
RESEARCH YEARBOOK
2018-2019
MIT

Editors in Chief

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Dana Guggenheim

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Acknowledgements

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This has been an amazing four years of research, and without all of you, none of it would have been possible!

Research Awards 2018-2019

Regeneron Science Talent Search (STS)

The Science Talent Search is one of the most prominent high school research competitions in the United States. From approximately 1800 entries, 300 scholars are selected. Scholars receive $2000. From the 300 semifinalists, 40 are selected as finalists. Finalists compete in Washington D.C. for a week for awards up to $250,000.

Justin Schiavo	Finalist
Adrian Ke	Scholar
Brandon Lee	Scholar
Mayeesa Rahman	Scholar
Lindsey Rust	Scholar

Long Island Science and Engineering Fair (LISEF)

LISEF is held annually at the Crest Hollow Country Club in Woodbury. Students from all over Long Island present their projects using poster boards and oral presentations. Approximately 25% of students are selected to move on to Round II, and top winners in each category are sent to the International Science and Engineering Fair (ISEF).

Jeffrey Yu	1st Place in Material Science and Engineering
Lindsey Rust	2nd Place in Behavioral Science
Adrian Ke	3rd Place in Behavioral Science
Justin Schiavo	3rd Place in Material Science and Engineering
Asher Bykov	Honorable Mention in Behavioral Science

Junior Science and Humanities Symposium

JSHS is designed to challenge and engage students (Grades 9-12) in science, technology, engineering or mathematics (STEM). Individual students compete for scholarships and recognition by presenting the results of their original research efforts before a panel of judges and an audience of their peers.

Brandon Lee	2nd Place
Jasmine Berger	Semifinalist
Emily Leventhal	Semifinalist
Alex Liu	Semifinalist

Stemanities

Stemanities is a competition that seeks to promote and reward research at the intersection of science and the humanities. Students across the country submit papers. In 2019, the top 10 projects were invited to present at the finals held in La Jolla, CA.

Sophie and Gabby Fries	1st Place

Long Island Science and Engineering Fair Junior Varsity (LISEF JV)

LISEF's junior varsity fair is judged by area science teachers. Students describe their research using presentation boards, and the top performers are recognized. The early timing of the fair (March) allows students who have progressed enough by this point in the year to have another presentation opportunity.

Nicole Blattman	1st Place in Cell Biology
Joshua Flashner	2nd Place in Computer Science
Daleep Grewal	3rd Place in Cell Biology
Sophie Fries	Honorable Mention in Behavioral Science
Maddie Rubin	Honorable Mention in Material Science and Engineering
Feyi Rufai	Honorable Mention in Behavioral Science

Long Island High School Psychology Fair

The Long Island High School Psychology Fair is a forum for the presentation and celebration of students' research in the field of psychology. The fair affords students an opportunity to present their work to an audience of their peers as well as a group of expert judges. Founded in 2008 by a group of high school teachers, the purpose of the fair is to promote the empirical study of psychology and the sharing of such work between students.

Adrian Ke	Best in Category
Sophie and Gabby Fries	Best in Category
Maleeha Rahman	Honorable Mention
Lindsey Rust	Honorable Mention

Long Island Science Congress (LISC)

Over 500 students each year prepare poster boards and oral presentations and are judged by high school teachers. A select group of highest honor award winners are invited to participate in the State Science Congress.

Will Borges	High Honors
Jake Stoller	High Honors
Andrew Goldberg	High Honors

Alida Pahlevan and Katie Lam	High Honors
Ariana Matarangas	High Honors
Mackenzie Komack	High Honors
Olivia Viruet-Quintero	Honors
Lianna Friedman	Honors
Jake Litvack	Honors

WAC Lighting Invitational Research Association Fair (RAF)

Students from 12 Long Island High Schools present projects to experts in the field. Seniors and students who completed their research in labs participate in the senior division while most other high students participate in the junior division.

Senior Division

Jasmine Berger	1st Place in Behavioral and Social Science
William Borges	2nd Place in Chemistry
Adrian Ke	3rd Place in Behavioral and Social Science
Jake Stoller	3rd Place in Biochemistry and Molecular Biology
Dana Guggenheim	Honorable Mention in Chemistry
Lauren Christenson	Honorable Mention in Behavioral and Social Science
Emily Leventhal	Honorable Mention in Behavioral and Social Science
Maddie Rubin	Honorable Mention in Biochemistry and Molecular Biology

Junior Division

Makenzie Komack	1st Place in Behavioral and Social Science
Madeline Groothuis	2nd Place in Behavioral and Social Science
Lianna Friedman	2nd Place in Behavioral and Social Science
Olivia Viruet-Quintero	2nd Place in Behavioral and Social Science
Joshua Flashner	3rd Place in Computer Science and Modeling
William Xu, Daniel Liu, Trevor Kim & Ben Farhi	3rd Place in Behavioral and Social Science
Feyi Rufai	3rd Place in Behavioral and Social Science
Sara Lok & Josie Mashkevich	3rd Place in Behavioral and Social Science
Laura Chu & Chelsea Kumar	Honorable Mention in General Biology
Ariella Hakimi	Honorable Mention in Behavioral and Social Science
Ria Malhotra & Ali Malik	Honorable Mention in Behavioral and Social Science
Hailee Youn, Ethan Kessler, Bennett Levine & Jessica Chen	Honorable Mention in Behavioral and Social Science

Maya Groothuis, Abby Silverman, Natalia Hakimi & Yasmine Kaplan	Honorable Mention in Behavioral and Social Science
Sebastian Plaza, Amelia Abraham, Jaideep Grewal & Elaine Lee	Honorable Mention in Behavioral and Social Science
Luke Christenson, Saydie Grossman, Hailey Margulies & Sam Jacobson	Honorable Mention in Behavioral and Social Science

eCybermission

The eCybermission competition is a web-based Science, Technology, Engineering, and Mathematics competition for 6th, 7th, 8th, and 9th grade teams, run by the Army Educational Outreach Program. The competition aims to have participants create and propose solutions to real problems in communities, with teams competing for State, Regional, and National Awards.

William Xu, Daniel Liu, Trevor Kim & Benjamin Farhi	Regional Finalist, 1st Place NYS
Harshita Sehgal, Chloe Tao, Jacob Ramsey & Owen Edelstein	2nd Place NYS

Kathy Belton Molloy Science Fair

A fair for only ninth and tenth graders. Students with projects in a variety of fields are assigned to present to a room of their peers and judges. One project is recognized in each room.

Sara Lok & Josie Mashkevich	Best in Room
Elena Lynn & Brooke Williams	Best in Room

Medical Marvels

The Medical Marvels Program, run by the Feinstein Institute, seeks to encourage Long Island high school students in 9th and 10th grades to pursue STEM careers.

TBD

NSPC Health Fair

The Neurological Surgery P.C. Health Science Competition (NSPC HSC), a program of the Center for Science Teaching & Learning (CSTL), describes itself as “the first and only Health Science Competition in the United States.” It is designed to spark interest in STEM fields as related to health science amongst students that attend high school on Long Island.

TBD

Senior Spotlights

JASMINE BERGER

Jasmine has been in research since day one and has been a Dr. Weseley disciple ever since–though not always the most obedient of them. Everyone knows that she is destined to become a future politician (or political *scientist* I guess) and is the greatest activist in the entire school (#staywoke). Her physics class may think she is going into medicine, but they are probably just confused by the fact that both of her parents are doctors. Her dad is honestly probably your pediatrician!

Jasmine's very first research project that she completed with Lindsey (see: Stanford Rowing '23) and Abby (see: research graveyard) was about how students perceive and consume sports drinks. Since Jasmine's projects always involve race by some definition (first it was the running kind), her two studies that followed continued to explore the role of race in our society. In tenth grade, she investigated the effects of race on punishment and perceived aggression. Her project is rumored to have caused a bit of tension with partner Adrian Ke, but that has since been sorted out over a nice cup of For Five coffee. One of Jasmine's most defining research struggles was when Jasmine had to completely redo her junior year research proposal while the rest of her classmates were moving onto bigger and better things, such as their research methods. She eventually figured it out, however, and created another race-centered project investigating the differences between multicultural and color blind racial attitudes. Jasmine is still determined to find the answers she was looking for about interracial couples one way or another. Although she sadly did not get the chance to go to LISEF and a research newbie did, Jasmine is a research star in her own right.

Jasmine is a lover of all things coffee, West Wing, and Cambodia related. Her love of coffee is so strong that it led Dr. Weseley to send her to the dean after doing the unthinkable–walking in five minutes late with a cup from Kitchen Kab. She would rather spend her summer on a VISIONS trip to an obscure location than in a research lab, and she will continue her service-oriented ways until the end of time. Jasmine's race-based studies are consistent with her activist nature and involvement in starting JANE, being GAC president, and leading a schoolwide rally for gun reform. As previously mentioned, Jasmine is a Dr. Weseley disciple–which of course entails participation in MoGo and Ethics Bowl–even when an important interview conflicts with the competition. You probably won't catch her conducting research surveys at her future college, unless they are to poll her fellow students about which candidate should win the 2020 election. Nevertheless, Jasmine appreciates her research journey and all of the memories that have STEMmed from it (although she is a humanities girl at heart).

PRINCETON
UNIVERSITY

Research Résumé

Grades 11-12 — Project Abstract:
When Colorblind is Color Biased: The Relationship Between Multicultural and Colorblind Racial Attitudes and Victim Blaming
Although overt racism has decreased over the past few decades, a subtler form of bias known as colorblind racism has replaced it. Colorblind racism avoids acknowledging that race plays a role in impeding minority success. Multiculturalism, an opposing ideology, celebrates racial differences instead of ignoring them. The purpose of this study was to investigate how Color-Blind Racial Attitudes (CBRA) and Multicultural Racial Attitudes are related to victim-blaming tendencies among various racial groups (White, Black, Latina, Asian). Four hundred thirty-four participants were randomly assigned to read a vignette about a White, Black, Asian, or Latina mother who was fired from her job and considering applying for welfare. Participants completed victim blaming, color blind, and multicultural scales. Results showed that color blind participants were more likely to blame the victim than multicultural participants, especially if the woman in the stimulus was Asian or Latina. This study suggests that people with a multicultural and color-conscious outlook acknowledge issues each racial group faces which could help combat racial tensions in the United States.

WAC Lighting Invitational Research Association Fair (RAF)
- ❖ 1st Place (Behavioral Science, 2019)
- ❖ Merit Award (Behavioral Science, 2018)

Long Island Science Congress
- ❖ High Honors (2018)
- ❖ Most Distinguished Behavior Science Project (2018)

Grade 10:
Caught White Handed: The Effect of Student Race on Assigned Punishment, Perceived Infraction Severity, and Perceived Aggression
WAC Lighting Invitational Research Association Fair (RAF)
- ❖ Merit Award (Behavioral Science, 2017)

Grade 9:
Students' Perceptions and Consumption of Sports and Energy Drinks (with Abby Drucker and Lindsey Rust)

ASHER BYKOV

Asher Bykov's research experience can be summarized in only a few words: lots of gestures, passionate speeches, and IRB rejections.

Asher started his research career like many other freshies: scared of the difficulty of an Intro to Research course. Barely squeaking through the first half of the year, he was saved by his research partners, Adrian, Johanna, and Charlotte (RIP research career). After an inspiring opening speech about a not-so-imaginary world where you would walk into a supermarket, Asher's research career began to prosper. Or so he thought…

Sophomore year was bumpy to say the least. He started off strong with his new partner, Lauren, as they officially joined efforts to become the Not-So-Aggressed Adolescents! Then, in a swift change of events, the Notorious IRB shot our project down (haha you get it…shot ☺). Ultimately, we were all Gucci though because we realized all we needed were pictures and not real toy weapons in a classroom. After hours spent in the Research Center after school running thousands of tests on SPSS to find even the smallest inkling of significance, all they could were statistically insignificant results and a semi-unrelated significant result about parental protection and aggression in adolescents. It was during competitions presenting these results that Asher truly realized how important communication could be.

In junior and senior year, Asher focused on why potentially less significant/impactful experiment could do so well as competitions (aka how was he able to do well with his meaningless results???). He learned that nonverbal communication controlled the key to effective presentations and that gender plays a larger role in how we are perceived, especially in gendered fields like STEM.

Asher will be headed to Georgetown University next fall (Hoya Saxa! or whatever that means…). He looks forward to continuing his passion for research and combining it with his interests in politics, entrepreneurship, and marketing.

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GEORGETOWN UNIVERSITY

Research Résumé

Grades 11-12 — Project Abstract:
Do Actions Really "Speak Louder" Than Words? The Effect of Power Posing, Gestures, and Gender on Perceptions of Competence and Likability
Communication involves far more than the content we hear. In fact, some have suggested that nonverbal communication is as important -- if not more important -- as verbal communication (Mehrabian, 1968). Additionally, men and women have been noticed to gesture differently and hold different postures (Baird, 1976). Two experiments investigated the impact of body posture, gestures, and gender on perceptions of competence and likability of a speaker. In Experiment 1, three hundred thirty-eight participants viewed one of six videos about dark matter that varied the gender of a speaker and their strategy of nonverbal communication; participants then evaluated the speaker's competence and likability. Results indicated that the female speaker was rated to be significantly more competent than the male speaker. Furthermore, gesturing was seen as significantly more likable than the control condition, while power posing was not. In Experiment 2, two conditions were added (an audio only control and a combined gesture and power pose condition) and videos discussed an unknown female poet instead of dark matter. Five hundred and five participants were randomly assigned to one of ten videos, which was followed by the same survey used in Experiment 1. Results indicated that power posing significantly increase ratings of competence when compared to the contracted posture, and the combined gesture and power pose condition was significantly more likable than the contracted condition. Unlike Experiment 1, there was no significant difference for ratings of competence based on the gender of the speaker. The two experiments suggest the use of gestures and a confident posture are effective strategies to receive more positive evaluations of a speech.

WAC Lighting Invitational Research Association Fair (RAF)
- ❖ 1st Place (Behavioral Science, 2018)

Long Island Science Congress
- ❖ High Honors (2018)

Grade 10:
The Effect of Toy Weapon Priming on Aggression in Adolescents (with Lauren Christenson)
WAC Lighting Invitational Research Association Fair (RAF)
- ❖ 3rd Place (Behavioral Science, 2017)

Long Island Science Congress
- ❖ Honors (2017)

Grade 9:
The Effect of Country-of-Origin and Ethnocentrism on Perceived Quality of Fresh Produce
(with Adrian Ke, Asher Bykov, and minimal contributions from Charlotte Trezza)
WAC Lighting Invitational Research Association Fair (RAF)
- ❖ 2nd Place (Behavioral Science, 2016)

LAUREN CHRISTENSON

Lauren began her research career with a victory: the validation she received when Dr. Weseley gave her outline to the whole Intro to Research class, pointing out how well it was written. Everything went downhill from that moment of fame… just like this bio will.

In 9th grade, Lauren researched "The Effect of Honor Codes on Cheating Rates and Students' Perceptions of Cheating," and while everyone had a nice group of 3 to 4, Lauren's research partners dropped like flies as soon as they had the chance (shout out to Josh Bloom and Aman Jaisinghani). That's when Lauren's solo career began. After completing the entire project by herself (and still having to put her late partners names on it), Lauren won an honorable mention for her eCybermission project. Upon receiving the three certificates, she promptly destroyed Aman's and Josh's award certificates (with Dr. Weseley's permission).

After many caffeine induced all-nighters, Lauren successfully completed dozens of TV shows she used to procrastinate… and, at 4 A.M., her research, after finally getting IRB approval (she didn't obtain it the first time). Lauren can be found in the social studies center waiting for Mock Trial, Mogo (EGO), Debate (RIP 2015-2017), or marching band to begin. In the future, Lauren hopes to pursue a career in either medicine (like Grey's Anatomy and the countless other medical dramas she watches) or law (like Law and Order and For The People).

Research Résumé

Grades 11-12 — Project Abstract:
The Effect of Ethics Bowl on Perspective Taking, Cooperation and Competition, and Civic Engagement
In recent years, politics has become increasingly partisan, and many politicians seem more interested in attacking their political opponents in public statements and debates than collaborating for the betterment of the nation. The lack of collaboration amongst politicians ultimately leads to the achievement of nothing (Gutman & Thompson, 2010). To counteract this competitive nature, Ethics Bowl, created by Robert Landenson in 1993, was developed with the mission to expose students to positions different than their own. Throughout the course of an Ethics Bowl round, participants work together to reach a higher ethical understanding by collaborating and revising their ideas to achieve the best outcome. The discussion is intended to be done in a way that doesn't demean or depreciate other views, but rather improves upon them (Landenson, 2001). I hypothesized that participating in Ethics Bowl would improve participants' perspective taking, cooperation and competition, and civic engagement. After completing this study once, I revised it to include matched pairs to make each participant a control for his or her self. This would insure that the changes were in fact due to Ethics Bowl and not other factors in the individuals lives. After analyzing the results, I found that in the pre-test the non-ethics bowl and ethics bowl participants scored equivalent levels in those categories showing that those participants were a good control. When comparing students who participated in ethics bowl over time they reported significantly higher levels of perspective taking and civic engagement as hypothesized.

WAC Lighting Invitational Research Association Fair
- ❖ Honorable Mention (Behavioral Science, 2019)
- ❖ Merit Award (Behavioral Science, 2018)

Long Island Science Congress (LISC)
- ❖ Honorable Mention (2018)

Grade 10:
The Effect of Toy Weapon Priming on Aggression in Adolescents (with Asher Bykov)
WAC Lighting Invitational Research Association Fair
- ❖ 3rd Place (Behavioral Science, 2017)

Long Island Science Competition "LISC" Senior Division
- ❖ Honors (2017)

Grade 9:
The Effect of Honor Codes on Cheating Rates and Students' Perceptions of Cheating
WAC Lighting Invitational Research Association Fair
- ❖ Honorable Mention (Behavioral Science, 2016)

DREW GOLDMAN

Drew Alexander Goldman (Goes by DG or DAG) has been a loyal member of the research program since Intro to Research back in ’15. It was there that Drew began his long struggle with SPSS. Notwithstanding the onerous task, DG learned SPSS with the help of his beloved teachers Dr. Allyson Weseley, Mrs. Morin, and Mr. Oggeri. Although Drew enjoyed learning inside the research classroom, he found a true source of happiness in the iconic Research Guide: the holy grail to research. Spending many hours a week perusing the guide, DAG learned the ins and outs of the research process and finally became comfortable enough with the process to gain a sense of confidence in the work that he did.

