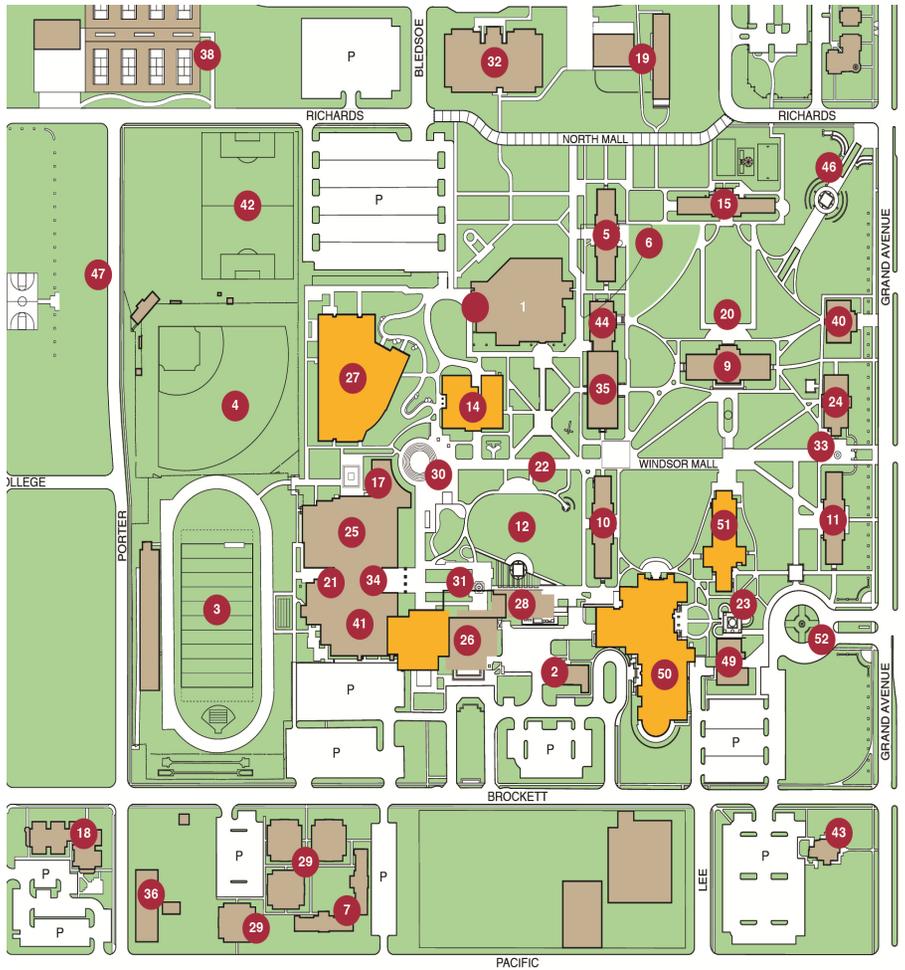


Austin College Map - Student Scholarship Conference Locations



MAP KEY

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



Welcome

Welcome to the 4th annual Austin College Student Scholarship Conference. The presentations describe original research undertaken by Austin College students. We are delighted to gather in celebration of the intellectual curiosity of our students and their participation in the broader pursuit of new knowledge.

Opportunities for “hands-on” learning is a hallmark of an Austin College education. It is significant that this conference includes many different disciplines and methods of study. We hope that each student will have the deep pleasure of moving their academic work beyond the classroom and into the laboratory, studio, or study.

Research and scholarship require the spark of an original idea, but they also require the dedication, patience, and commitment to see that idea through to completion. Presenting the results of research requires its own skills of strong oral, written, and visual communication. All of these efforts serve our students well in whatever future craft or career they decide to pursue.

In every instance, the student researchers have been guided and mentored by Austin College faculty, who construct their own intellectual pursuits to engage undergraduates and provide ample jumping off points from which students can embark on independent projects. I am grateful to the many faculty sponsors who have supported these young scholars and scientists. And I am especially grateful to the conference planning committee who has given energy and time to providing this showcase for student achievement.

The conference is designed to encourage dialogue and engagement. We hope you will take this opportunity to meet new people, encounter new ideas, and think about the ways your own education can be expanded through the pursuit of original research.

Marjorie

Marjorie Hass

President

Sponsors

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Learning Through Research

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Schedule of Events

Thursday

7-9 p.m.

Elevator Speech Competition

Wright Campus Center, Puch Club

Friday

1:30 p.m. Conference Registration Table Opens

Wright Campus Center Lobby

2:00-3:25 p.m. Poster Symposium I

Mabee Hall- Wright Campus Center

3:30-5:00 p.m. Honors Candidate Presentations

Mabee Hall- Wright Campus Center

5:00 p.m. Welcome Reception with Remarks from Dr. Hass

Mabee Hall- Wright Campus Center

7:00 p.m. Austin College Playwrights Showcase Including Story
Voices and Performances by the Austin College Improv Troupe

Ida Green Theatre

Saturday

- 8:30 a.m.** Conference Registration Table Opens
Wright Campus Center Lobby
- 9:00-10:25 a.m.** Poster Symposium II (Breakfast available)
Mabee Hall- Wright Campus Center
- 10:30-11:55 a.m.** Block I Student Presentations
Wright Campus Center Classrooms
- 12:00-1:25 p.m.** Block II Student Presentations (Lunch available)
Wright Campus Center and Idea Center Classrooms
- 1:30-2:55 p.m.** Block III Presentations
Idea Center Classrooms
- 3:00 p.m.** Bilingual A.C.T. Presents: "Blood Wedding by Garcia Lorca"
Wright Campus Center 231
- 3:00 p.m.** Poetry in Music: Student Scholarship and the Influence of Words on Music
Recital Hall- Craig Hall
- 4:30 p.m.** Student Artwork Display and Musicians Reception
Craig Hall Gallery
- 7:30 p.m.** Community Series presents the Greater Texoma Orchestra Young Soloist Concert
Wynne Chapel

Student Contributors

Zayra Acosta
 Mason Adams
 Daniel Ahle
 BreAnna Aikins
 Christopher Alcorta
 Brittney Aldridge
 Mohammed Allawala
 Brittany Alvarado
 Cedric Ambulo
 Elijah Andres
 Saswatha Anireddy
 Nickolas Ashburn
 Hiba Bader
 Matthew Bagley
 Katie Barber
 Joel Barrett
 Morgan Beeman
 Lindsay Betchel
 Cassandra Broeker
 Niyel Campbell
 Victoria Campbell
 Sandra Carrasco
 Kaitlyn Casmedes
 Victor Castellano
 Joshua Chanin
 Alison Chao
 Ashley Charales
 John Chesser
 Desiree Coleman
 Reed Cook
 Chrissy Croninger
 Raquel daCunha Martins Silva
 Brandon Dang
 Kyle Davis
 Cody Derrick
 Xuanru Ding
 Tony Duong

Chelsea Easley
 Kacey Eichen
 Carly Fagnant
 Theodora Fokas
 Aubrey Foose
 Elliott Freudenburg
 Austin Gaddis
 Heliang Gao
 Jorge Garza
 Erik Gentzel
 Amy Glazier
 Katie Gowdy
 Callie Graham
 Victoria Grano
 Brette Grieder
 Isaac Groover
 Astrid Grouls
 Dylan Guthrie
 Spencer Hankins
 Kendall Heitmeier
 James Hemen
 Ryan Hood
 Andrea Hudson
 Johanna Hunter
 Jay Jeon
 Anthony Johnsen
 Austin Jones
 Travis Kannarr
 Jack Kennady
 Tabatha Keton
 Sarah Klawun
 Will Kollet
 Siena Krueger
 Jiwon Lee
 Kayla Linthicum
 Emily Low
 Savannah Low

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

Submit your work to
Suspension Literary Magazine

POETRY
 FICTION
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 ART
 ORIGINAL WORK

Send inquiries and submissions to:
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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 the 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**.

Daniel Loya	Josi Ridenour
Linlin Lyu	Connor Rigg
Ashley Malcom	Chris Rivas
Ganesh Maniam	Edgar Rodriguez
Deepika Mannem	Jade Ross
Rose Massey	Holly Sample
Aditya Misra	Greyson Sanders
Kennedy Mazara	Brian Schrandt
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Deric McCurry	Akshaya Selvamani
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Daniel Medford	Yemisirach Seyoum
George Melchor	Dilan Shah
Madeline Mendoza	Karisma Sheth
Matt Meyer	Jason Shin
Sarah Monroe	Charlotte Smart
Daniel Mulligan	Chelsea Smith
Francisco Neal	Brittney Son
Anna Nevels	Emily Spears
Rachel Newsom	Jodie Stautner
Katrina Ngo	Austin Stevens
Kendall Nibert	Brittany Stepanski
Katrina Nicholas	Jayden Stumbaugh
Holly Nightingale	Chris Tanner
Damla Oezkan	Ben Thomas
Mychael Parish	Cassi Tullier
Mark Pernik	Kathryn Van Dinh
Kylie Peterson	RheAnna VanVoorhis
Benjamin Pickens	Alekhya Veeramalla
Steven Prinslow	Aardha Venkatachalam
Alex Quinn	Shardae White
Rohail Rahman	Lee Williamson
Norely Ramos	Robert Wells
Chris Rattan	Evann Wu
Samanthan Rhyne	

Committee

Coordinator
Aaron Block

Political Science
Nathan Bigelow

Psychology
Renee Countryman

East Asian Languages and Culture
Jennifer Johnson-Cooper

Music
Ricky Duhaime

Theatre
Kirk Everist

Art
Mark Monroe

Chemistry
John Richardson

CREATE
Lance Barton

Student Intern
Rachel Fusselman

Administrative Support
Amy Parsons

Community Series

Wynne Chapel at 7:30 p.m.

