

*2023 Austin College  
Departmental Honors*



# Table of Contents

<b>Acknowledgements</b>	-----ii
<b>Avery Atencio</b> Honors in Economics	-----page 1
<b>Beau Beshires</b> Honors in Chemistry	-----page 2
<b>Anika Chand</b> Honors in Chemistry	-----page 3
<b>Katherine Cox</b> Honors in Public Health	-----page 4
<b>Caroline Fowler</b> Honors in Psychology	-----page 5
<b>Diana Gomez</b> Honors in Spanish	-----page 6
<b>Cayden Griffith</b> Honors in Anthropology	-----page 7
<b>Zachary Griffith</b> Honors in Classics	-----page 8
<b>Jedediah Lim</b> Honors in Public Health	-----page 9
<b>Katherine McBroom</b> Honors in Biology	-----page 10
<b>Mariagisse Morales</b> Honors in Spanish	-----page 11
<b>Adam Myers</b> Honors in Biology	-----page 12
<b>Tate Nelson</b> Honors in Mathematics	-----page 13
<b>Addison Norman</b> Honors in English	-----page 14
<b>Shruti Raghavan</b> Honors in Biology	-----page 15
<b>Lawrence Ramirez-Quintana</b> Honors in English	-----page 16
<b>Austin Rue</b> Honors in Chemistry	-----page 17
<b>Rebecca Tobias</b> Honors in Chemistry	-----page 18
<b>James Truitt</b> Honors in History	-----page 19
<b>Lora Vaughan</b> Honors in Psychology	-----page 20
<b>Sydney Versen</b> Honors in Biology	-----page 21
<b>Honors Nominees 2023-2024</b>	-----page 22
<b>Alpha Chi Membership</b>	-----page 23
<b>Phi Beta Kappa Membership</b>	-----page 24

*Special thanks to those who have made the  
2022 – 2023 Honors Program at Austin College possible:*

***Honors Committee Members***

Scott Langton, *Director*  
Elizabeth Banks  
Daniel Dominick  
Jessica Healy  
John McGinn  
Andra Petrean  
Lisha Daniels Storey  
Wendy Wilson, *Office Coordinator*

***Thesis Directors***

David Aiello  
Saritha Bangara  
Meg Brandl  
Andrew Carr  
Kelli Carroll  
Renee Countryman  
Patrick Duffey  
Ryan Felix  
Danielle Franks  
Felix Harcourt  
Jessica Healy  
James Hebda  
Julie Hempel  
Kerrie-Anne Mitchell  
Daniel Nuckols  
Andrea Overbay  
Sebastián Páramo  
John Richardson  
Brian Watkins  
Martin Wells

***Thesis Committee Members***

Mathis Akuoko  
Lance Barton  
Tom Blake  
Cate Bowman  
Lisa M. Brown  
J'Lee Bumpus  
Brianna Burnett  
Robert Cape  
Andrew Carr  
Kelli Carroll  
Erin Copple-Smith  
Renee Countryman  
Patrick Duffey  
Ryan Felix  
Stephanie Gould  
Felix Harcourt  
Aaron Harrison  
Jessica Healy  
Michele Helfrich  
Julie Hempel  
Terry Hoops  
Scott Langton  
Peter Marks  
Sebastián Páramo  
Sandy Philipose  
Kelynn Reed  
John Richardson  
Peter Schulze  
Amon Seagull  
Bradley Smucker  
Ashley Tharayil  
Brian Watkins  
Martin Wells  
Claire Wolnisty

***Booklet Created by:***

Stephanie Hardin  
Jacqueline Barboza  
Jimena Ibarra

# Avery Jade Atencio

Hometown: Centennial, Colorado



Majors: Economics and History with a minor in Spanish

Future Plans: I will be attending the Barcelona School of Economics and completing a Master's degree in the Economics of Public Policy program

Thesis Director: Dr. Daniel Nuckols

Committee Members: Dr. Ashley Tharayil & Dr. Claire Wolnisty

Thesis Title: *The Effect of the Coronavirus on Low-Income Counties in Texas*

The purpose of this study is to explore how low-income counties in Texas impact the number of COVID-19 cases. This study seeks to determine if these low-income counties in Texas had more confirmed COVID-19 cases than high-income counties. For the purposes of the study, low-income is defined as below the poverty level (the 200% federal poverty line is \$24,632 for one person), income less than \$75,000, having a relatively high unemployment rate (i.e., 8-10% unemployment), and having a relatively high percentage of service sector employment (i.e., 20-30%). This study utilized publicly available data from the U.S. Census Bureau COVID-19 site, the Texas Workforce Commission site, and the Texas Department of State Health Services site using the Statistical Analysis System (SAS) to run a multiple linear regression (MLR) analysis exploring the county-level relationship between the number of confirmed COVID-19 cases and 1) population density 2) total population 3) total households below the poverty level 4) total households with income less than \$75,000 5) labor force participation rate 6) total vaccine doses administered 7) service employment as a percentage of county employment and 8) the total number of people of color (including Hispanic, Asian, and Black people, as well as those whose race was classified as "other") within each county in Texas. After adjustments were made to address the multicollinearity and heteroskedasticity present in the model, the results of this study found that the variables population density, poverty level, service sector employment, labor force participation rate, total number of people of color, and vaccine doses displayed a direct relationship with the number of confirmed cases per county.

