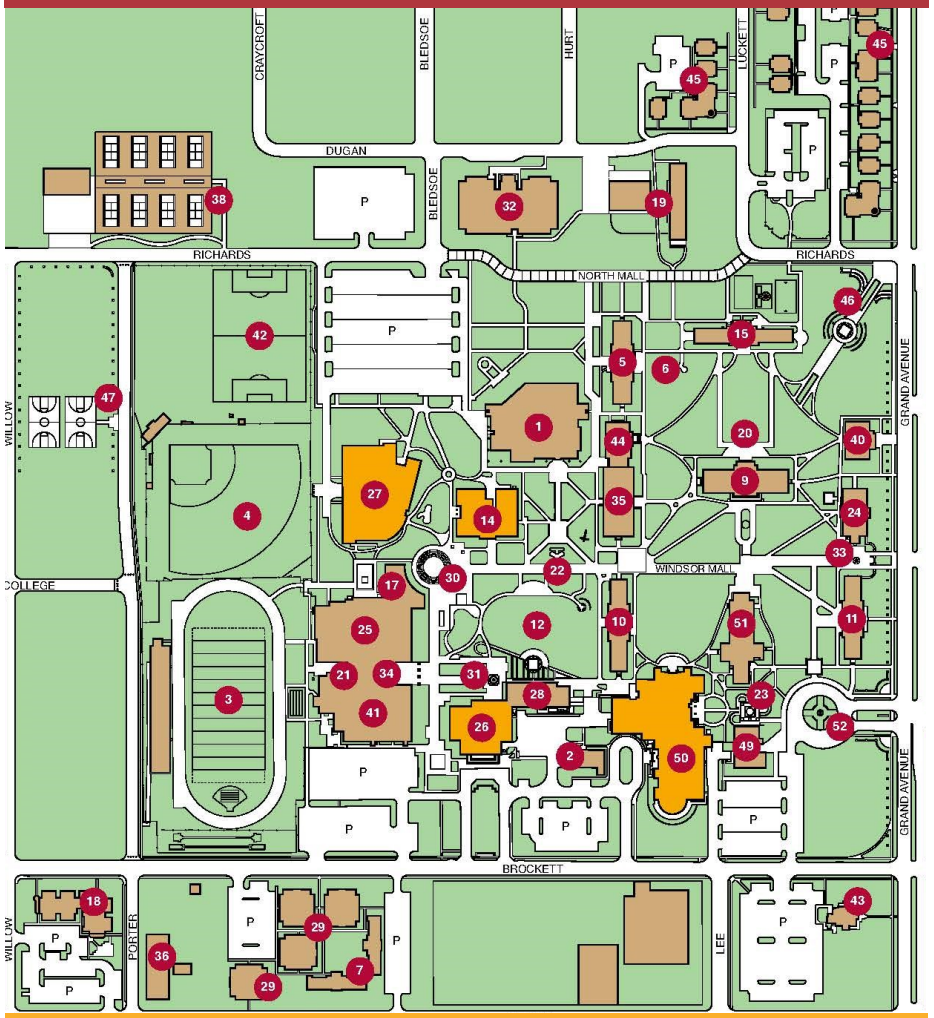
# Austin College Map - *Student Scholarship Conference Locations*




**MAP KEY**

1. Abell Library Center
2. Adams Center
3. Apple Stadium
4. Baker Athletic Field
5. Baker Residence Hall for Men
6. Ella Barker Memorial Garden
7. Bryan Apartments
8. Carruth Guest House
9. Caruth Administration Building
10. Caruth Residence Hall for Women
11. Clyce Residence Hall
12. College Green
13. Collins Alumni Center
14. **Craig Hall for Music**
15. Dean Residence Hall
16. Detweiler House
17. Dickey Fitness Pavilion
18. The Flats at Brockett Court
19. Forster Art Studio Complex
20. Hall Graduation Court
21. Hannah Natatorium
22. Hersh Memorial Garden
23. Honors Court and Collins Fountain
24. Hopkins Social Science Center
25. Hughey Gymnasium
26. **Ida Green Communication Center**
27. **IDEA Center**
28. Jackson Technology Center
29. Johnson 'Roo Suites
30. Jonsson Fountain
31. Jonsson Plaza
32. Jordan Family Language House
33. Kappa Fountain
34. Mason Athletic-Recreation Complex
35. Moody Science Center
36. Physical Plant Building
37. President's House
38. Russell Tennis Center
39. Settles House
40. Sherman Hall (Humanities) and Hoxie Thompson Auditorium
41. Sid Richardson Recreation Center
42. Soccer Field
43. Temple Center for Teaching and Learning at Thompson House
44. Thompson Hall (Sciences)
45. The Village on Grand
46. Williams Founders Plaza
47. Williams Intramural Complex
48. Windsor House
49. Wortham Center
50. **Wright Campus Center**
51. Wynne Chapel
52. Zauk Circle Drive and Garden

P = Parking


# AUSTIN COLLEGE
# STUDENT SCHOLARSHIP CONFERENCE

MARCH 22 - 23, 2019

ACSSC

# Welcome

Welcome to the seventh annual Austin College Student Scholarship Conference, a celebration of our students' intellectual curiosity and their participation in the pursuit of new knowledge and new achievement.

One of the hallmarks of an Austin College education is our belief that learning takes place everywhere. Our students go beyond the boundaries of the classroom and into the laboratory, the studio, the stage, and the community. The work presented here demonstrates how students have extended their learning across many disciplines and methods of study.

Research and scholarship are not only valuable in their own right; the process brings with it many other positive outcomes. Students develop a variety of communication skills to present their results. They gain persistence, patience, and commitment by testing their own hypotheses, considering alternate solutions, and seeing their own original research questions through to completion. All of these efforts serve students well in whatever future interests they pursue.

Another hallmark of an Austin College education is the individual mentoring relationships our students find here. Faculty members demonstrate their own intellectual curiosity through academic pursuits and also create structures that both engage students and provide opportunities for them to embark on independent study. Without faculty support and guidance, this conference would not be possible. I would like to particularly thank the Conference Planning Committee for the time and energy they spent providing a showcase for student achievement of such depth and breadth.

This conference is designed to encourage dialogue and engagement. We hope that you will take this opportunity to meet new people and encounter new ideas.

Sincerely,

Steven P. O'Day, J.D.

President

# Sponsors

**Robert & Joyce Johnson Center for Faculty Development and Teaching Excellence**

Austin College is an enhanced institutional member of the Council on Undergraduate Research

*Learning Through Research*

Sigma Xi

The Scientific Research Honor Society

**Acumen *(Student Research Journal)***

***Suspension Literary Journal***

***CREATE@AC***



# Table of Contents

# Schedule of Events

**Thursday**

7:00 - 8:30 p.m.
Elevator Speech Competition
Pouch Club

7:30 - 9:30 p.m.
Silent Sky - Theater Performance
With student Led Discussion Idea Green

**Friday**

1:15 - 3:15 p.m.
Poster Session I
Mabee Hall

3:30 - 5:00 p.m.
Oral Session I
Wright Campus Center Rooms

5:15 - 7:15 p.m.
Art Reception
Ida Green Gallery

7:30 - 9:30 p.m.
Silent Sky - Theater Performance
Ida Green

9:00 - 10:30 p.m.
Star Party
IDEA Observatory



Are you Creative?
Are you Artistic?
Are you Imaginative?

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# ACUMEN
# Call for Papers

ACUMEN is *Austin College's student-run journal of research. Are you involved in a research project on campus? Have you written a paper for class you are particularly proud of? Submit your paper for publication! All subjects welcome.*

How to Submit

Send your research paper (with bibliography) as .doc or .rtf to **acumen@austincollege.edu**

Submission Guidelines

- Submissions should be approximately 7-20 pages in length.
- Submissions may be the products of individual or class research, directed or independent studies. Please do not submit work that is up for publication elsewhere, such as honors theses or research done in collaboration with AC faculty.
- Students should consider their audience to be generally educated and well read. However, the emphasis on interdisciplinary exchange of ideas requires that technical terminology from any field be generally explained for this audience.
- Submissions may be selected for publication on a conditional basis, provided the student makes the necessary revisions.
- All papers must follow college guidelines for academic integrity.

For more information, or if you are interested in participating in Acumen as a member of the review board, please email the editor at **acumen@austincollege.edu**



# Schedule of Events

**Saturday**

8:00 - 10:00 a.m.
Poster Session II
Mabee Hall

10:00 - 11:20 a.m.
Oral Session II
Wright Campus Center Rooms

11:30 - 12:30 p.m.
Honors Research Panel
WCC231 Living Room

1:00 - 2:20 p.m.
Oral Session III
Wright Campus Center Rooms

2:30 - 3:50 p.m.
Oral Session IV
Wright Campus Center Rooms

4:00 - 5:00 p.m.
Music Recital
Craig Hall

7:30 - 9:30 p.m.
Silent Sky - Theater Performance
Ida Green

# Student Contributors

Anastasia Acobyan
Erin Adams
Saiaditya Addepalli
Green Alexander
Emily Aller
Kristina McLeod-van Amstel
Tianna Anderson
Austin Andrle
Lindsay Apgar
Taqwa Armstrong
Vanessa Baker
Abigail Ballard
Phung Banh
Katelyn Bass
Amanda Bernal
Erin Bobbitt
Alison Boehmer
Madison Bolin
William Bridgewater
Sandra Carrasco-Bueno
Hannah Butterfield
Gary Casey
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Teresa Chavera
Nick Chaviers
Mary Cheadle
Chad Childress
Caitlyn Collins
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Jazmin Condado
Zoe Crews
Michael Dang
Andrew Dawson
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Salina DuClos
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Makayla Dunlap
Karina Duran
Mandy Eckhardt
Shannon Fagen
Rosemary Fasullo
Kat Forbus
Nicholaus Frederick
Caroline Fullerton
Grant Garrison
Courtney Goldstein
Abigail Goodman
Karla Herrera
Aurora Hadzic
Laurel Hagge
Morgan Hall
Nadia Hannon
Amelia Hardy
Andres Hernandez
Seth Howard
Meredith Huff
Hannah Hunt
Sydney Jackson
Anusha Jacob
Lisha Jacob
Harper Jambor
Rachel Jimenez
Benjamin Johnson
Zsuzsa Ratliff-Johnson
Ethan Jordan



Notes

# Conference Music Recital

The Scholarship Conference Music Recital will be from 4:00 - 5:00 p.m. on March 23rd in the Craig Hall's Recital Hall.

**Composition Presentation and Performance**
**Student Composition:** Paola Matus '20
Faculty: John McGinn
Performers: Paola Matus, '20 *clarinet*
Zoe Rice, '20 *viola*
Dr. John McGinn, *piano*

**Student-Faculty String Quartet:**
**A Moment of Mozart**

**Student Performers:** Andres Hernandez, '22, *violin*
Andrew Kim, '22, *violin*
Zoe Rice, '20, *viola*
Andrew Dawson, '20 *cello*
Faculty: Cathy Richardson, *violin*

**Composition Presentation and Performance**
**Student Composition:** Truman Dowdy, '19, *trombone, baritone*



# Student Contributors

Aarthi Kannan
Joseph Khalaf
Yusuf Khan
Andrew Kim
Noel Haeun Kim
Siddharth Kortikere
Varun Kotipalli
Katelyn Kuehnhold
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Nicholas Marshall
Adonis Martin
Joann Mathew
Paola Matus
William McCarthy
William McDonough
Camarah McLean
Michael Meganhardt
Georgia Moore
Robbie Moore
Caelie Morris
Kate McComack-Morris
Ndanzia Mpunga
Madison Myles
Khanh Nguyen
Tuan Nguyen
Sarah Ortiz
Emma Page
Elizabeth Parks
Krishna Patel
Addie Pederson
Anh-Thu Pham
Joshua Pollard
Evan Powell
Grady Priest
Dan Pucul
Sita Ramasamy
Janani Ramesh
Joceline Ramirez
Natalie Randall
Sanjana Rasamsetti
Bennett Reagan
Laurel Reiche
Richard Reyes
Zoe Rice
Brianna Richmond
Abigail Ross
Antonio Saavedra
Sarah Safarimaryaki
Azlin Saldivar
Ben Schmidt
Chloe Schnaible
Sona Selvamani
Samuel Skupin
Benjamin Sloan
Sarah Smith
Niya Stewart
Michael Suresh
Tommy Teschner
Claudia Theriot
Jessica Thoennes

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Harrison Vickmark
Micah Weber
Samuel Weir
Alisa White
Robert Williams
Sarah Yarbrough
Rachel Young
Thomas Yuan
Joshua Zamora



## Terrorizing the Vulnerable: Terrorism and the Preservation of Institutions in Power

Robert Hunter Williams
History Department, Austin College

Terrorism serves as a device in the subjugation of nonwhite peoples, (consolidated idea) delegitimizes challenges to the institutions in power, and promotes emotional intuition over factually grounded logic. Terrorism, consistently utilized as a means of instilling fear, often perpetuates societal norms, one of the most significant of these being misogyny. This trend manifests itself in the modern day, reflected in the 2014 massacre in which involuntary celibate, Elliot Rodger, desired to murder women for inflicting his status as an 'incel'. Rodger's weaponized and delusional male entitlement to the female body and the desire for female submission reflects the persistent danger associated with long held patriarchal norms and the relentlessness of some individuals in preserving established institutions of power. Evidently, terrorist ideologies are often bred within the United States, stemming from American cultural norms.

## From Definition to Paradigm: Revolutionary and Counterrevolutionary Terrorism

Anastasia Acobyan
History Department, Austin College

When discussing the topic of terrorism in relation to the history of the United States, there is often scholarly disagreement on how terrorism should be defined. This disagreement lies in determining what acts of violence constitute terrorist attacks. I argue that terrorism is a situational phenomenon. Rather than trying to pigeonhole it into one set definition, terrorism should be determined through a series of analytical and systematical critiques using not a definition, but a paradigm. The push and pull between revolutionary and counterrevolutionary terrorism is the bedrock of the terrorism paradigm that has been encapsulated in American history.



# Committee

**Coordinator**
Renee Countryman

**Associate Coordinator**
Tom Blake

**Humanities Representative**
Kirk Everist

**Fine Arts Representative**
Ricky Duhaime

**Sciences Representatives**
John Richardson
David Whelan
Andrea Overbay

**Social Sciences Representatives**
Audrey Flemming
Ashley Tharayil

**Student Support**
Aneurin Minson

**Administrative Support**
Amy Parsons

# Art Contest Winners

Congratulations to
the Winners of the 2019
Abstract Book Cover Artwork
Design Contest

1st Place: Phung Banh
2nd Place: Johnathan Biffar



# Not Your Grandparents' Terrorist

Joseph Khalaf
History Department, Austin College

Too often thought to be an exclusive characteristic of the late 20th century that overflowed into the 21st century, terrorism is a phenomenon common to the United States since European colonists followed Columbus to the new world. It shaped the political, social, and religious interactions of each era. Terrorism is cyclical and parallels can be made across terrorist attacks of different periods in US history. It is important in this analysis to see that terrorism is not inherently evil-willed. Rather, terrorism is an engine within power struggles. The United States was founded on the basis of terroristic acts, and terrorism has been used in America ever since to harvest and sustain power. Further, terrorism is used by governments, ogranizations, activist groups, local gangs, and individuals. This research is an attempt to move past the modern-stereotypical conception that we subconsciously associate with the word "terrorism."

# Wright Campus Center 255

## Terrorism in the United States

Moderator: Felix Harcourt

### Eric Rudolph and the Pervasiveness of Witch-Hunts in America

John Thompson
History Department, Austin College

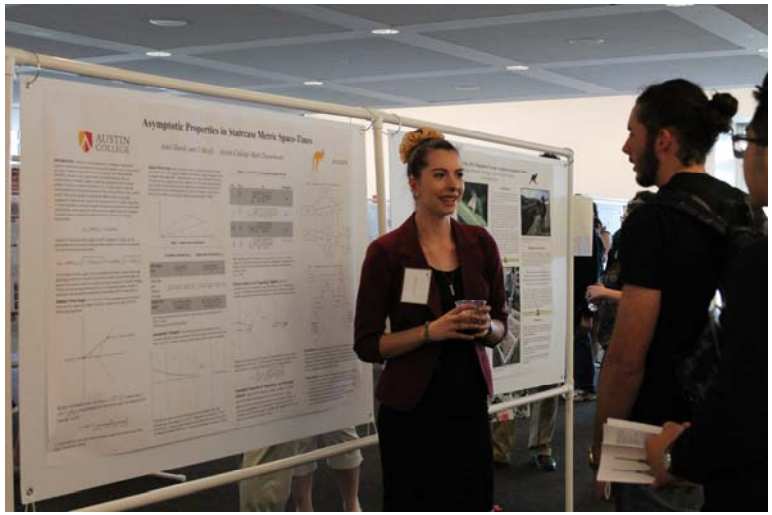
Eric Rudolph, infamously known as the Centennial Park bomber, and less well-known as an anti-abortion terrorist, was in the greater scheme of American history a relatively inconsequential threat. However, the reaction to his attack at Centennial Park provides a key example of how fears of terrorism can spark a misguided and misdirected witch-hunt. An innocent security guard, and one who might have saved a tremendous of amount of lives on the day of the attack, was isolated as a prime suspect for his "obsession" with law enforcement. A similar incident was seen this decade with the Boston Marathon bombing, when a completely unaffiliated individual was targeted by a judiciously unsatiated crowd of internet users, later committing suicide, potentially due to the false accusation. America frequently falls into the trap of wanting immediate justice, and, in its haste, damages the lives of many.