*The Greater Texoma Orchestra Young Soloists
Concert*

Featuring: Angela Huang and members of the Community

Student Artwork

Reception, Craig Hall at 4:30 p.m.

Elijah Andes
Brittany Alvarado
Siena Krueger
Rachel Newsom
Holly Nightingale
Theodora Fokas
John Chesser
Anthony Johnsen
Connor Rigg
Chris Tanner
Craig Hall Gallery

Congratulations to

Carolyn Yao

The Winner of the 2016
Abstract Book Cover Artwork
Design Contest

Elevator Competition

Joel Barrett

Winner of Lanterne rouge

Ganesh Maniam

Kylie Peterson

Kathryn Van Dinh

Second Place

Rose Massey

First Place

Steven Prinslow

Poetry in Music

Recital Hall – Craig Hall at 3:00 p.m.

*Student Scholarship and the Influence of Words
on Music*

Featuring: Deepika Mannem, Sarah Monroe, Norely Ramos,
Sylvia Rivers and Dylan Guthrie on the Piano

The Bilingual A.C.T. Group

Wright Campus Center 231 at 3:00 p.m.

Bodas de Sangre/Blood Wedding
by Federico Garcia Lorca



Edgar Rodriguez
Victor Castellano
Chris Rivas
Sandra Carrasco
Zayra Acosta
Hiba Bader

Recognizing 50 Years of Honors Research

Undergraduate Research has a long history on the Austin College campus. To help facilitate high quality undergraduate research projects, the Austin College Honors Program was started in 1965 with the first honors theses published in 1966. Since 1965 over 600 Austin College students have completed an honors thesis. These bound theses can be found on the first floor of the Austin College Abell Library. Even after 50 years, the Honors Program remains a capstone experience for some of the best and brightest students at Austin College.

Through most of its history, the Honors Program represented the primary mechanism for student research on campus. In 2016, more Austin College students than ever are engaging in research, scholarship, and creative activities. Among the 150 students participants in this year's ACSC are seven students who are also completing work on an honors thesis. Many of these students have participated in the Austin College Student Scholarship Conference previously as under- classmen, gaining valuable experience that has helped prepare them for their honors thesis research and defense.

In special recognition of 50 years of research within the Honors Program, we are welcoming the honors theses alumni back to campus for the 2016 ACSC and showcasing seven of the 2016 honors candidates in a special set of symposia on Friday, March 18.



2016 Honors Candidates

Friday, 3:30 p.m – 5:00 p.m.

WCC 254

Charlotte Smart
Joel Barrett
Kayla Linthicum

WCC 231

Tabatha Keton
Johanna Hunter
Savanah Low

Junia M. Osterhout's Scrapbooks: Literature, the Archive, and Story Waiting to be Told

Antonette Weatherly, Reed Cook, Callie Graham, Damla Oezkan,
Brette Grieder, Madeline Mendoza, and Randi Tanglen
English Department, Austin College

In the past scrapbooks have not been viewed as being worthy of scholarly attention. In part this is because they have been attributed to women and children, and therefore marginalized. Also, because the scrapbook does not tell a story in the traditional sense of the word, and cannot be evaluated the same way that a novel or a poem can, it has been widely overlooked. The purpose of my research is to allow readers the opportunity to reconsider the scrapbook as a literary text. Using the tools of literary inquiry and recent scholarship from literary and cultural critics like Ellen Gruber Garvey, we can begin to properly evaluate those literary features inherent in the scrapbook. Looking at the work of Miss Junia M. Osterhout (whose papers are held in the Abell Library Special Collections), I concentrate on three central themes for which Junia's work raises poignant questions: dealing with death, ideals of womanhood, and the role of authorship in the making of the scrapbook. Scrapbooks do tell a story, and in my *Scalar* book I begin to discover Miss Junia M. Osterhout's. With clippings ranging from 1937-1945, we can gain a sense of Junia's story by taking a closer look at what she saved and how she saved it. Through asking the right questions of this 60 years old work, we can come to know and value the woman Junia was, the beliefs that she held, and the brilliant work she created, perhaps opening the doors for further exploration in the literary world of the scrapbook. Through the use of *Scalar* as a digital platform, Junia's time worn work has been drawn out of the shadows of the archives and been made easily accessible and navigable for an audience to enjoy and explore.

Pirates, Scrapbooks, and Missing Women: Recovering Lost Literature in the Digital Archive

Callie Graham and Randi Tanglen
English Department, Austin College

Through her journalism work and societal position, Hope Ridings Miller's career reflects the history of female journalism as a means of women's expression in the media during the 1930s and 1940s. Hope Ridings Miller was an influential and known social journalist in Washington, D.C. writing in the 1930s through the 1970s. Miller kept a scrapbook, which is now held by the Austin College Archives. Also held in the Hope Ridings Miller Collection are numerous articles written by her, articles written about her, photos, news clippings from the time, research for various articles, original poetry, and interviews of Miller herself. Miller's impressive contributions to the journalism world seen through the lens of how women were represented in the media and how they broke into the industry is one way to add to and analyze the rise of professional women in the workplace. Reading the world of the 1930s and 1940s Washington through her eyes was fascinating, as well as reading the personal poetry she kept and the drafts and edits of her work. As I learned more about Miller, I was interested in seeing how her scrapbook lined up with her work could create a picture of this women's professional life and place her within the time period. My research looks into what other female journalists were doing at the time, how Miller's work and position fit into this history of journalism, and if Miller's work could be a look into the life of a journalist at the time, especially as a female. Miller was working and writing right in the middle of a transitional time for female journalists; society was quickly changing after World War II. With this study on Hope Ridings Miller, I hope to provide an overview of Miller's life and her work. My project was done in the digital form of an e-book using Scalar.

Comus and Coronation

Charlotte Smart and Alex Garganigo
English Department, Austin College

How radical was the young John Milton? Looking at his masque *Comus* (1634) in the context of Charles I's Scottish coronation in 1633 will allow me to assess his attitude toward monarchy and the Anglican Church. In particular, does the sequence in *Comus* in which the character of the Lady is "imprisoned" on a throne-like seat and smeared with "gums of glutinous heat" parody the royal coronation ritual? If so, does it indicate an early opposition to monarchy and provide a hint of Milton's later republicanism?

PA28 γ modulation of the retinoblastoma tumor suppressor following DNA-damage

Joel H. Barrett, Jr. and Lance Barton
Biology Department, Austin College

The cellular response to DNA damage is critical to maintaining organismal homeostasis and preventing the development of diseases, such as cancer. Several studies have cited heightened expression of an activator of the protein, PA28 γ . The protein is an activator of intracellular protein degradation pathways and has been shown to facilitate the MDM2-mediated degradation of a tumor suppressor, p53. The present study has demonstrated that PA28 γ indirectly modulates retinoblastoma (Rb) protein activity to prevent E2F-1 transcription of genes necessary for cell cycle progression from G1 to S phase. After treatment with a DNA-damaging compound, Cisplatin, PA28 γ -deficient murine embryonic fibroblasts (MEFs) exhibited decreased phospho-Rb expression. There were also increases in E2F-1 transcriptional activity in PA28 γ -deficient MEFs following Cisplatin treatment, as determined by qPCR analysis of an E2F-1 reporter gene, Cyclin A. Chromatin immunoprecipitation (ChIP) confirmed the association of E2F-1 with Cyclin A, a target gene whose transcription is enhanced by the E2F-1 transcriptional enhancer for G1/S cell cycle progression, following the Cisplatin treatment. The study suggests that further work should be done in explicating the role of PA28 γ and mediating nuclear interactions between proteins that result in changes of gene expression, particularly in context of carcinogenesis and cancer development.

through my digital humanities project on Scalar. Ora V. Eddleman Reed's fictional short story and non-fictional editorials protest the inescapable transition into modernity while attempting to evoke empathy from the opposing majority. Her texts reveal the importance of communal history and the problem of Native American survival.