# Beau Christopher Beshires

Hometown: Garland, Texas

Major: Chemistry with a minor in Spanish

Future Plans: Obtain a Ph.D. in Chemistry from the University of Washington in Seattle

Thesis Supervisor: Dr. Ryan Felix

Committee Members: Dr. Andrew Carr & Dr. Julie Hempel

Thesis Title: *Advancements Toward the Synthesis of Anisucoumaramide*



Anisucoumaramide has been recently isolated from *Clausena anisum-olens*, a plant commonly found throughout Southern China and Southeast Asia. The Felix lab has been exploring synthetic pathways for the formation of this coumarin-based molecule. Coumarins are a common bioactive compound with high functionalization potential. There are two main advantages for the total synthesis of anisucoumaramide – increase the commercial availability of this novel compound and provide an opportunity to conduct research on its potential biological applications. The scientists who discovered anisucoumaramide tested its ability to inhibit MAO, an enzyme implicated in the development of Parkinson's Disease. It showed a high level of inhibition, but further testing was unavailable due to the compound's isolation from *Clausena anisum-olens* in low yields. However, given the coumarin component of the molecule, this may not be the only beneficial property it contains. Coumarins are components of a variety of pharmaceuticals, including warfarin, a common anticoagulant, or scoparone, a common immunosuppressant. The current research for the synthesis of anisucoumaramide is focused on creating two halves of the molecule separately and combining them in a convergent step.

# Anika Katherine Chand



Hometown: Southlake, Texas

Major: Biochemistry

Future Plans: PhD in Chemistry at WashU St. Louis

Thesis Director: Dr. John Richardson

Committee Members: Dr. Jessica Healy & Dr. Aaron Harrison

Thesis Title: *Investigation of Peptide Structure As An Agent To Compromise The Intestinal Barrier*

Microbial transglutaminase (mTG) is an enzyme used ubiquitously throughout the food industry to primarily improve the texture of protein-based food products. Moreover, mTG can react with gliadin peptides from several cereals, including wheat. Celiac Disease (CD) is an autoimmune disorder characterized by increased intestinal permeability and gastroenteritis symptoms due to a reaction to the gliadin peptides found in gluten<sup>1</sup>. The human tissue transglutaminase 2 (TG2) is responsible for the deamidation of glutamate. Deamidation of gliadin peptides results in the adoption of polyproline II-like structures, in turn increasing their binding affinity to human leukocyte antigen (HLA) DQ2 and DQ8. This interaction triggers a strong immune response associated with the symptoms of CD. It has been previously demonstrated that mTG can turn gliadin peptides immunogenic like TG2. Polyproline II structure is typical of peptides bound to major histocompatibility complex II proteins, implicating this structural motif in gluten intolerance. Additionally, the immunogenic 33-mer gliadin peptide and its homologs have been shown to have a strong type II polyproline helical character when deamidated via far-UV circular dichroism (Far UV-CD). Here we propose testing the ability of gliadin peptides deamidated by mTG which adopt a type II polyproline structural motif to increase intestinal permeability using a Zebrafish model.

# Katherine Grace Cox

Hometown: Flower Mound, Texas

Major: Public Health with a minor in History

Future Plans: I will be completing a Master's in Public Health for Maternal and Child Health at George Washington University.

Thesis Director: Dr. Kerri-Anne Mitchell

Committee Members: Dr. Mathias Akuoko & Dr. Felix Harcourt

Thesis Title: *Menstrual Health Information Seeking Behaviors During Menarche in College-age Women*



A key part in creating a healthy life course for women is using Information Seeking Behaviors (ISB) to learn about menstrual health. While effects of poor menstrual health are well documented, little is known about how women find information about menstruation during menarche, and how that affects health information seeking behaviors in young adulthood. The study aims to 1) discover how young-adult women sought information about menstruation, 2) discover factors that influenced behaviors, and 3) use life-course theory to understand how menstrual health information-seeking in adolescence evolves and is reflected in health information seeking in young adulthood. This phenomenological study collected data from 15 participants at a small liberal arts college via semi-structured interviews and a written exercise. The data were transcribed and coded. Women described many adolescent ISB such as, using the internet, using the mother as a resource, and “learned from my friends.” Factors identified as potentially influencing ISB included: the regularity of the cycle, “take care of it,” and keeping menstruation a secret, which was noted as Victoria’s Other Secret. Themes related to the evolution of ISB over time were changes from parents to internet, a delay in seeking information, and a sparking event that reignited information seeking. Some of the common identified effects of ISB and influences on ISB including knowing what a healthy period is, were the menstrual cycle being Regular, and having a trusted friend. This study adds to literature surrounding menstrual health by understanding the how menstruation is received and explored by young girls and how that learning greatly impacts future health behaviors.