Eventually, after his 9th grade social science project, Drew discerned that his heart belonged elsewhere, and he explored the realms of rocket science in 10th grade. That summer, fortuitously, Drew, in search of a computer science project, started collaborating with Yale Professor Dr. Ruzica Piskac and her graduate student Mark Santolucito. One thing led to the next, and before DG knew it, he had secured a research project for his junior and senior years. The project brought the little group success, as their paper was published in two conferences’ proceedings and the DBLP Computer Science Bibliography.

Near the end of junior year, Drew received a research mug from the research exemplar himself: Matt Berman. It remains undecided who Drew will pass on the legendary mug to next… Henceforth, DAG hopes to pursue computer science research involving the interaction of various program interfaces with users on the university or graduate level.

Research Résumé

Grades 11-12 — Project Abstract:

Programming by Example: Efficient, but Not "Helpful"

Specific computer tasks can be done manually but can also be done more easily and efficiently by the creation of a script. While these tasks can be automated with scripting languages such as the widely used PowerShell, these languages can be difficult for users to comprehend and execute. A program, known as StriSynth, was created by a group of Yale computer science researchers in an attempt to make it quicker and easier for people to complete common scripting tasks (Gulwani, Mayer, Niksic, & Piskac, 2015). The present experiment compared the speed and perceived ease of use of StriSynth and PowerShell in a participant pool of experienced and non-experienced scripters. All participants completed three common scripting tasks in both PowerShell and StriSynth; half of the participants first used PowerShell, while the other half first used StriSynth. The time it took participants to complete the tasks using each program was recorded, and participants evaluated the helpfulness of each program in a questionnaire. Paired samples t-tests revealed that participants completed two of the three tasks more quickly while using. However, participants rated PowerShell as more helpful overall and for each of the separate tasks. These differences held true across various levels of scripting experience. The findings suggest that, while StriSynth may facilitate quicker completion of tasks, more work needs to be done to improve users' perceptions of the experience.

WAC Invitational Research Association Fair

- 3rd place (Behavioral Science, 2018)

Yale University Research Assistant

- Paper published in DBLP Computer Science Bibliography (https://dblp.uni-trier.de/db/conf/oopsla/plateau2018.html)

OOPSLA 2018: Object-Oriented Programming, Systems, Languages & Applications

- Presented Co-Authored Paper: "Programming by Example: Efficient but Not Helpful"
- Paper published in conference proceedings and accepted into publication in *Journal Open Access Series in Informatics* (https://www.dagstuhl.de/en/publications/oasics/)

FLOC 2018: Federated Logic Conference

- Presented Co-Authored Paper: "Programming by Example: Efficient but not Helpful"
- Paper published in conference proceedings

Grade 10:

Comparing Different Fuel Sources for a Hybrid Rocket Engine (with Justin Schiavo)

WAC Lighting Invitational Research Association Fair

- 1st place (Physics and Astronomy, 2017)

Grade 9:

The Effect of iPad Versus Paper on Long Term Memory (with Brandon Lee, Izzy Friedfeld-Gebaide, and Kevin Lam)

WAC Lighting Invitational Research Association Fair

- Honorable Mention (Behavioral Science, 2016)

DANA GUGGENHEIM

Dana (also affectionately known as Daña or Daniel by her fellow students of Mole University) is best known as a scholar of chemistry. Dana first feel in love with chemistry as a sophomore in Ms. Charles's class, where her undying curiosity for the subject earned her another nickname–Question. Though perhaps the moniker originated out of Ms. Charles's annoyance at her constant pregunta-ing (there really is no good synonym for questioning, is there?), it transformed into a pet name as Dana quickly established herself as a Chemistry Queen™ in the AP Class. Studying (and often suffering) among established Weseley minions Johanna and Adrian, Dana was inspired to take her endless curiosity to the place where it belonged–the research program.

Before entering the land of blue couches and Einstein memorabilia, however, Dana took to the streets of New York City, and specifically, NYU, where she studied structural DNA nanotech with the tutelage of the iconic Dennis (who later refused to answer her emails about ISEF forms that were *definitely* signed before her project started and not in October when assembling her research portfolio). Besides working under her PI nAdrian, she spent her lunches with Adrian, when the two scholars solidified Adrian's undying love and obsession with Dig Inn. A description of Dana's summer would never be complete without mentioning Charlotte, the redhead Westchester gal who quickly became one of Dana's closest friends (because Dana would be the girl to find a best friend in the elevator of a lab building #gstem).

After the summer concluded and the real hell year began–Juniors, you know nothing–Dana began her career with Dr. Weseley, joining Johanna, Jazzy B, and fellow senior research newbie Emily for weekly seventh period meetings. Question and her curiosity quickly gained Weseley's favor and was granted prestigious competition opportunities like LISEF (to a certain research veteran's dismay). She was also appointed to the research yearbook board (to a different research veteran's dismay). But Dana did not let the haters stop her from doing her thang, and she thrived wherever Weseley placed her.

A speaker of double-talk, an adder of Jewish name-suffixes, a drinker of coffee (because the Night Owl of Class of 2019 *needs* her caffeine), and most importantly, an avid napper, Dana will be able to go wherever she wants to in life–which, undoubtedly, will often be her bed. Because she likes to nap. A lot. But it will also be a life full of chemistry and curiosity, because in Ms. Charles's heart, and her own, Dana will always know that her true name is the one she found in room 230–Question.

Research Résumé

Grades 11-12 — Project Abstract:

Self Assembly of 3D DNA Crystals with Super Torsional Stress in the Tensegrity Triangle Inter-junction Distances

The field of structural DNA nanotechnology aims to form 3D structures from DNA to solve problems in crystallography, nanomedicine, and nanoelectronics. The self-assembly of DNA enabled by Watson-Crick nucleotide base-pairing rules allows for organized formation of three-dimensional lattices from tensegrity triangle motifs. Previous studies have proven the viability of three-dimensional rhombohedral crystals from triangles with seven nucleotide pairs between the tensegrity triangle junctions as well as eight nucleotide pairs, which caused internal torsional stress. This study examined the effect of further increasing torsional stress in the inter-junction region on the crystallization of purified, combined DNA strands by using tensegrity triangles modified to contain two additional nucleotide pairs in the inter-junction area, yielding nine total base pairs. Two-turn tensegrity triangles with seven nucleotide base pairs between junctions were also used to form crystals as a basis of comparison. Results from a 6% acrylamide native gel predicted structure formation from the designed triangle systems, 7-J1, 7-CH, 9-J1, and 9-CH. The intended rhombohedral crystal structure formed from the systems with seven nucleotide pairs in the inter-junction region, while enhanced torsional stress in the inter-junction region of triangles with nine nucleotide pairs produced less rigid and unified crystal lattices.

New York University Research Assistant

- Nadrian Seeman Structural DNA Nanotechnology Lab

WAC Invitational Research Association Fair 2019

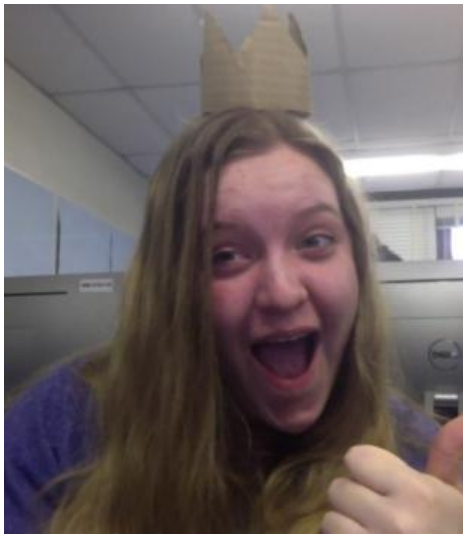
- Honorable Mention (Chemistry, 2019)

Grades 10 & 9:

Was not in research

- #what was she doing?

JOHANNA KANN



It has been a long and strenuous four years filled with many a nap on the less than hygienic research couch (what a magnificent specimen) and all-nighters before research logs are due (to look it over of course!).

Johanna [Goldie] Kann began research with two of her very closest friends—Charlotte and Asher—and also allowed Adrian into the group out of pity. This dream team, named Superfecta, completed many hours of fighting before the sad departure of one of the teammates. Despite these early rough and tumble times, the team put together a wonderful project about grapes and something about those grapes that no one really knows. Superfecta went on to win 2nd place at the WAC Lighting Research Association Fair—the crown jewel of 9th grade research honors.

Riding the high of ninth grade research fame, Johanna went on to study something about feminism, a fake abstraction of the mind, with Mayeesa of the Rahman twins. How Mayeesa dealt with Johanna's unwarranted, unwanted, unfunny jokes and anecdotes is something no one will ever figure out. Regardless, the two queens published in the subpar Walt Whitman Journal (check out a superior publication at www.jofsps.weebly.com) and won a ton of awards at a ton of places.

Johanna has also sent multiple summers doing research at University of California at Berkeley and University of Northwestern at Evanston. The former was spent with the peel to her banana, Adrian, where they bonded over hiding in their room at a rental house with 20 Chinese exchange students who spoke not at an ounce of English. There, they discovered their love for fast French cuisine and the homelessness issue that exists in the Bay Area. The latter was spent with an emotionally unstable French girl and Monica Furci. There, her love for supporting the evils of BigPharma™ was born and inspired her desire to join the ranks of drug pushers (Tina Fey included).

Johanna has somehow made it to senior year of research with a very relevant project about race and police. She peaked when she got 1st place at RAF in the Senior Division as a Junior and really has just gone down from there. She has also, somehow, been named a research buddy and provides statistically insignificant help to fresh men and soph "o" mores. She has been able to suppress her desires to live life as a cow on a farm in Texas (Yeehaw!) and is also an editor for the Journal of Secondary Psychological Studies (or is she… she didn't have fifth period free so Dr. Weseley never spoke to her about it again) with her other research buddy friends. Oh, also she's the Valedictorian of the Class of 2019, her family lives in Seattle, she is going to Northwestern, and she has totaled her grandma's car twice in one month, but that's really not that big a deal.

Research Résumé

Grades 12 — Project Abstract:

Black and Blue: Investigating the Role of Race in Perceived Legitimacy and Trust of Police Officers

With mentions of police brutality and racial profiling in the news almost daily, tensions between minorities and law enforcement have come to an all-time high. These growing tensions have led to a widespread distrust in the police force, especially within the African American community. Additionally, research (Haider-Markel, Joslyn, & Kniss, 2000; Nicholson-Crotty, Nicholson- Crotty, & Fernandez, 2017; Wilkins & Williams, 2008) suggests that increasing the presence of minority police officers would improve black citizens' perceptions of law enforcement. Two studies investigated the impact of race on perceived legitimacy and trust of police officers. In the first, participants were randomly assigned to view one of four versions of a newspaper article that manipulated the race of the officer and suspect (black or white). Participants were then asked to rate the officer in terms of perceived legitimacy and trust. ANOVAs revealed no significant interactions but several significant main effects. Black police officers were seen as more trustworthy than white police officers, and white participants perceived the police officer as significantly more trustworthy and legitimate than black participants. The second experiment employed the same method to compare perceptions of white and Latino police officers. Similar to the findings of Experiment 1, white participants rated the police officer as more trustworthy and more legitimate than Latino participants; however, neither officer nor suspect race affected the ratings. The results of these experiments suggest that there is still a prevalent minority distrust in police that could possibly be reduced by increasing the black presence in the police force.

WAC Invitational Research Association Fair

- 1st place (Behavioral Science, 2018)

Summer 2018:

Research Assistant at Northwestern Feinberg School of Medicine, under Dr. Minoli Perera

Grade 10:

The New F Word: Perceptions of Feminism (with Mayeesa Rahman)

Published in *The Whitman Journal of Psychology*, October 2018 edition

Long Island Science Congress (LISC)

- High Honors (2017)

Long Island Psychology Fair

- Best in Category (2018)

MIT Inspire

- Semifinalist (2017)

WAC Lighting Invitational Research Association Fair

- Honorable Mention (Behavioral Science, 2017)

Summer 2017:

Research Intern at Whitney Perception Lab, under Dr. Allison Yamanashi-Leib

Grade 9:

The Effect of Country-of-Origin and Ethnocentrism on Perceived Quality of Fresh Produce (with Adrian Ke, Asher Bykov, and minimal contributions from Charlotte Trezza)

WAC Lighting Invitational Research Association Fair

- 2nd Place (Behavioral Science, 2016)

ADRIAN KE

A few words come to mind when one hears the name Adrian Ke (also known as Aidz(not-the-STD), Drain, Keke, kissupKe, aiderson, dr weseley, 1/3 of gFt): humble, modest, and easy-going. She is never one to confront or compete, always willing to share notes with her fellow researchers. You can find Drain in the Research center every Monday, happily answering underclassmen's questions.

Adrian started out her modest research career studying grapes and ethnocentrism. She's still not sure how the two connect, but with the help and her partners Johanna and Asher, they pulled second place at RAF (arguably the peak of her career). Beating all of the students at the ripe age of 15, she decided research would be her lifelong passion as it was something she could easily win. In 10th grade Adrian partnered with her now BFF Jasmine, where they investigated how the race and infraction committed by a student impacted their perceived aggression and assigned punishment. It was a rocky year, with Jasmine having no idea what was going on and Adrian doing most of the work (in Jasmine's opinion she DID know what was going on and the work WAS split evenly). Despite their quarreling Adrian and Jasmine eventually made up, sorting out their issues in passive aggressive email chains.

Adrian then worked in a lab at Berkeley over the summer where she researched social psychology. Adrian's passion for research was so persistent that despite the lease being up on the apartment she was living in, she decided to stay at Berkeley for an extra week. Thankfully she found housing and lived on an air mattress in the kitchen of a man's apartment she found on airbNb. Some may call her an independent woman, others may call her parents negligent – either way, the home she found in research was all she needed.

Drain pursued her earth-shattering career by investigating how embellished graphs versus normal boring graphs impact scientific literacy (bacon graphs and bacon-themed-promposals were involved in the study). She took a break from her groundbreaking bacon research to work in a lab at NYU over the summer, only to discover that the lab did not exist, and she had to work remotely from home. Drain was upset until she realized she could spend all summer perfecting her Regeneron application, which paid off because she achieved her lifelong dream: grudging respect* from Dr. Weseley (read as: Regeneron semi-finalist).

On the rare occasion Adrian is not in Dr. Weseley's office, you can find her still doing Dr. Weseley's bidding in other parts of the school. She spends her time curating the research journal, setting up the Model Government website, sending out MoGo and Rex emails, leading the ethics team, texting Dr. Weseley "Ok Queen" and meeting her at ForFive Coffee Roasters.

*An original draft suggested that Adrian earned *ultimate validation* in leu of *grudging respect* from Dr. Weseley. However, this was eliminated in the first rounds of edits when Weseley pointed out she would never grant anyone complete validation
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Research Résumé

Grades 11-12 — Project Abstract:

The Effect of Graph Embellishment on Information Comprehension, Memorability, and Perceptions of Trustworthiness

A way to combat Americans' low science literacy is through graphs, which can help the public better understand critical information about diet-cancer links. However, there exists a long-standing debate over the benefits of graph embellishment among graphic designers. Two experiments examined the effect of graph embellishment on information comprehension, memorability, and perceived trustworthiness. In Experiment 1, participants (N = 240) recruited online were randomly assigned to view a newspaper article with a non-embellished graph, moderately embellished graph, or no graph and then tested on their comprehension, memory, and perception of trust of the information. Data analysis revealed that, as hypothesized, graph embellishment had no effect on the comprehension of participants but led to greater information retention and trust. Experiment 2 added two more embellishment levels, high and low and confirmed that level of embellishment did not affect comprehension. In addition, it was found that as level of embellishment increased, memorability increased, except for between non-embellished and low embellishment graphs. With regards to perceived trustworthiness, the data showed that the presence of a graph increased participant trust in the article and that embellishment had a curvilinear effect on trust in which participants were most likely to trust moderately embellished graphs. The results of this study can be applied to many other sectors and positively influence the way people process and perceive information.

Long Island Science Congress
- ❖ Honors (2018)

Regeneron Science Talent Search
- ❖ Scholar (2019)

Long Island Science and Engineering Fair JV ("LISEF")
- ❖ 3rd Place (2018)

Long Island Psychology Fair
- ❖ Best in Category (2019)

Summer 2018:

Research Assistant at NYU Stern, Dr. Gavin Kilduff
Research Assistant at UChicago Booth, Dr. Christopher Bryan

Grade 10:

Caught White Handed: The Effect of Student Race on Assigned Punishment, Perceived Infraction Severity, and Perceived Aggression (with Jasmine Berger)
WAC Lighting Invitational Research Association Fair
- ❖ Merit Award (Behavioral Science, 2017)

Summer 2017:

Research Assistant at Mind and People Perception Lab, UC Berkeley Haas, Dr. Juliana Schroeder

Grade 9:

The Effect of Country-of-Origin and Ethnocentrism on Perceived Quality of Fresh Produce
(with Adrian Ke, Asher Bykov, and minimal contributions from Charlotte Trezza)
WAC Lighting Invitational Research Association Fair
- ❖ 2nd Place (Behavioral Science, 2016)

KEVIN LAM

By Kevin Lam's Evil Twin

Kevin Ray Lam began his research career by first re-entering Roslyn in 9th grade after spending five years in Hong Kong. He was off to a rough start in the beginner's class Intro to Research, in which he took a few zeroes in the homework assignments (e.g. for not replying "Love Data" to Dr. Weseley's email). However, he soon got his act together and completed a group project on studying whether reading comprehension is better on iPad or paper.