Pirates, Scrapbooks, and Missing Women: Recovering Lost Literature in the Digital Archive

Madeline Mendoza and Randi Tanglen
English Department, Austin College

Native American literature during the 19th century made its transition from oral storytelling to written form. These works of literature are not only a way to preserve the legends once told by the oral storytellers long ago but later became objects of protest. There were many political and social events which degraded the identity of Native American culture that date back to the beginnings of European colonization. Writing served as a tool to help address these problems, but it wasn't till the 18th and 19th century that Native American writers became more prominent due to the enforcement of education among many Native American Tribes and thus, enabled them to English literacy. Ora V. Eddleman Reed was a Cherokee author and journalist whose life was influenced by the Indian Assimilation period between 1879 and 1934, especially the forced removal of indigenous children from their families to attend government-funded boarding schools. She addresses this in her forgotten short story "A Pair of Moccasins," which I analyze within the context of her editorial writings from Cherokee newspapers. Reed's contribution to Native American literature provides a further perspective of Native American literature and the adversity the culture faced during the 19th century. Her writings are a testament to these events being a witness and equally a victim of subjugation. In her writings she brings forth the sentiments, trauma, and discrimination felt by many Native Tribes, especially, the Cherokee and Choctaw Nations. Native American writings are a rarity and their presence is vital in preserving the thoughts and ideas of the survived community- most importantly they bring awareness to the public and aid in correcting their history. I hope to begin to remedy this by making Eddleman's writing available

Developing a Measure of Vicarious Resilience

Kayla Linthicum and Ian MacFarlane
Psychology Department, Austin College

The work done by those in helping professions is extremely demanding as well as deeply gratifying. Those who specialize in working with clients who have lived through a traumatic event are especially at risk for experiencing both of these extreme consequences of their work. The research on negative effects of working with traumatized clients has aided in the development of concepts such as compassion fatigue, secondary traumatic stress, and vicarious traumatization. Another area of psychology focuses on the practitioner's positive personal growth from his or her relationship with a client who has experienced trauma, rather than focusing on the possible deficits of this type of relationship. Until recently, concepts such as vicarious resilience and vicarious posttraumatic growth were not studied as thoroughly as the concepts previously mentioned. As a result, there have been several measures developed in order to assess phenomena such as vicarious traumatization, yet none have been published to assess the concept of vicarious resilience. In order to further the depth of research on these concepts, it is critical to accurately evaluate these phenomena. Therefore, the aim of the current study is to develop a scale to assess levels of vicarious resilience among helping professionals, as well as test the reliability and validity of the measure.

Cultural Revitalization with the Siraya of Taiwan and the Choctaw of Oklahoma

Tabatha Keton and Brian Watkins
Anthropology Department, Austin College

In order to conduct my research, I spent the summer of 2014 with the Choctaw of Oklahoma and the Siraya of Taiwan studying cultural revitalization and the effect it has on identity within the group. I focused on how cultural revitalization is perceived, what strengthens the identity of the group, and how this effects the interaction with the dominant society. I used interviews and participant observation from my time in Oklahoma and Taiwan to inform my research, matching it with a theoretical background of the anthropologists Pierre Bourdieu and Fredrick Barth. I focused on elements such as language, the changing nature of culture and how that is mediated within each group, and the elements that make up the culture they are trying to revitalize such as dances, singing, art, and the lifestyle of their ancestors. Elements within the group are sometimes contested, of which I explore these conflicts and what they say about the nature of cultural revitalization.

Pirates, Scrapbooks, and Missing Women: Recovering Lost Literature in the Digital Archive

Brette Grieder and Randi Tanglen
English Department, Austin College

The Barbary, or “pirate,” captivity narrative was common reading material with American audiences in the eighteenth and nineteenth centuries, as more and more survivors of African captivity started publishing their stories of capture and torment after being shipwrecked on the coast of what we known as North Africa. One of the most popular of these so-called “truthful” accounts was *An Authentic Narrative of the Shipwreck and Sufferings of Mrs. Eliza Bradley*, published in 1823. Unlike previous Barbary captivity narratives, Bradley’s tale offers the unique perspective of a female in a traditional male role. In my research, I examine the ways in which Bradley’s narrative reveals the intertextuality of the American Barbary captivity genre with other popular American literary forms such as the Indian captivity narrative. I also employ feminist and post-colonial approaches to explore its importance in understanding early American literary history regarding perceptions of race and gender. By presenting my research on a digital platform, I am able to expose this “lost” piece of forgotten American literature to present day audiences, who are grappling with some of the same anxieties and concerns raised in Bradley’s 1823 narrative. By utilizing the digital platform of Scalar, I was able to present the information in a style that in a now familiar style, thus making it easier and more appealing to the younger generation of readers.

Propaganda and Poetic Temperance: Examination of an Anti-liquor Austin Newspaper

Reed Cook and Randi Tanglen
English Department, Austin College

For many literary scholars, the literature from the Temperance movement represents a reformation steeped in moralistic and religious zealotry, spouting propagandistic letters. However, the pamphlets and newspapers produced by the movement are deserving of more nuanced and careful literary analysis. One such newspaper, rooted in Austin Texas in the year 1872, was known as the Temperance Banner and shared many stylistic similarities with other like-minded works of its day. But most curiously, within the pages of the first edition of the Banner, three poems lie in scattered locations. These three poems are indeed works of literature deserving of future study and review by any scholars willing to take up the challenge. In my research, I reconstructed the societal and cultural contexts needed to understand the poems and analyze the works both in terms of style and elemental components. Recovery and illumination are only the first steps in fully recognizing the breadth of this style of forgotten literature and the movers and shakers behind the Temperance movement that inspired the writing itself. By presenting this research in a digital form, I hoped to educate present day audiences on the cultural and literary significance of Temperance movement poetry, and its connections to our present day experiences.

Guadalupe: Aztec Goddess to Chicano Protector

Johanna Hunter and Terry Hoops
Latin American Iberian Studies Department, Austin College

The Virgin of Guadalupe is an extremely important symbol to many: Catholics, Mexicans, Americans, and other sects of Christianity alike, but she is not more important to any of these groups than she is to the Mexican-American. The Mexican-American has grown up with her as their protection. They have watched her transform from the goddess Tonantsin of the Aztecs to the Mother of the Mexicans to the Protector of the Mexican-American. This group of people has had many a trial and tribulation and the symbol that they have never abandoned has been La Virgen de Guadalupe. She has been used in every adventure and exploit of the Mexican people. Both sides during the civil war used her face as a rallying point for their men. She has been the symbol of the perfect mother and wife, an upholder of machismo, but also a strong symbol of feminism and the fight against machismo. She has been employed to represent all walks of life within and outside Mexico. She can be seen everywhere from her basilica to greeting card stands to gift shops for any attraction in the United States of America. I have seen her as decals on trucks, on notebooks, and in a toast impresser (when you toast your bread after using it, her image will stand out). I will dissect the story of her apparition, touch on the controversy surrounding her within the church and analyze Mexican-American pieces of literature to discover the impact she has had on the Mexican-American population. I will also attempt to show just how she has affected the social movements in which she has been used as well as what affect she has had on the Mexican-American population.

Sex Education Policy Prescriptions for Sherman Independent School District

Savanah Low and Donald Rodgers
Political Science Department, Austin College

This paper will discuss three sex education programs designed to reduce teen pregnancy rates for Sherman Independent School District. I will review the current situation on national, state and local levels paying specific attention to the effect of teen pregnancy on health outcomes, educational attainment, and economic well being among other measures and their effect on the area. Existing programs in the United States will be surveyed and evaluated on their costs, benefits, and possibility of implementation and success in Sherman, utilizing behavioral psychology, analysis of alternative models, and research into the political, social and cultural constraints of the area. I will then argue for one policy and present ways in which the SISD School Health Advisory Council can be motivated to adopt it over the current policy. Considering the region, it is unlikely that a completely comprehensive program will be seen as feasible in Sherman. For that reason the work will be to find and argue for the most appropriate and successful program available.

change for women, but were not acknowledged in their own day. By recovering their writing and making it available on a digital platform, we can give their voices a chance to be heard and honored once again.

Women to Be Banned – The Recovery of Gertrude Beasley’s My First Thirty Years

Damla Oezkan and Randi Tanglen
English Department, Austin College

My research contributes to the recovery of Gertrude Beasley’s once banned and therefore forgotten memoir *My First Thirty Years*, which was published in 1925. Beasley’s memoir was published in Paris, but describes her childhood and family life in Abilene, Texas. In her narrative, Gertrude Beasley reveals appalling and traumatizing details about her life while growing up in a large low-income family in the Texas of the late 19th century. Her story mainly features sexual matters, her family’s abuse and poverty, and her career as a teacher. Her narrative is indeed regarded as “provocative and highly subversive” (Graham) due to her blunt and cynical report of the events. By exploring what made the book so controversial that it was banned, I am able to retrace the social and literary conventions of the early 20th Century.

The focus of my project is set on Beasley’s more bold and controversial revelations about sexual abuse and incest within her family. Using the theory of Sidonie Smith and Julia Watson, I offer a reading of the novel as a trauma narrative and show how Beasley used the writing first as a process to cope with her trauma, and second to criticize social conventions for women of her time. By connecting Beasley to contemporaneous women writers such as Charlotte Perkins Gilman, I highlight the impact of ideas about female hysteria on Beasley’s life and the reception and condemnation of her memoir. With the advantages of the digital platform Scalar, my eBook guides the reader not only textually but also visually through my aim to contribute to the recovery of forgotten voices that are still helpful and necessary to understand the society and culture we live in today—especially women’s roles and lived experiences. Women like Beasley dedicated their lives to a positive

Poster Session

Mabee Hall
March 18- March 19

Session 1: Odd Numbers
Friday, 2:00 p.m. – 3:25 p.m.

Session 2: Even Numbers
Saturday, 9:00 a.m. – 10:25 a.m.