# Caroline Grace Fowler

Hometown: Austin, Texas



Major: Psychology with minors in Public Health and History

Future Plans: Pursuing a PhD in Behavioral Neuroscience at Baylor University

Thesis Director: Dr. Renee Countryman

Committee Members: Dr. Michele Helfrich & Dr. Stephanie Gould

Thesis Title: *Sucralose Paired with a High Carbohydrate Diet on Attention and Neuroinflammation in a Rodent Model*

With the use of low-calorie sweeteners rapidly rising in the Western Diet, my thesis examined sucralose's effect on the brain and behavior when paired with a high-carbohydrate diet. Previous research suggests artificial sweeteners and carbohydrates respectively cause adverse metabolic, behavioral, and neural effects, serving as the inspiration for our study. 36 Long-Evans rats were sorted into 3 treatment groups: Control vs. Sucralose vs. Sucralose + Carb. Over 10 weeks of treatment, the rats underwent several behavioral tasks, including the Open Field Behavior (OFB) task, Elevated Plus Maze (E + M), Novel Object Recognition (NOR) task, and Barnes Maze. After sacrifice, we analyzed the rats' prefrontal cortexes for neuroinflammation via glial fibrillary acidic protein (GFAP) expression by inflammatory glial cells. I hypothesized that the high carb + sucralose treatment group rats would exhibit increased weight gain, increased food and sucralose consumption, decreased attention, and increased neuroinflammation over their cohort, followed by the rats in the sucralose treatment group. While we did not find statistically significant differences between the groups for the metabolic, behavioral, or neural data, the statistical trends show the sucralose group weighing more, exhibiting increased attention deficit, and expressing higher levels of neuroinflammation as compared to the control group and the sucralose + carb group.



# Diana Gomez

Hometown: Houston, Texas

Major: Spanish with minors in Psychology and Education

Future Plans: Attend cosmetology school during gap year and then potentially pursue a PhD to become a professor

Thesis Director: Dr. Patrick Duffey

Committee Members: Dr. Julie Hempel & Dr. Terry Hoops

Thesis Title: *A New Voice in the Yucatan: Gender Roles in Two Novels and Short Stories by Sol Ceh Moo*



Marisol Ceh Moo (SCM) is a Yucatek Mayan novelist, poet, essay writer, translator, and interpreter. She is an important figure in literature for Mayan culture, and currently is an activist for women and minorities of Mexico. Most of her novels focus on revitalizing and protecting the Yucatek language and also in helping pave the way for other indigenous women writers to take the stage. My research will focus on two of her novels, “Teya- un corazon de mujer” and “Solo por ser mujer,” including some of her short stories in “Tabita y otros cuentos”. These two novels give us the opportunity, as outsiders, to learn more about the gender roles in these communities. Oftentimes, in this culture, there is an unfair treatment of women and lack of opportunity. These two texts as well as her short stories discuss these important issues and give us a first-hand perspective of life as a woman and as a man in an indigenous community. We are able to learn about how women are mostly seen as vessels for life, taking care of children, and making the food at home, while the men are seen as providers. We are also able to learn about the implications of these values and the many injustices both genders suffer. Through studying these novels, I hope to expand more on the research about what the expected gender roles in these communities are and what it’s like to be a woman coming from a world of machismo and often unfair norms/expectations.

# Cayden Griffith



Hometown: Oak Brook, Illinois

Majors: Anthropology, Classics, and History

Future Plans: PhD in Anthropology at the University of Buffalo

Thesis Director: Dr. Brian Watkins

Committee Members: Dr. Terry Hoops & Dr. Martin Wells

Thesis Title: *Mycenaean Terracotta Figurines and the Archaeology of Religion*

Mycenaean terracotta figurines were widely popular during the end of the Mycenaean period, yet little attention has been given to explain their significance or potential meaning within Mycenaean culture. Previous research has focused on the stylistic development of Mycenaean figurines or on their potential connection to later Greek religion, while more recent research has discussed other potentially nonreligious uses of these figurines and the potential variation of use and belief across the Mycenaean world. These earlier researchers ignore the potential for multiple uses and functions as well as potentially important symbolic connections that can help explain many of the previous theories.

# Zachary Griffith

Hometown: Oak Brook, Illinois

Majors: Classics, Anthropology, and History

Future Plans: Will be pursuing a PhD in Anthropology at the University at Buffalo

Thesis Director: Dr. Martin Wells

Committee Members: Dr. Brian Watkins & Dr. Robert Cape

Thesis Title: *City Planning at Megara Hyblaea during the 8th-7th centuries BCE*



Megara Hyblaea was the last Greek colony founded in the first wave of Greek colonization of Sicily. It is unique in many ways compared to other Greek colonial foundations in Sicily, due to the trapezoidal agora, system of 5 distinctly oriented residential areas, and its similarities to later Greek city planning centuries later. Megara Hyblaea developed into a city that was nearly orthogonal and that had a systematic and organized design. From the initial foundation of the city in the 8th century BCE, a system of organization appears to have been laid out, and this plan was respected as the city grew in the 7th century BCE. Furthermore, Megara Hyblaea developed over time and changed due to practical considerations at the site. Lastly, features of city planning at Megara Hyblaea have important implication on Greek city planning as a whole.

# Jedidiah Lim



Hometown: McKinney, Texas

Major: Public Health with a minor in Biology

Future Plans: Will be attending medical school at VCOM in Louisiana.