In his sophomore year, Kevin did a project that was the most ambitious crossover event in history. The research focused on intermingling behavioral and natural science by studying the correlation between participants' behaviors and the amount of bacteria on their smartphone screen. Using the presence of coliform bacteria as the indicator of fecal matter, Kevin found that reading the shampoo bottle in the bathroom would definitely promote stronger hygiene than scrolling through Instagram. Nowadays, this study would unfortunately be better known by its shorter title, "Got virus on phone?", it is still heavily ridiculed by his peers.

During Junior year, Kevin quit. He had enough, he was done. He dumped research, hired a divorce lawyer –

But wait! For his summer before senior year, Kevin decided to intern for a proteomics (genomics, but with proteins instead) lab at Columbia. There, he spent numerous weeks on studying how to optimize protocols of conduction proteomic studies. He learnt how to mix stuff, heat stuff, chill stuff, breakdown stuff, analyze stuff, some big science-y words, and the art of faking it 'till you make it ('cuz who on Earth knows what *The Endochronic Properties of Resublimated Thiotimoline* really means at first glance?!). This internship then became the basis of his senior project as he reincarnated himself from the research graveyard.

Outside of research, Kevin entertains himself by playing sports (including badminton, cycling, and swimming), eating good food (bacon, steak, donuts, etc.), playing video games (Skyrim, Bioshock), and performing random chemistry experiments (don't worry, he hasn't blown up anything yet). He is also a frequent participant in Quiz Bowl, Science Olympiad, and ACSL (coding stuff). For the rest of his leisure time, one can find him hopping on Discord to fool around with a few friends.

In the future, Kevin looks forward to studying Biological and Chemical Engineering and sure hopes Mrs. Tsarevsky doesn't consider this field stamp collecting. Research, for Kevin, will always be something he enjoys, as long as the category does not start with a "B," end with an "L," and contains "ehaviora" in it.

Research Résumé

Grades 12 — Project Abstract:

Optimizing Proteomics Protocols: The Effect of Freeze-Thaw Cycles on the Performance of Modified Porcine Trypsin

Proteomics currently stands as one of the emerging fields in molecular biology, following years of extensive research in genomics. However, unlike genomics and transcriptomics, issues of sensitivity can sometimes lead to impediments in proteomics studies. In order to yield more accurate data, strong efforts are required to reduce bias and false positives. When analyzing a proteome, cells are first lysed, creating a solution containing proteins in their complete form. The sample is then further enhanced for the digestion of proteins into smaller peptides via the use of a protease. Such agents are generally stored under frozen conditions to prevent autolysis and are required to be thawed for usage. The digestion step is necessary for subsequent processes, such as high-performance liquid chromatography and tandem mass spectrometry (HPLC-MS/MS), which are used to quantify and qualify protein molecules. With this expensive approach becoming increasingly prevalent, operational research is necessary to understand how to optimize the aforementioned process. Research has shown that repeated freeze-thaw cycles damage and reduce the ability of trypsin – the gold standard protease – to digest proteins, leading to a reduction of reliable MS data. As a result, this study aimed to analyze the adverse effect of repeated freeze-thaw cycles on untreated trypsin in a proteomics setting. Two separate procedures were conducted to analyze the difference in the performance of trypsin between samples that had undergone short-term or long-term freeze-thaw cycles. The results confirmed that trypsin had an extraordinarily consistent performance after five freeze-thaw cycles in both protocols. Given the findings and conclusions achieved throughout this research, it could ultimately lead to the discovery of more adaptive and creative proteomic protocols, eventually expanding to a wider range of biological applications due to the versatility of trypsin.

Summer 2018

- ❖ Research Assistant at the Jovanovic Lab in the Biology Department of Columbia University

Grade 10:

The Effects of Perception and Hygienic Behaviors on Smartphone Cleanliness

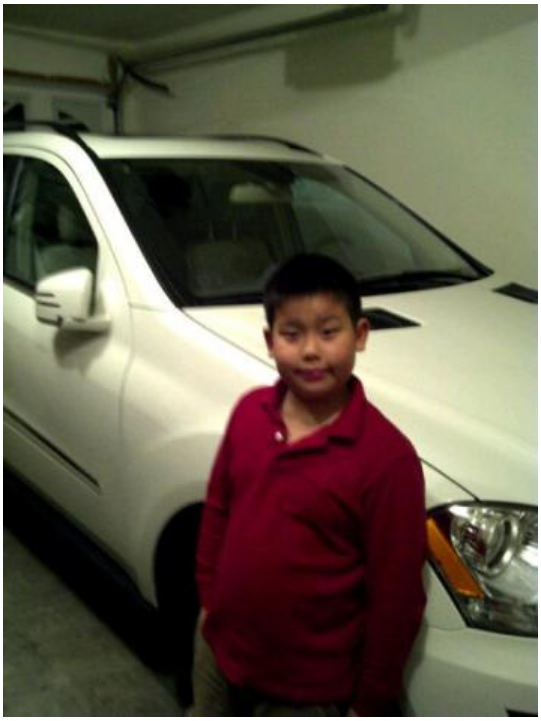
WAC Lighting Invitational Research Association Fair

- ❖ Honorable Mention (Behavioral Science, 2017)

Grade 9:

Short and Long-Term Memory Effects of Paper and iPads (with Drew Goldman, Izzy Friedfeld-Gebaide, and Brandon Lee)

BRANDON LEE



Brandon Lee has pretty much been part of the research family since 9th grade. Well, something like that. Abandoned by Dr. Weseley in Research Essentials, Brandon continued his studies with Ms. Kim, where he and his partners completed an assessment on the benefits of iPad vs Paper on short and long-term memory. He later transitioned to biological research his sophomore year, where he analyzed exhilarating colonies of bacteria in various yogurt samples!!

The brighter parts of Brandon's research career occurred during his summers going into junior and senior year, where he traveled to Baltimore to conduct research at a lab at Johns Hopkins University. There, he spent countless nights playing with mice and tumors. Not only was he questionably mugged outside his apartment, Brandon faced imminent death, as he was exposed to a biohazard contamination his third week in. Focusing his research on immunology, Brandon conducted an evaluation of the safety and efficacy of albumin-based therapeutics on cytokines.

His passion for cytokine immunology quickly led to his success his senior year, landing him several awards including Semi-Finalist of The Regeneron Science Talent Search and Finalist of Junior Science and Humanities Symposium.

In his free time, Brandon enjoys getting hair perms and ignoring fellow peers with his notorious gold Beats headphones. In the future, he hopes to study law and pursue his childhood dreams of preserving justice.

Research Résumé

Grades 11–12 — Project Abstract:

Evaluation of Albumin-Based Therapeutics: The Safety and Efficacy of Albumin Fusion on Cytokine Half-Life Extension, Tissue-Specific Trafficking, and Toxicity

Cancer therapeutic strategies capable of eliciting a potent antitumor response remain an unmet medical need. Recently, there has been a growing interest in cytokine immunotherapy, a strategy that targets cytokines, a group of proteins involved in signaling pathways, to develop cancer treatments. However, the significant drawbacks of cytokine immunotherapy are two-fold: Cytokines have short half-lives, which means daily injections into patients are required to maintain clinical efficacy. In addition, the injection of cytokines can produce off-target effects, as these cytokines can travel to untargeted locations across the body, potentially causing autoimmune diseases. The purpose of this project was to develop a cytokine delivery strategy that would extend the half-life of cytokines while directing them to locations of interest in order to advance cytokine immunotherapy. Albumin, a protein that can bind to cytokines, was proposed as a candidate to overcome these drawbacks by binding to the cytokines. To assess albumin's capabilities in prolonging the short half-life and eliminating off-target effects, two major cytokines, Flt-3 Ligand and GM-CSF, were used to develop half-life curves, bioluminescence images of targeted tissue, and staining images. The results suggest that albumin is a strong candidate as a safe cytokine delivery strategy.

Junior Science and Humanities Symposium

- ❖ National Delegate for Long Island (2019)

Regeneron Science Talent Search

- ❖ Semifinalist (2019)

Summer 2018

Research Assistant at the Cervical Cancer Research Lab of Dr. T. C. Wu and Dr. Chien-Fu Hung at Johns Hopkins University

- ❖ *Albumin-Flt3L expands cross-presenting dendritic cells promoting neoantigen specific anti tumor immunity. Brandon Lam, Daniel Esquivel, Brandon Lee, Esteban Velarde, T.C. Wu, Chien-Fu Hung. Manuscript in preparation.*
- ❖ *Single Weekly Administration of Albumin-GMCSF drives dendritic cell expansion and subsequently promotes tumor control. Brandon Lam, Alana MacDonald, Brandon Lee, Esteban Velarde, T.C. Wu, Chien-Fu Hung. Manuscript in preparation.*

Summer 2017

Research Assistant at the Cervical Cancer Research Lab of Dr. T. C. Wu and Dr. Chien-Fu Hung at Johns Hopkins University

Grade 10:

Effect of Packaging on Viability of Probiotic Bacteria in Yogurts (with Lindsey Rust)

WAC Lighting Research Association Fair

- ❖ Merit Award (General Biology, 2017)

Grade 9:

Short and Long-Term Memory Effects of Paper and iPads (with Drew Goldman, Izzy Friedfeld-Gebaide, and Kevin Lam)

EMILY LEVENTHAL

While desperately searching for a lab to work in her junior year, a lost Emily stumbled into the beauty of the third floor research center, where she went to ask Dr. Weseley a question about a research email. It was then that she was taken under the wing of the noble Dr. Weseley. It was also then that she somehow trapped herself into completing a 60 page Regeneron application that would ultimately result in nothing.

Emily ended up spending her summer living in Cambridge with her best friend (the famous research/Regeneron/ISEF queen) Kaylie and working in a neurobiology lab at Boston Children's Hospital. There, she analyzed mouse depressive behavior tests in order to study a gene named protocadherin-17 implicated in mood disorders. Or in Weseley's words, it was where she complied in "mice torture." Call it what you want. She insists it's for science... In a weird twist of fate that summer, she once witnessed a mouse run across her dorm room. She proceeded to hysterically cry, leave the dorm, and hide in the Starbucks down the street until closing time, but that's beside the point. This lab experience taught her many things including but not limited to how to stop awkwardly eating lunch with your mentor and his wife after you run out of things to talk about.

Described as "fun" by Dr. Weseley to Emily's mom on the morning of JSHS, Emily was always sure to spice up her research meetings (with Barbara's Bagels occasionally, of which she is the ultimate fan). Emily, for a reason that remains unclear, peaks at academic competitions, often getting high off of her own and others' nerd energy. This passion for nerd culture is probably what landed her Quiz Bowl President (Quiz Queen™) despite her inadequacy at it and why she makes so many random friends at Science Olympiad. When she is not befriending strangers at academic competitions, she is chatting up pole vaulters at track meets (another interesting brand of individuals to which she belongs) or talking to baristas from a certain coffee shop (shoutout to Joe from For Five) with her fellow students at Mole University.

Emily is happy to have been accepted by the tight research fam, and she is forever grateful to Dr. Weseley for introducing her to the crazy research world. In the future, Emily hopes to continue researching neurological and neuropsychiatric disorders or possibly enter medicine as a pediatric neurologist.

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Research Résumé

Grades 12 — Project Abstract:

Investigating the Depression-related Behaviors in Neural Circuits-specific Protocadherin-17 Knockout Mice

Major Depressive Disorder (MDD) is a debilitating medical condition characterized by depressed mood, impaired cognitive function, altered psychomotor activity and impaired neurovegetative functions, such as appetite or sleep (Fava & Kendler, 2000; Otte et al., 2016). Many patients with MDD are non-responsive to current treatment methods, highlighting the need to better understand the mechanisms which contribute to the disorder. In previous clinical studies, single-nucleotide polymorphisms (SNPs) along the protocadherin-17 (PCDH17) gene region have been significantly associated with depression. Creating models for major mood disorders in knockout mice and studying how mutations express themselves in vivo may give more insight into the pathogenesis of these disorders. Global PCDH17 knockout mice have been examined to show antidepressant phenotypes in previous studies, however detailed circuit mechanisms are still unknown in PCDH17 deletion. In order to pinpoint these neural circuits, this study focused on knockout mice in which PCDH17 was only deleted from the indirect pathway of the corticobasal ganglia circuits. In the forced swim test and the tail suspension test, these mice showed slightly higher immobility, or more depressive-like behaviors compared to control mice. Therefore, PCDH17's dysfunction in the indirect pathways of the corticobasal ganglia circuits may contribute to the passive stress-coping behaviors associated with depression.

Junior Science and Humanities Symposium

- ❖ Semifinalist (2019)

WAC Invitational Research Association Fair

- ❖ Honorable Mention (Behavioral Science, 2019)

Summer 2018

Research Assistant in the Umemori Lab at the F. M. Kirby Neurobiology Center at Boston Children's Hospital, Harvard Medical School

ALEX LIU

When I first started doing different research projects in school, I picked topics in biology and chemistry. My ninth grade project was about comparing the nutrient retention of food after using different preservation methods. My teammates were Mark Russ, Joseph Pak, and Jerry Hu (RIP). My sophomore year project was about comparing the effects of phosphorus and nitrogen on algal growth. For this project, I worked with Riddhi Mangal and Mr. Oggeri (RIP again). While I learned from those projects, I wasn't excited by them. However, what I did like were rules.

Rules define systems and act as a deterrent to chaos. When I was young, I loved to destroy things. It fascinated me to smash something into pieces to see how it worked. As I grew older, I fortunately grew out of this hobby, but my interest in the mechanisms of different systems has not waned. However, it wasn't until high school that I discovered the greatest and most complex system of all: mathematics. Mathematics appealed to me because it forms the basis of the world. I suppose you could say that I discovered after "smashing the world" that it's made up of numbers.

My interest in numbers eventually led me to take up a theoretical physics project about double pendulum systems. What was fascinating about this project was that even something as simple as a double pendulum system actually exhibits unpredictable behavior at certain energy thresholds, a characteristic not accounted for by the rules of physical systems. This anomaly, known as chaos theory, attracted me because it challenged me to find rules within the chaos. The implications of defining the world in rules and numbers are enormous, of course. For me, discovering these rules that govern the universe lie at the core of our existence.

Obviously, like any other scientific researcher, I direct my research towards concepts I find interesting or important. Yet, what I've really come to admire about doing research is the idea that anyone can try to solve any problem with the right resources and skills. When I finally reach a conclusion in my project, I feel as if I have done something monumental, regardless of how significant or insignificant the problem I am researching is.

Research Résumé

Grades 11-12 — Project Abstract:

Calculating the Energy Threshold at which the Double Pendulum's Motion Becomes Chaotic

This study investigated the energy level at which the double pendulum becomes chaotic. At extremely low and high energies, the motion of a double pendulum is integrable, or predictable. However, the double pendulum's motion becomes chaotic at intermediate energies, so there must exist a threshold for the energy level at which the motion of the pendulum transitions from integrable to chaotic. The purpose of this project was to find that energy threshold and examine how that transition happens. The Hamiltonian equations of motion were derived for the system and solved for the solutions on Wolfram Mathematica. The Mathematica code showed that the double pendulum system became chaotic at the energy threshold where angular displacement was $\pi/2$ radians. It is important to know not only if a change in a system occurs, but how that change occurs. When the double pendulum system became chaotic, there was a sharp transition where the system instantly became chaotic when the energy threshold was reached. This behavior could suggest that chaotic motion can occur suddenly without warning and that a system can suddenly go from being integrable to chaotic without prior warnings.

Research Mentee under Dr. Matthew Lippert
Junior Science and Humanities Symposium (JSHS)

- ❖ Semifinalist (2019)

Grade 10:

***The Effect of Phosphorus and Nitrogen on Algal* Growth** (with Riddhi Mangal)

Grade 9:

The Effect of Preservation Method on Nutrient Retention (with Mark Russ, Joseph Pak, and Jerry Hu)
WAC Lighting Invitational Research Association Fair

- ❖ Honorable Mention (General Biology, 2018)

MALEEHA RAHMAN

Maleeha Rahman's research experience began the way that most projects do: almost blowing up a raw chicken breast in the microwave of the science office. Don't worry, the chicken abuse had a scientific purpose: Maleeha and her teammates (all cherished members of the Research Graveyard now) were looking at how different cooking methods affected the antioxidant capacity of foods. Three months of stinking up the research center with blended chicken and iodine, two panic attacks about salmonella, and countless close calls with hot oil in sauté pans later, Maleeha emerged slightly scathed and very ready to leave the world of food chemistry behind.

For her sophomore year project, Maleeha teamed up with the last standing member of her original group, Anneliese, to look at the effect of power perceptions on self-esteem and self-efficacy. Quick summary: dictatorships are bad and grape Jolly Ranchers won't buy you the attention of your participants 😕.

Junior year, Maleeha circled back around to food–this time, to investigate which parenting methods best predict healthy eating behavior in children. Using a frustratingly large statistics book and her multi-colored notes, she ran multiple regressions (now her favorite type of analysis <3) to conclude that by communicating right, cutting up carrot sticks, and munching on celery in front of your kids, you can cure obesity and heart disease (ok maybeee that's a little bit of an exaggeration).

The summer between her junior and senior years, Maleeha ferried herself to Mount Sinai for eight hours a day to analyze 800,000 cases of thyroid cancer. After almost going blind from looking at too many spreadsheets and surviving the time her building was evacuated because someone set fire to a trash can, she left with two papers pending publication and a strong relationship with her mentor.

Outside of research, Maleeha can be found painstakingly making grammar edits on articles for the Hilltop Beacon, "captaining" in Science Olympiad, dazzling her music teacher with her amazingly average piano skills, watching crime tv shows that are definitely worth the nightmares, and apologizing for being late literally everywhere she goes.

In the years to come, Maleeha hopes to study on the pre-medical track with a sprinkle of history mixed in. Wherever she goes, she knows that she'll never stop "accidentally" cutting class, writing eight-page papers for three-page assignments, and of course, asking the most important research questions. Maleeha is extremely grateful she joined the research program and to Dr. Weseley for all her help, though she hopes her experiences in 9th grade have not scarred her too much to re-enter biological research.