Refreshments Sponsored by Sigma Xi

Monitoring surface reactions on titanium dioxide using ATR infrared spectroscopy

RheAnna VanVoorhis, Raquel da Cunha Martins Silva, and Karla S. McCain

Chemistry Department, Austin College

Abstract #1

Most methods currently used to produce energy are non-renewable energy sources and contribute to global warming. This is why energy sources that are renewable, efficient, and non-harmful to the environment should be explored, such as dye-sensitized solar cells. Our research looks at controlling the position and concentration of dye molecules on the surface of titanium dioxide so that electron injection into the conducting band is favored over other processes, so that the efficiency of the photoconversion process is increased. We are trying to use the reaction between a surface bound epoxide or succinic anhydride and an amine tagged dye complex in order to covalently bond inorganic dye molecules to the surface of the titanium dioxide. Silane chemistry is used to prepare a monolayer terminated with one of the above reactive groups using as a support a zinc selenide crystal with a thin layer of titanium dioxide. These reactions were performed in a flow cell, making it possible to follow the reactions in real time using attenuated total reflectance infrared spectroscopy. The progress of the reactions could be confirmed by the decrease of the peaks corresponding to the epoxide and succinic anhydride and depending on the amine used by the increase of bands associated with it.

What Is the Construct of “Islamophobia”: How is the Perceived Fear of Islam Communicated and how do those Messages Impact Broader Culture?

Deric McCurry and Michael Fairley
Communication Department, Austin College

The construct of “Islamophobia” represents the perception that certain messages in media and other aspects of culture help to create bigotry and racism toward the people of Islam. The misrepresentation of this religion by scholars and media, particularly in Western World, highlights a real and ongoing problem in intercultural communication. As we become a more globalized society, the otherization of Islam in no way facilitates productive and cooperative communication. Through the study of recent examples of the media and cultural responses, including otherization/stereotyping, racism/discrimination, and ignorance/misunderstanding in relation to Islamic topics of discussion, the animosity towards Muslims and their culture is evident. The painting of Islam as a violent and oppressive religion with a broad brush is an issue that needs to be addressed and a shift in this ideology is greatly needed. However, until this happens, there will continue to be a lack of cultural understanding and acceptance of nearly a quarter of the world’s population.

“Not Real Americans”: Los Angeles’s Federal Campaigns for the Removal of Mexican Aliens

Andrea Hudson and Light Cummins
History Department, Austin College

The Great Depression began with the stock market crash in 1929 causing Americans to panic at the instability of the job market. Large numbers of people lost their jobs and applied for welfare. With Herbert Hoover as President, the government frantically tried to remedy the issues of high unemployment rates and exhaustion of welfare by implementing new programs. Appointed as Secretary of Labor in the Bureau of Immigration, William N. Doak believed that one solution to shrink unemployment would be to remove the overwhelming number of illegal immigrants residing in the United States. Doak launched a campaign of deportation against these illegal aliens who, according to Doak, were stealing jobs from “real Americans.” Looking at policies implemented in Los Angeles during this time, it is evident officials such as Charles Visel viewed Doak’s campaign as an endorsement to pass legislation and conduct raids which targeted illegal aliens specifically those of Mexican descent. In addition, local agencies such as the Charities and Public Welfare Committee enacted repatriation programs, which sought to return destitute Mexicans back to their home country. These programs encouraged Mexicans to voluntarily return to Mexico by paying transportation costs. Although both campaigns claimed to be helping the Los Angeles area by removing illegal laborers or welfare-dependent foreigners, deportation raids targeted residential areas where families lived and the repatriation programs paid for transportation costs for Mexican Nationals and Mexican Americans without considering their welfare status. Evidence for this article is derived from local Los Angeles and national newspapers, and from annual reports of the Bureau of Immigration.

The change in precipitation over the past 100 years in sherman

Josi Ridenour, Anthony Johnsen, and David Baker
Physics Department, Austin College
Abstract #2

This study investigates how precipitation has changed in Sherman, Texas, over the past century. We first calibrated the Austin College Weather Station tipping bucket rain gauge to ensure that precipitation measurements are accurate for light, moderate, and heavy rainfall. We then used data from the Austin College Weather Station and the National Weather Service for the past 100 years to plot annual and seasonal rainfall. In the past century, Sherman has experienced a decrease of annual rainfall of roughly 2 inches. The fall season exhibits the most prominent change in precipitation with a decrease of 26% in the past 100 years. Summertime rainfall has increased by 14% over the past century, but is still less than the average fall precipitation (8.5 inches vs. 12 inches).

Perceptions of Hickeys by College Students: Mark of Territory or Indicator of Social Behaviors?

Jade Ross and Renee Countryman
Psychology Department, Austin College
Abstract #3

Perceptions of hickeys from college students were analyzed to see if participants viewed hickeys as a mark of territory or viewed hickeys as indicators for other social behaviors. I measured variables such as sexual dominance, social dominance, relationship security, promiscuity, sexual desirability and romantic desirability. I also looked at an interaction effect between demographic information about the participant, specifically their relationship status and socio-sexual orientation, and their perceptions of hickeys. Participants received a survey and were asked to make judgments based on a target with or without hickeys present. A 2x2 factorial MANOVA examined the gender of the target and hickey presence. I concluded that people do notice hickeys and make perceptions about the relationship status of a person with hickeys as well as perceptions about their social behaviors. Preliminary results revealed that those with hickeys are perceived as being more promiscuous, sexually desirable, bigger risk takers, and more socially dominant. If I were to continue this study I would look into the state (i.e. intoxicated or sober) that people receive hickeys in, and the circumstances under which people perceive them to be given. Lastly I am interested to see if the size and location of the hickey would have an impact on the perceptions of hickeys.

Religious Diversity and the United States: and Econometric Analysis

Benjamin Pickens and Kevin Simmons
Economics Department, Austin College

This paper aims to establish empirical links between the United States' various characteristics and its religious diversity.

Using Pew Research's Religious Diversity Index (RDI) formula, I calculated each state's RDI using religious demographics (also from Pew Research) yielding a score from 0 (no diversity) to 10 (perfect diversity). With nine explanatory variables, (age, divorce, education, geography, health, income, politics, race, and unemployment) I hypothesized that a state with a higher religious diversity index (RDI) would be associated with characteristics generally considered to be "good," e.g. better health, more education, low unemployment rate, etc.

After running the initial ordinary least squares regression, I tested for omitted variable bias using the RESET test and found that the model was not missing any important variables. However, the model did suffer from multicollinearity, and several key variables needed to be removed as a result. Because there were so many variables, I decided to use the White Test to find heteroscedasticity-consistent values rather than examining each one individually; the resulting p-values for significant variables improved but were not greatly affected. Finally, using the Durbin-Watson test, I found that the model was not affected by autocorrelation.

With these fixes being taken into consideration, I found that there are four statistically significant predictors of a higher religious diversity within the United States: a high health index (low infant mortality), how liberal a state is (the more liberal, the higher the RDI), a high divorce rate, and whether a state bordered an ocean and neighboring country (as compared to a landlocked state, which had a lower RDI).

Attitudes Towards Monogamy and Polyamory

Chelsea Smith and Ian MacFarlane
Psychology Department, Austin College

Monogamy and polyamory have not been studied together so no one has compared the two directly, including peoples' attitudes towards them. Much research exists on monogamy but there is little on polyamory. This study looks at attitudes towards monogamy and polyamory with regard to gender, sexual orientation, religion, race, and political orientation. Our focus is to conduct more research about polyamory that compares individuals' attitudes toward polyamory and monogamy. We hypothesized polyamory will be less accepted by women, heterosexuals, those who identify with any specific religion, and political and/or religious conservatives, while those who endorse sexually adventurous attitudes and behaviors will be more accepting of polyamory. We did not expect racial differences in responses. A sample of 127 students from a private, liberal arts college completed an online survey containing demographics, various scales, and one of three possible scenarios that discussed a gender neutral potential roommate in a monogamous, polyamorous, or open-relationship. An ANOVA found the significant predictors of participants' responses were sexually adventurous behaviors, attitudes toward polyamory, and religiosity. Participants were more likely to choose the monogamous roommate over the open-relationship and polyamorous roommate. The results provide a basis for further inquiry into whether people think those who are polyamorous are more appealing than those who are monogamous.

Pricing Exotic Options

Carly Fagnant and J'Lee Bumpus
Mathematics Department, Austin College
Abstract #4

Digital options are stock options which have a predetermined payoff that one only receives if the stock ends in-the-money. If the stock ends at the money or below, one receives no payoff. An issue of this type of option is that large, powerful companies can manipulate the stock price near the time of expiration so that it ends exactly at the money, leaving one with no payoff, even if they purchase both a call and a put. In order to avoid this problem, a new payoff is defined for a digital option where one receives half of the predetermined payout if the stock ends at the money. A new Black-Scholes pricing formula was then determined for a digital option under this new definition.