Thesis Director: Dr. Saritha Bangara

Committee Members: Dr. Amon Seagull & Dr. Cate Bowman

Thesis Title: *Assessing the impact of COVID-19-related information and vaccination barriers/motivators for COVID-19 among Austin College students in association with vaccination status using a cross-sectional study*

College students can be reservoirs for COVID-19. A recent study found college counties with in-person learning had a 56.2% increase in COVID-19 incidence (Leidner et al. 2021). However, there is little research on vaccine hesitancy in private liberal arts institutions. Our aim is to examine how sources of information and personal beliefs regarding COVID-19 vaccination efficacy and safety can impact vaccination rates among undergraduate students in a private liberal arts college setting. From November 2022 to January 2023, students from different disciplines at Austin College were surveyed. A binary logistic regression was performed using Statistical Package for the Social Sciences (SPSS) to explore barriers/motivators for getting vaccinated, the association between sources of COVID-19 information and vaccination status, and predictors favoring a vaccine mandate on campus. 346 students participated. Students utilizing social media were 2.208 times more likely to be vaccinated than those using CDC information. Students typically got the vaccine to protect others (32.87%) and reduce spread (28.32%). Common barriers included perceived adverse effects/safety (30.00%) and limited information (18.33%). Asian students were more likely than Whites to favor a vaccine mandate ( $p < 0.001$ ). Participants' perceptions of their knowledge level ( $p = 0.030$ ) and concern about infection ( $p < 0.001$ ) were significant predictors of desiring a COVID-19 vaccine mandate. In the private liberal arts setting of Austin College, social media played a significant role in persuading students to get the COVID-19 vaccine. These findings suggest that social media can serve as reliable and effective means of driving public health measures.

# Katherine E. McBroom

Hometown: The Colony, Texas

Majors: Biology and Anthropology

Future Plans: Ph.D. in Biomedical Sciences with a specialty in Genetics at UNT Health Science Center

Thesis Director: Dr. David Aiello

Committee Members: Dr. Kelynn Reed & Dr. Brian Watkins

Thesis Title: *Exploring the Diversity of Soil Microbiota in Cadaver Decay Islands (CDI) located in Central Texas*



Decomposition is a highly variable process based on the local temperature, weather patterns, and more. As a cadaver progresses through decomposition the body begins to putrefy. Pressure from the buildup of gases forces cadaveric fluid from natural orifices, ruptures in the skin, and wounds. The cadaveric fluid creates a nutrient rich area underneath and around the cadaver called the cadaver decay island (CDI). Effects of the cadaver decay fluid on the soils underneath and around the body have gained interest as a method for determining the post-mortem interval (PMI) of the cadaver. PMI is defined as the amount of time that has passed since death at the time of discovery. This study examines the effects of cadaveric fluid on bacterial diversity based on PMI, distance from the cadaver, and location of soil sample around the cadaver. Soil samples were analyzed via 16s rRNA sequencing. Results show bacterial diversity measured using alpha diversity measures may show biologically relevant trends but statistically insignificant results. Results contribute to the ongoing conversation regarding using the changes in the microbiome of the CDI to measure PMIs, while bringing awareness to the difficulty of replicability in studies of decomposition.

# Mariagisse Morales



Hometown: Brownsville, Texas

Majors: History and Spanish with an Education Minor

Future Plans: Spanish Teacher in DFW Area

Thesis Director: Dr. Julie Hempel

Committee Members: Dr. Patrick Duffey, Dr. Sebastián Parámo & Dr. Sandy Philipose

Thesis Title: *Actitudes sobre la educación y el idioma en la cultura mexicanoamericana.*

Mexican Americans in the United States in the late 1960s and early 1970s experienced racism in the public school system causing them to walk out and fight for their rights as students. Mexican American students were belittled for speaking Spanish, were not provided the same opportunities or resources as their peers, and did not receive help to continue a 4-year education. Films such as *Lonestar* and *Walkout* and literature pieces by Tomás Rivera and Reynaldo Ruiz are a reflection of the various perspectives that exist in Mexican American culture regarding education and/or speaking Spanish. Due to the history of Mexican Americans, many were not taught how to speak Spanish and feel a disconnection from their roots. However, nowadays the idea of reconnecting with one's roots has allowed for a change in the culture and made the presence of Mexican American history and culture more known in education and literature.

# Adam Justin Myers

Hometown: Houston, Texas

Major: Biology with a minor in Political Science

Future Plans: PhD program at UNLV

Thesis Director: Dr. Jessica Healy

Committee Members: Dr. Peter Schulze & Dr. Renee Countryman

Thesis Title: *Thirteen lined ground squirrels retain memory through hibernation*



Hibernation is an annual physiological phenomenon in certain mammals used to avoid long periods of absence of food during the winter season. We set out to study the effect of hibernation on spatial memory in thirteen lined ground squirrels (*Ictidomys tridecemlineatus*). The retention of spatial memory is believed to relate to the preservation of certain areas of the thirteen lined ground squirrel brain, as the animal goes through hibernation, large parts of their brain experience significant changes. The significant changes to the brain during hibernation are equivalent to the differences between a human child's brain and an adult's brain, yet some memory is retained through hibernation. During the course of the experiment, we were able to successfully train male thirteen lined ground squirrels in a simple spatial memory task, using a Barnes maze, during the pre-hibernation season. Post hibernation, we found that the squirrels retained a significant level of spatial memory through hibernation, as evidenced by the similar completion times of the maze post hibernation to the pre hibernation times seen at the end of training. We also saw a lessened ability to learn the Barnes maze post hibernation, when comparing a naïve group that did not interact with the Barnes maze prior to hibernation, learning the Barnes maze for the first-time post hibernation. In the future a more neuroscience-based approach may be useful for determining how exactly spatial memory is preserved and if that trait is preserved across species.