## Elevator Speech Competition

Join us on Thursday, March 22 from 7:00 - 8:30 p.m. in the Wright Campus Center's Pouch Club for an Elevator Speech Competition. Prizes will be awarded. Students will be judged by special "celebrity" judges.

# Poster Sessions




## Mabee Hall

**Session 1: Odd Numbers**
**Friday, March 22, 1:15 p.m. - 3:15 p.m.**

**Session 2: Even Numbers**
**Saturday, March 23, 8:00 a.m. - 10:00 a.m.**



## Searching for Planets Outside Our Solar System with the Adams Observatory

Chloe Schnaible, Thomas Yuan, Emma Page, & Eva Natinsky
Physics Department, Austin College
Faculty Sponsor: David Baker

Austin College's Adams Observatory contributes to two major international scientific projects in the search for planets outside of our solar system, the Kilodegree Extremely Little Telescope (KELT) project and NASA's Transiting Exoplanet Survey Satellite (TESS) mission. Both KELT (in Arizona and South Africa) and TESS (in orbit around Earth) use wide-angle telescopes to scan the night sky with coarse resolution to identify possible target stars with potential exoplanets. More powerful telescopes such as the 24-inch Adams Observatory telescope then conduct higher resolution follow-up observations of these stars. At the Adams Observatory in 2018, we monitored 26 target stars using the transit method in the search for exoplanets. The transit method measures light from a target star over a period of a few hours, and a decrease in the intensity of detected light could be caused by a planet passing in front of the star. We present results from our observations of false positives (no planet), possible planetary candidates (more data needed), and confirmed exoplanets.

# Predicting the NFL Playoffs: Understanding What Variables Contribute to NFL Teams' Winning Percentages

Seth Howard
Economics Department, Austin College
Faculty Sponsor: Kevin Simmons

Each year, teams in the NFL compete to win as many games as possible to secure a spot in the playoffs in hopes of competing for the Lombardi Trophy. This study uses statistics from the past five years of the NFL's regular season to determine which variables best explain teams' winning percentage for a single season. The study shows that nine variables, including point and turnover differential, pass and rush yards per game, number of third down conversions allowed, and the number of pro bowl players on the team, all have a significant effect on a teams' winning percentage. This study makes a unique contribution as it can access both the predicted model from this study and actual results of winning percentages in the NFL, making it capable of seeing the prediction's accuracy. Thus, using the nine variables along with the model created from previous data, we were able to predict 11 out of the 12 teams that would make the 2018 playoffs. This is a valuable study because it produces relevant results that contribute to the literature on sports economics, with the potential of aiding NFL teams with statistically valid information that can positively influence their "on the field" behavior.



# The Effects of Acetylation of Beta-2 Microglobulin on Amyloid Formation

Abigail Ballard & John Richardson
Chemistry Department, Austin College
Abstract # 1

Beta-2-Microglobulin (B2m) is a small 99 residue globular protein that is a part of the type I major histocompatibility complex found on all nucleated cells. It is shed from the surface of cells into the bloodstream as cells undergo apoptosis then is degraded and excreted from the body in people with normal functioning kidneys. However, B2m is not effectively removed from the blood by hemodialysis causing systemic problems for patients in end-stage kidney disease (ESKD). B2m serum levels in patients with ESKD are up to 60 times greater than healthy individuals. Dialysis related amyloidosis (DRA) results from the accumulation of misfolded B2m and is characterized by carpal tunnel like symptoms coupled with chronic joint inflammation. DRA is a result of the deposition of misfolded B2m in the musculoskeletal system due to B2m amyloid plaque formation. However, the increased concentration of B2m alone is not sufficient to trigger the pathogenic amyloidosis at physiological pH. Thus, a secondary factor must be acting as the trigger of misfolding. This study is investigating the effect of acetylation as a non-natural post translational modification on B2m. Acetylation is a practicable suspect as aspirin consumption is known to acetylate a variety of proteins non-specifically. The acetylation of lysines would alter the overall charge and possibly disrupt ability of B2m to maintain its native state conformation thus increasing the aggregation propensity of B2m. We are primarily testing the susceptibility of B2m to acetylation via protocol established for acetylation in bovine carboxy anhydrase. Additionally, growth of the amyloid fibrils of the acetylated B2m will be monitored with thioflavin-T florescence to assess the effects of lysine acetylation on B2m amyloid formation.

## Valuation of Exotic Options

Joseph Khalaf & J'Lee Bumpus
Mathematics Department, Austin College
Abstract #2

We compute various derivatives of digital options using the Black-Scholes pricing formula for digital options found in a prior work. A digital option is an exotic stock option that has a predetermined payout that is received if the stock ends in-the-money. Chooser options are exotic stock options that allow the holder to decide whether it is a standard call option, or a standard put option on or before the expiration date. The valuation of a chooser option with decision time at expiration is found using an arbitrage argument. The valuation of a chooser option with decision time before expiration is derived using the risk-neutral principle. Additionally, a pricing formula for compound options, which are standard European options on an underlying option, is derived using the risk-neutral principle. Supplementary discussions, proofs, and figures are also included.



# Wright Campus Center 254B

## Utilizing a Transcriptomic Approach to Analyze *spt4*Δ-mediated Rescue of a *pgm2*Δ Strain of *Saccharomyces cerevisiae*

Keara Malone
Biology Department, Austin College
Faculty Sponsor: David Aiello

Utilizing galactose as a sole carbon source by Saccharomyces cerevisiae is possible due to the presence of phosphoglucomutase (PGM), which catalyzes the interconversion of glucose-1-phosphate (G1P) and glucose-6-phosphate (G6P), key metabolites in the carbohydrate metabolism pathway. Losing the major isoform of PGM, PGM2, results in hyperaccumulation of G1P relative to G6P, and slowed growth when this strain is grown on media containing galactose. Interestingly, the pgm2Δ strain also shows defects in calcium homeostasis when grown on galactose-containing media. Previous work in the Aiello lab has shown that loss of SPT4, the non-essential subunit of the transcription elongation factor complex DSIF results in the rescue of galactose-related growth defects. This rescue also includes a decrease in total cellular Ca2+ levels, but does not rescue the imbalance of G1P to G6P. Normally, Spt4p acts to stabilize RNA polymerase II (RNAPII) during transcription elongation. While the method of rescue of pgm2Δ defects through the loss of SPT4 is unclear and indirect, it follows that a change in expression of some other gene is directly responsible for ameliorating pgm2Δ defects in the pgm2Δspt4Δ strain. This study seeks to characterize the genome-wide changes in transcription from pgm2Δ to pgm2Δspt4Δ, and identify genes or biological pathways comprising the link between calcium homeostasis and carbohydrate metabolism.

# Choosing Virginity in Cross-Dressing Saints' Lives

Salina Duclos
English Department, Austin College

This talk will examine the ideas and ideals of women's virginities in the Middle Ages. In today's society, virginity is called a "social construct," and more often than not, involves double standards for men and women. Many seem to disregard or dismiss the notion of "choice" behind living a life of chastity and holiness. For many women in the Middle Ages, the choice to uphold a lifelong virginity and a life dedicated to chastity was not readily available, since women were lower in the social status hierarchy. Even if a woman entered a convent, her father could remove her and force her to marry against her will, demonstrating the little agency women had over their own bodies. However, if a man wanted to be a monk, there was little resistance he had to face. In this talk I will discuss the lives of Saints Eugenia, Euphrosyne, and Joan of Arc, and the common thread they all shared—dressing and posing as men to fulfill their desires of living Christian, holy, and chaste lives. Furthermore, I will discuss the varying repercussions and challenges they faced once their true female identities were exposed. These crossdressing female saints reclaimed their autonomy of preserving their virginities by dressing as men, entering the monastic life, and in turn also elevated their statuses within their societies. Through their actions, they were able to transcend the limitations of their sex.



# The Relationship Between Victims and Their Tormentors

Karla Herrera & Lourdes Bueno
CML Department, Spanish Program, Austin College

Abstract #3

Mario Benedetti's Pedro y el capitán, Juana Escabias' Cautivas, Gracia Morales' NN12, and Ariel Dorfman's La muerte y la doncella are Spanish plays depicting the relationship between the tortured and torturer and its effect during and after the interaction between the two. Benedetti and Escabias' respective plays focus on the victim and the tormentor's relationship as it occurs during the dictatorship whereas Morales and Dorfman's plays center on the relationship after the dictatorship has ended. The purpose of this research is to analyze how the gender of the victim and the tormentor affects the relationship in each of the plays, and how this with the timing of the play contributes to the victim's voiceless identity.

# Irony of the Protestant Work Ethic: Who's Working and is it Ethical?

Nicholas Marshall, Katelyn Kuehnhold,
& Lisa M. Brown
Psychology Department, Austin College

Abstract #4

This study examined people's appraisals of effort and whether judgmental Protestant work ethic (PWE) endorsers and humanitarian PWE endorsers differentially perceiving someone providing a service for a client because of differences in the perception of the client's deservingness. Previous research suggests that for people who strongly endorse the PWE, this value may promote judgmental and disparaging views of people who do not share their values for work (Mudrack, 1997). Two hundred eighty-three undergraduate students participated in this study. Participants read about an interaction between a tutor (Terry) and a student (Chris). They were randomly assigned to a condition in which Chris was either hardworking or lazy or a condition in which Terry was hardworking or started out hardworking but became lazy. As hypothesized, judgmental PWE endorsers ($M = 10.6$) viewed Terry's decrease in effort as significantly more appropriate than humanitarian PWE endorsers ($M = 6.3$) in the condition when Chris was lazy and Terry seemed to become lazy in response to Chris's behavior, $t(45) = 2.6$, $p < .025$. None of these comparisons was significant in the other three conditions. This study revealed that judgmental PWE endorsers were relatively tolerant of reducing efforts when the efforts would benefit someone judged as unworthy. Ironically, although judgmental PWE endorsers strongly endorse the Protestant work ethic these results reveal that judgmental PWE endorsers endorse work conditionally.



# Why did the Sultan's Skin Change Color in *The King of Tars*?

Camarah McLean
English Department, Austin College

Critics have debated whether the controversial moments illustrated by the medieval English romance story, *The King of Tars*, centered around a pious white Christian princess in Muslim Syria, demonstrates the story simply as a message promoting whiteness or an entirely misunderstood work with a deeply religious meaning. Focusing on a few key scenes where race and religion coalesce--a blazon emphasizing the princess' whiteness, the birth of her monstrous lump child from her union with the Sultan of Damascus, and the black Sultan's external transformation, I argue that these difficult moments within the story serve as calls for religious conversion rather than allusions to racial superiority. While the present-day uproar regarding these particular scenes is understandable within the context of a society which has effectively separated notions of race and religion, it is imperative to study this text under the pre-existing understanding that the medieval period viewed race and religion as inextricable and correlational. Therefore, scenes such as the Sultan's external race change from black to white, which takes place towards the end of the story, should not be perceived as the tale's way of demonizing blackness or endorsing whiteness, but instead as the text's primary method of demonstrating religious conversion to its audience through simultaneous external change.

# Wright Campus Center 254A

## Re-Imagining Women in Medieval Literature

Moderator: Tom Blake

### Bloody Hell: Blood and Gender in *The Táin*

Zsuzsa Ratliff-Johnson
English Department, Austin College

Contrary to our modern progress narrative which casts medieval women as damsels in distress, the medieval Irish epic *The Táin* offers instead a story which presents a strong, capable, and fearless female lead. It also, however, shows a time in which women were viewed as inferior, scheming beings who manipulated men for their own gain, especially through the use of blood. This talk will explore the relationship between blood and gender in *The Táin*: the shedding of men's blood signifies honor whereas women's bleeding is wretched and abject. Set in first-century Ireland, *The Táin* tells the story of Queen Medb and her fight for Donn Cuailnge, a powerful bull that would even out the wealth between herself and her husband, Ailill, which pits her against the famed warrior Cú Chulainn and the cursed Ulstermen. The epic battles of *The Táin* abound in bloodshed, both of men and women, but the epic clearly delineates a value system that distinguishes between the blood of men and the blood (specifically menstrual blood) of women. *The Táin*, while maintaining a strong, unorthodox female character in Medb, offers a gendered view of blood in which men's blood is deemed righteous and women's blood is deemed despicable.



### Methods for CRISPR Deletion of PA28γ in Cancer Cell Lines

Tuan Nguyen & Lance Barton
Biology Department, Austin College

Abstract #5

This study examined people's appraisals of effort and whether judgmental Protestant work ethic (PWE) endorsers and humanitarian PWE endorsers differentially perceiving someone providing a service for a client because of differences in the perception of the client's deservingness. Previous research suggests that for people who strongly endorse the PWE, this value may promote judgmental and disparaging views of people who do not share their values for work (Mudrack, 1997). Two hundred eighty-three undergraduate students participated in this study. Participants read about an interaction between a tutor (Terry) and a student (Chris). They were randomly assigned to a condition in which Chris was either hardworking or lazy or a condition in which Terry was hardworking or started out hardworking but became lazy. As hypothesized, judgmental PWE endorsers ($M = 10.6$) viewed Terry's decrease in effort as significantly more appropriate than humanitarian PWE endorsers ($M = 6.3$) in the condition when Chris was lazy and Terry seemed to become lazy in response to Chris's behavior, $t(45) = 2.6$, $p < .025$. None of these comparisons was significant in the other three conditions. This study revealed that judgmental PWE endorsers were relatively tolerant of reducing efforts when the efforts would benefit someone judged as unworthy. Ironically, although judgmental PWE endorsers strongly endorse the Protestant work ethic these results reveal that judgmental PWE endorsers endorse work conditionally.

## A Spectroscopic Catalog of 653 OBA-Type Stars

Gary Casey & David Whelan
Physics Department, Austin College
Abstract #6

Spectral classifications are given for 653 bright O-, B-, and A-type stars observed between 2015 and 2018. Stars are plotted to a Hertzsprung-Russell diagram with the temperature class as a proxy for color, and absolute magnitudes computed using Gaia and Hipparcos parallaxes and extinction correction from tabulated intrinsic colors. Current spectral standards prove to be inadequate for severe cases of line emission spectra. This catalog is in many cases the first time that 2- dimensional spectral types of these stars have been taken since the Michigan catalogue was published (Houk & Cowley, 1975). For these cases and others that were not included in the Michigan catalogue, our spectra provide serious corrections in temperature and luminosity classifications, plus the identification of spectral peculiarities. For sources with previously well-defined spectral types, our spectra provide an updated record of spectroscopic variability.



## Wright Campus Center 231

Bilingual A.C.T.

### "Cuéntame… ¿un cuento? / Tell me… a story?"

The Bilingual A.C.T. Group participates in the Spring '19 Austin College Student Conference with a bilingual stage-reading entitled "Cuéntame… ¿un cuento?/Tell me…a story?" The performance will be based on texts written by AC students and the director of the performance, with four fictional female characters as protagonists; and will include some games to encourage the audience's participation.

Sandra Carrasco-Bueno (Host)
Karla Herrera (Snow White)
Sarah Smith (Sleeping Beauty)
Joceline Ramirez (Little Red Riding Hood)
Caelie Morris (Tiana)

Under the direction of
Professor Lourdes Bueno.

**Saturday Oral Session 4: 2:30-3:50**

**Room 231** Moderator: Lourdes Bueno

2:30-3:50

**Bilingual A.C.T.**

**"Cuéntame… ¿un cuento? / Tell me… a story?"**

Sandra Carrasco-Bueno (Host)
Karla Herrera (Snow White)
Sarah Smith (Sleeping Beauty)
Joceline Ramirez (Little Red Riding Hood)
Caelie Morris (Tiana)

**Room 254A** Moderator: Tom Blake

**Re-Imagining Women in Medieval Literature**

2:30 **Zsuzsa Ratliff-Johnson**
2:50 **Camarah McLean**
3:10 **Salina DuClos**

**Room 254B** Moderator: David Aiello

2:30 **Keara Malone**
2:50 **Seth Howard**
3:10 **Chloe Schnaible**

**Room 255** Moderator: Felix Harcourt

**Terrorism in the United States**

2:30 - 3:10

John Thompson
Joseph Khalaf
Anastasia Acobyan
Robert Hunter

**Idea Center 310** Moderator: Andy Carr

2:30 **Anh-Thu Pham**



# Exploring a Role for KCH1 and KCH2 in Calcium Homeostasis in *Saccharomyces cerevisiae*

Pranavya Manickavelu & David Aiello
Biology Department, Austin College

Abstract #7

Phosphoglucomutase (PGM), an enzyme interconverting glucose-1-phosphate and glucose-6-phosphate, is essential in yeast carbohydrate metabolism. The deletion of PGM2 (pgm2Δ), the major isoform of PGM, leads to calcium defects including sensitivity to extracellular calcium and cyclosporine A (CsA) among other defects when grown on galactose. The high affinity calcium influx system (HACS) is critical in yeast cells when exposed to endoplasmic reticulum (ER) stressors and mating pheromones. KCH1 and KCH2 are known low affinity potassium channels and are upregulated during the activation of HACS when exposed to ER stress; they promote S. cerevisiae cell survival through the activation of HACS. In previous studies, deletion of these genes led to increased cell death in response to ER stressors and mating pheromones. KCH1 in particular is known to regulate calcium uptake and calcineurin activation. The purpose of this study is to investigate the role of the low affinity potassium channels encoded by KCH1 and KCH2, their involvement in calcium homeostasis in S. cerevisiae, and whether they contribute to further calcium homeostasis defects observed in pgm2Δ yeast cells since their function aids cell survival through the activation of calcium channels. To test this, KCH1 and KCH2 will be removed from the cells to create kch1Δ, kch2Δ, pgm2Δkch1Δ, pgm2Δ kch2Δ, pgm2Δ kch1Δ kch2Δ strains. The growth of the colonies, calcium accumulation, and UPR response phenotypes of the unique strains in various media environments will be analyzed to further examine the role of KCH1 and KCH2 in S. cerevisiae and whether pgm2Δ defects are suppressed or exacerbated in the absence of these genes.