PA28 γ -deficient Transformed Clone does not Exhibit Hallmarks of Cancer

Kylie Peterson, Joel Barrett, and Lance Barton
 Biology Department, Austin College
 Abstract #5

Cancer develops through mutations that cause abnormal functioning in key pathways, including the p53 pathway. The proteasome activator, PA28 γ , is associated with several of these key pathways. After transforming control and PA28 γ -deficient murine embryonic fibroblasts, the resulting cancer-like cells were analyzed for cancer phenotypes. Migration, a significant hallmark of cancer, was observed during scratch and transwell migration assays. Karyotyping was utilized to identify the degree of genomic instability that may have accumulated. While sequence analysis identified a point mutation in the p53 tumor suppressor shared by wild type and PA28 γ -deficient cells, the response of the cells to a chemotherapeutic drug, SCH529704, designed to reactivate mutant p53, was different. The PA28 γ -deficient cells were more viable following reactivation of p53, suggesting additional alterations in this pathway. Overall, PA28 γ -deficient cells showed similar phenotypes to PA28 γ expressing cells. Further studies are required to narrow down the exact influence PA28 γ expression may have on a cancer cell, but this research holds potential to improve therapeutic treatments in many cancers that have been demonstrated to overexpress PA28 γ .

Medical tourism as the result of rising American healthcare costs in the context of healthcare globalization

Ganesh Maniam and Dan Zhao
 Economics and Business Administration Department, Austin College

The industry of medical tourism has shown a recent surge in popularity among the middle-class citizens of developing nations. Specifically, the large volume of patients in the United States healthcare system seeking their medical care abroad is why many researchers are studying this emerging practice. There appears to be two major driving forces behind this growing trend, the first being the rise in costs of the domestic healthcare system, which itself has three major underlying causes: the current state of the health insurance system, the increased practicing of defensive medicine, and the rise of the medical consumerism attitude among patients. The second driving force would appear to be the globalization of healthcare, which besides making international travel easier and integrating worldwide communications, also drives down the costs of medical care abroad. Thus, medical tourism is the result of rising American healthcare costs in the context of healthcare globalization, and this practice has interesting implications for the healthcare landscape.

Oral Session III

1:30 p.m – 2:55 p.m.

Economics and Psychology Presentations
Idea Center 124

American Culture Panel
Idea Center 125

Pirates, Scrapbooks, and Missing Women: Recovering Lost
Literature in the Digital Archive
Idea Center 127



Synthesis and Activation of N-Heterocyclic Carbene Boranes

Rohail Rahman, Kendall Heitmeier, and Ryan Felix
Chemistry Department, Austin College
Abstract #6

Boron is an important element in organic chemistry because it is prevalent in many organic reactions, such as hydroboration-oxidation reactions and Suzuki cross-coupling reactions. The goal of this project was to show that borylation of a carbon-hydrogen bond into a carbon-boron bond is possible through the use of the borenium ion. However due to time constraints, efforts were focused on the synthesis of NHC-boranes. The formation of the diamido NHC-borane proved quite difficult to accomplish. However, the use of a commercially available NHC, without electron withdrawing groups or large steric groups, proved to be successful for the synthesis of an NHC-borane. Further investigations must be performed with various NHC backbones in order to determine steric and electronic effects of various structural features on the formation of NHC-Borane.

The Impact of Poverty and Race/Ethnicity on Substance Use Disorder Treatment Acquisition in 18 to 25 Year Old Young Adult Males Living in Metropolitan Areas

Jack Kennady¹, Nicholas Ialongo², and Kathryn van Eck³
 Public Health Department, Austin College¹
 Johns Hopkins University²
 Johns Hopkins School of Medicine³
 Abstract #8

Substance use disorder (SUD) affects 6.7% (21 million people) of the United States costing \$600 billion annually. In particular, young adult males (18 to 25 years of age) living in a metropolitan area are at high risk of SUD. Of these sufferers, 10% receive treatment, leaving a significant treatment gap. Poverty and minority status have an impact on this treatment acquisition. However, questions remain regarding the degree to which poverty affects treatment acquisition amongst various racial and ethnic groups. This study will examine race and ethnicity as a moderating factor in the association between poverty and SUD treatment among young adult, urban, drug dependent males. The National Survey of Drug Use and Health (NSDUH) was utilized for this study and a sample population of drug-dependent males, aged 18 to 25 who lived in a metropolitan area was analyzed (N=1,403). Consistent with previous research, 10% of the sample received treatment for SUD. Chi-square tests and logistic regressions were utilized to assess the association between poverty status, race/ethnicity, and SUD treatment. Chi squared tests determined that there were no differences across races/ethnicities in receiving treatment. Poverty was significantly higher amongst Hispanic and African American participants as compared to Whites. Analyses indicated that race did moderate the association between poverty and treatment ac-

American Modernist Literature: Sex and Sexuality: a “Hands” on Approach to Their Construction and Exhibition in Modernist Writing

Alex Quinn and Greg Kinzer
 English Department, Austin College

My paper discusses how the period of modernism addressed changes in perceptions of sex and sexuality in the context of several short stories written by Sherwood Anderson. Modernism was a period in the early 1900's where multiple paradigm shifts, including those on sex and sexuality, took place and affected both European and American literature. Anderson incorporates into his stories “Hands” and “The Teacher” two recently popularized ideas about sex and sexuality that stemmed from Sigmund Freud and Otto Weininger. Weininger believed that women were overly emotional and incapable of coherent and autonomous thought while Freud was developing his theory of the unconscious mind and how it affected sexuality. I argue that these ideas coincide with Anderson's stories as he writes about a man who unconsciously expresses his sexuality through his hands and a woman driven by an unidentified force who tries to seduce another man.

American Modernist Literature: Something Old, Something New: The Tensions Between Marriage and the Modern Woman in Marianne Moore's Poetry

Aubry Foose and Greg Kinzer
English Department, Austin College

In this essay I will discuss the position of the institution of marriage in American modernism as discussed by poet Marianne Moore. Modernism is a literary movement beginning in the late 19th early 20th centuries that initiated a break from traditional literary forms and applying new ideas to a text that worked in tandem with new social changes emerging at the time. Moore herself is an American modernist poet known for her precision and irony, but also for establishing a distinct female voice in her poetry, a medium which was mainly male exclusive. Her poem "Marriage" explores and challenges a very traditional ceremony and place it within the context of modern society, and I delve into how Moore's writing reflects changing notions of the role of women during this time, both in society and in poetry.

quisition. When participants had income below the poverty line, White participants are 6 times more likely to receive treatment than Hispanic participants and 2.25 times more likely to receive treatment than African American participants. While poverty and race/ethnicity independently did not demonstrate a relationship with treatment acquisition, poverty demonstrated a different effect on treatment acquisition across race/ethnicity in young adult males, 18 to 25 living in a metropolitan area.

Synthesis and characterization of 3,4-dialkoxybenzyl substituted *bis*-urea organogelators

Daniel Loya and Andy Carr
Chemistry Department, Austin College
Abstract #9

The goal of the research was to synthesize a series of branched *bis*-urea molecules using 3,4-dihydroxybenzaldehyde (3,4-DHB) as the starting material for an organogelation structure function study. By starting with 3,4-DHB it is possible to vary the length of the alkyl tails (R=C10 to C22) attached to the phenols at the 3 and 4 positions through a standard S_N2 reaction. The alkylated benzaldehyde can then be converted to an oxime in situ then reduced to the benzylic amine either by nickel/sodium borohydride under basic conditions or using zinc and acetic acid. The overall conversion to amine typically occurs in high yield. The benzylic amine is then reacted with a diisocyanate ($\text{OCN}(\text{CH}_2)_x\text{NCO}$, $x=6$ or 12) to generate the desired *bis*-urea in moderate yields. Initial critical concentration studies of the *bis*-ureas in toluene are below 1 wt% there by making these superorganogelators. Of particular note, several C12 linked *bis*-urea compounds form stable gels in ethanol and acetone, which previous organogelators of this type have precipitated from.

American Modernist Literature: “You Say What You Say”: The Deconstruction of Linguistic Boundaries in the Work of Gertrude Stein and William Carlos Williams

Emily Spears and Greg Kinzer
English Department, Austin College

My paper examines the works of William Carlos Williams and Gertrude Stein as experimental writers in the American modernist movement. Amid the social and technological changes of the early 20th century, the modernist literary movement arose, seeking to make literature new and fresh. My paper is an investigation into Williams's and Stein's deconstruction of traditional grammar in their poetry and prose writing, and what influenced their deconstructive ideas. I particularly focus on exploring how the technological, mathematical, and scientific advances of the early 20th century shaped their writing. I am exploring the idea that Williams and Stein were breaking poetic and grammatical form to test the limits of language because of the intellectual context of the 1910s and 1920s—while technology was flourishing like never before, mathematicians and scientists were breaking down previously accepted theories and testing the limits of knowledge in their fields. Williams and Stein, both intellectuals, knew about these developments, and I am arguing that they were both heavily impacted by them, as made evident in works like Williams's poetry-prose book *Spring and All* and Stein's genre-shifting “Portraits.”