Research Résumé

Grades 11-12 — Project Abstract:

How to Raise a Healthy Eater: Parenting Methods as Long-Term Predictors of Eating Behavior

Obesity and weight struggles plague today's youth and endanger their future health, with 1 in every 10 school-aged children worldwide reported to be overweight. Fruit and vegetable consumption is on a steady decline while intake of processed foods is on the rise. This trend is particularly concerning as dietary habits from childhood are likely to persist to adulthood, increasing one's risk for diseases linked to poor diets. However, parents may be able to shape their children's diets for the better by modeling good habits, communicating about nutrition, and making healthy foods readily available in their environment. Two studies examined the relationship between parenting methods and eating behavior of children during both childhood and adulthood – something few others have investigated. Information about parental eating, communication, and the availability of various kinds of foods was collected through an online survey. Multiple regressions were used to analyze the relationship between the three predictor variables and the outcome variables: eating habits during childhood and adulthood. In the first study, parenting methods accounted for almost 40% of the variance in childhood eating habits and slightly over 10% of the habits when these children became adults with modeling and communication playing significant roles. The second study used the same method, but this time investigated whether the gender of the parent or the child had any role in how effective the parenting methods were. It was found that both maternal and paternal methods account for almost 40% of variance in childhood eating habits, and about 20% in adult habits. It was found that fathers play an important role in shaping the diet of their daughters. With regard to parent gender, it was found that fathers' parenting methods explain a slightly greater degree of variance in childhood eating habits than mothers', while the opposite is true for adult eating habits. While the second study supported the first study's finding that modeling and communication were a significant predictor of healthy childhood eating behavior, the most significant predictor of both childhood and adulthood eating behavior in Study 2 was accessibility and availability of healthy foods – which was not a significant predictor in Study 1. The slightly different results of the two studies may be due to the different demographic characteristics of the samples surveyed and/or the inclusion of parental gender in Study 2. Collectively, the results suggest that demonstrating healthy eating habits, making sure children are well-informed about the consequences of their nutritional choices and filling the child's environment with easily accessible healthy foods may promote better eating habits in children and that these methods may have a lingering influence into adulthood.

Long Island Science and Engineering (LISEF) JV Fair

- ❖ 2nd Place in Behavioral and Social Science (2018)

Long Island Psychology Fair

- ❖ Honorable Mention in Health Psychology (2019)

NYIT Undergraduate Research Grant Award (2018)

Summer 2018

Research Assistant at the Institute for Translational Epidemiology at Mount Sinai's Icahn School of Medicine

Grade 10:

When Power Hurts: The Effect of Power Perceptions on Self Esteem and Self Efficacy (with Anneliese Opran)

Grade 9:

How Cooking Methods Affect the Antioxidant Capacity of Meats and Vegetables (with Anneliese Opran, Michael Sun and Hunter Smith)

MAYEESA RAHMAN

Mayeesa's research experience began like any other–in a ninth grade Intro class of which approximately 65% would eventually make their way into the Research Graveyard. After first completing an environmental science project (and almost dying while collecting ocean water at high tide), she moved on to psychology. For her first behavioral project, she worked with Johanna Kann on a study investigating modern perceptions of feminism. The duo – perhaps better known as JoMay, as apparently very few people are capable of spelling their names correctly (shout out to the *Whitman Journal of Psychology* for Johhannna Kahn & Mayesesa Rahmen) – made some interesting discoveries, won a couple of awards, and, after approximately 1,001 drafts, succeeded in publishing their paper.

Mayeesa thought long and hard about her junior year project before finally being struck with inspiration by a topic she holds close to her heart and is extremely knowledgeable about: football. Seriously, you'd be shocked by the sheer number of games she's watched ($1/4^{th}$ of the Superbowl commercials this year), the multitude of teams she can name (3), and all the complicated terminology she knows (…. what's a touchdown?). Influenced by Deflategate, *not* Kahootgate, Mayeesa looked at the effect of benefit to the cheater, completeness of cheating, and gender on perceptions of academic dishonesty for her last two years in the research program.

Adding to her diverse research résumé, Mayeesa elected to spend the summer between her junior and senior year stalking NYC parks in ninety-degree weather as part of her internship at Mount Sinai Hospital. Although her team's research is currently still pending publication, she is happy that she got to work with her mentor, who still sends her thirty-eight-page articles on heat stroke and responds to 2 a.m. emails asking for recommendation letters.

In the few hours she doesn't dedicate to research, Mayeesa can be found captaining the Science Olympiad team or writing for the school paper that no one reads. As a member of Science Olympiad, she has devoted hours of tireless work and studying to her events (more specifically: from 4:00 p.m. to 2:00 a.m. the day before/of the competition). In her role as a Section Editor for the Hilltop Beacon, she mostly writes articles on global events the majority of Roslyn has never heard of and sends passive aggressive texts about deadlines to her writers.

Throughout high school, Mayeesa's main motivation has been her long-standing rivalry with her twin, Maleeha, with whom she has shared every class and extracurricular activity. At least 50% of you probably think they're the same person. In the future, Mayeesa hopes to be practicing medicine and, of course, researching.

Research Résumé

Grades 11-12 — Project Abstract:

Can You Be Just a Little Bit of a Cheater? Perceptions of Academic Dishonesty

Although it is not a novel behavior, academic dishonesty has become an increasingly pervasive issue in recent years. This growth in the rate of academic misconduct can perhaps be explained by the emergence of more acceptance of cheating. Two experiments were conducted to ascertain the factors influencing how people view cheating in schools. Experiment 1 sought to determine the impact of completeness of cheating and the benefit to the cheater on perceptions of academic dishonesty. Participants (N=137) were randomly assigned to view one of four vignettes in which the completeness of the cheating behavior (25 or 2 questions copied on exam) and benefit to the cheater (a score of either 96 or 60) were manipulated. The experiment revealed that participants reported they would be more willing to engage in incomplete cheating than in complete cheating, and participants perceived incomplete cheating to be more acceptable than complete cheating. In addition, male participants viewed cheating less negatively, were more willing to cheat, and indicated that they would punish cheating less severely than female participants, leading to a new variable in Experiment 2: the gender of the cheater. Experiment 2 investigated the effect of cheating completeness using another type of cheating – copying a student's essay – and gender of the cheater on perceptions of academic dishonesty. Participants (N = 235) first viewed one of four vignettes describing an instance of a student plagiarizing an essay. Completeness of cheating behavior was manipulated by saying the student copied either an entire paper or just a single paragraph; gender of the cheater was manipulated through the name of the student (either Hannah or Michael). The results again revealed that male participants viewed cheating less negatively and were more willing to cheat than their female counterparts. In addition, it was found that a boy's academic dishonesty was viewed more negatively than a girl's. The findings of the two studies demonstrate that the effect of completeness of cheating behavior varies between forms of academic dishonesty and that participant gender has an important influence on perceptions of cheating. This research helps to shed light on the factors that motivate cheating behavior and influence the way people perceive academic dishonesty.

Regeneron Science Talent Search

- ❖ Scholar (2019)

Long Island Science Congress (LISC)

- ❖ Merit (2018)

Summer 2018

Intern at the Icahn School of Medicine at Mount Sinai

Grade 10:

The New F Word: Perceptions of Feminism (with Johanna Kann)

Peer-Reviewed Publication

- ❖ *The Whitman Journal of Psychology*, October 2018 edition

Long Island Science Congress (LISC)

- ❖ High Honors (2017)

Long Island Psychology Fair

- ❖ Best in Category (2018)

MIT Inspire

- ❖ Semifinalist (2017)

WAC Lighting Invitational Research Association Fair

- ❖ Honorable Mention (Behavioral Science, 2017)

Grade 9:

Investigating the Effects of Sunscreen on the Marine Environment (with Jasmine Ting, Priscilla Lee, and Jeffrey Yu)

LINDSEY RUST

Yes, I am one of the rare ones who made it through the research program all 4 years of high school. Even though my first few years of research weren't as rewarding as hoped, things started to look better junior and senior year.

It all started in the intro to research class, where I began to work on my first project that had to do with sports and energy drinks. Don't ask me anything about this project because I erased it from my memory for the better (including my many power struggles with @jasmineberger). Unfortunately, this project was not very successful, and the year ended with Jasmine and I hating each other since we could never agree on anything. Don't worry though, Jasmine and I reconnected in the fabulous class of AP bio (which has something to do with research right?). Shoutout to Dispigno and my fellow blebs.

Then came sophomore year, and my "amazing" (note the sarcasm) research project with Brandon Lee on "The Impact of Yogurt Type and Fat Content on the Growth of Probiotic Bacteria." We may have won the Roslyn research fair, but don't be fooled. If you want to know what type of yogurt is best for YO-GUT, I would not recommend looking at our results. (Sorry for roasting you Brandon). It was this year that I realized that I would not want to continue down the path of biological research (sorry Mr. Ogerri - oh wait, he's not here anymore!)

Onto junior year… when my real research career began. By this time it was pretty well known among the research squad that I spent a good amount of my life doing this thing called rowing, and I decided to focus my research on something that was actually relevant in my life (tip for anyone who has yet to decide their junior year topic.) I ended up conducting my study on attitudes toward and perceived deserved salaries of male and female coaches. Luckily, I was able to find significant and pretty interesting results (although I didn't really understand them until senior year...shh don't tell Weseley).

Finally, senior year. My weekly meetings with Weseley largely consisted of me consuming salads, listening to complaints about my sub-par grammar and spelling skills, and finally learning what my results actually meant! Quite a miracle. Next year I will bring my research skills to Stanford University, and hope to build onto my research career (Whenever I'm not rowing...which may be like never). I know that all that I have learned from the Wes herself throughout these past few years will help me in the next phase of my life (except for using SPSS, because I still have not clue how to use that).

Research Résumé

Grades 11-12 — Project Abstract:

Baseball Diamonds Are Not A Girl's Best Friend: The Effect of Sport, Coach Gender, and Participant Gender on Attitudes Towards and Perceived Salaries of Coaches

It is common knowledge that women are paid less than men. Research has established that men and women tend to favor male coaches, especially when a sport is considered masculine in nature (Bloom, 2011). The present experiment investigated the effect of the type of sport and gender of a coach on participants' attitudes towards the coach and perceptions of salary deserved. Three hundred thirty-eight participants were recruited online and were randomly assigned to read a description of a hypothetical male or female coach involved in baseball (masculine), soccer (gender neutral) or softball (feminine). Participants answered eleven Likert-type questions to assess their attitudes towards the coach and were asked to fill in an average annual salary they believed would be appropriate for the coach in the description. In all sports, people held more negative attitudes towards female coaches compared to male coaches. The ratings of male and female coaches in feminine and gender neutral sports were similar; however, the gap between attitudes towards male and female coaches was much greater when asked about a masculine sport. In addition, a male coach was assigned a higher salary than a female coach in all sports. This effect was also most pronounced in a masculine sport. Female coaches' salaries were highest in a feminine sport and lowest in a masculine sport, while male coaches' salaries were highest in a masculine sport and lowest in a gender neutral sport. When participant gender was taken into account, in baseball and soccer, the gap between the salaries assigned to male and female coaches was greater for female participants compared to male participants. In these sports, female participants assigned male coaches higher salaries and female coaches lower salaries when compared to male participants. In softball, however, men assigned male coaches higher salaries and female coaches lower salaries while female participants assigned male and female coaches relatively equal salaries. This experiment suggests that strong biases exist towards female coaches, especially in masculine sports, and that these biases may have a dramatic effect on female coaches' earning potential.

Long Island Science Congress

- ❖ High Honors (2018)

Regeneron Science Talent Search

- ❖ Semifinalist (2019)

Long Island Science and Engineering Fair JV ("LISEF JV")

- ❖ 2nd Place (2018)

Long Island Science and Engineering Fair ("LISEF")

- ❖ 2nd Place (2019)

Long Island Psychology Fair

- ❖ Best in Category (2019)

Grade 10:

Effect of Packaging on Viability of Probiotic Bacteria in Yogurts (with Lindsey Rust)

WAC Lighting Research Association Fair

- ❖ Merit Award (General Biology, 2017)

Grade 9:

Students' Perceptions and Consumption of Sports and Energy Drinks (with Jasmine Berger and Abby Drucker)

JUSTIN SCHIAVO

Justin Schiavo is what's known in the Roslyn Research Community as a wildcard. He seems normal from a distance, but as you get closer, he notices that you haven't heard whatever random space/astronomy fact is in his head today, or that you haven't seen the awesome video of his rocket going off (No seriously though, have you seen it? It's cool you should see it). Instead of making surveys he seems to be building rocket engines. Maybe he read the directions wrong in the research guide, but it seems to be going well for him so far, regardless of how difficult the journey has been.
When Justin started in Dr. Weseley's Intro Class, instead of hitting the ground running, he hit the ground flat on his face. Too many spreadsheets, not enough fireworks. Yet he somehow survived 9th grade, and he embarked on his master plan.

He came into sophomore year with this crazy idea to build a rocket engine from scratch. How would he build it? How would it be safe? The school can't be involved in this you will blow yourself up! Luckily for him, Justin somehow convinced Drew Goldman that he wasn't absolutely mental, so the project went ahead. Under the careful and crucial guidance of the legendary Mr. Daniel Oggeri and his father Michael Schiavo, Drew and Justin constructed their first prototypes, which were basically glorified Bunsen Burners. To their surprise, they were awarded first place in Physics and Astronomy at RAF, the first top prize in that category in Roslyn's history. This gave Justin the confidence to continue with even more ambitious projects with rockets, despite everyone telling him to drop it due to the difficulties of finding any mentor whatsoever.

As Drew went on to do computer science, Justin continued to play with explosives. But this time, he was more systematic. He learned from mistakes in his first experiment and built his own rocket nozzles. He put his heart and soul into the project and after much trial and error, he finally nailed his design, wrote his paper, and sent his research to Regeneron STS, along with his other fellow seniors. However, what he did not know was that his research on rockets would change forever when he was selected as an STS Finalist. He embarked on a week of judging and STEM promotion, while also exposing his project to the world. In the end, he made 39 new friends.

When Justin is not researching, you can find him "running" on track and cross country, quoting the dankest memes, and learning rocket science through his computer games.

As his research journey comes to an end, a new chapter in his crazy life will begin at MIT, where he will study aerospace engineering in hopes of getting us to Mars. Will he make it to Mars and Solidify humanity as a Multi-Planetary Species, or will it literally blow up in his face? Only time will tell…

But for now, thanks to everyone (especially Dr. Weseley) for all the support and advice throughout this amazing journey ☺.

Research Résumé

Grades 11-12 — Project Abstract:

The Effect of the Aerospike Nozzle on the Hybrid Rocket Engine

Rockets have always been expensive, complicated and dangerous. However, the hybrid rocket engine, a design that balances mechanical simplicity with easy use, could help to make spaceflight more available to the general public. One major barrier that keeps the hybrid engine from entering mainstream rocketry is that its thrust output is not as efficient as the commonly used liquid and solid fueled engines. This study explores the possibility of using an aerospike nozzle to achieve a higher thrust output from a hybrid engine compared to the traditional bell design. Two small hybrid engines were constructed and fueled with PEX tubing. The only difference between the engines was the type of nozzle used: a traditional bell design or an aerospike design. The engines were held down by a test rig, with the thrust measured by a probe attached to the rig. Each engine was tested under three trials of 15 seconds. In the first phase of the study, the aerospike nozzle melted due to its restrictive design, and a *t*-test showed that the aerospike nozzle produced less thrust compared to the traditional nozzle, contrary to the hypothesis ($p < .001$, $d = 1.336$). The nozzle was redesigned, adding a regenerative cooling system and increasing the cross-sectional area used by the exhaust. With these additions, a *t*-test showed that the aerospike nozzle produced more thrust than the traditional, which supports the hypothesis ($p = .018$, $d = 0.752$). This technology, if fine-tuned and scaled up, might be a viable option for amateur orbital sounding rockets or propulsion systems for small satellites.

Regeneron Science Talent Search

- Finalist (2019)

Long Island Science and Engineering Fair "LISEF"

- 3rd Place (Materials Science and Engineering, 2019)

LISEF JV

- Honorable Mention (Materials Science and Engineering, 2018)

WAC Lighting Invitational Research Association Fair

- Merit Award (Physics and Astronomy, 2018)

Grade 10

Comparing Different Fuel Sources for a Hybrid Rocket Engine (with Drew Goldman)
WAC Lighting Invitational Research Association Fair 2017

- 1st Place (Physics and Astronomy, 2017)

Grade 9

What's in the Name?: How Labeling and Naming Change our Perspective on Medicine (with Mason Huckins, Ryan Kim, Louie Kotler)
WAC Lighting Invitational Research Association Fair 2016

- Honorable Mention (Behavioral Science, 2018)

JASMINE TING

At the end of 4 years, Jasmine Ting has one thing to say about research — thank God she actually went through with it (because plot twist she was originally forced into signing up for the research program by her parents).

She has grown a lot since her first year project on the effects of sunscreen on marine environments, which she would say was the best, most fun way to be introduced to the whole research process. Shoutout to her squad (Mayeesa (MVP), Priscilla (RIP), and Jeffrey) for making that year so memorable. However, after that year, she decided to switch over to psychology.

Her sophomore year was full of music and Rebus puzzles, as her sophomore research project with Jeffrey focused on how the tempo and genre of music affects time perception and enjoyment of a task. Their project hit a couple roadblocks that year, but Jasmine believes she's become a more capable and independent researcher because of it.

She spent her junior year working on a probably overly complicated project on priming and bilingualism that she feels bad for needing to explain to Dr. Weseley probably more than 100 times. She then took her interest in languages overseas in a summer program where she went to Taiwan to teach indigenous elementary school kids English.

In her free time, you can probably find her helping design and build sets for the school productions, hanging out at Science Olympiad, volunteering at Sunharbor Manor, or at Diane's with friends. If not, make sure to call, not text, because she's probably taking a nap.