# Tate Nelson



Hometown: The Colony, Texas

Major: Mathematics with a minor in East Asian Studies

Future Plans: I plan on becoming a full time tennis coach and potentially a high school math teacher.

Thesis Director: Dr. Andrea Overbay

Committee Members: Dr. J'Lee Bumpus & Dr. Scott Langton

Thesis Title: *Finding Resolution Tree Depth of Mathematical Braids*

Knot Theory is a relatively new field of mathematics that studies something called mathematical knots, knots that have no loose ends and are a tangled mess of crossings. One way that these knots can be represented is by a braid, a simplified version of the knot that allows us to look at its various properties and allow for other representations within this braid framework. In this thesis, we look at these braids and a way to “break them down” into other braids with less crossings through a process known a Resolution Tree, a branching diagram that helps us visualize each step of this break-down process. More specifically, we generalize a previously known braid theorem for a certain size of braids that can provide an upper bound to the size of this tree, all through an algorithmic process rather than a purely visual analysis. Along the way, we look at various other properties of these braids and dive into what purpose these serve for the resolution tree depth.



# Addison Victoria Norman

Hometown: Pilot Point, Texas

Major: English with an Emphasis in Creative Writing

Future Plans: I plan to keep writing, always, and eventually work towards a PhD.

Thesis Director: Dr. Meg Brandl

Committee Members: Dr. Lisa M. Brown & Dr. Tom Blake

Thesis Title: *The Wishing Well*



For writers, short stories are a site for experimentation. They offer an opportunity to set aside our hesitation to try something new, risky, or unfamiliar because the commitment is not as heavy as longer works might feel. Within the pages of this project, you will find eight stories that are the result of months of experimentation. They are not united by a particular style or genre because the purpose of my research was to explore the range of my craft and push the boundaries of how I viewed my writing. Instead, they are connected by common themes, the most prominent of which is the theme of wishing. It's an inherently human trait, wishing for things that are just out of our reach, especially for those of us who are still figuring out who we are and what our place in the world is. Many of the wishes in these stories center around love, because wanting to belong is perhaps the most human wish of all. The wish of this work is that it will lead to future experiments and future stories, as writing is a lifelong study.

# Shruti Veera Raghavan



Hometown: Allen, Texas.

Major: Biology with a concentration in Cellular and Molecular and minors in Communication and Non-profit Organisations & Public Service

Future Plans: Attending medical school following a gap year of volunteering internationally in the healthcare field.

Thesis Director: Dr. David Aiello

Committee Members: Dr. Kelynn Reed & Dr. Ryan Felix

Thesis Title: *Yeast p24 family proteins and CSG2 in relation to pgm2Δ phenotypic defects in the secretory pathway*

In *Saccharomyces cerevisiae*, phosphoglucosyltransferase (PGM) is the key metabolic enzyme that allows the cell to interconvert glucose-1-phosphate (G1P) and glucose-6-phosphate (G6P). Loss of its major isoform encoded by *PGM2* presents carbohydrate metabolism defects including a slow growth phenotype and increased G1P:G6P ratio when cells use galactose as the sole carbon source. Additionally, *pgm2Δ* exhibits calcium homeostasis defects including sensitivity to cyclosporine A and increased  $\text{Ca}^{2+}$  uptake and accumulation. The mutant has also been shown to have elevated unfolded protein response (UPR) in the endoplasmic reticulum (ER) and is sensitive to UPR inducer dithiothreitol. The p24 family proteins regulate protein trafficking across the early secretory pathway organelles, the ER and Golgi apparatus. Primary literature suggests that the receptor p24A in yeast facilitates calcium sensing receptor (CaSR) maturation and stabilisation in the early secretory pathway and p24Δ activates UPR. These findings suggest a link between p24 proteins to UPR and calcium homeostasis and warrant an investigation into the role of p24 family members involved in transport through the secretory pathway. In order to examine whether the  $\text{Ca}^{2+}$  and UPR issues of the *pgm2Δ* mutant stem from issues of transport through the secretory pathway, knockouts of p24 family proteins were constructed and examined. Stress response was considered as an alternative possibility in addressing the  $\text{Ca}^{2+}$  and UPR issues in the secretory pathway of the *pgm2Δ* mutant through *CSG2*, a gene involved in calcium homeostasis and localised to the secretory pathway. The effect of the loss and overexpression of *CSG2* on *pgm2Δ* was examined under a variety of different extracellular stress inducers. This study investigates the loss of select p24 family proteins and the loss and overexpression of *CSG2* in relation to *pgm2Δ* defects in a variety of stress conditions to understand the *pgm2Δ* calcium homeostasis and UPR issues in the secretory pathway.