## Synthesis of Asymmetrical Pyridil Containing Ureas for the Coordination of Metals to Create Organogelators

Elizabeth Parks & Andy Carr
Chemistry Department, Austin College
Abstract #8

Coordination of metals by pyridine and its derivatives has been utilized to create compounds that serve as dyes for solar cells and as drugs. In our lab we are working towards the development of metal coordinating ureas to create bis and higher order ureas that can serve as dyes capable of gelling an electrolyte solution. This has potential of increasing the life time of the dye and by immobilizing the electrolyte increase the robustness of the photochemical cell. It is known that the bis-urea (A) gels organic liquids and is the model we are following. By using pyridine to coordinate a metal we can self-assemble a bis-urea thus creating the gelator in situ. Initial synthesis from the alkylated 3,4-dihydroxybenzaldehyde leads quickly to the benzylic anime. The amine in past research was converted in to an isocyanate by reaction with diBoc and DMAP, however this reaction resulted in low yields and a large amount of symmetric urea byproduct. We report now the utilization of the phenyl carbamate intermediate as a precursor to the asymmetric urea. The phenyl carbamate is made in greater that 80% yield and is transformed in to the unsymmetric urea by reacting in diglyme with the desired amine and three equivalence of LiCl. The isolated yield of urea(B) is over 90%.



# Student Oral Presentations Block IV

## Saturday, March 23, 2019
## 2:30 p.m. - 3:50 p.m.

## Louisa May Alcott: Little Women, Long Shadows

Tianna Anderson
English Department, Austin College

Autobiographical literary criticism is a style of academic writing that weaves together literary analysis of an academic paper and personal narrative from the author's life that relates to the subject. In my paper "Louisa May Alcott: Little Women, Long Shadows" I explore the connections between the fictional female characters Louisa May Alcott created 150 years ago and the fictional female characters I grew up reading. Alcott, best known for her 1868 novel *Little Women*, was the daughter of a financially inept Transcendentalist teacher who strove to break out of her low class status through selling her fictional writings. The finest of these were marketed to young girls, and in doing so she created a standard for literary female characters that endures today. Like myself, Alcott was an avid reader from a young age and when she became a career author she wrote complex, intelligent, politically provocative female characters for a young audience. These are exactly the type of characters I recall loving to read about and wanting to be when I was a young girl. Louisa May Alcott's self-inspired and realistic female characters have and continue to inspire me as a feminist, writer, and woman.



## Effect of Terrorism News on Prejudice Toward Immigrants

Caroline Fullerton, Jessica Thoennes, Phung Banh, Karina Duran, Noel Kim, & Michele Helfrich
Psychology Department, Austin College

Abstract #9

Terror Management Theory (TMT) suggests that heightened awareness of death can have a variety of impacts on judgments. TMT could explain changes in the degree of prejudice against immigrants. Today immigrants account for approximately 14% of the United States population and political rhetoric has targeted both legal and undocumented immigrants. Previous research has found that terrorism news reports increase the thoughts of mortality, therefore strengthening prejudice against outgroups. There has been no research to establish if mortality salience would increase American's prejudice toward immigrants. The present research was conducted to examine this topic. Participants read one of eight articles. The article was either about a mall shooting or a museum theft committed by either a White or Arabic man in either Toronto, Canada (about 1,153 mi from the participant) or Fort Worth, Texas (about 67 mi from the participant). Participants death related thoughts were then measured. Participants then completed a set of questions that included political questions on immigration and various other distractor questions. It was hypothesized that participants in the control condition would be less prejudiced toward immigrants than those in the terrorism condition. It was also hypothesized that physical proximity of the event would lead to higher levels of mortality salience and thus higher levels of prejudice against immigrants. Results showed that Republicans were more likely to have negative views towards immigrants than Democrats. Other variables did not impact immigrant attitudes. Further research likely needs more nuanced methods of measuring immigrant attitudes as well as a more robust method of measuring thoughts of death.

# Modeling Recovery from Inactivation in Raphe Neurons

Emma Thornburg[1], Connor M. Engel[2],
Marco A. Navarro[2], & Lorin S. Milescu[2]
Biology Department, Austin College[1],
University of Missouri[2]

Abstract #10

Serotonin is important for regulation of multiple brain processes. Serotonin is mainly secreted by pacemaking raphé neurons, which maintain steady activity without synaptic inputs. Our lab has previously demonstrated that voltage gated sodium (Nav) channels are critical for the pacemaking ability of these neurons, particularly the recovery from inactivation. This project focuses on how models with different recovery time courses can change neural output. We created Markov models using maximum likelihood fitting to macroscopic currents with different recovery time courses while maintaining similar activation and inactivation voltage dependencies. We then added these Nav channel models to a simple neuronal model and measured neuronal output. These data will better inform us about the contribution of inactivation to neuronal firing.



# One Huckleberry at a Time: Changing the World Through Transcendentalism

Zsuzsa Ratliff-Johnson
English Department, Austin College

Autobiographical literary criticism is a form of literary criticism that allows the writer to connect to the literature through personal narrative and experience in a way that provides not only deeper insights into the literature, but that gives both the writer and the reader the opportunity to interpret the literature through a real, human lens. In my paper, "One Huckleberry at a Time: Changing the World Through Transcendentalism", I investigate the connections between Henry David Thoreau's transcendental ideas and my own passion for protest literature. Thoreau's late essay "Huckleberries" shows the complex relationships he had with his ideas of "Nature" (the Divine), nature (the wildlife around him), and activism. Thoreau uses huckleberries to express these ideas as well as a metaphor for the importance of individual action in cases of social injustice. Thoreau's "Huckleberries" helped me discover my combined love of literature and activism, helping to lead me down a path of hope for my own generation and the generations to follow. This paper explores Transcendentalism and its relationship with activism, advocating for the use of Transcendentalism as a platform for social justice and change.

## Jesus Guide My Quill

Karla Herrera
English Department, Austin College

Autobiographical literary criticism is a form of writing that interweaves the text with the writer's personal narrative to bring forth a more layered interpretation. In my paper, "Jesus Guide My Quill," I explore the connections between Transcendental author Mary Moody Emerson and my own journey in keeping a journal to process the complexities of life. Mary Moody Emerson has been thought to be the originator of the Transcendentalist movement as opposed to her nephew, Ralph Waldo Emerson, due to her *Almanacks* which encapsulate some of the foundations for several Transcendental ideals. Through her *Almanacks*, Emerson showcases that to know the Divine Being and to understand the order of the world, you have to know yourself first. Emerson's *Almanacks* depict my struggle of trying to keep my faith in God and finding myself through my writing. Furthermore, Mary Moody Emerson goes beyond the gendered limitations of her day by redefining the traditional, "private" sense of commonplace books to create a new social context in which women could participate. Emerson's *Almanacks* illustrate her ability to keep a strong religious faith while still trying to advocate for herself in a male dominated world that discouraged women from learning.



## Lebanon: Is Arab Enough For You?

Abiel Cardenas-Botello & Stacey Battis
CML Department, French Program, Austin College

Abstract #11

Lebanon is a fascinating country that is vibrant with culture, religion, and history that can be traced from many places across the Mediterranean Sea. Nevertheless, in recent years Lebanon has embraced another face that was part of its culture but hidden in plain sight. French is a language that is part of the history of Lebanon, through its period of the French Mandate of Syria and Lebanon during the 1920s through 1940s. This period of time seems forgotten by the literature of the country, even though it helps to explain the events that followed, such as Independence and the Civil War. In recent years, the country has experienced growth in the number of speakers in French from recent generations. This would lead to the notion that Lebanon, though not typically considered as such, should be included as a Francophone country.

## Towards the Synthesis of Alkene-Spaced Bis-Urea Organogelators

William McDonough & Andy Carr
Chemistry Department, Austin College
Abstract #12

Interest in improving gelation efficiencies of bis-urea organogelators has driven recent research into the structure-function relationship of the compounds. The proposed compounds contain alkene spacers between the urea and aromatic regions. The spacers can also be hydrogenated to yield non-rigid compounds. Earlier synthetic steps were found to yield impure products, but as new synthetic pathways were explored many of the steps performed gave pure products in moderate to excellent yields. Time constraints allowed for synthesis only through the primary amine.



## Feminism Before it Was Cool... or Before it Was Even Feminism: Mary Moody Emerson

Sarah Yarbrough
English Department, Austin College

In my paper, "Feminism Before It Was Cool… or Before It Was Even Feminism: Mary Moody Emerson," I explore connections between the 18th-century proto-Transcendentalist author Mary Moody Emerson and my own journey as a woman and a reluctant feminist in the 21st century. Mary Moody Emerson is the aunt of the more well-known Transcendentalist leader Ralph Waldo Emerson, and her ideas were the main source of inspiration for the Transcendentalist movement during the early 1800s. Because she was a woman, however, Mary Moody Emerson was unable and unwilling to publish her cutting edge theories. In my paper, I show that Emerson's unpublished journals, her *Almanacks*, illuminate the reasoning behind many present-day women's reluctance to label themselves as feminists, including myself and my mother. I claim that nonetheless Mary Moody Emerson was what we would today call a "feminist" because of her dedication to knowledge and her rejection of the standards imposed on women. A comparison between Emerson and my mother highlights the sexism experienced by both women; this sexism motivated both women to achieve but also solidified their unwillingness to publicly fight for women's rights because of an anti-feminist backlash from society that would inhibit their intellectual and career goals.

# Wright Campus Center 255

## "First We Read, Then We Write": Experiments in Autobiographical Literary Criticism

Moderator: Randi Tanglen

### Louisa May Alcott: The Most Transcendental Transcendentalist?

Erin Laine
English Department, Austin College

Autobiographical literary criticism steps away from the traditional literary analysis essay by weaving personal narrative together with scholarly voices to make an argument about literature, crossing the boundaries between the academic and the personal to illuminate meaning. In my paper, "Louisa May Alcott: The Most Transcendental Transcendentalist?," I argue that Alcott upholds transcendental values more than the actual founders of the movement. Alcott grew up surrounded by such literary minds as Ralph Waldo Emerson and Henry David Thoreau (friends of her father), who encouraged her to write. Emerson and Thoreau spent a lot of time philosophizing on ideas they thought would improve society, but wrote from a place of privilege and never really put these things into action. Alcott, on the other hand, lived out the values of equality and self-sacrifice as demonstrated through many of her written works. Utilizing autobiographical literary criticism, I analyze Alcott's upholding of her values through my own challenges and aspirations to maintain my values.



### Gold Deposition on Cesium Lead Mixed-Halide Perovskites ($Au\text{-}CsPbX_3$ , X = Cl/Br) via Anion-Exchange Reactions

Richard Reyes[1], Benjamin Roman[2],
Freddy A. Rodriguez Ortiz[2], & Dr. Matthew Sheldon[2]
Chemistry Department, Austin College[1] & Chemistry & Material Science Departments, Texas A&M University, College Station, TX

Abstract #13

All-inorganic cesium lead trihalide perovskite nanocrystals are an active area of research due to their high photoluminescence quantum yields (PLQY), making them candidates for future optoelectronic applications. These perovskites can be modified through ion-exchange reactions, providing the capability to change the composition of these colloidal semiconducting nanocrystals after their initial synthesis. Specifically, a simple anion-exchange reaction has shown fine tunability of the nanocrystal bandgap across the visible spectrum by controlling the ratio of the halides. Currently, gold-semiconductor hybrid nanocrystals are being examined for maintaining their high PLQY, unlike their chalcogenide counterparts. One of the challenges with depositing gold on all-inorganic perovskites is that current methods only work for single halide perovskites. This work explores two methods of anion-exchange reaction to achieve a gold-deposited cesium lead mixed-halide perovskite. One method attempts anion-exchange with pre-deposited $Au\text{-}CsPbCl_3$ and $Au\text{-}CsPbBr_3$ perovskites. Another method adopts the exchange reaction with gold monohalide salts as the anion source for ion exchange, as well as the gold source for metal deposition. The products of the exchange reaction were studied further to examine the capabilities of these reaction methods. Both methods demonstrate bandgap and single peak photoluminescence shifting from that of the precursor perovskites, indicating successful anion exchange. Additionally, transmission electron microscopy was used to confirm the presence of gold deposition on the perovskite surface.

# Planetary Imaging at the Adams Observatory: Mars, Jupiter, and Saturn

Emma Page, Chloe Schnaible, Thomas Yuan,
& David Baker
Physics Department, Austin College
Abstract #14

On July 31, 2018, Mars was closer to Earth than it will be until 2035. We used the Adams Observatory telescope to document this historic event by collecting and processing high resolution images of the Red Planet. In order to prepare for the close approach, we first refined our imaging process using Jupiter and Saturn: high-speed video capture in three channels (red, green, blue), extraction and stacking of the best video frames, high performance sharpening with wavelets, RGB combination to produce color images, and derotation of images to align features on the planets. Final images of Jupiter clearly show distinct belts and zones, and the Great Red Spot. Images of Saturn exhibit structure in the rings and faint storms near the pole. Finally, images of Mars show the largest volcano in the solar system and the polar ice caps, despite most of the Red Planet being engulfed by a global dust storm.



# Cowboys and Corporations: Wild West Gunslingers and Their Ties to Big Businesses

Samuel Skupin
History Department, Austin College
Faculty Sponsor: Felix Harcourt

In Patricia Limerick's The Legacy of Conquest, she cites Thomas Jefferson's three-stage vision of how US settlement of the West will play out: the noble pioneer, the honest farmer, and then the aspiring industrialist. To Limerick, the conflict that marked the chaos for which the American Wild West was known arose between phases two and three. Through this, the gunslinger arose as a symbol of resistance against the new industrial order, while attempts to tame this resistance, such as those of the Pinkerton Detective Agency, became symbols of oppression and outright plutocracy. While there is a basis for such a mythos, specific instances of violence paint a much less cut-and-dry, romantic picture. This thesis examines specific individuals and organizations associated with violence in the American Frontier such as Billy "the Kid," Jesse James and the James-Younger gang, and the Pinkerton Detective Agency for their ties to the industrialization of the West and how they developed their modern reputations in relation to those ties.

## Japan and "New Asianism"

Joseph Vetter
CML Department, Austin College
Faculty Sponsor: Scott Langton

This historical overview of the ideology of "Pan-Asianism" focuses particularly on links to policy and culture in modern-day East Asian states, especially Japan. This paper was originally prepared at University in Tokyo.



## Calculating New Knot Invariants Using an Expansion of the Colored Jones

Joshua Pollard, Hannah Hunt, & Andrea Overbay
Mathematics Department, Austin College
Abstract #15

Take a string, tangle it up, and fuse the ends. You have just made a knot, a mathematical object of which there are an infinite number. Distinguishing between different knots is a complex mathematical problem, and a diverse array of mathematical disciplines prove useful in finding different ways to represent and encode information about a knot that remains unchanged no matter how the knot is presented in space. Some such properties, termed invariants, can include, but are not limited to, polynomials, matrices, topological groups, and objects in hyperbolic geometry. Our research focuses on finding new polynomial knot invariants which we will present in our poster. Additionally, we will describe the methods we used to calculate these invariants and explain their relation to other well-known knot polynomials.

# Arthropod Community Sampling Suggests Soil Inoculation has Positive Effect on Urban Rooftop Prairie Development

Sydney Jackson[1], Dr. Brooke Best[2]
& Loriann Garcia[1]
Biology Department, Austin College[1],
Botanical Research Institute of Texas, Fort Worth, TX[2]
Abstract #16

Prairie-style green roofs designed to be low maintenance require the development of a healthy arthropod community to provide important ecological services. Green roofs with greater habitat variability typically exhibit greater plant biodiversity. Is the same true for arthropods? We used pitfall traps to sample ground-dwelling arthropods across a 2-year old green roof in order to (1) determine the overall status of the developing arthropod community and (2) determine whether that community differs relative to two slope positions and three plant assemblages. We predict arthropod diversity to be highest in grass-dominated foot slope areas due to the combined effects of higher vegetation coverage and higher soil moisture. We found an abundance of Collembolans (springtails) and Acarids (mites) which indicate early successional soils. We also found a high proportion of Hymenopterans, Hemipterans, and Coleopterans, which could indicate a diverse array of higher trophic level predators. BRIT hopes that this arthropod sampling will help determine the benefits of native soil inoculation into native prairie restoration management practices.



# Theodora: The Enigma of Hill House

Harris Drake
Theatre Department, Austin College
Faculty Sponsor: Kirk Everist

*The Haunting of Hill House* by Shirley Jackson is one of the better-known horror novels. It has been adapted into several formats over the past sixty years and each format presents a different idea of how the house is haunted and who it may be haunting. Each of these alters the story, but one character seems always in flux: Theodora. This mysterious, probable lesbian becomes either central to the plot or a mere device. Does "substance" or "texture" offer more to an actress? Which would an actress prefer? What makes a good or ideal character and which Theodora fits that bill? I compare three versions of Theodora to see which offers more substance, explore each from an actor's viewpoint, and discuss what exactly makes a desirable character.