Curves, Coils, Controversy: The Black Female Body in the Public Eye

Shardae White and Randi Tanglen
English Department, Austin College

My project entitled “Curves, Coils, Controversy: The Black Female Body in the Public Eye” is the product of my Scarborough Fellowship, for which I decided to research how the black woman’s body is treated in the public sphere and pop culture. This paper explores how dominant society, which is historically and continuously white, is able to validate whiteness by socially devaluing black women. By defining them as what sociologist Patricia Hill Collins calls the “Other” in her book *Black Feminist Thought*, dominant society is effectively able to determine black women’s place and value in a given social institution. My paper focuses on how this done using biopower, the ability of dominant society to regulate bodies. First, I looked at how the Mammy and Jezebel stereotypes applied to black women, both of which have their origins in slavery, affect how the body is seen by black women and dominant society, and how those images affect the body itself. For this presentation, however I will focus on the second half of my work, which is dedicated to hair, because I believe black women’s hair is an extension of the body, but distinct and influential enough that it deserves its own discussion. In the discussion of black hair, I further explore how it is treated in the public eye, and the ways it affects black women’s place in important social institutions and their identities. Throughout my work, I use sources from pop culture and black women including scholars, novelists, feminist thinkers, and even the occasional Twitter user to support the validity of this intersectional reality.

Ghrelin and Estradiol as Indicators of Energy Levels in Ground Squirrels that Hibernate

Lee Williamson, Austin Gaddis, and Jessica Healy
Biology Department, Austin College
Abstract #10

Ground squirrels represent several species of seasonal hibernators. In order to facilitate hibernation these species experience significant flux in energy balance throughout the year. The purpose of this study was to investigate how concentrations of ghrelin, estradiol, and testosterone correlate with an important indicator of energy balance, adenosine monophosphate-activated protein kinase (AMPK), how they correlate with one another, and how they differ between species and sex. We hypothesized that estradiol negatively regulates AMPK in these hibernators as it does in other rodents, and that the distributions of two of the species studied (*Ictidomys parvidens* and *Ictidomys tridecemlineatus*) are shifting northwards in response to climate change. We found that higher levels of estradiol correlated with higher levels of ghrelin and testosterone, and with levels of pAMPK in white adipose tissue. We also found that hormone and pAMPK levels were generally higher in the obligate hibernator species studied than in the facultative hibernator species. Finally, we observed that the expanded range of *Ictidomys parvidens* receives significantly more precipitation than its historic range, indicating that high precipitation is not a barrier to the species moving further north. Understanding the mechanism by which these species are able to instigate and maintain these changes in energy balance could provide the tools to more effectively treat people suffering from diseases that stem from inefficient use of the bodies resources such as obesity.

Fluorescence Assay of Wild-Type, W60Y, and W96F β -2-Microglobulin Aggregation

Christopher Alcorta and John Richardson
Chemistry Department, Austin College
Abstract #11

β -2-microglobulin (β 2M) is a small 99-residue nonpolymorphic structural protein composed of β -sheets and β -turns, which is a subunit of the Class 1 Major Histocompatibility Complex that functions in the immune response. When native state β 2M is induced to misfold, it aggregates with other misfolded β 2M and forms amyloid plaques. Formation of these plaques are more energetically favorable than native-state β 2M, which therefore draws more native protein into the growing plaque. Furthermore these plaques are protease resistant. These plaques can accumulate on the surfaces of articular tissue and cause dialysis-mediated amyloidosis, a condition where accumulated plaques cause articular destruction, which leads to joint pain and bone cyst formation. Aggregation patterns of wild-type β 2M and two mutants, W60Y and W96F, were studied using Thioflavin T Fluorescence to determine the effect of replacing the natural tyrosine with another aromatic residue on aggregation rates. Experiments were run at 12hr intervals at 25°C where amyloid events were induced by acid hydrolysis at a pH of 2.5. Wild-Type β 2M showed faster aggregation with a max at 7hr while the W60Y and W96F showed slower aggregation patterns, at 11hr and 12hr respectively, and distinct lag phases. These data suggest that both Trp at position 60 and 96 are important for stabilizing the aggregation process.

Personality and Foreign Policy Opinion

Katrina Nicholas and Nate Bigelow
Political Science Department, Austin College

This research examines relationships between personality traits and opinion on foreign policy by analyzing the interactions between personality and social factors and its affect on foreign policy opinion formation. My hypothesis is that individuals with certain personality traits, when combined with social factors, are more likely to favor one type of foreign policy over another. In order to make analysis easier, foreign policy is broken into the three dimensions: Militarism/Nonmilitarism, Multilateralism/Unilateralism, and Internationalism/Isolationism. Personality is measured using the commonly accepted Big Five Model, which looks at Openness, Agreeableness, Neuroticism, Extraversion, and Conscientiousness. By analyzing four different datasets, two of which were collected by other scholars and the other two from surveys I created and conducted specifically for this research, I address the interactive affect of personality and social conditions in explaining foreign policy preferences. While not all were statistically significant, the relationships between many of the policy preferences and combinations of personality and social factors indicated that certain personality traits, interacted with social factors, do render persons more likely to favor certain types of foreign policy.

Chinese Tea Culture Among China's Silent Generation

Evann Wu and Jennifer Johnson
Chinese Department, Austin College

Tea is more than just a beverage in China. It represents more than three thousand years of China's culture. Nowadays, tea is the most popular among China's elderly; tea is a thread that connects each and every one of them and has endured through the many social changes (during the Mao era) of their lifetimes. While Chinese tea, as a product itself, does not only play a significant role in China, but it also flourishes in Western cultures as well. Even so, very little work about Chinese Tea Culture exists in English. For a more specific focus in this study, I want to explore the roles of tea in China's Silent Generation in three different aspects: socially, spiritually and physically. A meticulous and comprehensive examination of the Chinese Tea Culture would greatly advance the understanding of Chinese culture in the English-speaking world.

Characterization of the Fungal Communities at the Sneed Prairie Restoration Site in Grayson County, TX

Elliott Freudenburg and Kelly Reed
Biology Department, Austin College
Abstract #12

Two centuries ago, the Backland Prairie extended approximately three hundred miles, making up 6% of the land in Texas. Today due to the effects of industrialization and human settlements, agricultural fields have replaced the tall native grasses. The native grasses which dominated the prairie, supported a diverse fungal community in their root systems. The fungi in the soil contribute to decomposition, and the cycling of nutrients such as carbon, nitrogen, and phosphorus. The Sneed restoration experiment is designed to test field managements of cattle (CM), fire (FM), and the combination of the two managements (FCM), on the ability to restore the native vegetation and soil microbial communities. This project examined the temporal changes in the fungal DNA communities of the prairie (PR) and pasture (PAS) plots. The ITS regions of the genomes of fungal communities extracted from the soil samples were amplified and labeled with fluorescent primers and analyzed with terminal restriction fragment length polymorphism (TRFLP). The results showed a clear distinction between the fungal communities present in the prairie plots compared to the fungal communities of the pasture plots, regardless of when the samples were taken. The results make sense because the prairie plots all have similar native vegetation, so the fungal communities found in the soil are structurally similar. The data will be used to compare the fungal communities of the restoration plots to the fungal communities of the prairie versus pasture plots.

Nanocast Metal-Organic Framework Catalysts for High-Temperature Olefin Production

Steven Prinslow¹, Camille Malonzo², and Andreas Stein²
Chemistry Department, Austin College¹
University of Minnesota²
Abstract #13

Current methods of dehydrogenating alkanes to olefins require various toxic and expensive catalysts such as chromium and platinum. Metal organic frameworks (MOFs) contain metal ions or clusters that can pose as a potential alternative source of Lewis acid catalytic activity for dehydrogenation. Because of the presence of organic linkers in their structure however, MOFs are not stable at the high temperatures where dehydrogenation is thermodynamically favored. In order to use the catalytic metal clusters in MOFs at high temperatures, we are taking a nanocasting approach to create a secondary SiO₂ backbone that will stabilize the clusters at these temperatures. Thus, the organic linkers can be removed while having the metal nodes anchored to the SiO₂ backbone instead of aggregating which leads to loss of catalytic activity. The nanocasting process was successful with the NU-1000 MOF and efforts are currently being undertaken to apply the method to NU-1000 samples that have been modified with various metals by atomic layer deposition (ALD) or solution-based methods.

Astrophotography of the Orion Nebula and the LL Orionis Bow Shock

John Chesser and David Baker
Physics Department, Austin College

Using the Adams Observatory at Austin College, multiple images of the Orion Nebula were combined into a single high-resolution color LRGB image. The procedure of image processing and analysis will be discussed. This investigation focused on a special star, LL Orionis, located in the Orion Nebula. Due to the high velocity of LL Orionis within the nebula, a bow shock forms at the leading edge of the star. By counting the number of pixels between LL Orionis and the crest of its bow shock, the bow shock radius could be calculated. Using previously calculated numbers for the velocity of the star moving through the nebula, a 3D plot of the LL Orionis bow shock could be modeled and the mass-loss rate of the star by stellar winds calculated.

New Polynomial Knot Invariants

Kathryn Van Dinh and Andrea Overbay
Mathematics Department, Austin College

In this talk, we will describe new polynomial knot invariants that occur in the Melvin-Morton-Rozansky expansion of the colored Jones polynomial. This expansion is of particular interest as it provides a relationship between the Jones polynomial and the Alexander polynomial of a knot. In addition to explaining this relationship, we will share how our results support a conjecture by Rozansky about amphichiral knots. We will be presenting a sample of our results and discussing the implications they may have on future work.