# Lawrence Ramirez-Zuintana

Hometown: Originally Reynosa, Tamaulipas, México. Now Pharr, TX

Majors: English with an Emphasis on Creative Writing, and German

Future Plans: Continuing to work on my Honors Thesis, while making sure to help the people in my community. I want to help people be able to communicate with each other, regardless of their language, so that they are able to advocate for themselves.

Thesis Director: Dr. Sebastián Páramo

Committee Members: Dr. Tom Blake & Dr. Cate Bowman

Thesis Title: *“Build That Wall? The Price of a Part-Time Citizenship”*



The point of my honors thesis is to show people all the different aspects people go through during the immigration process. It tells the story of why a person would “decide” to leave their country (while explaining the reality that most of the time people are *forced* to leave; there’s no freedom of decision).

It shows the emotional price one must pay, and the journey one must go through to grow to accept and perhaps even love their new home. It talks about identity confusion; the feeling of one’s homeland turning their back on them, while dealing with their new home’s active hatred towards them. The emotional turmoil children go through, and how they are forced to grow up quicker as their parents try to offer them a better life.

But not all of it is bad. Like I said, it ends on a hopeful note. It ends with the idea that one can always find their home. Or at least, they can make their own, and find their community along the way. And with knowing that you are still who you are, regardless of *where* you are.

# Austin Rue



Hometown: Sherman, Texas

Major: Biochemistry with a minor in Music

Future Plans: Attending Baylor College of Medicine

Thesis Director: Dr. James Hebda

Committee Members: Dr. Andrew Carr & Dr. Kelli Carroll

Thesis Title: *Characterizing Coassembling  $\alpha$ -Helical Peptides and Developing a Novel Synthetic Gene for Recombinant Expression*

Self-assembling peptide fibers can be used to create large fibers with textile applications, and they can be used to create hydrogels, which have applications in tissue engineering, drug delivery, and biosensor enhancement. Previous self-assembling peptides have had design limitations which require them to be synthetically produced, limiting the feasibility of their commercial use as self-assembling peptides. Previously, we designed three peptides for coassembly: a positively charged 35-residue peptide (35p.2), a negatively charged 28-residue peptide (28n.2), and a negatively charged 21-residue peptide (21n.2). In the current study, new peptides were designed with inspiration from our initial design. Circular dichroism was used to determine the secondary structure of our synthetic peptides, and aggregation assays were used to track the assembly of higher-order structures. In addition to characterizing new peptides, *Escherichia coli* cells were transformed with novel synthetic genes that coded for the original design of oppositely charged peptides. Test inductions were conducted, and progress was made towards the recombinant expression of the presented coassembling peptides. The design and characterization of new coassembling peptides provides fibers with different properties and levels of tunability. Peptides which only coassemble when mixed are unique, as they have the potential to be expressed in bacteria without being toxic to the cell, providing an efficient method for synthesizing peptides for fibrous coassembly.

# Rebecca Annis Tobias

Hometown: Pflugerville, Texas

Major: Chemistry with a minor in studio art

Future Plans: Will be pursuing a Ph.D. in Chemistry at Brown University

Thesis Director: Dr. Andrew Carr

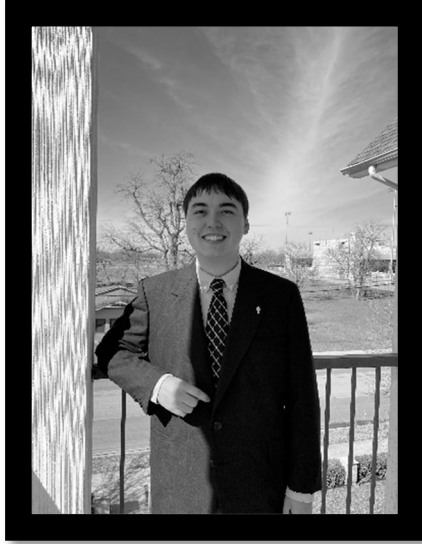
Committee Members: Dr. Bradley Smucker & Professor Brianna Burnett

Thesis Title: *Polydentate Ligand Binding: Formation of Bis-Urea Metallogelators*



Limitations in solubility of bis-urea molecules used to form thermoreversible gels in organic solutions has brought interest in examining mono-urea molecules to form metallogelators as an alternative. The Carr research team found success in gelling tetrahydrofuran (THF) solutions utilizing a mono-urea ligand with a metal coordinating pyridyl group, and with a metal coordinating carboxylate group. However, coordination of first row transition metals with these ligands proved to be weak or slow, thus making them impractical. To improve metal coordination, a complimentary ligand motif composed of diacetate (1/2 EDTA) containing mono-urea was designed, synthesized, and studied. It is believed that the diacetate urea ligand when deprotonated in the presence of a +2-metal cation will coordinate to the metal in an octahedral complex, creating a bis-urea organogelator in-situ. Synthesis of mono-urea ligand begins with 3,5-dihydroxybenzaldehyde, which was alkylated under basic conditions in dimethylformamide with 1-bromododecane, yielding the diether. The aldehyde of the diether was then converted to the benzylic amine in one pot by the reduction of the in-situ oxime and stored for later use. The metal binding region synthesis begins by mono-protection of 1,6-hexanediamine with di-tert-butyl dicarbonate, producing the primary amine. The carbonate amine was doubly alkylated with methyl bromoacetate, forming the metal binding region. The boc protecting group is removed with an acidic work up. The benzylic amine was reacted with dimethyl aminopyridine, di-tert-butyl dicarbonate to form the isocyanate, and the alkylated amine is added to the mixture in a 1:1 ratio, producing the urea. A saponification reaction was conducted producing crude final ligand, with the polycarboxylate metal binding region. Crude gelation tests and solubility tests proved to have an increased solubility, and proof of concept that an octahedrally coordinating ligand can form a gel with organic solvents.