Research Résumé

Grades 11-12 — Project Abstract:

The Effects of Priming on the Memory and Response Structure of Bilingual Participants

The way people speak can be affected by factors including priming and the language in which they are speaking. Research has shown that participants primed with agentive language tend to use agentive language in their descriptions of events (Fausey & Boroditsky, 2010). In addition, participants visually primed with images can be influenced by the images they see to perceive certain things differently (Goolkasian & Woodberry, 2010; Harris, Bargh, & Brownell, 2009). Research has also shown that inherent differences exist between English and Spanish speakers, demonstrating that differences in ability to remember the agent of accidental events and use of agentive language in describing those events exist likely because the Spanish language distinguishes more strongly between accidental and non-accidental events than does English (Fausey & Boroditsky, 2010; Fausey, Boroditsky, & Long, 2009). In the present study, participants were randomly assigned to watch a video of a man either intentionally or accidentally popping a balloon. After watching another video of a man accidentally spilling water on the ground, participants were asked to describe what happened in the second video Contrary to the hypotheses, when primed with an accidental video, participants were more likely, though not significantly, to use agentive language (100% v. 93.8%) and had significantly better recall for details about the agent (91.7 v. 83.3%). Regardless of any priming, participants seemed to respond with the expected response structure for their native language, indicating that the influences of a native language are more powerful than the influences of short-term priming.

Long Island Science & Engineering Fair JV ("LISEF")

- ❖ 3rd place (Behavioral Science, 2019)

Grade 10:

Does Time Really Fly When You're Having Fun? (with Jeffrey Yu)

Long Island Science Congress ("LISC")

- ❖ Merit Award (2017)

Grade 9:

The Effects of Different Types of Sunscreen on Marine Environments (with Priscilla Lee, Mayeesa Rahman, & Jeffrey Yu)

JEFFREY YU

Jeffrey is a maker at heart, loving to build things whether it be out of cardboard, electronics, or software. However, his research wasn't always focused on creating and building.

He entered research in ninth grade with high hopes and a high morale. This quickly vanished after a painful first quarter. However, enter second quarter and the experimentation phase. Hidden in the deep crevices of the middle room, away from the wrath of a certain someone, Jeffrey and his group members (Priscilla Lee, Mayeesa Rahman, and Jasmine Ting), swam in tubs on seawater and sunscreen. Mercky tanks with the quiet hum of the pumps churning defined that room, asides from the ranched smell from other more questionable groups.

Sophomore year he worked with Jasmine Ting on a project filled with sound and time.

Junior year finally became a reality and the importance of choosing a fun project was all the more important. A summer spent at the Cooper Union, a 3D printer had emerged. After tinkering with shady DIY kits shipped from China for years, now he was able to bring a hobby to the research world. Working from the depths of his basement and testing in the coveted middle room, a project he could call all his own was born.

Jeffrey ended his high school research career doing what he loved: making.

Research Résumé

Grades 11-12 — Project Abstract:

Designing a Universal Liquid 3-Dimensional Printer Utilizing a Novel Liquid Transport System

Liquid three-dimensional (3D) printing using non-traditional materials has a vast range of applications. However, current technology has failed to create a low-cost and efficient system. Researchers have demonstrated that liquid 3D printing is useful when working with living cells, soft materials, and even industrial-grade materials, however, research and applications are restricted by prohibitory costs and limited print material capacity deposition systems. The current project aimed to address both the problems of cost and print material capacity by creating a low-cost, universal liquid 3D printer apparatus. A novel method of material transport, using a peristaltic pump, was created in this project. The apparatus is platform-independent, thus is able to be used with a variety of existing low-cost 3D printers. The apparatus is comprised of three main components: the extruder assembly, pump system, and reservoir. An open reservoir is used to store the print material, allowing for more material to be added mid-print without disrupting the ongoing print job. A peristaltic pump is used to transport the material from the reservoir to the extruder assembly. The extruder then deposits the material through a needle into the build area. A common test print was fabricated and data regarding the dimensional accuracy of the given print was collected. This prototype has provided a proof of concept that liquid 3D printing can be accomplished with a peristaltic pump system with dimensional accuracy. This project can have profound impact on 3D printing technology/rapid prototyping as printers capable of using non-traditional build materials cheaply and efficiently become more prevalent.

WAC Lighting Research Association Fair

- 1st Place (Prototype Engineering, 2018)
  Long Island Science Congress
- Honors (2018)

Long Island Science and Engineering Fair

- 1st Place (Materials Science and Engineering, 2019)

Grade 10:

Does Time Really Fly When You're Having Fun? (with Jasmine Ting)
Long Island Science Congress ("LISC")

- Merit Award (2017)

Grade 9:

The Effects of Different Types of Sunscreen on Marine Environments (with Priscilla Lee, Mayeesa Rahman, & Jasmine Ting)
eCybermission

- Honorable Mention (2016)

There's a sudden zombie apocalypse– How do you survive?

Jasmine Berger –Move to Cambodia and use the survival skills she learned in Montana

Asher Bykov – Debate his way out of it

Lauren Christenson – Hire Anthony to defend her

Drew Goldman – Scream and throw carrots/celery at the zombies

Dana Guggenheim – Cry for hours

Johanna Kann – Sigh and let the zombies take her

Adrian Ke – Take a fatal dosage of painkillers before a zombie could curse her to eternal life

Mayeesa Rahman – Just smile and hope they didn't bother her

Maleeha Rahman – Give them her fatal death stare

Lindsey Rust – Beat them with an oar and row to safety

Kevin Lam – Blow up the entire earth in a chemical fire

Alex Liu – Eat whey protein to buff up and fight them

Brandon Lee – Become bros with the zombies

Emily Leventhal – Confuse the zombies with her multiple personalities

Justin Schiavo – Build a rocket and blast out of this b*tch

Jasmine Ting – Sleep through the days and only go out when even the zombies are asleep

Jeffrey Yu – 3D print a bunker to hide in

LOWEST TEST GRADE

Jasmine Berger – 54 (AP Calc AB, Grade 12)

Asher Bykov – 54 (Health, Grade 10) or 69 (AP Physics 1, Grade 12)

Lauren Christenson – 59 (AP Physics 1, Grade 12)

Drew Goldman – 72 (Research Seminar, Grade 10)

Dana Guggenheim – 55 (AP Economics, Grade 12)

Johanna Kann – 78 (AP Lang, Grade 11) [because apparently her 64 in Freshman Engineering doesn't count]

Adrian Ke – Unknown-- it was so low, Tsarevsky just told her to drop without telling her the number (AP Physics C, Grade 12)

Mayeesa Rahman – 56 (AP Physics 1, Grade 12)

Maleeha Rahman – 63 (AP Physics 1, Grade 12)

Lindsey Rust – 65 (AP Physics 1, Grade 12)

Kevin Lam – 69 (AP Economics, Grade 12)

Alex Liu – 40 (AP Chemistry, Grade 12)

Brandon Lee – 55 (AP Calc AB, Grade 12)

Emily Leventhal – 58 (AP Calc BC, Grade 12)

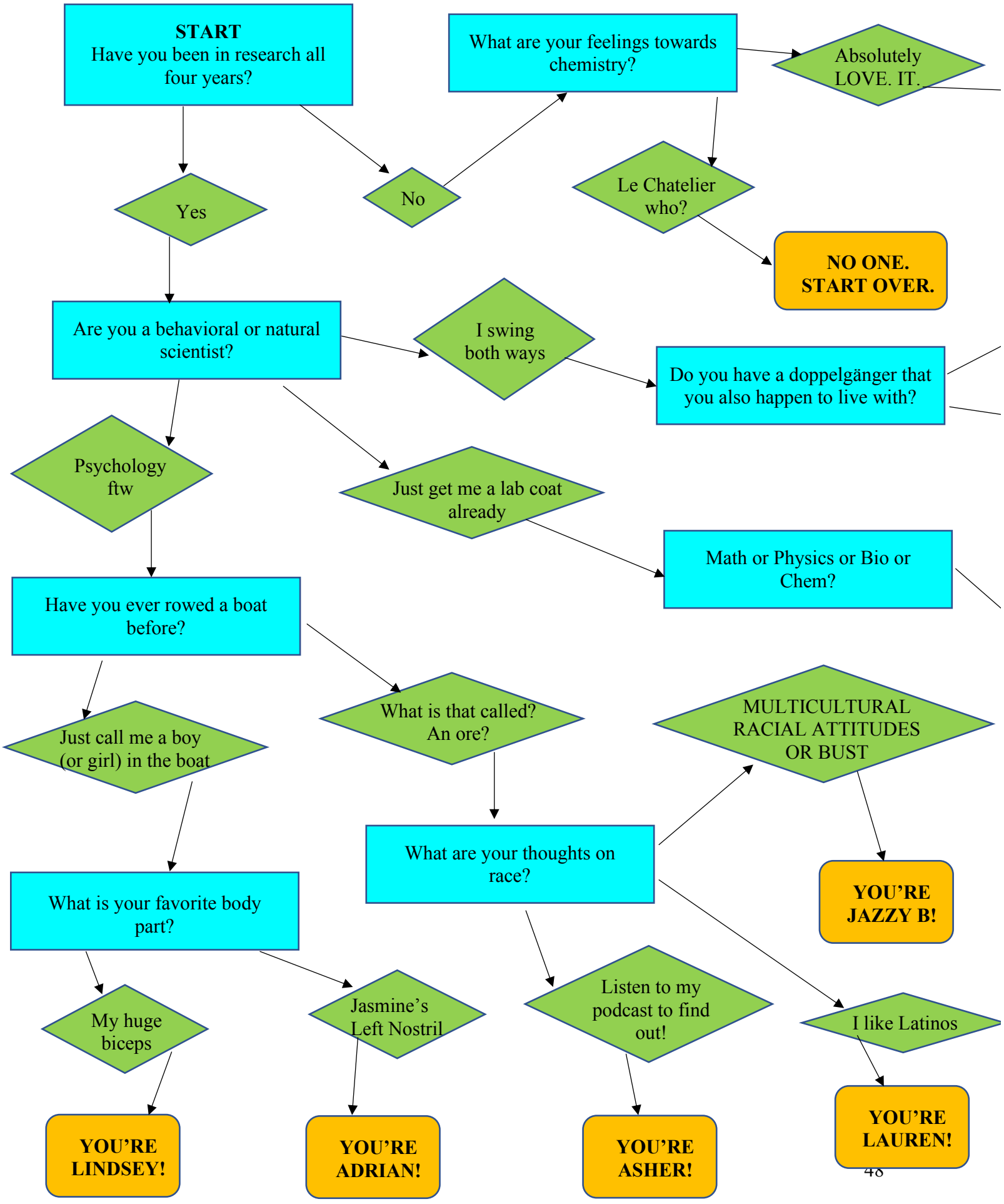
Justin Schiavo – 69 (Algebra II RSH, Grade 10)

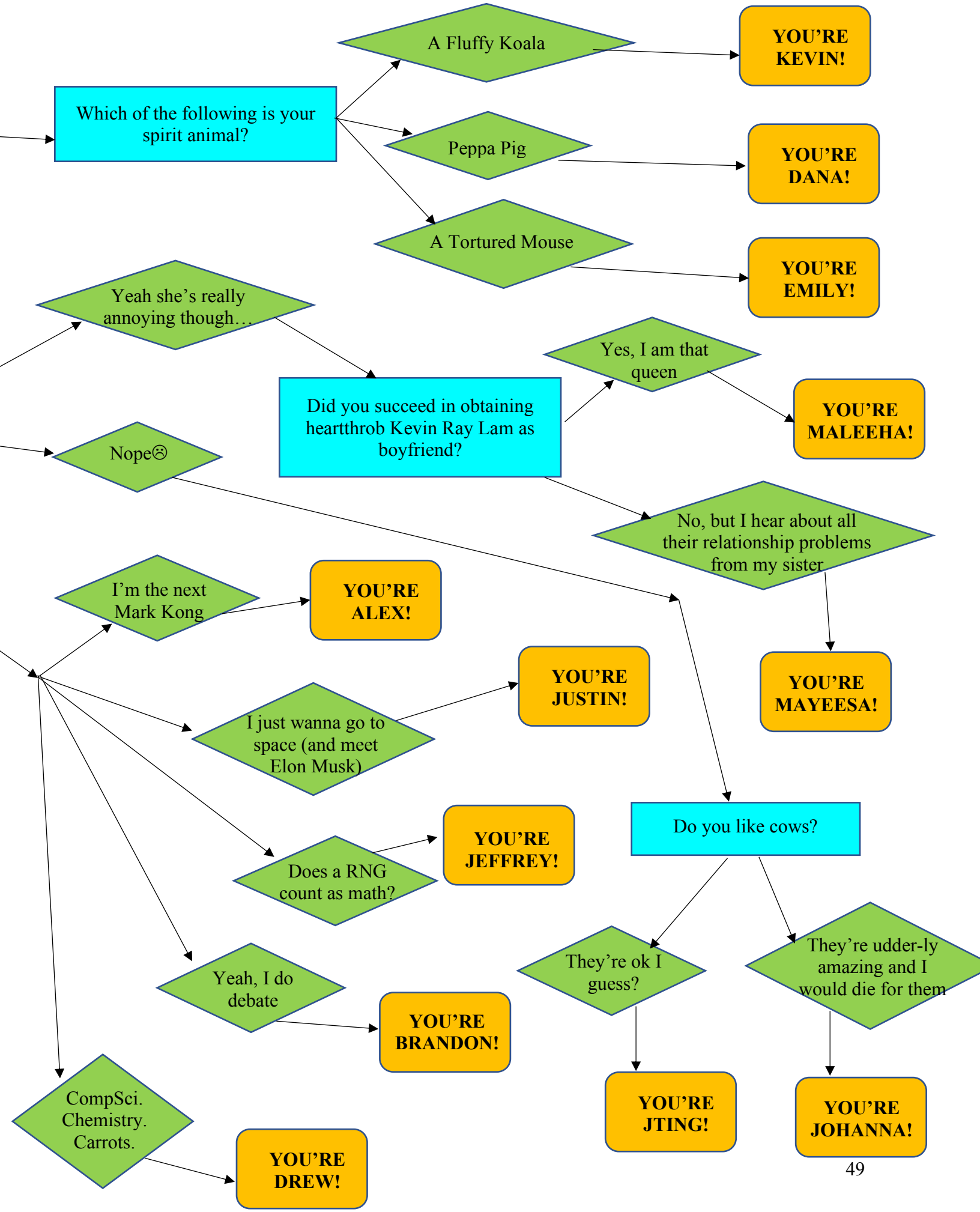
Jasmine Ting – 70 (AP Chem, Grade 11)

Jeffrey Yu – 42 (Living Environment, Grade 9) [claims he has lower but refuses to give a number]

Mean: 59.9 **Median:** 58.5 **Modes:** 54, 55, 69

WHICH RESEARCHER ARE YOU?




Which of the following is your spirit animal?
A Fluffy Koala
YOU'RE KEVIN!
Peppa Pig
YOU'RE DANA!
A Tortured Mouse
YOU'RE EMILY!
Yeah she's really annoying though…
Did you succeed in obtaining heartthrob Kevin Ray Lam as boyfriend?
Yes, I am that queen
YOU'RE MALEEHA!
Nope☹
No, but I hear about all their relationship problems from my sister
YOU'RE MAYEESA!
I'm the next Mark Kong
YOU'RE ALEX!
I just wanna go to space (and meet Elon Musk)
YOU'RE JUSTIN!
Do you like cows?
Does a RNG count as math?
YOU'RE JEFFREY!
They're ok I guess?
They're udder-ly amazing and I would die for them
Yeah, I do debate
YOU'RE BRANDON!
YOU'RE JTING!
YOU'RE JOHANNA!
CompSci. Chemistry. Carrots.
YOU'RE DREW!

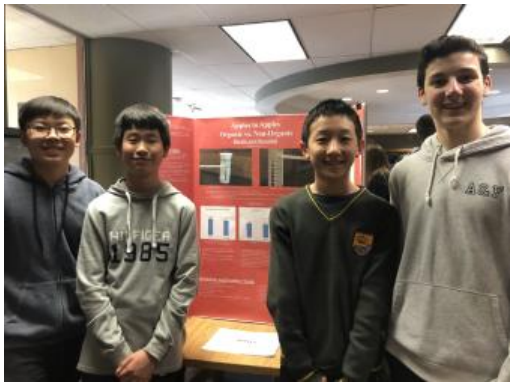
Grade 9 – 11

Abstracts

9th Grade Projects

Apples to Apples: Organic vs. Non-Organic

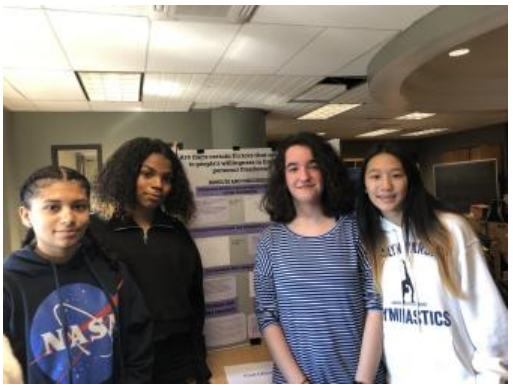
Daniel Liu, William Xu, Ben Farhi, and Trevor Kim



Consumers have many different perceptions of organic and non-organic foods; however these perceptions may be false. Our project sought to solve this problem by specifically focusing on organic and non-organic apples. Twenty organic and non-organic honeycrisp apples were tested with Quantofix vitamin C test strips. Each apple had to be cut and blended before testing. Fifty-eight randomly-chosen shoppers at a local grocery store were shown an advertisement for either organic or non-organic apples. A survey regarding their perceptions of the apples was then given to the participants. Each item was a 7-Point Likert Scale, 1 being "Strongly Disagree" and 7 being "Strongly Agree." The ítems measured how healthy, safe, and expensive participants perceived the apples to be. The organic apples were perceived as being more nutritious, safer to eat and less expensive than the non-organic apples. Additionally, the our natural science assessment, found that the organic apples had the same vitamin C content as the non-organic apples. The data supported our hypothesis, and the study suggests that people perceive organic food as more nutritious, safer to consume, and more expensive than non-organic food. These findings may have a wide range of implications, for perceptions of organic and non-organic foods.