Juror's Perceptions of the Mentally Ill

Katie Gowdy, and Ian MacFarlane
Psychology Department, Austin College
Abstract #14

Problem: Mental health within the court system has been a highly controversial topic in the United States ever since NGRI (not guilty by reason of insanity) verdicts were adopted by various states throughout the U.S. In the literature about mental health, one consistent pattern is the issue of the negative stigma surrounding the mental health community. This is especially relevant to the legal system because every defendant is entitled to a fair trial. This study investigates potential jurors' perceptions of a defendant with schizophrenia who is employing a NGRI defense in Texas. **Method:** There were 48 participants from a private, liberal arts college in Texas in our study. The study employed a 2x2x2 experimental design via an online survey. Participants read one of eight transcripts of a court case regarding a shooting (including opening and closing statements and testimony from a forensic psychologist and the defendant), then rendered a verdict and responded to six questions regarding their perceptions of the defendant. The independent variables were triggering event for the crime (psychosis vs. accident), whether or not the defendant was taking psychiatric medication at the time of the shooting, and the severity of the crime (paralysis or an arm injury).

Results: A logistic regression analysis of participants' verdicts showed that when the defendant was using the NGRI defense, he was more likely to be found guilty ($p = .003$, $OR = 8.58$), while severity of the crime and whether or not his disorder was controlled by medication were not significant predictors of verdict ($p = .36$ and $.37$, respectively; Nagelkerke's $R^2 = .31$). No statistically significant differences were found on the six questions regarding perceptions of the defendant or the participants' confidence in their verdicts (Wilks's $\lambda = .72$, $p = .09$).

Discussion: The findings of this study are consistent with the prior literature, which states that there is much negativity within the stigma of mental illnesses. In addition to this, it is quite interesting that participants, who found themselves being able to relate to the defendant and sympathetic towards him, still found him guilty if he was having a psychotic episode. The extremely large effect size indicates participants were 8.5 times more likely to find the defendant guilty when claiming he was psychotic than when he claimed it was an accident, even though there was equally strong support for the defense in both conditions. These results suggest that mentally ill defendants may not be getting a fair trial. It is important that research continues in this area because we need to protect Americans' rights to a fair trial, and we need to determine what is making potential jurors respond this way (e.g., people are unwilling to consider NGRI verdicts, does the specific mental disorder play a role?). Limitations of the study and future research recommendations are also presented.

Geometrically accurate probability diagram

Linlin Lyu and Jack Mealy
Mathematics Department, Austin College

A new scheme for illustrating the relationship between events in a probability sample space is presented. In this scheme the information is displayed in a geometrically accurate way. Specifically, the prob's are precisely depicted by the n-vol of subjects of a unit n-dimensional box. We focus primarily on the situation with two events. Claim that this is an improvement over the traditional Venn diagram approach.

Oral Session II

12:00 p.m – 1:25 p.m.

Mathematics and Physics Presentations
Idea Center 124

Scarborough Panel Presentations
Idea Center 127

Why do Good People Drink Bad Coffee?
Wright Campus Center 231

Modernist American Literature
Wright Campus Center 254



Lunch sponsored by Robert and Joyce Johnson Center and Acumen

Monitoring click reactions on titanium dioxide using ATR infrared spectroscopy

Daniel D. Medford, Steven D. Prinslow, and Karla S. McCain
Chemistry Department, Austin College
Abstract #15

Because many of the resources used to currently meet our energy needs cause climate change, it is important to increase the efficiency of cleaner, renewable energy sources such as dye-sensitized solar cells. The goal of this project is to increase the efficiency of this conversion process by controlling the orientation and surface concentration of the dye molecules on the surface of the titanium dioxide to favor electron injection to the conducting band of the titanium dioxide. Dye molecules are covalently bound to the surface of the titanium dioxide by a click reaction between a surface-bound azide and a alkyne tagged dye complex. Silane chemistry is used to prepare an azide terminated monolayer, followed by derivatization by the click reaction. These reactions are monitored in situ by preparing a film of titanium dioxide particles on a zinc selenide internal reflection element contained in a flow cell and acquiring attenuated total reflectance infrared spectra as a function of time. The presence of the monolayer is detected by the azide stretch at 2100 cm^{-1} . A solution of the target alkyne and a copper(I) catalyst are allowed to stir at room temperature for 16 hours and then is introduced through the flow cell to react the alkyne tagged target to the surface-bound azide. Upon reaction, a decrease in azide stretch is observed as the reaction proceeds. These reactions both proceed by first order kinetics than can be measured by integrating the area under the azide stretch. Several factors have been investigated to help increase the reproducibility of the click reaction.

Spiraling Geodesics (II) in Staircase Metric Geometries

Ryan Hood and Jack Mealy
 Mathematics Department, Austin College
 Abstract #16

In the summer of 2014, spiraling geodesics were found in a certain subset of Geometry called Staircase Metric Geometry. These geodesics were created by crossing straight rays through circular Snell Boundaries. An infinite number of Snell Boundaries creates an infinite spiral. In the summer of 2015, a different type of spiraling geodesics were discovered (type II). Type II geodesics were created by crossing straight rays through straight and radial Snell Boundaries. The creation of type II geodesics will be discussed along with their relationship with type I geodesics.

A Theatre's Call to Action: The Living Newspapers of the 1930s

Kaitlyn Casmedes and Kirk Everist
 Theatre Department, Austin College

In my paper, I explore what key elements characterize a living newspaper play, an experimental genre of theatre popular in the 1930s that examined issues plaguing society with support of both live performance and media documentation. The issues of unemployment, poverty, and other social ills were rampant during the Great Depression, whose causes begged a stage for exploration. This stage came in the form of the Federal Theatre Project, a government funded, national theatre that used the living newspaper form to examine societal issues and called all Americans to action. I examine the dramatic themes and topical choices, the kind and use of documentary research, the employment of a large cast, and the focus on group mentality and voice. With these characterizations in mind, I look at specific living newspapers, including Power, Spirochete, and One Third of a Nation, to see how these key elements combine to create a unique form of theatre. This analysis reveals what made the genre so successful in its time and how it continues to be impactful in contemporary theatre.

Witchcraft in American Theatre

Greyson Sanders and Kirk Everist
Theatre Department, Austin College

American theatre exhibits its own practices of witchcraft and sorcerer. Less about flying brooms and bubbling brew, as anyone who's dabbler in the art of theatre will tell you, the practice often contains its own collection of rituals and spells. Look no further than the variety of hex-removal "spells" for mentioning *The Scottish Play*. This play's own magical maleficence has made it a "Volde-mort" within the community birthing numerous taboos and rituals. An understanding of this conceptualization of witchcraft is perhaps best understood through an exploration of Bronsilaw Malinowski's idea that witchcraft is more about what it does as opposed to what it is or isn't. In this sense, American theatre has a plethora of magical practices and hoodoo happenings to ensure the show must go on.

Actual and Perceived Gender Differences in Enjoyment of Sexual Practices

Jorge Garza, Ashley Malcom, and Lisa Brown
Psychology Department, Austin College
Abstract #17

College participants rated their enjoyment of five sexual practices associated with women's orgasm. Results showed no gender differences in enjoyment for most of these sexual practices. In Study 2, perceptions of gender differences were consistent with reported enjoyment in Study 1 but differed from Armstrong, England and Fogarty's (2012) findings.

Investigating the role of CDK 1/2 inhibitors as a radiosensitization strategy for glioblastoma therapy

Francisco Neal¹, Molly C. Hardebeck², Carlos R. Gil Del Alcazar², and Sandeep Burma²
 Biology Department, Austin College¹
 UT Southwestern Medical Center²
 Abstract #18

The genome is constantly under attack by endogenous and exogenous agents capable of inducing DNA lesions. Cells have developed specialized pathways to repair specific types of lesions. Two of these pathways, non-homologous end joining (NHEJ) and homologous recombination (HR), specifically repair double-strand breaks (DSBs). DSBs are the most lethal form of DNA damage, and therefore inhibiting NHEJ or HR could provide an opportunity for advances in the area of glioblastoma (GBM) therapy. GBM are a class of highly malignant brain tumors that are difficult to treat due to high chemo/radio-resistance. As a result patient prognosis is usually poor. In the present study, we examined whether radiosensitization of GBM could be achieved through the use of CDK 1/2 inhibitors. CDK 1/2 have a critical role in the phosphorylation of proteins involved in the HR pathway, one of which is the phosphorylation of EXO1 for long-range resection and commitment to HR. This activity makes CDK 1/2 prime targets for HR inhibition. To establish this paradigm, we used U2OS osteosarcoma cells to determine that a panel of CDK 1/2 inhibitors can block DSB repair and radiosensitize cells. We then focused on the CDK 1/2 inhibitor SCH727965 and found that it can attenuate repair of DSBs during S/G2 phases in U87vIII GBM cells, resulting in increased radiosensitivity. Interestingly, dual treatment of U87vIII-derived sub-cutaneous tumors in mice with SCH727965 and IR delays tumor growth by approximately 25 days compared to untreated tumors or those treated with the SCH727965 inhibitor