# James Christopher Truitt



Hometown: Dallas, Texas

Majors: History and Anthropology

Future Plans: Seek a career in grant-writing, museum sciences, or tabletop gaming

Thesis Director: Dr. Felix Harcourt

Committee Members: Dr. Claire Wolnisty & Dr. Erin Copple Smith

Thesis Title: *Sexism in Dungeons & Dragons*

The tabletop role-playing game *Dungeons & Dragons* has recently seen a massive upswing in popularity, with a movie coming out earlier this year to capitalize on the game's success. The community has also become more diverse in terms of gender and sexuality as the number of fans has increased. But what many people do not know is the history of the game, and how the game at its inception was as inclusive as it is today. This paper examines this history, starting with the history of tabletop gaming itself and following this history all the way to the creation of *Dungeons & Dragons* itself. This thesis then contextualizes the sexism built into *Dungeons & Dragons* in terms of feminist and anti-feminist historical trends going on at the time, such as the Women's Liberation movement. I hope to make it clear through this thesis that even though a game like *Dungeons & Dragons* can start off in a dark place, there is always hope that it can get better. The game used to be a space where sexual assault was a regular feature of the game, but as women activists and innovators gained more influence over the game, they changed the nature of it to one that is friendlier to female players. This was not a passive process, but one where women made their voices heard and pushed the players and designers of the game to improve their treatment of women both in and out of the game.

# Lora Vaughan

Hometown: The Woodlands, Texas

Major: Psychology

Future Plans: Completing a master's degree in Counseling and becoming a therapist

Thesis Director: Dr. Danielle Franks

Committee Members: Dr. Peter Marks & Dr. Brian Watkins

Thesis Title: *The relationship between cognitive empathy, social anxiety, and self-perspective inhibition*



Current research on the interaction between cognitive empathy and social anxiety is mixed. Potentially, the use of inaccurate self-report measures (Murphy & Lilienfeld, 2019), the treatment of cognitive empathy as one process (Spunt & Adolphs, 2019), or the existence of a mediator such as self-perspective inhibition (Kelly et al., 2022) may contribute to the diverse results. Participants completed the Movie for the Assessment of Social Cognition (Dziobek et al., 2016) consisting of a series of videos depicting social interactions, a self-perspective inhibition task, and questionnaires assessing social anxiety and self-reported cognitive empathy. Unlike previous research, no relationship was found between social anxiety and cognitive empathy. However, the relationship between behavioral cognitive empathy and self-reported cognitive empathy was moderated by social anxiety, suggesting social anxiety influences how individuals perceive their ability to understand others. As the study did not have sufficient power, further research should be done to understand the relationship between social anxiety and the processes of cognitive empathy.

# Sydney Versen



Hometown: Sugar Land, Texas

Major: Biology (Cellular and Molecular Biology) with minors in Philosophy and Chemistry

Future Plans: I will be attending Duke University in the fall and pursuing a PhD in developmental and stem cell biology.

Thesis Director: Dr. Kelli Carroll

Committee Members: Dr. Lance Barton & Dr. John Richardson

Thesis Title: *Identification and Characterization of tango6 in Early Zebrafish Development*

The Undiagnosed Disease Network (UDN) is a collection of clinicians and researchers that diagnose individuals with rare or previously uncharacterized diseases. A UDN participant with heart and brain abnormalities was identified to have mutations in *TANGO6*. Additionally, *Tango6* knockouts generated by The International Mouse Phenotyping, resulting in embryonic lethality, suggesting that it is required for development. However, the function and expression patterns of *Tango6* are largely unknown. In order to understand the role that *tango6* plays in development, we utilized embryonic zebrafish to analyze the quantitative and spatial expression of *tango6*. It is expressed at low to moderate levels between 24 and 120 hours post fertilization (hpf). *In situ* hybridization demonstrated that *Tango6* is present in the brain beginning at 24 hpf and by 72 hpf, it is also expressed in a specific region of the lower jaw. By 96 hpf, *Tango6* is in the developing gastrointestinal system and swim bladder. Preliminary data of mosaically edited *tango6* knockouts generated using CRISPR have found an accumulation of blood around the gut by 120 hpf, suggesting defects in gut morphogenesis or vascular permeability. Additionally, *tango6* knockouts present with craniofacial malformations. In total, these data suggest that *tango6* is involved in brain, gut, and craniofacial development, and further analysis of knockouts and spatial expression patterns is underway to determine the precise role of *tango6* in development and disease.