Do People Really Want to Give Up Civil Liberties?

Lola Kurbanov, Laura McNair, Camila Shori-Boreland, Jasmine Lin

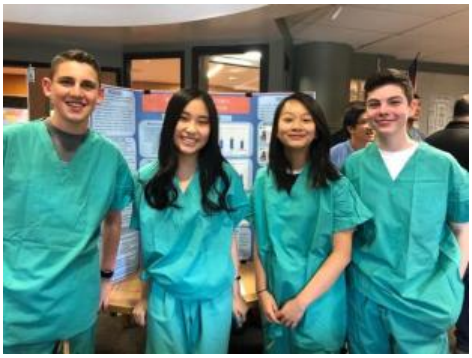


With all the recent terrorist attacks on America we conducted a study on people willingness to cede civil liberties for a greater perceived sense of safety. Previous studies have shown that people who feel more in danger are more willing to cede their civil liberties when feeling pressure from an international or domestic threat to others or their family. But, there have been no studies showing the correlation between different groups of people, i.e. ethnic groups or political groups and their sense of danger and willingness to cede civil liberties. Our study shows the results of people with different backgrounds and their willingness to cede their civil liberties. Our first hypothesis explored people's political beliefs and how willing they were to cede civil liberties. Our participants (N = 62) were given a survey; the first part of the survey focused mainly on one's political beliefs. We ran t-test and we found that liberals had a mean score of 4.00 and conservatives had a mean score of 3.10. We then created a correlation and we concluded that our results were insignificant. It was shown that liberals are less likely than their counterparts, conservatives, to cede their civil liberties despite the threat of terrorism. Our second hypothesis explored racial backgrounds and their readiness to cede civil liberties. We wanted to see if there were differences when comparing racial minorities (non caucasians - cap!) to caucasians. When we

ran a t-test people who felt more danger had a mean average of 4.33, whereas people who felt less danger had a mean average of 3.04. We then created a correlation and found that the results were insignificant and might've occurred due to chance with a p-value of 0.878. It was shown that non Caucasians were less likely to cede civil liberties despite a threat and Caucasians were more likely to cede civil liberties. Our final hypothesis was that people who feel more in danger are more likely to cede their civil liberties and this hypothesis was supported but, the data itself was statistically insignificant because we ran our data through a t-test, we found that Caucasians had an average mean of 4.46 and that Non-Caucasians had an average mean of 3.97. These results show that depending on a person's environment or their own personal beliefs, their readiness to cede civil liberties are swayed to fit the circumstances they are in.

Don't Judge a Doctor by Their Location

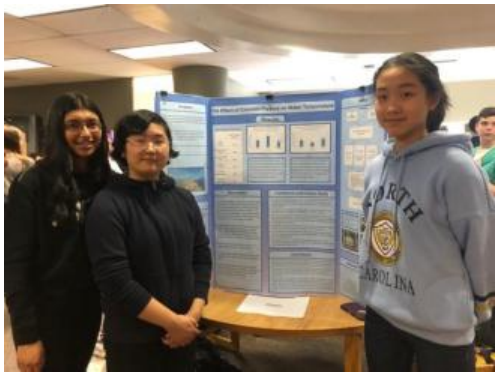
Hailee Youn, Bennett Levine, Jessica Chen, Ethan Kessler



Many people are willing to travel long distances and pay more money to receive what they view as "better health care." While past studies have contrasted perceptions of rural and urban doctors, our study looks at perceptions of suburban doctors as well. Participants (N=120) were randomly assigned to view one of four doctor profiles. The profiles were identical, with the exception of the location of the doctor's practice. Some participants saw an urban location, some saw a suburban location, some saw a rural location, and some profiles did not specify a location. After reading the profile, participants rated the doctor's competence, trustworthiness, and how caring they would be. We found that people perceived urban doctors as most competent, trustworthy, and caring, while suburban doctors were perceived to be the least in all three categories. Two of the variables, trustworthiness and caring, were significant for our ANOVA test. The p-value for how caring they'd be was 0.043, and the p-value for trustworthiness was 0.024. Although it was shown that how caring they would be and trustworthiness were affected by location, competence was not, as it's p-value was insignificant. This study suggests that people are more willing to travel to urban doctors mainly because they are perceived to be more caring and trustworthy.

The Effect of Common Plastics on the Water Temperature

Yeji Kim, Yijia Liu, and Mahi Shah



Global warming has become an exponentially growing concern. The water surface temperatures have been recorded to have risen over the past few decades. Greenhouse gases are often blamed for global warming. Certain types of plastics are made of natural gas liquids ethane and propane, which are closely related to greenhouse gas molecules. These plastics produce greenhouse gases as they are degraded. Greenhouse gases cause temperatures to rise at a more rapid rate by using heat energy absorbed by loose bonds to produce and re-emit more heat energy (UCAR, 2011).This study sought to determine if plastics made of polyethylene would impact the rate at which the water temperature increases. By testing groups of distilled and seawater with pieces of plastic and running two one-way ANOVA tests, we have shown that the effect of plastic bottles in

distilled water were the only ones that had a significant effect. The effect of plastic bottles in sea water, and plastic bags in distilled and sea water did not have a significant effect. These findings suggest that the direct presence of plastic does not contribute to the rate at which the water temperature rises. These findings also hint at the possibility that there may be a difference in the effects of plastic pollution on water temperature between freshwater and seawater. However, more trials would be needed to draw a more reliable conclusion. Possible further investigation include investigating whether other plastics have the capabilities to heat up and re-emit heat energy as greenhouse gases can.

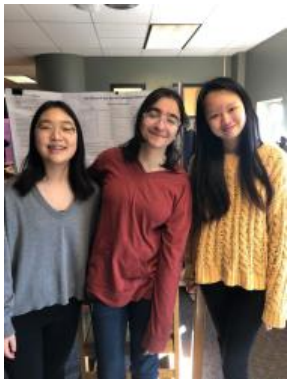
The Effect of Copper Sulfate on the Mortality Rate of Brine Shrimp

Mikey Rice, Garrick Cheng, Jonah Ben-Levi, Yazid Badawy

The experiment was conducted to determine whether there is a correlation between increased copper sulfate, and the mortality rates in a sample of Infantile Brine Shrimp. Copper Sulfate is an ingredient in several fertilizers. Infantile Brine shrimp was used in the experiment, because they're easy to hatch and grow, and are a major food source for many aquatic organisms. The experiment used several containers containing either 0g/ml, 0.5g/ml, 1.0g/ml, or 2.0g/ml of copper sulfate. There were eight containers each of the three different concentrations. A sample size of 1.0ml of Infantile Brine Shrimp was placed in each individual container, and a daily observation was recorded of how many Shrimp were alive in each container. The findings display how Infantile Shrimp in the 2.0g/ml and 1.0g/ml containers had a greater mortality rate than the Shrimp in the 0.5g/ml and 0 g/ml containers. It is recommended for further study that Mature Brine Shrimp should be used for the experiment because Infantile Brine Shrimp are difficult to analyze. It's suggested that other invertebrate aquatic organisms should be used as samples to test the reliability of copper sulfate on the mortality rate of aquatic organisms.

The Effect of Soil pH on Hydrangea Sepal Color

Madison Kwon, Eunice Huang, and Rena Kurbanov



Hydrangeas are flowers typically used for aesthetic display. The purpose of our study was to evaluate if hydrangeas could also be used to naturally monitor soil pH. Hydrangeas tend to change color as soil pH changes. A soil pH of 6.0-6.2 usually creates pinkish hydrangeas, and a soil pH of 5.0-5.2 usually creates bluer hydrangeas. The experiment was conducted for three weeks watering blue hydrangeas with 50mL of sodium chloride and pink hydrangeas with 50mL of vinegar to manipulate the pH of soil. The results indicate that there was a slight amount of change. The experiment showed that the blue hydrangeas were initially a color of 5B 5/8, according to the Munsell color chart. The final color was 5RP 6/2. The initial color of the pink hydrangeas was 5RP 7/18, and the final color was 5B 6/4. As a result, we were able to verify our claim that hydrangea color changes as we alter soil pH. The experiment

suggests a larger sample size, and a longer period of observation is necessary in order to measure a significant difference in hydrangea color, and more accurately determine the pH movement in soil.

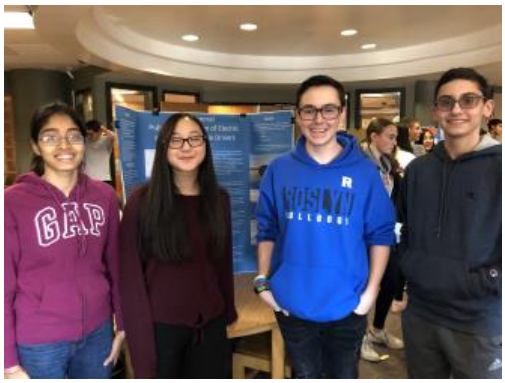
The Effect of Source Differentiation on Trust of and Likelihood to Obtain the Flu Vaccine

Maya Groothuis, Natalia Hakimi, Yasmine Kaplan, and Abigail Silverman

This investigation focused on the ongoing problem of people getting dangerously sick with influenza each year. The influenza vaccination has been shown to protect people against getting sick. Medical professionals can tailor outreach efforts to prevent influenza in communities by using the results found in our study. The study investigated the effect of changing the source of an article regarding the influenza vaccination. Each participant (N=90) read an article before completing a survey. The articles consisted of factual information showing the dangerous effects of influenza. For our experimental stimuli, three articles were administered, each with a different specified source. The three sources included the U.S. Military; the University of Pennsylvania; and one article with no specified source. The results of the study showed that the University of Pennsylvania was both more trusted; and had a higher likelihood of participants getting vaccinated compared to the U.S. Military article and the unnamed source article. The results of the study indicates that there may be several implications that may have influenced the results of the study.

The General Public's Perception of Hybrid and Electric Car Drivers

Owen Edelstein, Jake Ramsey, Harshita Sehgal, and Chloe Tao



Global warming and rising CO2 emissions pose threats to the environment and human health. Humans may be at risk for various cardiovascular and respiratory diseases. The preference of gas-powered cars over electric and hybrid cars contribute to this threat. Research has been conducted on how consumers perceive electric and hybrid cars. Our study looks at the perception of the drivers of these electric and hybrid cars.For this experiment, we adapted three scales measuring perceptions of environmental friendliness, intelligence, and financial success. One hundred twenty one participants, 17 and older, were randomly assigned to view an image of a car and its' driver, and to complete a survey. The car was described as either electric, hybrid, or gas-powered in a written description below the image. Participants were asked to complete the survey which included eight 7-point Likert-type scale questions, along with demographic questions. An ANOVA analysis concluded that drivers of hybrid cars were perceived as the most environmentally friendly. They were also perceived as most intelligent and financially successful, but these results were insignificant and marginally significant, respectively. This suggests that the public perception of drivers who operate hybrid cars are positive, compared to drivers who operate electric and gas-powered cars.

How Cell Phone Radiation Affects Brassica Brassica rapa

Julian Barish, Ian Litvack, Brendan Cucuzza, Monty Goldstein

Cell phones are one of the most widely used cellular devices in the United States. The use of cell phones in society has imposed health and environmental issues due to the large amounts of radiation they emit into the atmosphere. This radiation is harmful to the cells of any living thing. Nearly every person over the age of 13 has multiple devices, including cell phones. In our study, we tested the effect of cell phone radiation on the growth of Wisconsin Fast Plants. We used two iPhones to apply radiation to the plants for the experimental group. We also had a control group that was not exposed to radiation. Radiation was applied to the experimental group for 10 days. We measured, watered, and calculated the average growth of each plant everyday. We included mathematics by measuring all the plants to see how the radiation from the iPhones affected the growth of the plants. We also calculated the average growth of each plant everyday and at the end of the study we calculated the average number of deaths. An independent samples t-test showed that there was significantly less growth in the group exposed to the radiation than the control group, $p = .05$. 18 plants died in the experimental group and 10 plants died in the control group. This will benefit our community because we can make people aware of the damage their cell phones are inflicting on plants in our community and the potential damage they could be inflicting on us.

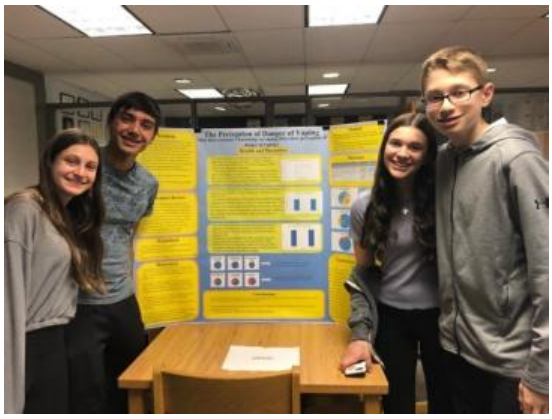
How Motor Oil Effects Daphnia Magna

Alexa Weinberger, Dylan Berlent, Lucas Saroop, and Manny Santos

A problem within our society is freshwater environments are being contaminated with harmful substances, including motor oil, which has a hazardous effect on freshwater species. Minimal research was done on the effects of motor oil on Daphnia Magna. This experiment could create interest in the effects of different oils on freshwater organisms. Oil can enter freshwater by runoff from parking lots and roads. In this experiment, we placed 5 Daphnia into 260 milliliters of water and placed 2.6 ml of oil in one group, 6.4 ml of oil in a second group, 10.4 ml of oil in a third group and one control group. All groups had 3 containers. Within 1 day, all the Daphnia died. We ran a follow-up experiment, where we placed the Daphnia into a 24 well plate with increasing amounts of oil. We then collected data for two days, because all the daphnia died after one day except for the controls. The next day all daphnia were dead. The results of the experiment supported our hypothesis that the oil is detrimental to the Daphnia Magna's survival, but since the daphnia died after one day, except for the control group in the 24 well plate, these result are not conclusive and further research has to be done. If we were able to experiment on a larger scale we could use bigger freshwater organisms and use larger quantities of oil, water, and animals. This could make our experiment more statistically significant and help other experiments with further research.

The Perception of Danger of Vaping

Luke Christenson, Saydie Grossman, Samuel Jacobson, and Hailey Margulies



The epidemic of vaping has been at a constant up-rise in high schools and the lives of teens. Vaping is a deceptive concept, and can cause many consequences. By investigating this phenomenon we wanted to analyze the perceptions of danger and knowledge of vaping among teens. Forty-eight tenth grade students, randomly assigned to three health classes, were given an assent form, and completed a survey. The survey had ten true or false questions about vaping, and three Likert type scales measuring perceived danger. The survey also included three demographic questions. There was no statistical correlation between knowledge, and perception of danger, and there were no significant connections between gender and vape knowledge, or of gender and perception of danger. However, there were trends in survey results. Questions relating to the effects of vaping were answered mostly correct, unlike questions relating to the contents of a vape product. Students recognize the effects of vaping but not what can cause those effects. This investigation showed us how knowledge and perceptions of danger can contribute to the problem of vaping. Also, it assisted in evaluating the factors contributing to the up rise, and will help us to invent new ways to counter the epidemic and improve the lives of young adults.

Should MBSR be implemented into student's lives in order to counter the ever-increasing stress levels students experience? The Effect of MBSR on Student Stress Levels

Jaideep Grewal, Amelia Abraham, Sebastian Plaza, and Elaine Lee

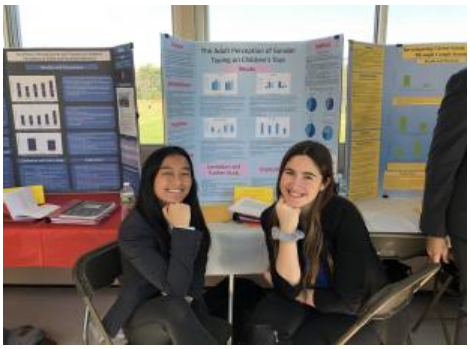
An increasing number of students suffer from high levels of stress. Stress interferes with both the mental and physical well-being of students. MBSR (Mindfulness Based Stress Reduction) is a way in which stress can be decreased effectively. As widespread of an issue as stress is for students, there have not been many studies where high school students from an upscale suburban neighborhood were exposed to MBSR as a stress reliever. Thirty-five participants from yoga classes at the target school were tested in this study. The MBSR methods tested were yoga and breathing techniques. The MBSR methods were compared to a control group. The yoga group performed Sun Salutation A; a series of yoga poses. The breathing group participated in 4 different breathing techniques. The control group experienced a time of socialization through basic conversations, simulating a normal social interaction. Three class periods were tested over the course of 3 sessions. To minimize confounds, every class performed a different task each day. In addition, each participant went through every condition. As the session concluded, each student completed a survey, which measured their stress levels and the likelihood of further usage of MBSR in their daily life (on a Likert-type scale) Multiple paired t-tests were conducted, comparing the

experimental groups to the control; comparing the likelihood for future usage of MBSR and the students' stress levels. The data when comparing students stress levels yielded significance through a *p-value* of less than 0.05, suggesting MBSR as an effective form of stress reduction. Similarly, the data comparing the students' likelihood for future implementation of MBSR was analyzed through multiple paired t-tests. The data yielded significance when comparing yoga to the control with a p-value less than 0.05. The data supported our hypothesis that MBSR (yoga and breathing techniques) can be used to decrease stress in students. The data collected shows that MBSR is an effective stress reliever for high school students hence it would be beneficial to implement MBSR into high schools.