# Wright Campus Center 254B

## Investigating the Effects of Deletion of Genes Encoding Ca2+ Channels of the Plasma Membrane and ER in a pgm2Δ Mutant Strain of *Saccharomyces cerevisiae*

Aarthi Kannan[1], Sona Selvamani[2]
Biology Department, Austin College[1],
Coppell High School[2]
Faculty Sponsor: David Aiello

The major isoform of phosphoglucomutase, encoded by PGM2, interconverts the two metabolites glucose-1-phosphate (G1P) and glucose-6-phosphate (G6P). Yeast strains lacking PGM2 exhibit defects in Ca2+ homeostasis, slow growth on galactose-containing media, sensitivity to cyclosporine A, increased levels of the unfolded protein response (UPR), and accumulation of G1P. Ca2+ homeostasis in yeast is a complex process characterized to be related to carbohydrate metabolism. Mid1p and Cch1p interact to form the two subunits of the HACS (High-Affinity Calcium uptake System) plasma membrane channel in yeast. Ecm7p regulates Mid1p and Cch1p. Flc2p and Ecm27p are Ca2+ efflux channels present in the ER. This bipartite study focuses on the effect of the loss genes involved with HACS, and then separately, genes involved with calcium efflux of the ER, in the context of the pgm2Δ mutant strain to further understand the mechanisms of calcium homeostasis in yeast. Loss of MID1 or CCH1 genes in the context of the pgm2Δ strain resulted in a slower growth phenotype on galactose-containing media relative to the pgm2Δ mutation alone, while loss of FLC2 or ECM27 slightly rescued the pgm2Δ mutant defects. Interestingly, the pgm2Δmid1Δcch1Δ strain exhibited no growth on galactose-containing media. This indicates that the presence of at least MID1 or CCH1 is essential for the growth of the pgm2Δ strain, while the loss of genes involved with calcium efflux in the ER alleviate the pgm2Δ defects on galactose. These results suggest that the uptake of Ca2+ through the HACS channel is important for the survival of the pgm2Δ strain, while the theoretical retention of calcium levels in the ER rescue the pgm2Δ defects on galactose-containing media.



## Ideal Oligomeric State of αB-crystallin

Benjamin Johnson & Jim Hebda
Chemistry Department, Austin College
Abstract #17

Alpha B Crystallin is a small heat shock protein that exists in large oligomers and acts as a chaperone. Chaperones act to prevent protein misfolding. Aggregation of proteins in the lens of the eye causes cataracts as aggregates cloud the lens making it difficult for light to pass through. A current hypothesis states that the chaperone mechanism of Alpha Crystallin is dependent upon dynamic oligomeric states. In order to understand how Alpha B Crystallin functions a new assay using chemical cross-linking is being developed to determine the oligomeric state of Alpha B Crystallin under conditions known to enhance or attenuate chaperone function. This novel assay uses crosslinking reagents and SDS PAGE to trap and visualize the size of oligomers. We found that the 3E mutant, a phosphorylation mimic of Alpha B Crystallin and known to have increased chaperone efficiency, shows more dynamic oligomeric states than wild type. Evidence suggests that conditions causing decreased chaperone efficiency favor static oligomers. The preferred size of oligomers under these conditions is an ongoing study. This cross-linking assay provides a way for us to visualize the oligomeric states of new mutants in order to further elucidate how oligomeric state relates to chaperone function.

# The Effect of Temperature on Social Perception

Makayla Dunlap, Yusuf Khan, & Matt Findley
Psychology Department, Austin College
Abstract #18

Being rejected by other individuals can lead to depressive feelings, anxiety and high levels of stress (Coie, Terry, Zakriski, & Lochman, 1995), while activating areas of the brain that produce and maintain physical pain (Eisenberger, Lieberman, & Williams, 2003). Previous research has also shown a strong connection between social perception and temperature. Many individuals incorporate metaphors such as the "cold shoulder" into their vernacular, not recognizing the real world implications this phrase carries with it. While the effect of social exclusion on the perception of temperature has been extensively studied, minimal research has been conducted to see if the relationship is upheld when reversed. By manipulating the temperature of the room, the current research aims to examine the effect of temperature on social perception. Additionally, the current research aims to examine how temperature interacts with social exclusion to predict perception of exclusion. Upon giving their informed consent, participants were randomly assigned to a inclusion or exclusion condition in a game of Cyberball. After the participant completed one full game of Cyberball, they were immediately redirected to answer questions regarding how excluded they felt from the game of Cyberball. Participants also predicted the temperature of the room they are currently sitting in. Results indicated that manipulating the temperature of the room did not significantly affect the participants perception of exclusion or inclusion. This data suggests that even when reversed the relationship between temperature and social perception found in previous background research was not upheld.



# How Medieval Women Set the Stage: Female Viking Influence

Victoria Dodd
English Department, Austin College

Reading about Viking women in medieval Icelandic literature exposes the subtle misogynistic attitudes that characterize representations of medieval women in popular media today. Perplexing paradoxes such as the portrayal of Guinevere in the 2004 drama *King Arthur*, produced by Jerry Bruckheimer—a purported feminist icon and independent warrior repeatedly sexualized and reduced to relying on the man she marries for political power—unravel next to strong examples of cunning Viking women. In selections pulled from the wide array of thirteenth- and fourteenth-century Icelandic sagas—specifically, *Njal's Saga*, *Egil's Saga*, and *The Saga of Grettir the Strong*—works focusing on events that occurred during the Saga Age spanning from 870 to 1000, these impressive ladies do far more than look pretty and attend weddings. Reliable literary personalities based on the standards of the time, they utilize family and friends, seduction, social conventions, whetting, rebellion, religion, and children to achieve their goals. If history evinces that they proved capable of turning to a variety of outlets to get the results they wanted—often without male assistance—which audience do twenty-first century films choose to cater to when they distort the facts and minimize feminine agency, and what does that say about the way contemporary American culture views girls? How can cinematic industries adjust their depictions of medieval women to match historical records and communicate an equality-based message emphasizing their unique perseverance and resourcefulness rather than their abilities to please men?

# The Wolf and the Swallow: An Analysis of Gender in Icelandic Sagas

Quinten Vandereviere
English Department, Austin College

This paper explores the roles, trappings, and limits of various genders presented in the Icelandic sagas. I will focus on how gender impacts the conflicts and narratives of the plethora of characters in these sagas. While centered primarily on the rivalry between Egil and Gunnhild in *Egil's Saga*, this paper will also draw from other sources, namely *Grettir's Saga*, and *Njal's Saga*. The purpose of gender in these pieces of literature is multifaceted. It influences the manner in which characters interact with one another, and what they expect of each other. It guides characters in their approach to certain problems. It affects how they can manipulate and be manipulated by others. On a more over-arching level, it outlines the types of power they can wield in their world and the avenues through which they can express that power. These sagas are focused overwhelmingly on men and their perspectives. It is in these settings that I aim to discuss the power of women, and the active role they have in the sagas. Instead of being relegated to the sidelines of a narrative, these women choose to actively and vigorously pursue their goals and ambitions. These women are not mere bystanders or forgettable characters, nor are they eye-candy. Furthermore, they do not seek to empower themselves by becoming like the men in their stories. Although these women do not play an active role in the sagas in the same way that the men do, the impact they have on a narrative is arguably just as crucial. The Icelandic Sagas offer a distinct perspective of gender hierarchies and power structures. They provide us with different ways of thinking about how gender can be used to express different kinds of power, and how power is given or taken away within these hierarchies.



# Quantifying Aberrations in Spectrograph Optical Elements

Bennett Reagan, Wenhao Li, & David Whelan
Physics Department, Austin College

Abstract #19

A spectrograph uses a dispersing element to split white light into its constituent colors, and converging lenses are required to first collimate and then focus that beam of light. The problem is that lens optics suffer from optical aberrations that degrade the final spectral image, primarily chromatically, but to a lesser extent monochromatically. We present research to quantify the chromatic and spherical monochromatic aberration in the lens system from the Adams Observatory spectrograph. We find that chromatic aberration is the primary source of aberration for the lens system, with focus position changing such that the spectrum can become as much as 50% wider across the desired spectral range, seriously degrading the final spectrum. This work suggests the necessity of developing a new method to collimate and focus the light through the spectrograph.

## Examining the Influence of Birth Order on Sibling Social Comparison Orientation, Self-Esteem, and Competitiveness

Abigail Goodman, Georgia Moore, Grady Priest, & Lisa M. Brown
Psychology Department, Austin College
Abstract #20

The present study explores the effect of birth order (one's place in one's sibling lineage) on personality; specifically Sibling Social Comparison Orientation, self-esteem, and competitiveness. 122 undergraduate psychology students completed a survey asking about their siblings and birth order, followed by the Rosenberg Self-Esteem Scale, an adaptation of the Smither and Houston Competitiveness Index, the Sibling Social Comparison Orientation scale, and an upward versus downward comparison scale. The results show that the only significant birth order effect was on Sibling Social Comparison Orientation ($p = .046$), supporting the hypothesis that later born children have a significantly higher social comparison orientation than that of earlier born children.



# Wright Campus Center 254A
# Viking Women

Moderator: Tom Blake

## What the #MeToo Movement Can Learn from Old Norse Literature

Abigail Ross
English Department, Austin College

Reading Old Norse literature and observing today's current media, similarities and differences regarding sexual violence are often found. For instance, Weinstein is a modern Odin. Within The Poetic Edda, a collection of Old Norse poetry, a Norse god named Odin is featured. He is portrayed as a misogynistic sexual predator of women on numerous occasions throughout the poems, both disrespecting and preying on women simply because they are women. Weinstein was a powerful male figure in Hollywood who was exposed for his predatory behavior including both sexual harassment and assault on women. Both men abused their position of power to attack and subjugate women. For Weinstein to fall, it took numerous influential women to step forward and tell their stories, subjecting themselves to society's tendency of victim-blaming. Victim-blaming comes from a place of distrust towards women in patriarchal societies, which Odin is especially guilty of. Odin's distrust and attitude toward women was reflected in the Weinstein allegations and especially the Ford-Kavanaugh hearing. All the women who have stepped forward with both predators were victimized all over again through endless questioning and inappropriate behavior by our society. By revealing how horrendous Odin's behavior is in the Poetic Edda, we would be revealing how horrendous today's culture is toward women who are victims of sexual violence. The similarities cannot be ignored.

# Serving the State: Metaphors of the State & the Statesman in Cicero's *De Republica*

Meredith Huff
Classics Department, Austin College
Faculty Sponsor: Bob Cape

In this paper I show that, by likening the role of the statesman to that of a servile worker, Cicero uses metaphor in his treatise De Re Publica to indicate that the statesman's work is rooted in service. I have chosen to focus on three categories of metaphor. In the first category are metaphors about the state, especially when it is characterized as a living being that has been sustained by the work of the maiores (ancestors) and generations of responsible statesmen; the implication of this image is that the state can die through neglect or malfeasance. The second category of metaphors liken the state to a ship that is guided by a gubernator who guides the state through the storms and waves of current political circumstances. The third and most significant category of metaphors include those that liken the statesman to a variety of skilled working, such as a gubernator (pilot), vilicus (farm overseer), artifex (artisan), and medicus (doctor); the great contrast between the social positions of the Roman politician and the freedman or enslaved artisan is interesting. By likening the high-status Roman politician to a lowly artisan Cicero suggests that the role of the statesman like that of a servant or guardian. This view of statesmanship is unlike that commonly held in the late Republic and is much more in line with modern conceptions of politics as public service.



# Estradiol May Not be Anorexigenic in Hibernators

Lisha Jacob, Taqwa Armstrong, Monica Martinez, & Jessica Healy
Biology Department, Austin College
Abstract #21

Hibernating animals are unique in the way they manage their energy, and it is known that there are several hormones that play an important role in the physiology and hibernation pattern of these mammals. This experiment examines how energy balance in thirteen-lined ground squirrels is affected by the sex hormone estradiol and its interactions with the energy-sensing enzyme AMP-activated protein kinase (AMPK). Previous research indicates that both estradiol and AMPK have a role in regulating metabolic rate, cellular energy homeostasis, and fatty acid oxidation in mammalian cells. However, the relationship between these molecules is as yet unclear, so in order to test it, we experimentally increased estradiol concentrations in prehibernation ground squirrels. We hypothesized that estradiol would inhibit AMPK through the enzyme liver kinase B1 (LKB1) (a known activator of AMPK) and thereby decrease food intake and increase metabolic rate. Our preliminary results indicate that estradiol addition has limited effects on food intake, metabolic rate, and LKB1 in prehibernation ground squirrels. This may indicate differential or seasonal regulation of energy balance in hibernators, but further experimentation is needed to increase sample size and determine whether the lack of differences observed were due to differential management of energy resources in hibernators or to mechanistic errors.

# Effect of Charge Mutations on the Chaperone Efficiency of α -Crystallin B

Antonio Saavedra & Jim Hebda
Chemistry Department, Austin College
Abstract #22

Proteins have numerous biological roles at the level of the cell. To begin understanding those protein functions requires the analysis of their composition and functional units. Motifs are similar structures, derived from stretches of amino acids that appear to be conserved, over a number of different proteins that serve similar functions. Our research analyzes the amino acid sequences of different proteins, specifically to identify palindromic sequences. A palindrome is a sequence that reads the same forwards as it does backwards. Nucleic acid palindromes have been heavily analyzed for their functional purpose and we predict that proteome palindromes have biological significance, too. As a continuation of a project started by Erik Gentzel and Jenny Maqui, a Wolfram Mathematica code was optimized to locate and characterize the complexity of palindromes of different proteome inputs. In conjunction, the code analyzes a random sequence, based on the fractional composition of the proteome input, for comparative purposes. The data showed that palindromes appear more often in nature than by random chance, which gives a strong indication that proteome palindromes have biological significance. This code can be utilized by researchers to identify palindromes in desired protein sequences and determine their functional significance.



# Counting Caraway: A Mathematical Analysis of America's First Female Senator

Nicholaus Frederick
History Department, Austin College
Faculty Sponsor: Vicki Cummins

Hattie Caraway was the second woman to be nominated to succeed her late husband and take his place in the Senate. Caraway would later win a primary against prominent male politicians in 1932, defying Arkansas party bosses and a powerful governor that appointed her to the seat and going on to easily win her first election. Becoming the first woman to serve as an elected senator, Caraway's legacy has been historically defined through the powerful men present in her life: her husband, Senator Thaddeus Caraway, her fellow senator from Arkansas, Majority Leader Joseph Robinson, and Huey Long of Louisiana, to whom historians have long attributed Caraway's "surprising" victory. Contemporary and historical analysis of Caraway showed her as a senator who rarely spoke to help her constituents. Gender normative voices have long bombarded historical interpretations of Caraway but have failed to examine the role she had to assume, a role of a women paving the way in a completely male-dominated Senate. By examining Caraway's DW Nominate score, I examine the relationship between Caraway and her party with regards to economic identity. This analysis leads me to the finding that Caraway is more progressive (at least economically) over time. This shows her in line with her male counterparts during a time when the Democratic Party served as an appendage of Roosevelt's New Deal.

# Wright Campus Center 231

## Scarbrough Panel

Moderator: Mindy Landeck, Director of Scarbrough

Summer Research Program

## Who Counts as a Victim? The 2017 Hurricane Season and Public Opinion on Redistributive Aid

Alison Boehmer
Political Science Department, Austin College
Faculty Sponsor: Nate Bigelow

Research on welfare and other public aid reveals much about how Americans relate and feel responsible to their fellow Americans. Findings indicate that 1) there exists principled partisan objections to redistributive aid, 2) there exists racially-tainted objections to redistributive aid, and 3) individual values and attitudes (such as individualism, trust, and nativism) affect one's perception of both aid distribution and its beneficiaries. How do these findings hold in the context of a different kind of public aid--natural disaster relief aid? Are Americans more generous and less partisan in the wake of such an event? Do racial biases influence one's redistributive preference? Furthermore, what does generosity and trust look like in the context of natural disaster during the Trump Era? This exploratory study seeks to answer these questions and understand the landscape of white American public opinion in response to the 2017 hurricane season--a devastating and unique natural experiment that affected three diverse populations: Houston, the Florida Keys, and San Juan, Puerto Rico. The findings of this study are delivered in three parts: a descriptive review of public opinion, a modeled analysis of partisanship and relief aid, and a modeled analysis of the effect of individual values on relief aid preferences. Ultimately, this research supports what many studies concerned with public aid claim: Americans are not--even after an event thought to elicit sympathy--always willing to offer their fellow Americans unquestioned economic aid.



## Building a Light Board with Arduinos

Chad Childress, Adonis Martin, Carlos Reyes-Leon, & Andra Petrean
Physics Department, Austin College
Abstract #23

# Poster Withdrawn

# Examining the Effects of Overexpression of Genes on the p17p07 Plasmid in *Saccharomyces cerevisiae* Mutants Lacking PGM2

Ndanzia Mpunga, Mandy Eckhardt,
& David Aiello
Biology Department, Austin College
Abstract #24

The major isoform of phosphoglucomutase, encoded by *PGM2*, interconverts glucose-1-phosphate (G1P) and glucose-6-phosphate (G6P) in carbohydrate metabolism. Yeast strains lacking *PGM2* lose the ability to interconvert the two metabolites and exhibit slow growth defects when grown on galactose-containing media. Additionally, the *pgm2*Δ strain exhibits an imbalance in G1P:G6P ratio, high levels of intracellular calcium, sensitivity to CsA, an increase in the induction of the unfolded protein response (UPR), and a hyperaccumulation of glycogen. These characteristics show that calcium homeostasis is related to carbohydrate metabolism in the cell. Previous work has shown that overexpression of genes on the p17p07 plasmid causes *pgm2*Δ like growth defects and glycogen accumulation in wild-type (wt) yeast strains on galactose. The p17p07 plasmid contains five genes: *GAL2*, *SIC1*, *EMP46*, *EMP70*, and *SRL2*, which all serve different functions within the cell. This suggests that it could be either one gene or a combination of genes on the plasmid that is causing *pgm2*Δ like phenotypes in the wt strain. We examined the effects of overexpressing the individual genes by inserting an overexpression plasmid containing each gene into the *pgm2*Δ and wt strains. We found that *pGAL2, pEMP46,* & *pEMP70* exacerbated slow growth of *pgm2*Δ mutant on galactose, and additionally caused slower growth of the wt strain on galactose. These results suggest that a combination of genes on the plasmid contribute to *pgm2*Δ like growth defects in the wt strain. Overexpression of any individual gene did not increase glycogen accumulation in the wt strain. Interestingly, *pSRL2* rescued *pgm2*Δ growth on galactose media containing CsA. This suggests that *SRL2* might play an important role in calcium regulation in the cell.