## *Honors Nominees 2023-2024*

### *\*Double Nominated*

#### **Anthropology**

Miranda Brown

Zoe Martir\*

Amie Johnson

#### **Biology**

Riley Cregg

Wenqi Ding

Frank Goodavish\*

Hannah Herron

Danya Van Vuuren

#### **Chemistry**

Bridget Ferris\*

Gabe Graf

Frank Goodavish\*

Miguel Liuzzi\*

Sebastiao Martin

Josh Sangalli\*

Carlos Suarez

#### **Computer Science**

Josh Sangalli\*

Jaidyn Vankirk

#### **Economics and Business Administration**

Jarrett Pleasant

#### **English**

Ireland Owens

Danielle Saltzman

Emma Schlomann

Samantha Thiele

#### **History**

Keely Perry

Jaylen Sharp

Clemon White

#### **Math**

Justus Fagan\*

Bridget Ferris\*

Christian Peterson

#### **Music**

Megan Kiel

#### **Neuroscience**

Alyssa Holloway

Grace Milligan

#### **Physics**

Justus Fagan\*

#### **Political Science**

Riley Stringer

#### **Psychology**

Rebecca Paul

Savanna Polen

#### **Public Health**

Omar Abu Al Soud

Zoe Brass

Zoe Martir\*

Ahana Shetty

#### **Sociology**

Charlotte Evelyn

Jason Jones

#### **Spanish**

Miguel Liuzzi\*

Alpha Chi is a national honorary society devoted to the promotion and recognition of scholarship effective among the undergraduate students in the academic division of the colleges and universities in the United States. Each year the faculty elects to the Alpha Chi membership the appropriate number of qualified candidates. Candidates for Alpha Chi are elected from the top ten percent of the senior class and the top five percent of the junior class by grade point average.

**ALPHA CHI**  
**National Scholastic Honor Society**

<b>Humza Ali Ashraf</b>	<b>Jasmine Latisha Glasford</b>	<b>Zuni-Ire Vera Rubio</b>
<b>Avery Jade Atencio</b>	<b>Gabriel Joseph Graf*</b>	<b>Joshua Caleb Sangalli*</b>
<b>Shaina Banh</b>	<b>Zachary Roderick Griffith</b>	<b>Emma Jean Schlomann*</b>
<b>Tyra Anne Bennett*</b>	<b>Clara Michelle Harper*</b>	<b>Michael A. Selby</b>
<b>Jeffrey Benjamin Berk*</b>	<b>Mia Jin Hibner</b>	
<b>Marianna C. Bert*</b>	<b>Miguel Alessandro Liuzzi*</b>	<b>Lara Iyad Shehadeh*</b>
<b>Logan James Brummer*</b>	<b>Katherine Elizabeth McBroom</b>	<b>Marcus Nathaniel Slonaker*</b>
<b>Anika Katherine Chand</b>	<b>Addison Victoria Norman</b>	<b>Carlos Alberto Suarez, Jr.*</b>
<b>Sarah Elizabeth Davis*</b>	<b>Sophie Emma Scott Oliver</b>	<b>James Christopher Truitt*</b>
<b>Peter Leo Dubois*</b>	<b>Nathan Daniel Reed*</b>	<b>Olivia Leeann Trusty</b>
<b>Enson Andres Flores*</b>	<b>Shruti Veera Raghavan</b>	<b>Jaidyn Alexandra Vankirk*</b>
<b>Isabel Lucille Garrison*</b>	<b>Alexis Nicole Ross</b>	<b>Sydney Hope Versen</b>
<b>Madison Taylor Gilmore</b>		

\*2022-2023 New Members

The Phi Beta Kappa Society, the oldest academic honor society, has a mission of fostering and recognizing excellence in undergraduate liberal arts and sciences. Selection to the Austin College chapter is by vote of faculty Phi Beta Kappa keyholders based on scholarly achievement, broad cultural interest, and good character. New members are selected from the graduating class each year with attention given to their overall scholarship with weight given to both the academic record and the breadth and proportion of the candidate's program demonstrated by the number and variety of courses taken outside the major. Candidates display a spirit of intellectual adventure, which is manifest in many ways including, but not limited to independent research, scholarly activity, significant advanced work outside the major, and significant coursework across all three divisions of the college.

**PHI BETA KAPPA**  
**National Undergraduate Honor Society**

Avery Atencio\*

Shaina Banh\*

Jeffrey Berk\*

Beau Beshires\*

Logan Brummer\*

Katherine Cox\*

Peter Dubois\*

Caroline Fowler\*

Madison Gilmore\*

Jasmine Glasford\*

Cayden Griffith\*

Zachary Griffith\*

Clara Harper\*

Katherine McBroom\*

Tate Nelson\*

Addison Norman\*

Shruti Raghavan\*

Lexie Ross\*

Zuni-Ire Rubio\*

Austin Rue\*

Lara Shehadeh\*

Marcus Slonaker\*

Thomas Strutton\*

James Truitt\*

Lora Vaughan\*

Sydney Versen\*

\*2022-2023 New Members