10th Grade Projects

The Adult Perception of Gender Typing on Children's Toys PHOTO

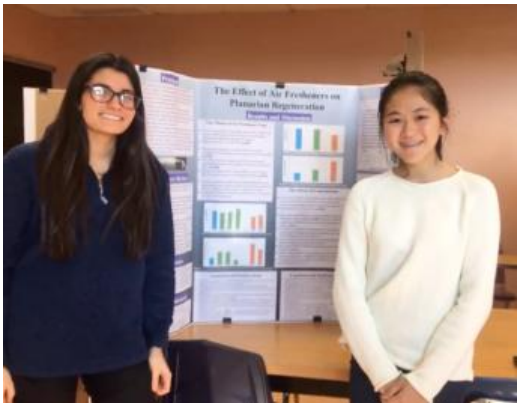
Sara Lok and Josie Mashkevich



In a society which has largely moved towards gender equality, many people still gravitate toward gender stereotypes. Companies and businesses in our society continue to contribute to the stereotypical views that our society still holds. Toy companies create and target their toys at specific age ranges and gender, they manipulate the color and toy type, aiming blue at boys and pink at girls. For a society that has largely moved towards gender equality a huge amount of parents continually fall for this trick. Research has shown that there are many factors, such as the companies and businesses, that are contributing to how children are forming their social and gender cognitions. Although businesses are the ones that are targeting specific ages ranges and gender, the parents are the ones that are buying their products. The action of the parents contribute to the idea that parents are becoming an increasingly important factor in the formation of their children's gender and social cognitions. Many previous studies have focused on the perception of children's view of gender stereotypes even though we should be focused on their parents. The purpose of our study was to look at adult perceptions of gender typing. In our experiment, each participant was randomly assigned to one of six different conditions. We had each participant choose a toy for either a niece or nephew, and answer questions from the Sex Role Attitude Scale, which would determine how feministic the participant's views were. We manipulated the toy type and color in each of the conditions. We had found there was no significant effect between having a niece or nephew stimulus with whether or not subject chose a masculine, feminine, or neutral toy. However, there was a significant effect for toy type. We also saw a significant effect between whether or not you gender typed the toys and the average on the Sex Role Attitude Scale, where a higher average indicated a more feminist view. But, no significant effect between being a mother or father and whether or not you gender typed was found. This experiment suggests that adults do tend to gender type children's toys in certain aspects. This leads us to believe that these adult perceptions could possibly be imprinted on their children, leading them to grow up with gender stereotypical views in a world that is supposed to be moving more towards gender equality.

The Effects of Air Fresheners on Planarian Regeneration

Alida Pahlevan and Katie Lam

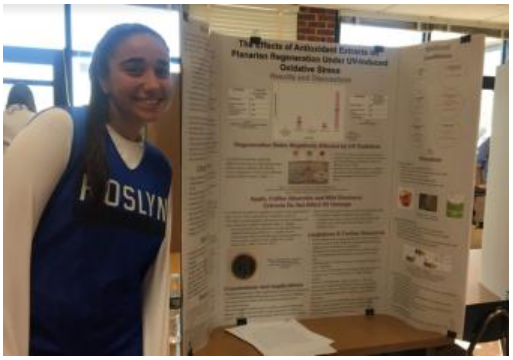


Purpose: Research has shown that air fresheners emit hazardous chemicals known as volatile organic compounds into the environment. In turn, new companies claimed to have discarded these chemicals by creating "safe and natural" air fresheners. There has been an absence of studies testing the actual effects of different air freshener types nor varying concentrations on living organisms. The purpose of this study was to find the effect of air freshener type and concentration on planaria regeneration. **Method:** The organism planaria were used due to their regeneration properties. Thirty-five planaria were assigned to one of three air freshener conditions, then assigned to one of three different concentration groups (0.1%, 0.01%, or 0.001%). Then the

planaria were cut in half and allowed to regenerate for 14 days. Immediately following, data was collected and analyzed on the rate of regrowth that occurred for each planarian. **Results:** This study identified that control and natural groups had similar percent regrowth with 87% and 86%, respectively, while the chemical group had a significant negative impact on their regeneration rates, with only a 64% regrowth. It was also found that increasing concentrations had a greater negative effect on the regeneration rate for both chemical and natural air fresheners. **Conclusions:** This experiment suggests that natural air-freshener is not as harmful as a chemical air freshener, which has many environmental and health implications. Also, higher concentrations of air fresheners could cause a greater amount of cellular and bodily health concerns.

The Effects of Antioxidant Extracts on Planarian Regeneration Under UV-Induced Oxidative Stress

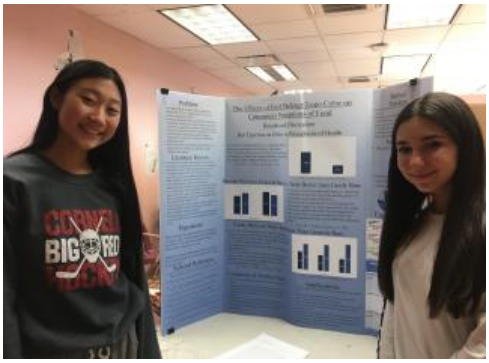
Ariana Matarangas



Research has established that ultraviolet radiation is the leading cause of skin cancer and pre-mature skin aging. Aside from the cosmetic effects, pre-mature skin aging is the result of damage to the skin's immune response. Previous investigations have explored the effects of ultra-violet radiation on the lifespan of *Caenorhabditis elegans*. Antioxidants such as wild blueberry extract, apple extract, and coffee silverskin extract have all been proven in being effective in increasing longevity after ultraviolet radiation exposure. The current study investigated the effects of ultraviolet radiation on planarian regeneration rates and the capability of antioxidant extracts in reducing the subsequent damage. It was hypothesized that exposure to ultraviolet radiation would decrease regeneration rates and application of antioxidant extracts would mitigate that damage. In order to reduce the effects, the planarian in the experimental conditions were treated with wild blueberry extract, apple extract, coffee silverskin extract, and a combination of the three extracts. After the fourteen-day regeneration period where planarian were exposed to one hour of radiation each day, it was established that while ultraviolet radiation did decrease planarian regeneration rates, treatment of antioxidant extracts did not reduce these negative effects.

The Effects of Food Package Logo Color on Consumers Perceptions of Food

Faith Lee and Emily Ruttgeizer

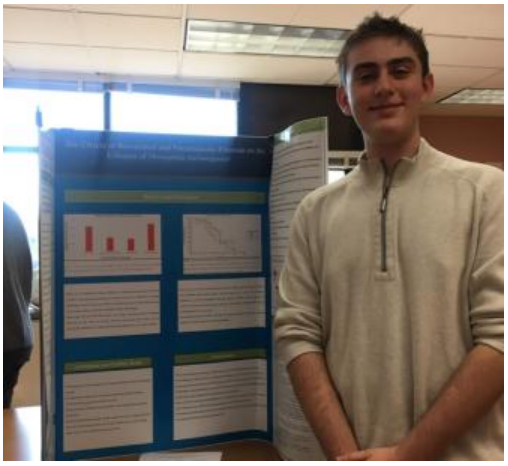


In today's society, color carries several symbolic meanings that bear cognitive implications and strongly influences an individual's perceptions. The color green is commonly associated with healthiness and "go" whereas the color red is commonly associated with unhealthiness and "stop". Research has shown that red and green food packaging colors affect perceptions of a food's healthiness. However, no recent studies have looked at the effects of a smaller stimuli, such as logo color, on perceptions of healthiness.

The present experiment investigated the effects of logo color, red and green, on the perceptions of healthiness, indulgence, and taste. One hundred and fifty seven participants were randomly assigned to view either a candy bar or granola bar with a green, red, or black logo. Participants evaluated the bar by rating their perception of the food's healthiness, indulgence, and taste using a 7 point Likert-Type scale. A one-way ANOVA demonstrated that participants viewed the granola bar to be healthier than the candy bar ($p= 0.01$). In addition, a two-way ANOVA revealed an interaction in which women perceived the granola bar to taste better than the candy bar whereas men perceived the candy bar to taste better than the granola bar ($p=0.01$)and participants identified the candy bar to be more indulgent than the granola bar ($p=0.03$). However, the color of the logo had no effect on the perceived healthiness, indulgence, or taste. This experiment suggests that the type of bar, instead of the color of the logo, effects perceptions of healthiness, indulgence, and taste of a candy and granola bar.

The Effects of Resveratrol and Nicotinamide Riboside on the Lifespan of Drosophila melanogaster

Jake Azrolan



Resveratrol (RSV) is a widely marketed longevity supplement that is a naturally occurring polyphenolic compound found in many fruits including grapes, peanuts, and berries (Bhullar & Hubbard, 2015). The mechanism of action of RSV is dependent on the presence of a surplus of NAD^+. Therefore, it is unclear how RSV might aid in longevity if not supplemented with NAD^+. *Drosophila melangaster* wild type were used in this study as a model organism and exposed to RSV and Nicotinamide Riboside (NR), a precursor to NAD^+, either independently or in combination (RSV+NR) and compared to the control group. It was hypothesized that RSV given in combination with NR will increase the lifespan of *D. melanogaster* more than either treatment given independently. The significance of this study is in its ability to analyze the relative effects of RSV and NR on longevity, both as independent treatments and when administered in combination. The results indicated that RSV and NR, two widely marketed products for improving longevity, was not effective in increasing lifespan in *D. melanogaster.*

Investigating Global Suicide Trends Through Google Searches

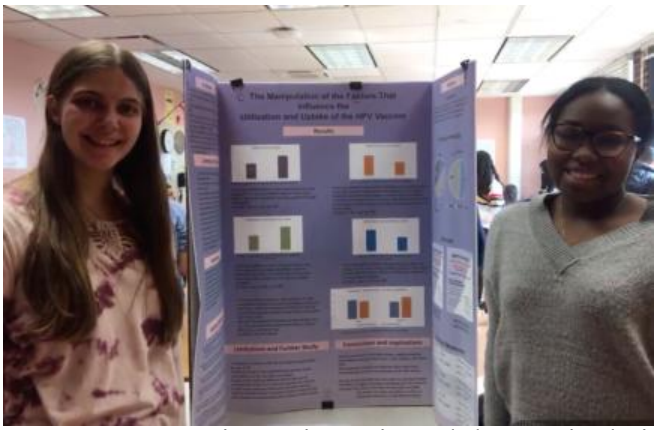
Ria Malhotra and Ali Malik

Globally 1,000,000 suicides occur annually (Khan, 2005). Suicide is a global epidemic which has been studied extensively in developed nations, however there is a lack of research on suicides within developing nations. In addition, mental health care has greatly lowered suicides in developed nations, but this is offset by a growing number of suicides in developing nations(Khan, 2005). Most empirical suicide research is prone to social desirability whereas the use of a Google Trends provides impersonal

conditions, which eliminates social desirability bias. Google Trends has been shown to provide information on a number of topics concerning mental health. (Davidowitz, 2017). This study investigated global suicide trends through the use of Google Trends software. Data was gathered through Google Trends for the relative suicide search popularity for 12 developed and 12 developing nations in the past 5 years. Relative suicide search popularity, which is calculated on a scale out of 100, was measured by six individual suicide search terms. Suicide, depression, suicidal, how to kill myself, want to die, and commit suicide. We inserted our data into the Statistical Packaging for the Social Sciences (SPSS) and ran six separate t-tests for each term, comparing developing and developed nations. Relative suicide search popularity was higher among developing nations for the search terms commit suicide and want to die. This study indicates that suicides are extremely prevalent in developing nations and even more so than that in developed nations.

The Manipulation of the Factors that Influence the Utilization and Uptake of the HPV Vaccine

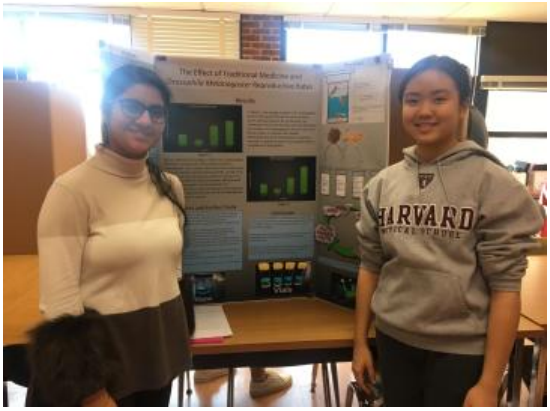
Elana Lynn and Brooke Williams



We live in a society where vaccinating our children against diseases is a commonly accepted practice. Human Papillomavirus (HPV) is a disease that can be treated with a vaccine that has been shown to be highly effective. Even though there is a highly effective vaccine, there are still many people who oppose the use of the HPV vaccine. Research has established that novelty and accessibility influence the utilization and uptake of the HPV vaccine. However, there have been no studies specifying which factors will affect the utilization of the HPV vaccine the most. The present experiment investigated the manipulation of the factors; novelty and accessibility and how they influence the utilization and uptake of the HPV vaccine in order to determine which factor would have the greatest effect on willingness to utilize the vaccine. Participants (N=800) were randomly assigned to view one of five informational sheets on the HPV vaccine. The informational sheets had the manipulations of high accessibility and high novelty, high accessibility and low novelty, low accessibility and low novelty, and low accessibility and high novelty. As well as the four stimulus with manipulations there was a control stimulus that only had general information about HPV and the HPV vaccine. Participants then took a survey that measured the likelihood of someone to vaccinate themselves and either their child or future child. The results revealed that participants who viewed the informational sheets that had the manipulation of high novelty were significantly more likely to vaccinate themselves and their child or future child. It was also found that males would be more likely to vaccinate their children if the vaccine was highly accessible, whereas females would be more likely to vaccinate their children when the vaccine was not highly accessible. This experiment suggests that novelty is a factor that can be manipulated successfully to influence the utilization and uptake of the HPV vaccine.

Traditional Medicine and Drosophila Melanogaster Reproductive Rates

Chelsea Kumar and Laura Chu



Around the world, couples are often faced with the issue of infertility, often resorting to treatments that can cost them hundreds or even thousands of dollars. Traditional medicine is often an affordable alternative to these treatments. Tradition medicine have been known to treat multiply health issues such as blood sugar levels, and hormone levels. Ginseng and Cumin common remedies are used in rural Asia for their high antioxidant levels and abilities to strengthen the immune system and fight hormonal imbalance. The purpose of our study was to determine whether the administration of Cumin, Ginseng, or a combination of the two effects the reproductive rates of Drosophila Melanogaster. Drosophila Melanogaster were administered 20ml of Ginseng, Cumin, and a combination of both extracts. The number of offspring produced by each female were used to measure the reproductive rates. It was hypothesized that when cumin and ginseng were administered independently or a combination of both extracts are administered the reproductive rates of the Drosophila would increase. When administered the cuminum cyminum extract or the panax ginseng extract independently, Drosophila displayed an increased reproductive rate. In contrast, Drosophila administered the combination of the two extracts displayed a decreased reproductive rate in comparison to the control. The implications of these results show the potential use of both panax extract and cuminum cyminum extract in the treatment of infertility, though further research is needed in this matter.

11th Grade Projects

The Battle of the Binge:
An Analysis of Drinking and Drinking Behaviors Between College Aged Individuals
Makenzie Komack

Much of current day literature has focused on drinking in young adults and the best methods to prevent poor drinking habits. Recent data suggest that there has been a broad shift in the age in which high schoolers begin drinking; however, the college drinking has remained constant. The present study, sought to focus on the shift in drinking patterns by comparing college aged participants high school drinking to their current drinking habits. One hundred and sixty-seven participants took a survey that included two seven-point scales assessing their current and high school drinking and two seven-point scales assessing their drinking behaviors and level of alcohol dependency. Though the main goal of the study was to find a significant difference in drinking between college aged individuals in college or in the workforce, the differences were insignificant. Secondly, as suggested by background literature, both college and non-college participants who reported higher levels of drinking also reported higher levels of alcohol dependence. However, though it was assumed that these same participants would also report higher rates of negative actions due to drinking, this proved to be highly insignificant. By discovering the short and long-term negative impacts of drinking prevention methods can be more effectively targeted at college aged individuals. This study brings light to how easily a few party years in one's youth can lead to life time of alcohol dependence.

Dinner's On Me:
The Effect of Gender of Initiator and Payer on Perceived Attractiveness and Compatibility
Sophie Fries

For the past few decades we have seen increasing gender equality in hiring, salaries, and political leadership; however, one sector of society still remains wildly traditional – the dating world. Women's fight for equality can seem somewhat contradictory when examining the widespread tendency to desire conventional behavior in the dating world. A survey conducted in 2017 revealed that 78% of female respondents believe the man should pay the expense of dates with their heterosexual counterparts. The present study examined the relationship between the gender of the initiator of the date and the gender of the payer of the date. Participants (N=319) saw one of six conditions that manipulated both the gender of the initiator of the date and the gender of the payer of the date and then completed a social attractiveness and relationship potential scale. Three two-way ANOVAs were run for data analysis. Analysis revealed that the gender of the initiator did not have any effect on the independent variables. Additionally, a male's attractiveness was unaffected by the gender of the payer. The attractiveness of the female, on the other hand, was perceived as greater

when she paid for the date compared to when she did not pay. Nevertheless, the couple was perceived as more compatible when the male paid for the date. The findings suggest that while it reflects well upon women to pay for a date, people view that as a sign that the relationship has less potential.

Does That Make Me Crazy?
The Effect of Disorder and Treatment Type on Personal Perception
Feyi Rufai

Research has established people are stigmatized based on the treatment they receive; however, there has been very little research on this stigma varies with certain psychological disorders. The present study will investigate students' perceptions of a theoretical college roommate. The participants will be randomly assigned to read a text message of a student with either depression or anxiety who will either receive therapy, medication, or no treatment. Participants were then given a series of statements based off of the text message and responded using a Likert type scale. For depression, no treatment received the most positive feedback. However, for anxiety, medication received the most positive feedback ($p = .028$). The results also show females tend to stigmatize more than males ($p = .032$). The experiment suggests there is still a stigma associated with certain psychological disorders and treatments.

The Effect of Accents on the Perceived Qualifications and Hireability of Workers
Olivia Viruet Quintero

Research has shown that there is conflicting beliefs about how linguistic studies with varying accents should be conducted. The predominant technique for accented research is known as "matched guise," which has one speaker record the same speech multiple times using different accents or dialects; however, the alternative is a non-matched guise technique which uses multiple speakers. Across the board, studies have shown that local accents receive higher ratings of hireability when compared to "minority" accents. However, we have seen no study that compares the two techniques and that assesses the perceptions of a doctor. This study will seek to explore the effects of accent on perceived qualifications and hireability in the workforce. The present study investigated adult's perceptions of the most qualified applicant for a doctoral position. Participants were randomly assigned to listen to a job interview with one of four accents, in either a heavy or light accent. Participants were then give a series of statements based off of the recording and responded using a Likert-type scale. This study goes against current research, as the results found all applicants who had non native accent were more likely to be hired than the applicant with the New York accent. This study goes against current research, as the results found all applicants who had non native accent were more likely to be hired than the doctor with a "native" accent. It was also found that there was no difference in how light and heavy accents were rated. This could be due to participants over correcting their answers to seem politically correct. Additionally, it was found that female participants rated the doctor slightly more qualified than male participants.