## Saturday Oral Session 3: 1:00-2:20

**Room 231** Moderator: Mindy Landeck

**Scarbrough Panel**

| | |
|---|---|
| 1:00 | **Allison Boehmer** |
| 1:20 | **Nicholaus Frederick** |
| 1:40 | **Meredith Huff** |

**Room 254A** Moderator: Tom Blake

**Viking Women**

| | |
|---|---|
| 1:00 | **Abby Ross** |
| 1:20 | **Quinten Vandereviere** |
| 1:40 | **Tori Dodd** |

**Room 254B** Moderator: David Aiello

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|---|---|
| 1:00 | **Aarthi Kannan** |
| 1:20 | **Harris Drake** |
| 1:40 | **Joseph Vetter** |
| 2:00 | **Samuel Skupin** |

**Room 255** Moderator: Randi Tanglen

**"First We Read, Then We Write":**
**Experiments in Autobiographical Literary Criticism**
1:00-2:20
Erin Laine
Sarah Yarbrough
Karla Herrera Guiterrez
Zsuza Ratliff-Johnson
Tianna Anderson

# Student Oral Presentations
# Block III

## Saturday, March 23, 2019
## 1:00 p.m. - 2:20 p.m.



## Examining the Loss of SPT4 as a Rescuer of ER/Golgi Ca2+ Homeostasis Defects Caused by the *pgm2*Δ Mutation in *Saccharomyces cerevisiae*

Shreya Uppala, Rachel Jimenez, Lindsay Apgar,
Sita Ramasamy, Courtney Goldstein, & David Aiello
Biology Department, Austin College
Abstract #25

Phosphoglucomutase (PGM) is an enzyme that plays an important role in carbohydrate metabolism. PGM2, the isoform responsible for 90% of PGM activity, interconverts glucose-6-phosphate (G6P) and glucose-1-phosphate (G1P) in Saccharomyces cerevisiae. It has been shown that mutants lacking PGM2 (pgm2Δ) exhibit carbohydrate metabolism defects such as an accumulation of both G1P and glycogen when grown on galactose containing media. But it has also been observed that there are defects in calcium ion homeostasis, such as an increase in total cell calcium, no growth on Cyclosporine A, sensitivity to high extracellular Ca2+, and an induction of UPR in mutants lacking PGM2. For the cell to maintain intracellular calcium homeostasis, functional secretory pathways are needed. Both Gdt1 and Pmr1 are calcium transporters localized in the Golgi apparatus. Mutants lacking either GDT1 or PMR1 have been shown to exacerbate the pgm2Δ phenotypes. However, separate studies in the lab have shown that the loss of SPT4, which encodes a transcription elongation factor, rescues pgm2Δ phenotypes. This study examines how the spt4Δ mutation rescues ER and Golgi apparatus Ca2+ defects as seen in pgm2Δgdt1Δ and pgm2Δpmr1Δ mutants. It was shown that the loss of SPT4 does in fact rescue the exacerbated growth defects observed in pgm2Δgdt1Δ and pgm2Δpmr1Δ mutants. Furthermore, the spt4Δ mutation rescues Ca2+ homeostasis defects associated with the loss of either PMR1 or GDT1 alone. Our results suggest the spt4Δ mutation to be a global suppressor of altered Ca2+ homeostasis caused by different gene mutations.

## Perceiving Ethnic Identity from Interethnic Couples with Two Partners of Color versus One White Partner

Katelyn Kuehnhold, Nicholas Marshall,
& Lisa M. Brown
Psychology Department, Austin College
Abstract #26

Previous research finds that observers make judgments about the ethnic identity of a person of color in the US based on his/her social beliefs and phenotypic prototypicality (Kaiser & Pratt-Hyatt, 2009; Wilkins, Kaiser & Rieck, 2010). This study examined whether perceivers make different judgments about a target's ethnic identity centrality, ethnic prototypicality, and Americanness based upon the ethnicity of the target's partner. Our previous research found that members of interethnic couples pictured together are perceived to be weaker in ethnic identity relative to members of monoethnic couples pictured together or pictured alone. In this previous research the interethnic couples always had a White partner. We extended this research to investigate interethnic couples in which both members are people of color. An online questionnaire was used to assess perceived ethnic identity centrality, prototypicality, and Americanness of individuals in couples from wedding photos. Each participant saw pictures of six interethnic couples: 2 Asian-Black, 2 Asian-White, and 2 Black-White as well as 6 monoethnic couples: 2 Black-Black, 2 Asian-Asian, and 2 White-White. Participants were randomly assigned to see both partners or an adapted picture with only one partner. Interethnic couples were perceived as having weaker ethnic identity centrality when seen together than when seen alone. Moreover, Asian-Black couples were perceived as less "American" than interethnic couples with a White partner.



# Honors Student Panel

## Wright Campus Center Living Room

## Saturday, March 23, 2019
## 11:30 a.m. - 12:30 p.m.

Joseph Khalaf (Economics)
Emma Thornburg (Biology)
Brianna Richmond (Psychology)
Joshua Pollard (English)

Moderator: President Steven O'Day

# All-Loving God

Caelie Morris
English Department, Austin College

Protest literature is a work of literature that serves to challenge and transform the audience, hopefully spurring them into action. Inherent in each work is a call to action, even if it is not specifically stated. After all, no author of protest literature would intend for the reader to read the work and do nothing. The protest literature I will read on this panel is a sermon meant to repudiate the church for the ostracization of the queer community. The style is taken from Frederick Douglass and Prince Hall, both powerful nineteenth-century advocates for the rights of African Americans. I took Frederick Douglass's invective tone in "What To The Slave Is The Fourth of July?" and contrasted it with the more gentle call to arms of Prince Hall's "A Charge Delivered to the Brethren of the African Lodge". My sermon adopts the themes of acknowledging corruption and striving to stop it. I utilized the format of Prince Hall, interspersing my discussion of current issues with Biblical precedents. Finally, I ended with a poem in order to highlight the encompassing nature of God's grace. In my presentation, I will read from my piece and speak on the growth I underwent in order to write this piece of protest literature. This paper is part of the panel on "American Protest Literature: A Roundtable Reading of Original Work".



# Efforts Towards the Synthesis of Anisucoumaramide

Kristina McLeod-van Amstel, Laurel Hagge, & Ryan Felix
Chemistry Department, Austin College

Abstract #27

The purpose of the current research is to synthesize Anisucoumaramide, a compound isolated from C. anisum-olens which has been found to have inhibitory effects on the MAO-B isoenzyme that contributes to neurodegenerative diseases. By synthesizing the compound in the lab, this research would provide a pathway for production of a compound normally obtained in minimal yields from natural resources, as well as provide for further biological research. In synthesizing two fragments of the compound, the two would be combined in a substitution reaction to give Anisucoumaramide. Although the synthesis is currently incomplete, this research provides insight into the initial steps in working towards this compound. Future work will be done to complete the synthesis of Anisucoumaramide, improve yields, and optimize reaction conditions.

# Methocinnamox (MCAM): Properties at κ- and δ-Opioid Receptors

Varun Kotipalli[1], Joshua Zamora[2], Teresa Chavera[2], Kelly Berg, PhD[2], William Clarke, PhD[2]
Biology Department, Austin College[1], Department of Pharmacology, UT Health Science Center at San Antonio[2]

Abstract #28

For the past two decades, abuse and overdose of opioids has increased dramatically. The effects of opioids (beneficial and adverse) are mediated by opioid activation of the μ-opioid receptor (μ- receptor). Currently, opioid overdose is treated with naloxone, a competitive antagonist for the μ-receptor. This medication is effective short-term, requiring multiple administrations for a long-term effect. The competitive nature of naloxone creates a possibility that an abuser can overcome the drug's effects with higher doses of opioids. Methocinnamox (MCAM) is an opioid antagonist which has a long duration of antagonistic action. The longevity of MCAM has great potential for treatment of overdose, and its longevity suggests irreversible antagonism at the μ-receptor. However, its pharmacological properties at the κ- and δ-opioid receptor (κ- and δ-receptor) sites are relatively unexplored. As κ- and/or δ-receptors could be targets for analgesic medications in people being treated with MCAM (opioid analgesic medications will not work if the μ-receptor is blocked by MCAM), it is important to delineate the effects of MCAM on κ- and δ-receptors. The goal of this project is to determine the pharmacological characteristics of MCAM at κ- and δ -opioid receptors. We used human embryonic kidney (HEK) cells that express κ- and δ-receptors. To assess receptor function, we measured inhibition of forskolin-stimulated cAMP accumulation in the cells in response to MCAM alone, κ- and δ-receptor agonists, and with MCAM plus the opioid agonists. Our hypothesis was that MCAM is an irreversible antagonist at the μ-receptor site but acts as a reversible antagonist at the κ- and δ-receptor sites. Our experiments supported the hypothesis.



# "Person A Private Lyric": Contextualizing Disability Rights in America by Borrowing Techniques from Other Minority Movements

Rachel Young
English Department, Austin College

Protest Literature addresses a societal ill and transforms the majority public perception by reflecting an image that recontextualizes the identity of the reader and personalizes the broader issue at hand. In this way, my lyrical protest poem "Person, A Private Lyric" attempts to recreate the effects of Claudia Rankine's lyric-novel *Citizen* on the discussion of African American rights for the Disabled community. Rankine, through a combination of deeply personal anecdotes, iconography, and historic-societal reflections, highlights the continued narrative of African American oppression in the States. This is done to the effect of reminding the oppressed that they are not alone and exposing those complicit in this oppression to the inescapable daily realities of racialized terror. Utilizing those same tools in my own piece and working to personalize and make obvious the microaggressions faced by people with disabilities in an ablistic America, I hope to be marginally as successful as Rankine in opening the eyes of my audience. In my presentation, I will recite my work using the discussion it opens to reflect upon my own experiences as a physically disabled person in a society catered towards the able-bodied and the power personalization grants a cause.

## Remember Where You Came From: My Mother and Immigration

Claudia Theriot
English Department, Austin College

Protest literature is a work of art, whether that be a novel, a speech, a poem or even a song, that connects with the hearts and minds of an audience and urges them to go out and change the world. My narrative "Remember Where You Came From" connects the issues of modern immigration and the backlash immigrants receive in America with the microaggressions depicted by Claudia Rankine in her lyric poem *Citizen*. Rankine is a powerful, modern civil rights activist who writes about prejudice against people of color all over the world. With Rankine's accounts of racism and macroaggressions, I reflect on my mother's and my own experiences with microagressions as Hispanic Americans. My narrative poetry, which I will read, works to share my own personal story with an audience hoping to create a connection and encourage action around the issue of immigration.



## Investigating Subunit Exchange of αB-Crystallin in Correlation with Chaperone Function Using Forster Resonance Energy Transfer (FRET)

Khanh Nguyen & Jim Hebda
Chemistry Department, Austin College

Abstract #29

Protein homeostasis is crucial for the proper working of the cell. Misfolded proteins are non-functional and can become toxic, leading to many diseases such as Alzheimer's and cystic fibrosis. Alpha Crystallin is a protein found in the eye lens that acts as a chaperone to prevent misfolding of other proteins. In this way, alpha crystallin helps maintain the proper refractive index and clarity of the eye lens. αB-crystallin is an isoform of alpha crystallin and is found in many different types of tissue. The mechanism by which αB-crystallin prevents aggregation is still not yet fully understood. In normal conditions, αB-crystallin is known to form large oligomers and exchange subunits extensively. This study investigated the correlation between subunit exchange and chaperone function of αB-crystallin utilizing fluorescently labeled proteins. By using Forster Resonance Energy Transfer (FRET), subunit exchange could be observed between donor and acceptor labeled proteins as a function of time. FRET was observed at different temperatures (25°C, 37°C, and 45°C) as well as at different pH conditions (6 and 7). Results showed that increasing temperature and decreasing pH correlated with increasing chaperone function. Different sets of labeled αB-crystallin were made and showed the same correlation. These results indicated that subunit exchange could potentially be a significant contributor to αB-crystallin's chaperone mechanism.

# Spectral Line Survey of IRC+10216 from 96-116 GHz: Using Radiative Transfer Code ESCAPADE to Model Molecular Abundances

Sarah Ortiz, Sarah Safarimaryaki, & Lindsay Zack
Chemistry Department, Austin College
Abstract #30

Data from a spectral line survey of the C-rich asymptotic giant branch (AGB) star IRC+10216 over the 96-116 GHz frequency region were analyzed. Recent spectra taken with the Arizona Radio Observatory (ARO) 12 m telescope on Kitt Peak, Arizona were combined with archival data dating back to 1998. Several hundred spectral lines were observed in the survey data, and roughly 10% have been assigned. A radiative transfer code, ESCAPADE (ESCape Probability rADiative transfEr), is being used to determine molecular abundances of CO, 13CO, and HC3N. Current progress will be presented.



# Truisms of the Modern Day: Women, Sexism, and Sexual Assault

Caroline Fullerton
English Department, Austin College

Protest literature can be defined as literature that seeks to ignite change in others through the author's own self-reflection. The list poem "Truisms of the Modern Day" adapts the format of William Lloyd Garrison's satirical racial commentary "Truisms" to fit the current attitude toward sexual assault in the United States. Garrison used his experience as an abolitionist in the 1800s to catalogue racist and ironic truths upon which southern slavery was built. Similarly, I utilize my experience as a woman and victim of sexual assault to demonstrate the ironic and misogynist truths that support our modern day attitude regarding sexual assault. The satirical strategies used in both Garrison's "Truisms" and my own version aim to reveal the hypocrisy and ironic nature of their topics. My poem is an opportunity for my own self-reflection, a way to show other women they are not alone, and an opportunity for the rest of the world to listen to a woman's account of modern day misogyny. In my presentation I will read "Truisms of the Modern Day" and reflect on how I used Garrison's example of protest literature to inspire my own self-reflection and writing.

# Wright Campus Center 255

## American Protest Literature: Roundtable Reading and Reflection

Moderator: Randi Tanglen

## Through the Eyes of a Woman

Morgan Hall
English Department, Austin College

Protest literature has the goal of "transform[ing] the self and chang[ing] society," according to literary critic John Stauffer. My poem, "Through the Eyes of a Woman," connects modern day issues of sexual assault and harassment and microaggressions against women to 19th century writer William Lloyd Garrison, speaker Frederick Douglass, and modern poet Claudia Rankine. William Lloyd Garrison and Frederick Douglass both were outspoken abolitionists and suffrage supporters. Claudia Rankine is a modern poet focusing on the Black Lives Matter movement, and I draw on her model of collecting stories from people she knows to illustrate a problem in society. In addition, I draw on Garrison's and Douglass's model of using bitter truths to protest how badly society disadvantages women. In my presentation, I will read my poem and take a moment to recognize how much writing this piece changed me as a feminist.



## Identification of Palindromic Sequences in Proteomes

Derrick Draeger, Khanh Nguyen,
Benjamin Johnson, & Jim Hebda
Chemistry Department, Austin College

Abstract #31

$\alpha$-Crystallin B is an oligomeric protein that was first isolated from the lens of the mammalian eye. Its primary function is to passively prevent protein aggregation, thereby mitigating any toxic effects of protein aggregation and ensuring the proper functioning of proteins. While it is hypothesized that monomers are the functional units of $\alpha$-Crystallin, it is found in large oligomers composed of anywhere from 20-40 monomers under physiological conditions. The hierarchical structure of $\alpha$ -Crystallin is based on charge interactions on the C-terminus of the protein. These charge interactions are the basis for dimer formation and larger oligomeric states. By mutating these charges we can observe how dimer/oligomer stability affects the chaperone efficiency of $\alpha$ -Crystallin.

# Identifying Novel Players in *pgm2*Δ Mutant Calcium Homeostasis Defects

Sona Selvamani[1], Ndanzia Mpunga[2], Krishna Patel[2]
& David Aiello
Biology Department, Coppell High School[1]
Austin College[2]
Abstract #32

Alzheimer's disease (AD) is a neurodegenerative disease that is the prominent cause of memory loss and dementia in those of 65 to 85 years old. AD directly results from the formation of plaques derived by the peptide, β-amyloid. Elevated levels of intracellular calcium cause the improper folding of the β-amyloid protein leading to the progression of AD. In contrast, low carbohydrate diets have shown a decrease in the amounts of the β-amyloid protein. Saccharomyces cerevisiae, or budding yeast, is a model system used to study basic functions of eukaryotic organisms as it contains a nucleus, membrane, mitochondria, vacuole, and endoplasmic reticulum/Golgi apparatus. Yeast cells also divide rapidly and can be manipulated with ease making it an efficient tool for cellular and molecular biology research. It has been shown that in S. cerevisiae, cells that are deficient in key carbohydrate metabolism genes show altered calcium levels. This project identifies an emp46Δ and srl2Δ mutation, as well as SRL2 overexpression, as suppressors of the growth defects caused by a loss of phosphoglucomutase, a key enzyme in carbohydrate metabolism. EMP70 overexpression also weakens growth in a Saccharomyces cerevisiae.



