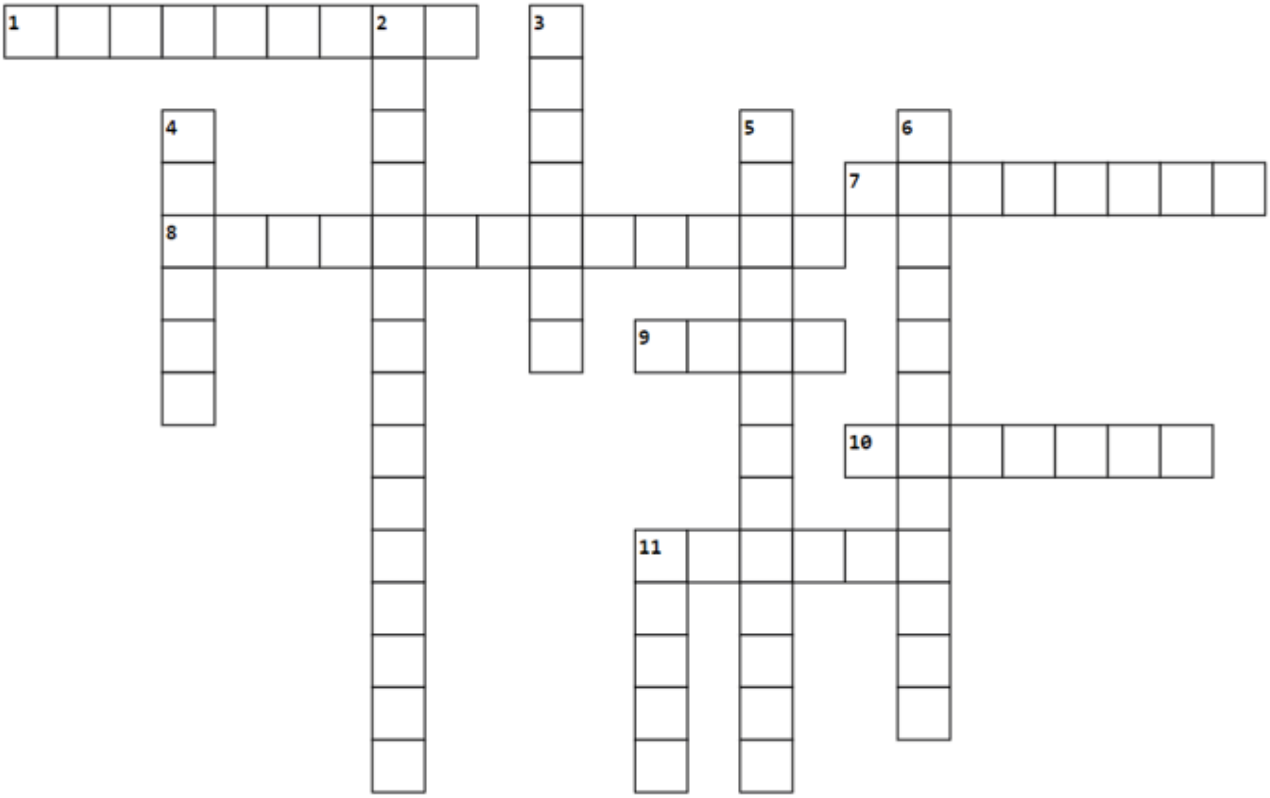
The highlight of my journey so far has to be Christmas! I always wished for a white Christmas, and even though I did not get one this year, I have high hopes from 2023. Christmas was a bittersweet holiday for me. Being away from family is not easy and seeing everyone else enjoy the holiday with family made the separation that much harder. Despite my holiday blues, I went for an Alcoholics Anonymous (AA) meeting on Christmas. AA, a truly American concept (as it was formed in the United States) taught me a big lesson about the culture. You can ask for help and you will find it, unconditionally and it was a liberating experience. I certainly hope India adapts to the thought of normalizing addiction instead of perceiving it as a taboo. I also hope India adapts Starbucks's mocha frappuccinos and caramel brulé lattes. I still have a lot to learn about the culture, lifestyle, and the country as a whole, but to put it in a nutshell, the USA is the land of the free and the home of the brave and a golden opportunity to learn the valuable lessons in life and to grow.

If you enjoyed what you read and want to contribute to the Spring 2023 issue, please don't hesitate to reach out to us at lionstalkscience@gmail.com with your idea or keep an eye out for sign-ups when the trees start having leaves again!
Stay warm,
The LTS Editors

Puzzles, Comics, and Artwork

Winter Issue Crossword



Across:

1. Shrew subfamily
7. the coffee shop with the best drip coffee
8. Chris Kendra's impressive hobby
9. one of the many things central PA is known for
10. walk like a __ to reduce slipping on ice
11. the process of combining two nuclei to create energy

Down:

2. Indian saying of hospitality
3. attracts water molecules to aid in crystallization
4. how to add blueberries to scone batter
5. optional garnish for an apple cider margarita
6. the coffee shop closest to COM
11. GSA event in early March

(Hint: The answers to the clues are hidden in select articles from this issue of Lion Ledger!)
To fill in this crossword (by puzzlemaster Stephanie Baringer) on your computer, follow this link:
https://crosswordlabs.com/embed/winter-issue-crossword-2