The Effects of Arming Guards and Teachers on Students' Perceptions of Safety and Comfort

Jake Litvack

Research has proven that students tend to have positive opinions of law enforcement officers in schools; however, no studies have looked into students' perceptions of arming these guards and arming teachers. The present study investigated the effects of arming guards and teachers on students' perceptions of safety and comfort. In this study, 63 high school students (ages 14-18) were randomly assigned a new article describing a schools recent security discussions (arming guards, arming teachers, deploying metal detectors, deploying unarmed guards, maintaining current system). Students then reacted to how safe they would feel at this school and how comfortable they would feel with their school adopting similar procedures based of a 7-point likert-type scale. Results for the effects of arming guards and teachers on students' perceptions of safety showed a insignificance results,although, students felt safest when unarmed guards were deployed in the school. The perceptions of comfort among students was insignificant. Though this is true, students reported feeling most comfortable when unarmed guards were used in their school. Interestingly, marginal significance was found between gender differences on perceived safety. Males in this reported feeling safer than female participants. This study can be expanded and use larger group of participants. Although results are insignificant, large effect sizes suggest that a larger sample size would allow us to conclude that students feel safer and more comfortable in schools where unarmed guards are deployed.

The Effects of Palbociclib and Decitabine on Dedifferentiated Liposarcoma

Jake Stoller

Dedifferentiated Liposarcoma (DDLS) is a high-grade and aggressive liposarcoma that arises from well-differentiated Liposarcoma. DDLS is characterized by the amplification of genes found on chromosome 12q13 ~ 15, including *MDM2, HGA2, CDK4,* and *CDK6*(The Cancer Genome Atlas Research Network, 2017). Previous research has established that utilizing the amplification of *CDK4* and *CDK6* as a therapeutic target for DDLS can be extremely effective (Klein et al., 2018). Furthermore, Taylor et al.'s study (2011) reported that*CEBPA*, a master transcriptional regulator of adipocyte differentiation, is methylated in 24% of DDLS tumors, offering a potential target for a new differentiation-based chemotherapy. The present study assessed the drug efficacy of *CDK*4/*6*inhibitor *Palbociclib* and DNA-methyltransferase inhibitor *Decitabine* in monotherapy, while evaluating the synergetic potential in a combination therapy on DDLS. Two patient derived cell lines were treated with either 1 μM of DMSO, *Decitabine, Palbociclib,* or *Decitabine* and *Palbociclib*. Cellular proliferation, cellular apoptosis, expression levels of downstream targets, and expression of genes of interest (CEBPA, PPARG, Rb1, TP53, and MDM2) at the mRNA level were assessed. The results suggest that *Palbociclib* inhibited the function of *Decitabine,* resulting in no additive or synergetic effect on DDLS. However, the results do demonstrate that *Decitabine* was able to suppress cellular

proliferation by inducing apoptosis and increased CEBPA expression. These findings may potentially indicate a new treatment option for DDLS patients.

The Effect of Swearing on the Perception and Likelihood of Voting for a Candidate

Lianna Friedman

Recently, there have been many stories in the news of politicians swearing, receiving both positive and negative feedback. Previous studies have demonstrated that swearing can affect the way that politicians are perceived; however, few studies have investigated how swearing might affect the likelihood of voting for a candidate. The present experiment investigated the effects of swearing on the perception of and likelihood of voting for a candidate. In order to conduct the experiment, adult participants were recruited and given information about two candidates and then randomly assigned to a group and given a speech about hunger in which either a male or female candidate used one of four swear words. Participants then completed a survey asking about their perception in terms of trustworthiness, persuasiveness, and competence based on the speech and their likelihood of voting for the candidate. It was found that the word choice had a significant effect on the perceived trustworthiness,persuasiveness, competence, and likelihood of voting for the candidate. However, there was no significant effect of the gender of the candidate or the participant on the perception of the candidate of the likelihood of voting for them.

#HeToo? How Victim Gender Affects Perceptions of Sexual Harassment

Madeline Groothuis

There is much modern debate about what constitutes sexual harassment. Much research exists on women being sexually harassed; however, little is known about the sexual harassment of men. The present study seeks to determine if perceptions of sexual harassment change depending on the gender of the person being harassed. The hypotheses tested were 1) Compared to when the gender of the harassee is male, when the gender of the harassee is female, participants will perceive more situations as sexual harassment 2) As ambiguity of sexual harassment scenarios increase, the gap between the perceptions of females being sexually harassed and males being sexually harassed will increase, and 3) Female participants will perceive more vignettes as sexual harassment than male participants. Participants were shown nine sexual harassment scenarios, each depicting either a female being sexually harassed by a male, or a male being sexually harassed by a female. They were then shown a statement that said “I consider this behavior to be sexual harassment”. Participants were asked to rate this statement on a 1 (Strongly disagree) – 5 (Strongly agree) Likert-type scale. The results found that participants perceived more scenarios as sexual harassment when the gender of the employee was female than when the gender of the employee was male. They also demonstrated that female participants perceived significantly more scenarios as sexual harassment than male participants.

Neural Plasticity for Auditory Processing: A Comparison of Musicians and Non-Musicians

Truman Chong

Studies have demonstrated that musical training can enhance the brain's processing capabilities and plasticity in children and adults; however, this study will observe how musical training affects the music and language processing in teenagers. The participants within this study included teenagers between the ages of 12 and 19. There were thirty-three participants in total. Fourteen participants were non-musicians and nineteen were musicians. Musicians are defined as people who have been practicing music on a weekly basis for more than three years of the last six or have been part of an orchestra for at least one year in the past six. All participants were recruited by oral solicitation, advertisements, and posting on social media. Musician participants will be recruited from local youth orchestras. The neural activity of the participants will be recorded with the ERP(event-related potential) while experiencing the same experimental stimuli as the one is a study by Kliuchko, Heinonen-Guzejev, Vuust, Tervaniemi & Brattico (2016). Afterwards, the participants will experience stimulation from the tDCS(transcranial direct current stimulation) for 10 minutes at 1.5mA before having their neural activity recorded once more with the ERP procedure. The participants' brain waves were measure in relation to six conditions: rhythm, intensity, location, slide, pitch, and timbre. Six repeated-measures ANOVAs were used and it was determined that the application of tDCS had a main effect in all conditions. However, the state of being a musician only had a main effect in the intensity condition and there was an interaction between the tDCS and being a musician in the slide condition, meaning that the degree at which the tDCS affected the brain was variable to whether the participant was a musician.

The Relationship between MDD, MDD Treatment, and Adult Hippocampal Neurogenesis Marker Doublecortin

Andrew Goldberg

Major Depressive Disorder (MDD) affects nearly 120 million people worldwide and 20% of adults in the United States alone (Boldrini et al., 2018). Yet, the pathogenesis of MDD is virtually unknown (Boldrini et al., 2013). In particular, the relationship between neurogenesis, the creation of new neurons which persists into adulthood in the hippocampus, and MDD is largely unexplored. Thus, the current study sought to determine the relationship between MDD, MDD treatment, and the adult hippocampal neurogenesis marker doublecortin (DCX). The sample consisted of 30 healthy control samples, 19 untreated MDD samples, and 13 samples of people whose MDD was treated with SSRIs. Frozen blocks containing the whole hippocampus were dissected, fixed in 4% paraformaldehyde, sectioned at 50 micrometers, and cryoprotected. Immunohistochemistry was performed with rabbit anti-doublecortin as the primary antibody and anti-rabbit as the secondary antibody. The total number of DCX-expressing cells in the dentate gyrus (DG) was estimated using Optical Fractionator in Stereoinvestigator. In the anterior DG, there was significantly less neurogenesis in the untreated MDD condition versus the controls or the high GAS MDD-treated group, but significantly more

neurogenesis in the high GAS MDD-treated group and controls versus the low GAS MDD-treated group. In the mid DG, there was significantly less neurogenesis in the untreated MDD condition versus the high GAS MDD-treated group. There was also an overall trend of decreasing neurogenesis with age. The experiment suggests that lower levels of neurogenesis are associated with MDD, while treatment is associated with higher levels of neurogenesis, potentially explaining its effectiveness.

Removal of Hazardous Dyes from Simulated Wastewater Using Nitro-Oxidized Carboxycellulose Nanofibers Extracted from Coconut Fibers

William Borges

Harmful dye compounds found in dyeing industry wastes can have deleterious effects on human health and the environment, especially in developing regions. High levels of coconut waste in developing areas pose a need for novel methods for coconut waste utilization. This study transformed waste coconut biomass into a Nitro-Oxidized Carboxycellulose Nanofiber (NOCNF) adsorbent for cationic dyes in water by using the Nitro-Oxidation (NO) method. Additionally, a sample of NOCNF was modified using cationic glycidyltrimethylammonium chloride (GTMAC) for remediation of anionic dyes. Coconut NOCNF existed in nanoscale with a negative surface charge and confirmed carboxylate group presence at 0.777 mmol/gram. Cationic NOCNF existed in nanoscale with GTMAC units at previous secondary OH units. Adsorption studies were conducted at varying concentrations for each material. NOCNF was a more effective adsorbent of cationic Basic Red 5 (BR5) dye compared to existing adsorbents in literature. Cationic NOCNF was a more effective adsorbent of cationic Malachite green (MG) dye than other adsorbents in literature. Cationic NOCNF was similar to other efficient adsorbents of anionic Acid Orange 10 (AO10) dye in literature. This indicates that cationic NOCNF retained carboxylate groups and the capacity for cationic dye adsorption. It also gained a capacity to adsorb anionic dyes. In summary, findings indicate that coconut NOCNF and cationic NOCNF are a novel approach for sustainable utilization of coconut waste and dye remediation in developing regions

The Role of FYN Inhibition and Knockdown in Determining Podocyte Cell Size and Actin Cytoskeleton

Daleep Grewal

Chronic kidney disease currently affects 30 million adults in the United States and is expected to rise substantially in the next 25 years, indicating that the current method of kidney transplant is sub-par and genomic analysis is necessary to find biomarkers of the disease. *Shroom3* was identified as a novel candidate gene whose expression in the renal allograft correlates with the decline of renal function. This is of public health relevance as 40% of Caucasian and admixed populations were found to carry a single nucleotide polymorphism (SNP), i.e. a *Shroom3*mutation (Chuang & Menon, 2012). To further

study the role of the *Shroom3* gene, Menon et al have used animal models where *Shroom3* levels were modulated {Menon, 2015; Menon, 2018}. Specifically, in podocytes, a specialized kidney cell, a protein-protein interaction was identified between *Schroom3* and *Fyn*, another Src protein, which impacts podocyte actin cytoskeleton and cell size (Menon, 2018). This interaction was necessary for *Fyn* activation. It is thus imperative to elucidate whether *Fyn* has independent effects on podocyte morphology in order to delineate the downstream mechanism of *Shroom3*, such that future therapeutics could specifically target the protein. The present study manipulated *Fyn* in podocytes such that the protein was either inhibited, using a novel inhibitor, or knocked down via shRNA. Overall, the actin organization in podocytes was not affected upon BD55 treatment (inhibition) or FYN knockdown. While there were observed increases in non-phosphorylated total Src kinase fraction, no differences in podocyte cell size or phosphorylated Src were seen with BD55. Upon *Fyn*knockdown, while no overt cytoskeletal changes were seen, podocyte cell size was reduced. These findings could suggest the importance of other Src family proteins in taking over the function of FYN in its absence or after inhibition of activation. Future studies are required to modify the structure of BD55 to reduce toxicity and confirm the effect of FYN knockdown on podocytes. This study provides insight on cell signaling, regulation, and morphology, which can hopefully contribute to the discovery of new biomarkers that play a role in chronic kidney disease.

Shining a Light on the Black Box of Neural Networks

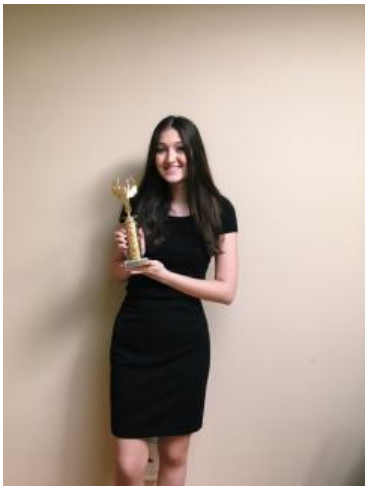
Joshua Flashner

Several algorithms exist which attempt effectively to represent the workings of a neural network; however, none are widely accepted in the machine learning community. This study developed a novel method by which to adapt a Recurrent Neural Network (RNN) to interpret the weights of a neural network. A Long Short-Term Memory (LSTM) module was attached to a Convolutional Neural Network (CNN) and a Sequential Networks (SNN) to create a time series of weights from the networks. These time series were then fed into an RNN which was trained with a custom mean squared error loss function. The RNN in question was designed from scratch and contains several hyperparameters which need to be set in accordance with the network that is being diagnosed. The matrix produced by the RNN accurately paired weights with corresponding levels of features in both the CNN and SNN. The results obtained by the networks were consistent with known values. The promising results of the study suggests that an RNN can be a robust and highly accurate method to diagnose neural networks.

Small Proteins, Large Roles: Resolving the Structure of Small Vasohibin-binding Protein Using E.coli Heterologous Expression and Nuclear Magnetic Resonance Spectroscopy

Nicole Blattman

Purpose: Small proteins, 20-70 amino acids in length, are highly underrepresented in proteome annotations, with large proteins having priority for annotation (Ling, Su, Wu, Xiao, & Yu, 2013).



Small vasohibin-binding protein is a protein whose structure has yet to be annotated. SVBP has been observed to interact with angiogenesis inhibitor vasohibin-1 (VASH1) (Kobayashi et. al, 2010). While SVBP's function has been annotated, its structure has yet to be determined. The present experiment uses Nuclear Magnetic Resonance Spectroscopy to resolve the structure of small vasohibin-binding protein. **Method**: The target protein was chemically altered and prepared to become suitable for imaging. The target protein was amplified using a Polymerase Chain Reaction and heterologously expressed in *E. Coli.* The protein was purified and cleaved of its tags, and it was then put into the spectrometer where a Heteronuclear Single Quantum Coherence, or HSQC, experiment was conducted. **Results:** The resulting spectrum elucidated the two-dimensional structure of SVBP. Unlike most proteins, SVBP contains a number of highly disordered regions, along with areas of structure such as alpha helixes. **Conclusion**: SVBP is a highly disordered protein with sparse structured regions. Discovering the structure of SVBP could be of critical importance to cancer research because VASH1 has been shown in multiple studies to have antitumor effects (Fujiwara et al., 2016). Elucidating the structure of the protein that binds VASH1 could make it possible to manipulate VASH1's other binding partners, and possibly allow for the manipulation of its function.

The Synthesis and Purification of Pam3CSK4 Spacer-Tag Variants

Madeline Rubin

Vaccines commonly contain small stimulatory molecules known as agonists is order to heighten the body's innate immune response against pathogens. While beneficial, these agonists can also lead to a plethora of complications, including sepsis and cytokine poisoning, when not administered in the correct dosage. A commonly administered agonist is Pam3CSK4. This molecule is a lipopeptide known to activate the Toll-Like Receptor (TLR) 1/2 pathway in macrophages, which leads to a greater inflammatory response. Furthermore, the minimum number of Pam3CSK4 molecules needed to activate the macrophages is unknown, causing potential for overdosing and adverse events. The overarching goal is to elucidate the activation threshold of the TLR 1/2 pathway through the quantification of fluoresencently tagged Pam3CSK4 molecules. In order to accomplish this goal, the agonist must be viewable under a microscope. The present study sought to synthesize and purify two spacer and antibody binding tag variants of Pam3CSK4, using a (G4S)2 spacer and the HA and V5 tags. Using peptide synthesis, HPLC and Mass Spectrometry methods, the spacer-tag variants were successfully synthesized and purified. With these agonists, researchers will be able to further experiment, leading to the safer design and appropriate dosage of several vaccinations.

To Free or Not to Free:
The Relationship Between Students' Lack of a Free Period and Somatic Symptoms, Perceived Stress, and Grades

Gabrielle Fries

Research has shown that student stress is near an all-time high (Bethune, 2014). The goal of high school for many has become to do as much as possible in order to build an impressive college resume, thus setting them apart from others and making them an appealing applicant. While the increased involvement in academics may seem impressive to colleges, it may actually be hurting students' grades and health. After working for extended periods of time, there comes a point where productivity declines (Grippo, 2017). There is ample research supporting a need for breaks in the work day that has been supported by studies in the workplace. However, there is little research available investigating this issue in high schools. The current study was conducted to investigate the relationship between the absence of a free period in schedules and the students' grades, perceived levels of stress, and health. A correlation between average perceived stress and average number of somatic symptoms revealed that there is a moderately positive relationship ($r = .53$) between the two variables. Two one-way ANOVAs were run to examine the relationship between the activity type engage (relaxing or academic) in during free periods and their stress levels and somatic symptom complaints. There was no significant relationship between activity type and stress level; however, there was a significant relationship between activity type and somatic symptoms ($p = .058$). Another one-way ANOVA reveals that there is no significant difference between activity type and reported GPAs of students; however, the effect size ($\eta p2 = .046$) suggests that with a larger sample size, significant results would be obtained. Two t-tests were run to examine the relationship between gender and students stress levels and somatic symptoms. The first t-test revealed that girls reported higher levels of stress than boys did ($p = .056$) and the second t-tests revealed that girls reported higher numbers of somatic symptoms than boys did ($p = .072$). The study suggests that schools should be more cognizant and involved with students scheduling and mental health.

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