# Why Science Needs Theater

Robbie Moore
Theatre Department, Austin College
Faculty Sponsor: Kirk Everist

From the operating theater to Bill Nye the Science Guy science and theater have coexisted for hundreds of years. However, when asked people do not typically associate the two disciplines. In this paper I explore some specific works of scientific theater and delve deeper into why science needs theater. I take a look at some popular works of scientific theater such as, Copenhagen by Michael Frayn, Arcadia by Tom Stoppard, and R.U.R. by Karel Capek. I will also take a look at some current projects and studies that are being conducted on the relationship between theater and science. This paper is designed to begin a dialog between scientist and the theatrical world on how they can better each other and the world through working together.

# Marquis de Condorcet and Eco-Feminism

Joseph Khalaf
Economics Department, Austin College
Faculty Sponsor: Dan Nuckols

Using historical-comparative methodology and its associated mandates for primary sources, this work studies the writings and works of Nicolas de Condorcet in an attempt to further understand his theories and desire for a democratic society and republic. A mathematician and philosopher, Marquis de Condorcet was one of the great French *philosophes* of the eighteenth century. Having kept the company of Turgot, Voltaire, and Rousseau, Condorcet is chiefly known for his formulation of insightful mathematical postulates within calculus and probability theory and their social and democratic applications, such as his voting paradox. This paper will make use of Condorcet's writings such as his works on freedom and despotism and those that advocate for the abolition of slavery and the enfranchisement of women, in conjunction with the works of eco-feminist theorists. In doing so, this paper will investigate Condorcet's contribution to environmental economics, and more specifically the connections of his works to the modern-day philosophy of eco-feminism. While this work contributes to the literature on Condorcet's influence and impact on environmental economics and feminism, its nuance lies in the connection made between Condorcet and eco-feminism and how understanding this relationship can enlighten modern policy deliberations. This study finds that Condorcet is an early formulation eco-feminist because of his understanding and connection between the marginalization of both women and the environment and how this leads to a corrupt society. The findings of this work can be used to better understand the necessary components of a true republic that encourages a sustainable socio-economy.



# Implementing a Fourth-Order Runge-Kutta Method in Python for Solving the Hodgkin-Huxley Equations

Natalie Randall & Huy Nguyen
Mathematics Department, Austin College
Abstract #33

Differential equations (DEs) are used to model various processes, including those that appear throughout the natural world. One well-known example is the Hodgkin-Huxley model, which is a system of nonlinear DEs used to model the action potentials in neurons. This non-linearity is a distinguishing characteristic of the Hodgkin-Huxley. Since this system is nonlinear we cannot evaluate it analytically, and so we must employ numerical methods as a means to approximate solutions. Using the programming language Python, we implemented an algorithm that uses the Fourth-Order Runge Kutta (RK4) numerical method to solve a system of differential equations. We then use this algorithm on the Hodgkin-Huxley model and compare the graphs we generate to those from the original paper by Hodgkin and Huxley.

## 8-18 Ghz Chirped Pulse Fourier Transform Microwave Spectroscopy

Saiaditya Addepalli & Lindsay Zack
Chemistry Department, Austin College
Abstract #34

Chirped-pulse Fourier –Transform microwave (CP-FTMW) spectroscopy has become one of the most commonly used techniques to measure the pure rotational spectra gas-phase molecules. This method offers broadband coverage at high resolution. However instruments are often built from expensive components, including arbitrary waveform generators (AWG), high power amplifiers, and fast digitizers, as well as costly vacuum chambers and pumps. These components often make these instruments unaffordable for most undergraduate institutions. Thus, we are currently designing and building an inexpensive CP-FTMW spectrometer using a direct-digital synthesizer in place of the AWG, a USB synthesizer as a frequency source, and lower power amplifiers. We have also replaced the vacuum chamber with a waveguide coil that can be evacuated with lower pumping requirements. The design of the spectrometer will be presented and current progress discussed.



# Wright Campus Center 254B

## Investigating Synergy Between PA28γ and IKKε

Hannah Butterfield
Biology Department, Austin College
Faculty Sponsor: Lance Barton

Cancer is characterized by excessive cellular proliferation and by dysregulation of signaling pathways related to growth. PA28γ is a proteasome activator frequently increased in cancer and involved in regulation of multiple cellular pathways that affect proliferation, including the Nuclear Factor κB (NFκB) pathway. Inhibitor of Nuclear Factor κB Kinase ε (IKKε) is a breast cancer oncogene that affects multiple pathways that implicate PA28γ, including the activation of NFκB. This study aims to elucidate whether PA28γ is required for normal IKKε activity. I hypothesize that PA28γ enhances the overall expression and nuclear export of IKKε, and aids IKKε-mediated cell signaling. I am assessing this through evaluating differences in IKKε nuclear, cytosolic, and overall concentration in PA28γ+/+ and PA28γ-/- murine embryonic fibroblast (MEF) cells. I am also evaluating differences in IKKε-implicated cellular processes including transcriptional activation, phosphorylation of target proteins, and animal weight gain. Preliminary data does not support a role for PA28γ in regulation of IKKε.

# Characterizing the DNA-Binding and Anti-Proliferative Effects of Modified Planar Platinum(II) Compounds

Manasa Kuncham, Janani Ramesh,
Dilan S Shah, Sanjana Rasamsetti
Biology Department, Austin College
Faculty Sponsor: Lance Barton

A notable hallmark of cancer is uncontrolled cell proliferation. Cisplatin is a chemotherapy drug used to interfere with cellular proliferation and treat the progression of cancer by inducing DNA crosslinks. This conserved mechanism, while effective, also has negative side effects on non-cancer cells. The disadvantage of cisplatin is the lack of selective toxicity to cancer cells. Additionally, over time cancer cells can develop resistance to cisplatin, providing a need for alternatives. The chemical composition of cisplatin includes a square planar platinum core with two cis-chloride and two cis-ammonia ligands. The objective of this project is to determine if modified square planar bioactive platinum compounds will demonstrate higher preferential toxicity and avoid resistance in cancer cells than cisplatin, and to assess the binding patterns and dosage effects of the novel compounds. Upon testing platinum compounds that contain sulfhydryl ligands in place of chloride ligands, as found in cisplatin, reduced overall toxicity was observed in certain derivatives, as reducible sulfur bonds could enhance bioactivity inside the cytoplasm of the cells. Cellular viability decreased more in cancer cells treated with B2D Pt(II) compound than in normal fibroblast cells, indicating higher selectivity to cancer cells compared to the other tested compounds. Differential toxicity for cancer cells compared to normal cells indicates that some modifications can improve specificity. These modifications could better enable DNA-compound interactions, potentially resulting in higher toxicity than previously observed, while staying selectively toxic to cancer cells and surpassing cisplatin-specific resistance mechanisms.



# Examining the Importance of Romantic Satisfaction to Subjective Well-Being among Unmarried Working Adults

Joann Mathew, Andrew Maienschein,
Brianna Richmond, & Matt Findley
Psychology Department, Austin College
Abstract #35

Previous research has found that romantic relationships are an important means by which to fulfill individuals' belongingness needs (Baumeister & Leary, 1995). Further studies have found that romantic relationship satisfaction is a significant predictor of subjective well-being when examined relative to other life constructs (Davis & Findley, 2017; Glen & Weaver, 1981). However, most prior research has predominantly examined the importance of romantic relationship satisfaction to subjective well-being among married couples (e.g., Glen & Weaver, 1981). Less is known about the role that romantic relationship satisfaction plays in subjective well-being in other types of romantic relationships. The current study examined the importance of relationship satisfaction to subjective well-being (relative to other life constructs) among unmarried, working individuals in a committed relationship. Results demonstrated that romantic relationship satisfaction was a significant predictor of subjective well-being even when controlling for other well-established correlates. These results suggest that the benefit of being satisfied in one's romantic relationship extend beyond married relationships. The current study examined the

# The Effects of Estradiol in Pre-Hibernation Thirteen Lined Ground Squirrels

Lindsay Apgar, Siddharth Kortikere, Madison Myles, & Jessica Healy
Biology Department, Austin College
Abstract #36

Estradiol is a sex hormone that has been shown to have anorexigenic (hunger-reducing) effects in non-hibernators. However, in hibernators such as the thirteen-lined ground squirrel, Ictidomys tridecemlineatus, estradiol concentrations are at their highest during the breeding season, which overlaps with the time at which organisms are increasing their fat stores for the next winter. The purpose of this study is to determine whether estradiol has an anorexigenic effect in hibernators, and if so what the mechanism is. We hypothesized that estradiol would have anorexigenic effects during the prehibernation fattening season, and that the addition of estradiol would lead to a decrease in the activity of energy-sensing enzyme AMP-activated protein kinase (AMPK) by decreasing AMPK's activator liver kinase B1 (LKB1). We further hypothesized that these anorexigenic effects would be accompanied by decreased fat mass, decreased levels of the hunger-inducing hormone ghrelin, and increased metabolic rate. We implanted body temperature data loggers and either estradiol or oil capsules in five weight-matched male squirrels and monitored food intake, measured oxygen consumption and fat mass, and took white adipose tissue biopsies and blood samples for western blots and enzyme immunoassays. None of our hypotheses were fully supported, indicating that either our sample size was too small or that estradiol is not an anorexigenic hormone in hibernators.



# Effects of Perceived Entitativity on Prejudice Against Mental Illness

Caitlyn Collins
Psychology Department, Austin College
Faculty Sponsor: Lisa M. Brown

Entitativity (Hamilton, 1958), results in prejudice (Hamilton, Sherman, & Maddox, 1999; Castano, Sacchi & Hays Gries, 2018). The perceived group entitativity also affects group member prejudice (Effron & Knowles, 2017). Mental health prejudice affects likelihood to seek treatment, recover, and worsens mental illness experience (Biddle, Donovan, Sharp & Gunnell, 2007). Research lacks consideration of the individual's perceived group entitativity and entitativity of those with mental illness. The current research examines how entitativity effects prejudice, including both the individual's group and those with mental illness. Recruitment is from an undergraduate pool of psychology students. Participants answer a demographic survey and two scales. The two scales include the Essentialist Entitativity Beliefs scale (EE scale; Roets & Hiel, 2011) and the Prejudice towards People with Mental Illness scale (PPMI; Kenny, A., Bizumic, B., & Griffiths, K. M., 2018) Participants read a scenario with high/low entitative group membership supporting/not supporting an alcoholism treatment center. The two scales assess the relationships between high/low entitative group membership, perceived entitativity of those with mental illness and mental health prejudice. The researcher hypothesizes 1) the high entitative group scenario will increase prejudice when against the treatment center, while the condition will decrease prejudice when the group is for the treatment center, 2) high entitativity of those with mental health will increase prejudice when the group is against the construction of the treatment center, while 3) the low entitativity of those with mental illness will decrease prejudice. The researcher aims to attain a greater understanding of prejudice and the research process.

# Wright Campus Center 254A

## Conforming to a Group: Effects of Gender Identity and Peer/Authoritative Influence

Brianna Richmond
Biology Department, Austin College
Faculty Sponsor: Lisa M. Brown

Previous research has established that people favor ingroup members over outgroup members. Also, there is an abundance of research examining peer influence and authoritative influence. The current study seeks to investigate how these two influential processes interplay with one another. This study examines the level of conformity from ingroup/outgroup members, as defined by one's gender identity, when the group consists of peers or authority figures. Participants recruited from the Austin College psychology participant pool will be randomly assigned to receive a gender identity prime or not. They will then complete an identity centrality scale. Next, participants will be randomly assigned to see input from an ingroup or outgroup source which will be either a peer or authority figure. Results are expected to show that ingroup authority figures will produce the highest rates of conformity among participants, outgroup peers will cause the lowest levels of conformity, and ingroup/peer and outgroup/authority will produce similar results that lie in the middle when gender is primed. I also hypothesize that when gender is not primed, the results will follow the same pattern but to a lesser effect. This study will contribute to literature concerning intergroup relations. It is important to know what can influence us, to what extent, and how these different variables interact.



## Acetylation as a Possible Trigger for the Misfolding of Beta-2 Microglobulin

Michael Dang & John Richardson
Chemistry Department, Austin College
Abstract #37

Beta-2 microglobulin (β2m) is a small 99-residue protein that, when misfolded, forms amyloid fibrils. These fibrils aggregate to form amyloid plaques, which deposit in skeletal joints and cause symptoms consistent with rheumatoid arthritis and carpal tunnel syndrome. In healthy individuals, β2m is efficiently filtered by the kidneys and excreted. However, when kidney failure occurs, β2m cannot be cleared from circulation. The most common treatment for kidney failure is long-term dialysis to compensate for impaired renal function. A secondary consequence of dialysis is a debilitating condition called dialysis -related amyloidosis (DRA), which is caused by the accumulation of misfolded β2m. While research has elucidated the downstream physiological effects of β2m fibril formation, there is not a clear understanding of how these fibrils are triggered in vivo. The purpose of this study is to investigate if β2m misfolding can be induced with chemical modifications that change the protein's charge by eliminating electrostatic repulsions between the proteins. One such modification is acetylation, which specifically reacts with the amine on lysine side chains to produce a modified residue with no charge. This charge alteration is the basis for the disruption of electrostatic repulsion being studied.

# Investigating Beta-2 Microglobulin Mutants

Erin Adams & John Richardson
Chemistry Department, Austin College
Abstract #38

Beta-2-Microglobulin (B2M) is protein composed of 99 resides that is part of the Class I Major Histocompatibility Complex (MHC). B2M is characterized by a beta sandwich that is stabilized by a disulfide bond. The protein misfolds into aggregated amyloid fibrils that has been linked to the disease known as Dialysis Related Amyloidosis (DRA). In order to investigate the misfolding of B2M, the protein will be mutated at different locations in order to examine their effect on how B2M folds normally and how it misfolds. By changing specific amino acids in particular positions of the protein, valuable information will be obtained on how B2M misfolds; the mutated genetic information will allow the mutated protein to be created. In this experiment, B2M will be mutated at the 65 position in which leucine was changed to aspartic acid. This mutation was hypothesized to reveal information regarding B2M misfolding due to the electrostatic contributions of such a non-conservative mutation. The mutated protein will then be purified through the purification process of sonication, centrifugation, and anion exchange chromatography.



# Is T.V. Ruining English?: How Media Influences Linguistic Change

Maxwell Levy
CML Department, Austin College

No abstract was given.

# The Myth of Linguistic Inferiority

Conner Kramer
CML Department, Austin College

I treat the myth that deals with the perceived notion that "Black Children are Verbally Deprived". I explore the linguistic inferiority principle and elaborate on the social and political views that have catalyzed the belief that African Americans have inferior language. I cite sources of the myth found commonly on the Internet and then test those notions against scholarly literature on the subject. Racism is evident in the notion that Black speech is inferior to Standard, meaning "proper" English, the variety that is taught in schools. I show that although African Americans are stereotyped as being linguistically deprived, they actually are not. Rather, they have a distinct vernacular governed by its own rules. Linguistic Inferiority is a myth



# PA28γ does not Promote Carcinogenesis via Cellular Management of Oxidative Stress

Janani Ramesh, Addie Pederson, Emily Aller,
& Lance Barton
Biology Department, Austin College

Abstract #39

Cancers develop through the accumulation of mutations in cellular DNA. Recent work supports the hypothesis that these mutations are caused by genomic instability, which result from oxidative stress due to increased levels of reactive oxygen species in cancers. Oxidative stress is managed via mechanisms such as antioxidants, Base Excision Repair (BER) and Nucleotide Excision Repair (NER) to avoid apoptosis. Previous studies have shown that PA28γ, a proteasome activator with elevated expression in many cancers, has a positive contribution to DNA double strand break repair. This study examines the correlation between PA28γ levels, oxidatively damaged DNA, and cellular defenses against oxidative damage in four cell lines containing increasing levels of PA28γ expression: PA28γ -/- MEFs, PA28γ +/+ MEFs, A9 tumorigenic cells, and M158 cancerous cells. Immunofluorescence microscopy demonstrated that PA28γ -/- cells have elevated baseline levels of oxidative damage in the DNA, however A9 and M158 cells also have elevated levels of oxidative damage, suggesting that PA28γ expression does not correlate with DNA damage. The cells with the greatest observed level of oxidative damage, A9 cells, also demonstrated higher mortality when exposed to each of the BER and NER inhibitor treatments, suggesting an increased dependency on both types of repair. Additionally, PA28γ-/-, M158, and A9 cells had altered levels of cellular glutathione, a major antioxidant, that neither correlated with PA28γ expression nor levels of DNA damage, suggesting that glutathione may not be the primary mechanism through which the oxidative load is managed in these cells. Therefore, these data show no correlation between PA28γ expression levels and baseline DNA damage, levels of antioxidants, or dependency on BER and NER in tumorigenesis.

## Exploring the Synthesis of Anisucoumaramide

Madison Bolin, Laurel Hagge, & Ryan Felix
Chemistry Department, Austin College
Abstract #40

Anisucoumaramide is a substituted coumarin which contains a furan ring and amide side chain. The compound was isolated from Clausena anisum-olens, a shrub found in the Philippines, South China and Southeast Asia. Coumarins have shown anti-inflammatory, antimycobacterial and antifungal properties. Anisucoumaramide has shown inhibitory activity on MAO-B, an enzyme which is elevated in depression and neurogenerative diseases, including Alzheimer's Disease. Due to very low yields in isolating from natural source a synthetic pathway is necessary for further investigation of this compound. Synthesis of the furanone ring and coumarin portions of Anisucoumaramide as well as various conditions have been explored.



# Wright Campus Center 245

## Language Myths

Moderator: Truett Cates

## The Myth of Verbal Deprivation of African American Children

Jaran Rudd
CML Department, Austin College

Various articles of educational literature, psychological findings, and everyday lay folk have pointed to first biological and then later sociological reasons for The Language Gap. A misunderstanding about existing linguistic disparities between groups has negatively affected speakers of African American Vernacular English. I debunk the pervasive myth about the supposed verbal deprivation of black children in America. Through an analysis of syntactic patterning, phonological properties, physiological similarities, through an exploration of the conditions necessary for language acquisition, and through a review of the literature, it becomes evident that this myth is false.

# La Identidad Chicana: Su Propia Frontera/ Chicanx Identity: Its Own Border

Erin Adams
CML Department, Spanish Program, Austin College

This analysis focuses on the dynamics of Chicanx identity, and how for many there is a border between US society and Chicanx society. Identity in general is perceived as belonging to a nation and the meaning that is associated with this sense of belonging. However, for Chicanx, their identity is a combination of belonging to Mexico and being associated with a minority status in the United States. Many members of the Chicanx community have learned to tolerate that their identity is not clear for both Mexicans and Americans. I present this argument through the well known media example of the 1997 film *Selena*. I focus on the life of Abraham Quintanilla, Selena's father. This character is a first generation Chicano, while Selena and her siblings are second generation Chicanos. In my work, I analyze both internal and external struggles that Abraham faced with his efforts of raising Selena to be the Queen of Tejano music.



# Contact Experience and Attitudes toward Transgender People

Azlin Saldivar & Matt Findley
Psychology Department, Austin College

Abstract #41

Identity is a critical aspect of a person's life and it plays a large role in a person's personal security. There are many components that make up an individual's identity including gender. Gender in itself has been socially constructed into two realms: male and female. However, there are many cases globally and domestically in which individuals do not practice or conform to this binary structure. The current research hypothesizes 1) that those who had interpersonal contact with a transgender individual would have more positive attitudes towards the greater transgender community than those who had not; 2) those who had experienced interpersonal contact with a transgender individual would be more accurate in identifying transgender individuals than those who had not had contact experience. Study 1 (642 respondents; 48.80% male) completed an online survey. The survey was slightly modified for Study 2 to correct some limitations of Study 1 and is anticipated to have approximately 400 respondents. Data collection for Study 2 is ongoing. The findings of study 1 found no evidence to suggest that increased contact will result in more positive attitudes toward the transgender community. In addition, those who have had more contact experience with the transgender community are not more likely to identify correctly transgender individuals out of an image set than those who did not know a transgender individual. The results of study 2 are expected to support hypotheses 1 and 2 based on the modifications made to the original survey.

# Triangle Inequality in Staircase Geometry

Wenhao Li & Jack Mealy
Mathematics Department, Austin College
Abstract #42

This paper addresses the proof of the denial of the triangle inequality theorem in Staircase Geometry.



# Música en la Frontera: Un Análisis del Corrido/ Music on the Border: An Analysis of the Corrido

Zachary Magers
CML Department, Spanish Program, Austin College

Culture and music within a society mirror each other, contribute to one another, and evolve together. Music transcends language and thus it became a primary medium of communication for people on the border to share their stories, struggles, and messages of hope. Original folk songs and *corridos* have evolved from their earliest forms on the border, but the central message of the works still remain the same - A message of hope and the desire to protect and care for one's family and identity.

# La Cultura Chicana en la Literatura de Gloria Anzaldúa y Lorna Dee Cervantes/ Chicana Culture in Works by Gloria Anzaldúa and Lorna Dee Cervantes

Karla Herrera Gutierrez,
CML Department, Spanish Program, Austin College

When one's identity is composed of two cultures, it can be difficult to distinguish where one starts and where the other one ends. As the eldest daughter in my family, I have often been the bridge between my parents and my two younger sisters. In this short play script, I tried to capture a typical every day conversation that usually ensues between my mother, my middle sister, and me. In doing so, I hoped to transmit the generational and linguistic differences that are prominent in my household and which at times divides us, but never for too long.



# Voice and Representation in the Martinican Canon

Manuella Owusu & Stacey Battis
CML Department, French Program, Austin College

Abstract #43

The purpose of this project is to study voice and representation in the twentieth-century Caribbean canon, particularly looking at that of Martinique and Martinican author Suzanne Dracius. Dracius presents an alternative discourse on Caribbean literature that is important to the understanding and reframing of intellectual approaches to Francophone literature. Focusing on her counter position, namely her identity theory of métissage-marronnage, against the major theories associated with Caribbean literature like Négritude and Créolité, I will provide insights that will help create new understandings and new ways of reading counter-narratives presented by women within Francophone literature.

## Examining the Effects of Loss of Gene Expression in *Saccharomyces cerevisiae* Mutants Lacking PGM2

Mandy Eckhardt, Paul Mpunga,
& David Aiello
Biology Department, Austin College
Abstract #44

Phosphoglucomutase (PGM) is an enzyme responsible for interconverting Glc-1-P and Glc-6-P, playing an important role in carbohydrate metabolism. A mutant yeast strain lacking the major isoform of PGM, pgm2Δ, displays many phenotypes on galactose-containing media, including high accumulation of Glc-1-P, slow growth, and increased Ca2+ uptake and accumulation. Another gene, SPT4, codes for a transcriptional elongation factor. When knocked out in the double mutant pgm2Δspt4Δ, most of these phenotypes are rescued, except for the high accumulation of Glc-1-P. Because Spt4p is a transcriptional elongation factor, it is likely that the rescue of these phenotypes is not due to the loss of SPT4 alone. RNA-seq analysis has identified seven transcription factor encoding genes as candidates for regulating genes showing differential expression between pgm2Δ and pgm2Δspt4Δ strains, and whose activity is probably involved in the rescue of phenotypes seen in the pgm2Δspt4Δ strain: GCR1, MOT3, CRZ1, NDT80, RLM1, RPH1, and CST6. This study examined these genes to determine if the increased expression of genes regulated by these transcription factors is an adaptive survival response, or if it is what is causing the pgm2Δ cells to become sicker. Deletion of CRZ1 and CST6 exacerbated the defective growth phenotype observed in pgm2Δ cells, while deletion of RLM1 partially rescued this phenotype. These results indicate that the increased activity of CRZ1 and CST6 may be involved in assisting in the survival of the pgm2Δ strain, while increased activity of RLM1 may be partially contributing to the calcium homeostasis defects in the pgm2Δ mutant.



# Wright Campus Center 231

## Border Lives, Borderlanders, Border Crossings

Moderator: Julie Hempel

## El Inmigrante en la Música Mexicana y Chicana/ The Immigrant in Mexican and Chicana Music

Ashley Loy
CML Department, Spanish Program, Austin College

Musical works from both American and Mexican points of view explore the concepts of the American Dream and immigration. In these works, the transition between life at home and the shock of moving to a new country as an outsider can lead to linguistic and identity borders. These concepts also serve as inspiration for the creation of an original piece, which focuses on the limitations a bilingual/ multicultural student may face in their day-to-day life.

**Saturday Oral Session 2: 10:00 – 11:20**

**Room 231** Moderator: Julie Hempel

**"Border Lives, Borderlanders, Border Crossings"**

| | |
|---|---|
| 10:00 | **Karla Herrera** |
| 10:20 | **Erin Adams** |
| 10:40 | **Zachary Magers** |
| 11:00 | **Ashley Loy** |

**Room 245** Moderator: Truett Cates

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|---|---|
| 10:00 | **Jaran Rudd** |
| 10:20 | **Conner Kramer** |
| 10:40 | **Maxwell Levy** |

**Room 254A** Moderator: Lisa Brown

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|---|---|
| 10:00 | **Brianna Richmond** |
| 10:20 | **Caitlyn Collins** |
| 10:40 | **Manasa Kuncham** |

**Room 254B** Moderator: David Whelan

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|---|---|
| 10:00 | **Hannah Butterfield** |
| 10:20 | **Joseph Khalaf** |
| 10:40 | **Robbie Moore** |

**Room 255** Moderator: Randi Tanglen

**American Protest Literature: Roundtable Reading and Reflection**

10:00-11:20

Morgan Hall

Grace Fullerton

Claudia Theriot

Rachel Young

Caelie Morris



# Modification of Bis-Urea Organogelator Aromatic Spacers and Urea Linkers

Tanner Duncan & Andy Carr
Chemistry Department, Austin College

Abstract #45

Organogelators are molecules, that through intermolecular forces, can aggregate and form complex networks that trap organic solvents. Modification of pieces of these molecules can result in drastic changes in their ability to gel. Furthering the research initiated by Dr. Andrew Carr with his patent on a bis -urea gelator in 2008, our goals were to modify the spacing between an aromatic core present in Dr. Carr's original molecule, and the urea functional groups. It was also determined that the direct comparison of tail spacing, and linker length would be best suited to accompany this research, and a serial gelation test was completed comparing not just modifications to structure, but to concentration of urea present to gel. Likewise, a mixture of different ureas was made and tested in efficiency, motivated by cost saving measures.

## Engineering Design with 3D Printer: No More Heat for Your Seat(belt)

Nadia Hannon, Adonis Martin, & David Baker
Physics Department, Austin College
Abstract #46

In Austin College's Statics and Engineering Design course, students applied principles of static systems and engineering design to identify innovative solutions to real-world problems. Students collaborated to conduct background market research and evaluated current product designs. Improved product ideas were formulated into new designs using computer-aided design software Autodesk Fusion 360. Through an iterative design process, 3D models were conceptualized, constructed, and printed using Product Lab's Ultimaker 2+ 3-D printer.

The Anti-Heat Belt helps solve the very painful problem of burning yourself on your seat belt! Countless fingers have been burned by this seemingly small bit of metal. But no more fear, the Anti-Heat Belt is here! It is a small device that simply slips over the metal end of your seat belt, protecting it from the Sun so it's still nice and cool when you return to your car. Say bye-bye to burns with the Anti-Heat Belt!



# Student Oral Presentations Block II

## Saturday, March 23, 2019
## 10:00 a.m. - 11:20 a.m.

# The Influence of Racial Prejudice on Parental Support of Interracial Romantic Relationships

Amanda Bernal
Psychology Department, Austin College
Faculty Sponsor: Matt Findley

The current study seeks to examine how different predictors may impact a parent's level of support for their child's hypothetical romantic relationship. The study also seeks to understand whether participants' levels of external motivation to control prejudice has an impact on their level of support. White parents, without children of 18 years of age, will be instructed to read a scenario that presents a future hypothetical situation in which their child is considering marriage. The race, social class, and religion of the child's potential spouse will be manipulated. The level of support the parent has for the relationship will be measured. Levels of external motivation to control prejudice will be measured via the External Motivation to Control Prejudice scale (EMS; Plant & Devine, 2009). Participants assigned in the other race condition will answer open ended questions that ask them to provide an explanation for why they chose that level of support for the relationship. Data collection has been completed, and the data analysis is currently underway. Results are anticipated to show that parental support will be the lowest among scenarios where the partner is of another race. Results are also expected to show that those high in external motivation to control prejudice and who are also assigned to the other race condition will give explanations that do not mention race.



# Mosquito Ecology and Nectar Preferences

Benjamin Sloan, Anusha Jacob, & Loriann Garcia
Biology Department, Austin College
Abstract #47

In nature, both male and female mosquitoes require nectar as a food source to carry out daily activities. Flower nectar composition greatly influences overall mosquito health and vector capacity. We investigated the effects of different plant nectar sources on Aedes aegypti mosquitoes' longevity using several native and ornamental plants present in the local Sherman (Grayson County, TX) area. We have found that mosquito longevity varied between plants as we saw increased longevity in mosquitoes that fed on milkweed (Asclepias curassavica) compared to blackfoot daisy (Melampodium leucanthum) and lantana (Lantana camara). We also explored whether visual cues affect mosquito nectar-host preference. White, yellow, and red artificial flowers were constructed to determine which color attracts mosquitoes to nectar resources. There was a red flower preference trend over other colors and controls of 10% sucrose and water. We ran taste preference assays of yellow, blue, and red dyed sucrose to determine if the food dyes used in our color experiment influenced mosquito preference. Male and female mosquitoes preferred sucrose over colored food dye. Females preferred blue over the other colors while males had no preference. This study offers important information into ecological mosquito nectar-host relationships and will aid in the design of future experiments. Floral olfactory and visual cues may influence mosquito nectar preferences thus consequently influencing the mosquito's ability to vector diseases.

# The Identification of Proteins Experiencing Cold Denaturation in Hen Egg Yolk

Samuel Weir & John Richardson
Chemistry, Austin College
Abstract #48

When egg whites are frozen and thawed, the whites are able to go back into a liquid solution as before. However, when egg yolk is frozen and thawed, it is unable to go back into a solution. In other words, the egg yolk proteins undergo an irreversible cold denaturation while the egg white proteins are reversible. This hypothesis revolves around the idea that a specific protein, or protein complexes are the cause of the permanent aggregation, or buildup of insoluble substance that causes the permanent aggregation of the egg yolk. To identify what protein or protein complexes were causing this denaturation, a variety of purification methods were used such as size exclusion chromatography, fast protein liquid chromatography, and centrifugation.



# Barriers to Plant Establishment from Seeds in a Tallgrass Prairie Restoration

Katherine Collins
Biology Department, Austin College
Faculty Sponsor: Peter Schulze

Conversion to agriculture during the late 19th and early 20th Centuries severely reduced the extent of the tallgrass prairies once prominent throughout the central United States. In an on-going tallgrass prairie restoration project at Austin College's Sneed Prairie, students track restoration progress on nine fields managed three different ways. Success of grass establishment from planted seeds has varied dramatically among fields, and even among experimental replicates subjected to the same restoration techniques. Three fields have had dramatic success of grass establishment from planted seeds. Six fields have had less, and in some cases much less, success. The objective of this project is test hypotheses with potential to explain the lack of widespread establishment from planted seeds in the latter six fields. I will report on the results of those hypothesis tests.

# Wright Campus Center 255

## Investigation of Phenothiazene Dithiocarbamate Ligand Metal Complexes

Richard Reyes
Chemistry Department, Austin College
Faculty Sponsor: Brad Smucker

Metal-complex with high photo-absorption and redox stability show promise as dye molecules for dye sensitized solar cells (DSSC), which are an alternative silicon-based solar cells. Previously, a new phenothiazine ligand had been synthesized, and displayed photoexcitation and redox stability. Coordination of the ligand M2+ metal, such as to nickel(II) and palladium(II) salts were synthesized, and the resulting metal complexes were characterized via NMR and IR spectroscopy. Photo-absorption and electrochemical redox stability were investigated via UV-vis absorption and cyclic voltammetry.



## The Impact of Candidate Gender, Messaging Style, and Attire on Voter Evaluations

Matthew Li, Evan Powell, & Michele Helfrich
Psychology Department, Austin College
Abstract #49

The Elaboration Likelihood Model (Petty & Caccioppo, 1986) suggests two routes of persuasion. Peripheral persuasion is based on cues such as attractiveness and likability, but central persuasion is based on audience processing of arguments. Previous research (McDonough & Helfrich, 2018) suggests that political candidate attire influences voters, and that female candidates are judged more by their dress than males. In addition, during the election cycle we noted that some candidates based messaging on voter similarity (peripheral). Other candidates detailed qualifications and provided messaging based on facts (central). The present study compared messaging strategies in the context of gender and attire. Randomly assigned participants viewed a male or female candidate dressed in casual or professional attire and read a statement that detailed expertise on issues (central) or the community ties (peripheral). Participants provided demographics, rated character dimensions, indicated voting likelihood, and provided free responses. Analyses indicated that the female candidate was judged more attractive, likable, and relatable when paired with the peripheral community-based statement, while male candidates were not impacted by statement type. Multiple regression analyses showed likelihood to vote for a candidate was influenced by candidate knowledge and message agreement. Unlike the previous research, attire did not significantly influence judgments. This study was conducted on the cusp of midterm elections. The candidate perceptions shifted away from attire (last year) to candidate messaging, preferring a populist candidate to an experienced professional, especially for the female candidate. Female gender norms and expectations may have influenced judgments.

# Student Art Exhibit

Join us Friday, March 22 from 5:15 - 7:15 p.m. in the Idea Green Art Gallery for the art reception.

## The Abstract Inspiration

Mary A Cheadle
Art Department, Austin College
Faculty Sponsor: Brianna Burnett

Art pieces displaying people and numerous mundane objects as they are in abstract form, using a combination of techniques. These techniques include the manipulation of light, shadow, depth, color, as well as vortography (taking pictures through a mirror or series of mirrors). These abstract forms can bring forth inspiration and creativity through the making of images out of what is no longer clear. They allow you to free your mind and be open and accept new possibilities and ideas. Images that have been abstracted or distorted give you a different point of view of something you have seen a million times before, and sometimes, they even help you see it more clearly



## Self-Disclosure on Social Media and its Effect on Treatment-Seeking in Emerging Adults

Ben Schmidt
Psychology Department, Austin College
Faculty Sponsor: Alyssa Dietz

This study examines whether self-disclosure on social media predicts treatment-seeking in emerging adults. Though literature examines factors that predict treatment-seeking (e.g., LeVine & Franco, 1983), the relationship of self-disclosure on social media and treatment-seeking has yet to be investigated. It is hypothesized that participants who exhibit a greater frequency of self-disclosure on social media will report reduced willingness to seek professional help. Disclosure on social media may have cathartic benefits that reduce mental health treatment-seeking. Approximately 264 participants aged 18-25 are being recruited through MTurk and receiving $0.50 for participating. Demographics, past treatment experience, and social media use will be assessed. Other variables will be measured by Attitudes toward Seeking Professional Psychological Help Scale - Short Form (Fischer & Farina, 1995; Fischer & Turner, 1970), Self Stigma of Seeking Psychological Help Scale (Vogel et al., 2006), Intentions to Seek Counseling Inventory (Cash, Begley, McCown, & Weise, 1975), and an adaptation of Self-Disclosure Index (Miller, Berg, & Archer, 1983) to measure social media disclosure. Linear regression and mediation analysis was conducted to determine whether self-disclosure predicts treatment-seeking. The results of this exploratory study will help elucidate whether disclosure of mental health content on social media impacts treatment-seeking. Results will inform public health and psychological education efforts to promote treatment-seeking in emerging adults and reduce consequences of untreated (or under-treated) mental health concerns.

# Sex Education in the United States: The Duty of the Parent and the State

Aurora Hadzic
Gender Studies Department, Austin College
Faculty Sponsor: Audrey Flemming

Children and adolescents experience inadequate sex education across the United States at a time in their lives where education about their bodily functions and relationship with others is most pertinent for their development. Not only is sex education important for their health and well-being, but proper sex education is crucial for protecting our children against the harmful side effects of ignorant sexual exploration and abuse. By defining sex education and exploring a variety of opposing viewpoints regarding sexual ideologies and sex education, I aim to address how a comprehensive sex education program is not only essential, but imperative for future generations to maintain healthy sexual relationships as well as a positive relationship with one's own body.

Furthermore, I aim to explore the rights of children, making clear a distinction between sexual and rational maturity, and the effects a lacking sex education can have on adolescents as they experience one of many crucial moments in their life. Through an examination of positive and negative rights, and a deeper understanding on political theory of government, this thesis concludes by discussing whether or not the US government has an inherent duty to provide proper sex education to children and what steps individuals can take to ensure this duty is upheld.



# BRISM | The Brain is a Prism: An Art Project on the Experience of Color

William McCarthy
Art Department, Austin College
Faculty Sponsor: Brianna Burnett

Why are we calmed by the ocean? Why are we invigorated by the sight of a green forest? Why do we save our red dresses and ties for date night? And why does the color yellow make us feel happy?

Functional MRI data has indicated that the brain reacts differently to the sight of different colors. Different neural pathways are active during the visual experience of differently colored objects. (Engel, 2008). Studies conducted by psychologists and linguistic anthropologists indicate that color might be experienced and categorized differently for people who speak different languages, and are learned and perceived in different ways in different cultural contexts (Özgen, 2004). While color perception can differ from person to person, and from one culture to another, it is interesting that different colors seem to have distinct effects on the human mind.

I intend to create an exhibition of artwork that explores my personal emotional and creative reaction to color, using the concept of the brain as a figurative prism. Using film photography, I will investigate different colors and the related emotion and set of experiential symbols that are invoked by that color, seeking to understand the significance of each distinct creative path. Using my art to explore the emotional influence of colors, and demonstrate the reciprocal response of the mind to these influences, I will give a unique perspective on the human experience of color.

# Exposed

Savannah Flores
Art Department, Austin College
Faculty Sponsor: Jeff Fontana

The majority of my experience with drawing realistic images in the past has been by working from still lifes and reference images. The pieces that I completed here are a unique collection in that they are some of the few drawings I have completed from a live model. I have relatively little experience with the human figure outside of observing people from drawings, pictures, and passersby. During this figure drawing class, we worked through many pieces each class period, timed from anywhere from 1 minute to 4 hours. My more detailed art generally takes me much longer to create so working under time constraints forced me to quickly become more confident in the strokes I was placing on the page, as well as knowing how to work so carefully and lightly at times, that I could fix mistakes later. This shows itself in the pieces I completed outside of class, some of which are displayed here, where I took the skills of quick observation of light, color, shapes, and shadow and applied these to a larger time-scale. I was also able to do quite a bit of experimentation with my pieces, not only completing realistic black-line drawings on white paper. Here I have explored different methods of capturing the figure, through non-traditional methods, so that you can view the form and movement of the figure rather than being grounded by its familiar, human appearance. I also utilize different types of paper to create drawings that are less focused on line and more focused on large blocks of color and shadow. This technique can create an illusion of looking at a painted statue, viewing the world through a strange light, or feeling the emotions of a figure coming out through the colors it is created with. These various techniques have given me new tools for evoking the full range of emotions in my pieces that I desire to highlight and create a more raw and exposed portrait of my subjects for people to witness.



# Culinary Medicine in Texoma

Alisa White, Victoria Dodd, Ben Berggren,
& Monica Argumedo Rendon
Leadership Department, Austin College
Faculty Sponsor: Martinella Dryburgh

What is culinary medicine and how would it benefit the Texoma community? This presentation answers this question by presenting research conducted by Leadership Studies students in the 2019 CityLab: Food as Medicine Jan term class. They will describe culinary medicine, what it takes to get a program like this started in Texoma, how it can benefit residents, and how this experience helped them become better leaders.

# Wright Campus Center 254B

## Electrical Properties of Gold Thin films at Nano-Scale

Carlos Reyes-Leon
Physics Department, Austin College
Faculty Sponsor: Andra Petrean

Gold exhibits metallic electrical properties: the resistance of metals is known to increase with an increase in temperature. Previous studies have shown a change in the electrical properties of thin films once their thickness is in the nanoscale range (100 nm or less). Our researches aims to determine the thickness at which gold thin films stop exhibiting metallic properties. We study gold films because they are used in many electronic applications and hence their properties are of upmost importance for the performance of these applications. Although our overarching goal is to study the properties of thin films, most of our work has been in optimizing our measurement system. We employ a Closed Cycle Refrigerator that allows our samples to be cooled down to 10 degrees above absolute zero. We use instrumentation capable of detecting very low electrical signals and we will present our work involving programming and improving this instrumentation.



# Theatre Performance

## Silent Sky

Cast:

| | |
|---|---|
| Henrietta Leavitt: | Harri Drake* |
| Margaret Leavitt: | Kate McComack-Morris |
| Annie Cannon: | Rosie Fasullo* |
| Willimena Fleming: | Zoe Crews |
| Peter Shaw: | Michael Megenhardt |

Crew:

| | |
|---|---|
| Director and Costume Designer: | Vanessa Baker |
| Stage Manager: | Kat Forbus* |
| Assistant Stage Managers: | Olivia Trusty |
| | Grant Garrison |
| Sound Board Op: | Harrison Vickmark |
| Light Board Op: | Erin Bobbitt |
| Props Manager: | Chloe Schnaible* |
| Props Team: | Harrison Vickmark |
| | Tommy Teschner |
| | Micah Weber |
| Video Director: | Nick Chaviers* |
| Costumers: | Sonia Charles |
| | Niya Stewart |
| Light Designer: | Liz Banks* |
| Set Designer: | Dan Pucul* |
| Dramaturgs: | Rosie Fasullo* |
| | Shannon Fagen |

Tech Workers:

| | |
|---|---|
| Cosmos Painter | Laurel Reiche |
| Star Lord | Austin Andrle |
| | Jessica Thoennes |
| | Harper Jambor |
| | Jaz Condado-Duque |
| | William Bridgewater |
| | Ethan Jordan |

All the asterisks are members of Alpha Psi Omega the theatre honors fraternity

# Student Oral Presentations Block I

## Friday, March 22, 2019
## 3:30 p.m. - 5:00 p.m.




## Investigating the Positive and Negative Regulators of PA28γ in Cancer

Emma Thornburg
Biology Department, Austin College
Faculty Sponsor: Lance Barton

PA28γ is an ATP and ubiquitin-independent proteasome activator implicated in the development of cancer. Many of the downstream targets of PA28γ can benefit cancer development, and multiple cancers demonstrate increased expression of PA28γ. While the benefits of elevated PA28γ activity have been studied, the mechanisms by which PA28γ expression is regulated have not been fully elucidated. Two key regulators of PA28γ expression, miRNA-7 and p38, may be involved in the increased expression of PA28γ in cancer cells. I hypothesize that in cell lines with increasing amounts of PA28γ, p38 activity will be increased concomitantly, while miRNA-7 expression will be decreased. I also hypothesize that the decrease in miRNA-7 could have a synergistic effect on p38 signaling, leading to an overall larger increase in PA28γ in cancer cell lines. Results confirm a role for both p38 and miRNA-7 signaling in the increased expression of PA28γ in a tumorigenic cell line and a metastasized cancer cell line. Interestingly, p38 appears to also play a role in the regulation of miRNA-7 in PA28γ +/+ cells. Finally, results show that p38 inhibition decreases cellular proliferation while miRNA-7 inhibition increases cellular proliferation. Overall, these results demonstrate that the regulation of PA28γ by p38 and miRNA-7 may play a role in cancer development through increased proliferation of cells.

# #RoosReadToMe: Leadership Development through Civic Engagement

Katelyn Bass & Green Alexander
Leadership Department, Austin College
Faculty Sponsor: Martinella Dryburgh

#RoosReadToMe: Leadership Development through Civic Engagement. The purpose of this presentation is to share the work of Leadership Studies students as they worked on a civic engagement project in their Capstone class. The students in this class worked as consultants for Sherman Independent School District (SISD) and researched how Austin College can partner with the school district to improve the rates of early childhood literacy in the community. This presentation will share the results of their research as well as their insights into their personal leadership development.



## Friday Oral Session 1: 3:30-5:00

| | |
|---|---|
| **Room 231** | Moderator: Kirk Everist |
| 3:30 | **Harris Drake** |
| **Room 245** | Moderator: Hank Gorman |
| 3:30 | **Michael Suresh** |
| 3:50 | **Sarah Smith** |
| 4:10 | **Monica Martinez** |
| **Room 254A** | Moderator: Andrea Overbay |
| 3:30 | **Josh Pollard** |
| 3:50 | **Aimi Hardy** |
| 4:10 | **Katelyn Bass** |
| 4:30 | **Emma Thornburg** |
| **Room 254B** | Moderator: Terry Hoops |
| 3:30 | **Carlos Reyes-Leon** |
| 3:50 | **Alisa White** |
| 4:10 | **Aurora Hadzic** |
| 4:30 | **Ben Schmidt** |
| **Room 255** | Moderator: Brad Smucker |
| 3:30 | **Richard Reyes** |
| 3:50 | **Katherine Collins** |
| 4:10 | **Amanda Bernal** |

# Wright Campus Center 231

## *"The Girl With One Eye": A Staged Reading*

Harris Drake
Theatre Department, Austin College
Faculty Sponsor: Kirk Everist

*The Girl With One Eye* emerged from a semester-long directed study in playwrighting. The project began as short scenes about a small group of characters with high emotional stakes. I quickly discovered the advantages of concentrating on a group of women of similar ages. The characters quickly demanded space and opportunities of their own for consideration in the final work. This particular version is presented as a staged reading, in part to gain insights from the audience as actors take on my characters publicly for the first time.



## Autonomous and Controlled Motivation for Eating Disorder Recovery

Amelia Hardy
Psychology Department, Austin College
Faculty Sponsor: Renee Countryman

Eating disorders are notoriously difficult to treat, with individuals in various levels of treatment often relapsing or dropping out before treatment is complete. This low recovery rate is often associated with low motivation; in particular, low autonomous motivation is associated with poor treatment outcome (Mansour et al., 2012). This study examines predictors of autonomous and controlled motivation for treatment (ACMT), including body mass index (BMI), eating disorder diagnosis, eating disorder severity, social support, and comorbid diagnoses. To examine the research question, a sample of 65 adults currently receiving treatment for an eating disorder was recruited via social media to complete an online survey. Initial analyses revealed eating disorder severity significantly predicted ACMT and BMI was a marginally significant predictor, where individuals with low BMI and greater eating disorder severity had higher controlled motivation and lower autonomous motivation than those with higher BMI and less severe eating disorder symptomology. These findings have implications for treatment outcome, since the literature suggests autonomous motivation is an important factor in treatment success. As such, the findings of this study suggest motivation-based therapeutic techniques may be especially beneficial for eating disorder patients at low weights and with more severe eating disorder psychopathology.

# Wright Campus Center 254A

## Inherent Vice: Pynchon-Lite or Something, like, much more vast, man?

Joshua Pollard
English Department, Austin College
Faculty Sponsor: Greg Kinzer

In this paper I show that, by likening the role of the statesman to that of a servile worker, Cicero uses metaphor in his treatise De Re Publica to indicate that the statesman's work is rooted in service. I have chosen to focus on three categories of metaphor. In the first category are metaphors about the state, especially when it is characterized as a living being that has been sustained by the work of the maiores (ancestors) and generations of responsible statesmen; the implication of this image is that the state can die through neglect or malfeasance. The second category of metaphors liken the state to a ship that is guided by a gubernator who guides the state through the storms and waves of current political circumstances. The third and most significant category of metaphors include those that liken the statesman to a variety of skilled working, such as a gubernator (pilot), vilicus (farm overseer), artifex (artisan), and medicus (doctor); the great contrast between the social positions of the Roman politician and the freedman or enslaved artisan is interesting. By likening the high-status Roman politician to a lowly artisan Cicero suggests that the role of the statesman like that of a servant or guardian. This view of statesmanship is unlike that commonly held in the late Republic and is much more in line with modern conceptions of politics as public service.



# Wright Campus Center 245

## Does Mind Wandering and Mindfulness Meditation Affect the Creative Performance of Undergraduates' Analytical Writing?: An Evaluation of Domain-Specific Creativity

Michael Suresh
Psychology Department, Austin College
Faculty Sponsor: Hank Gorman

The incubation effect on creative performance is a new and growing research topic in cognitive psychology. Mind wandering and mindfulness meditation are specific types of incubation and previous research suggests that both cognitive processes are accurate predictors for creative fluency and originality. Individuals that practice mindfulness seem to produce higher scores in novelty production during a divergent thinking task compared to those who engage in task-unrelated thoughts. Mind wandering may produce higher cognitive rigidity scores because of the Einstellung (set) effect. A few studies have tested the relation between incubation and creative performance by using creative writing. However, no previous research has directly tested the incubation effect on domain-specific creativity – such as analytical writing skills. Before condition assignment, all participants ($n = 21$) received a study guide that contained high scoring example essays. I hypothesized that those in the mind wandering condition would implement more examples previously learned in their own work compared to those in the mindfulness and control conditions. All participants had typed an essay, in which primary data analysis was extracted from. The results suggest that undergraduates are more likely to produce elements of others' work as their own if engaged in task-unrelated thoughts ($M = 14.29$, $SD = 5.58$, $p < .01$, $\eta 2 = .578$), and that incubation type alters task difficultly perception. The implications of such findings can be taken into consideration in vocational or academic environments.

# Examining the Role of TPS1 in pgm2Δ Glycogen Accumulation and Calcium Homeostasis Defects in *Saccharomyces cerevisiae*

Sarah Smith
Biology Department, Austin College
Faculty Sponsor: David Aiello

Phosphoglucomutase (PGM) plays an important role in yeast carbohydrate metabolism. It is responsible for interconverting glucose-1-phosphate (G1P) and glucose-6-phosphate (G6P). PGM2 is the major isoform of PGM in Saccharomyces cerevisiae. Yeast that lack PGM2 (pgm2Δ) exhibit an accumulation of glycogen when metabolizing galactose. In previous experiments when glycogen phosphorylase, encoded by GPH1, was overexpressed to increase glycogen breakdown, an accumulation of trehalose was noted in addition to decreased glycogen levels. The purpose of this investigation is to determine whether trehalose-6-phosphate synthase 1 (TPS1) contributes to the glycogen deficiency seen with the overexpression of GPH1. TPS1 synthesizes an alternative carbohydrate source, trehalose, and is known to be produced in the absence of glucose, similar to glycogen. It has been shown that TPS1 functions to reduce glycogen levels through trehalose production and hexokinase inhibition. To test this a plasmid allowing for overexpression of the TPS1 gene was introduced into wild-type and pgm2Δ strains as well as a TPS1 knockout (tps1Δ) was made. The growth on glucose and galactose containing cyclosporine A media, glycogen/trehalose accumulation, and calcium accumulation phenotypes of each strain were analyzed. Previously it was reported that GPH1 overexpression partially rescues pgm2Δ defects, potentially due to an increase in trehalose accumulation. Our results provide support for this hypothesis and allow us to further examine the link between trehalose synthesis and glycogen accumulation and calcium homeostasis.



# Estradiol Effects on Hibernating Physiology of Ground Squirrels

Monica Martinez
Biology Department, Austin College
Faculty Sponsor: Jessica Healy

Estradiol is a sex hormone with anorexigenic effects. Previous literature reports that exogenous estradiol reduces food intake and body fat in non-hibernating rodents, yet few studies confirm whether this pattern is applicable to the Thirteen-Lined Ground Squirrel (Ictidomys tridecemlineatus). In 2018, 5 individuals were implanted with capsules that contained either vehicle (control) or exogenous estradiol (Est+) and food intake, body composition, and metabolic rate were measured during the summer active period. Preliminary analysis suggests that Est+ animals may have increased metabolic rate compared with controls during the implant period, but it is unknown if estradiol implantation has long term effects on torpid metabolic rate. Individuals were aroused from an initial torpor at 18, 15, and 5 ☐C and their oxygen consumption, as well as water production, was recorded as a proxy for metabolic rate. Observing the effects of exogenous estradiol on torpid metabolic rate will give more insight into the physiological mechanisms underlying energy balance and allocation within Ictidomys tridecemlineatus.