The Elevation of an Art Form: Flying Effects on the Stage

Jayden Stumbaugh and Kirk Everist
 Theatre Department, Austin College

Flying effects within the theatre can evoke both visually and emotionally stunning responses from audiences; however, questioning why such effects are used provides a means by which we can look at how these effects transform the space in which they are applied. Given the fact that an individual dramatic production has no guarantee of universal form or structure, interpretation of meaning is as varied as the production itself. When presented with space wherein dramatic action can be performed, one could assume that every aspect holds a deeper, or perhaps more informed symbolic reference than what is presented at its surface. When an object or individual is elevated from the stage, the process by which we give meaning is now forced to adapt. The technological advancements of such effects are themselves influenced by changes in the need for practicality, as well as the evolution of potential symbolic reference. Flying effects on the stage provide a ground for re-interpretation for both audience members, and those within the production itself.

larities of some results that were obtained between the restoration managements and negative control indicate that continuing to take measurements could be helpful in further analyzing progress. One recommendation for future analyses is to use environmental pH for each plot within the managements when conducting the enzyme assays.

or IR alone. In contrast, treatment with the CDK4/6 inhibitor PD0332991 does not attenuate the repair of DSBs or radiosensitize cells. This demonstrates that the repair defect associated with SCH727965 is caused by specifically inhibiting CDK 1/2. In summary, the results of the present study indicate that attenuating DSB repair by inhibition of CDK 1/2 may hold promise for future GBM radiosensitization strategies.

Effects of Concussions on Academic Performance

Kayla Linthicum, Austin Stevens, and Ian MacFarlane
 Psychology Department, Austin College
 Abstract #19

Concussions are a problem many athletes will confront at least once in their athletic career. This can have an impact on the education they need for when their career is over and they find a new field in which to work. While most of the literature focuses on immediate (days) or long-term (10+ years) consequences, a relatively small portion of this literature has looked at the effects between these time periods. Since many high school athletes suffer concussions, it is important to see if college academic performance is influenced.

Students at Austin College who were enrolled in a psychology course and or were varsity athletes were invited to participate. The study was two-fold: a survey portion ($n = 211$), and a lab-testing portion ($n = 26$). The survey collected information regarding GPA, concussion history, and attitudes toward concussions. The lab testing assessed four components of academics: verbal memory, processing speed, verbal reasoning, and delayed recall. Verbal memory and delayed recall were assessed using the Selective Reminding Test (SRT; Hannay and Levin, 1985). Processing speed was assessed using a timed series of math equations. Verbal reasoning was assessed using practice GRE questions.

While none of the differences in the lab-based intellectual performance were statistically significant ($p = .19-44$), the effect sizes were in the small to moderate range (.31-.47) for verbal memory, verbal reasoning, and delayed recall. A regression analysis of the survey data, however, showed each diagnosed concussion was associated with a decrease in cumulative GPA of 0.19 points ($p < .001$) when controlling for gender and age.

GPA had a negative relationship with total number of concussions, suggesting additional cautions may be needed. Non-

Blackland Prairie Restoration and Below-Ground Analyses

Daniel Ahle, Matt Meyer, and Kelly Reed
 Biology Department, Austin College

Blackland prairie is a temperate ecoregion in Texas consisting primarily of flat elevation, tall grass vegetation, and dark clay-rich soil. Restoring Blackland prairie provides potential benefits to both the local ecosystem as well as humans. In addition, investigating the process of prairie restoration provides valuable information about the effectiveness of modern prairie restoration methods. In 2002, a prairie restoration experiment was designed at the Sneed Environmental Research Area consisting of 3 managements, located 10 miles west of Sherman. All restoration managements are mowed while certain managements are burned, grazed with cattle, and have a combination of both grazing and burning. A positive control consisting of a native prairie management that has never been plowed before and a negative control consisting of a pasture that has been altered from Blackland prairie will be used to compare results with the restoration managements. The following below-ground characteristics were measured for each management: soil moisture, soil organic matter (SOM), total soil nitrogen (TotN), total soil carbon (TotC), soil pH, and soil enzyme activity. Assays for β -glucosidase, N-acetylglucosaminidase, and phosphatase were conducted at a pH of 5 in order to analyze the soil enzyme activity. Soil moisture, SOM, β -glucosidase activity, and phosphatase activity showed significant differences between the months of March and June whereas pH, TotC, TotN, and N-acetylglucosaminidase activity showed no significant difference between the two months. For most measurements, the prairie management showed significantly higher values than the restoration managements as well as the pasture management. There was a correlation between pH and enzyme activity for individual plots within the managements; enzyme activity was lower for plots with a higher pH. The simi-

Suppression of Cell Growth by Butyrate is PA28 γ Independent

Rose C. Massey, Astrid Grouls, Vidur S. Marwaha, and Lance Barton
Biology Department, Austin College

PA28 γ is a proteasome activator involved in ubiquitin-independent protein degradation. PA28 γ deficient cells display slowed cell cycle progression at the G0 to G1 phase transition and elevated PA28 γ expression is correlated with rates of growth and prognosis in cancers. Butyrate is a short chain fatty acid known to decrease the expression of PA28 γ among a number of other proteins and is currently being researched as a potential chemotherapeutic for cancer. Butyrate has been previously characterized as a Histone Deacetylase Chromatin Remodeling Complex (HDAC) inhibitor. In order to evaluate Butyrate's mechanism of cell cycle inhibition, we compared its effects with another HDAC inhibitor, Trichostatin A (TSA). The effects of both HDAC inhibitors on the viability of Murine Embryonic Fibroblasts (MEFs) were studied in the presence and absence of PA28 γ . Western blotting used to examine levels of PA28 γ and p38 in treated and untreated cells showed that butyrate reduces PA28 γ expression while TSA does not. Neither of the HDAC inhibitors had a significant effect on p38 activation. Cytotoxicity from both butyrate and TSA treatment was dosage dependent but independent of PA28 γ expression. These results suggest that while butyrate reduces PA28 γ expression, this may not be the primary mechanism by which cell proliferation is inhibited. Understanding the mechanism of action for butyrate will help both to elucidate how to best utilize it in treatment and potential targets for cancer therapy in the future.

significant findings on measures of laboratory-tested intelligence may be due to power issues, use of non-standard measures of intelligence assessments, or may have occurred because the sample came entirely from Austin College. Since all students accepted at Austin College have to meet thresholds of performance, those students with concussions may have been able to compensate, and had similar scores to those without concussions. The effect sizes obtained in this study suggest further exploration of the relationship between concussions and academic performance should be conducted.

The Effect of El Niño and La Niña on North Texas Climate

Cedric Paul Ambulo, Lindsey Bechtel, and David Baker
 Physics Department, Austin College
 Abstract #20

El Niño and La Niña are two opposite phases of the El Niño-Southern Oscillation cycle in wind and sea surface temperature in the tropical south-eastern Pacific Ocean. El Niño is characterized as the warming phase, and La Niña is the counterpart characterized as the cooling phase. Both induce a ripple effect throughout the world due to the displacement of the jet stream. After recalibration of the instruments from the Austin College Weather Station, data were collected to determine the effects of El Niño and La Niña on North Texas climate. Results show that El Niño produced lower winds, temperatures, and higher precipitations during the winter season. La Niña produced higher winds during winter and spring, lower temperatures during spring, and lower precipitation during the summer season.

True omnivores: Predation rates of fleahoppers on Lepidoptera eggs and larvae

Morgan Beeman and Loriaan Garcia
 Biology Department, Austin College

Cotton fleahoppers, *Pseudatomoscelis seriatus*, are small hemipteran insects with piercing, sucking mouthparts that are widely known for their ability to damage crops like cotton. Previous research indicates that fleahoppers can also be omnivores that eat Lepidopteran eggs and larva. The purpose of this investigation was to quantify predation rates of fleahoppers on Beet Armyworm, *Spodoptera exigua*, eggs and larvae and to determine fleahopper diet preferences between plant and animal material. Fleahoppers used in this investigation were either field collected or raised from eggs found in Dove Croton (*Croton setigerus*) stems, a known host plant. Adult and late instar fleahoppers were used in choice and no choice tests and time budget scan sampling to better understand their predation rates. Preliminary data indicates that fleahoppers consume or damage 87% of eggs and 56% of larva. Fleahoppers predation on lepidopteran pests could lessen their pest status. Their presence in fields as caterpillar predators would be beneficial because caterpillars are more harmful to crop yields than fleahoppers. Therefore, the benefits of having fleahoppers in fields could outweigh the negative effects of their herbivory.

Old Age in Roman Law

Desiree Coleman and Robert Cape
Classics Department, Austin College

Within my upcoming research paper, I wish to explore how old age is dealt with in Roman Law, particularly focusing upon what aspects of Roman Law most pertain to old age. Through this exploration, I hope to gain a richer grasp of the place of the elderly within Roman Society, which would influence laws relating to them. And, while growing in my knowledge of the role of the elderly in Roman Society, I hope to attain a deeper understanding of the familial structure of Roman Society, and thereby, its foundation.

The Art of Books and Graphic Design

Chrissy Croninger, Anna Centala, Halle Smith, Zsuzsa
Ratliff-Johnson, and Justin Banks
Library Department, Austin College
Abstract #21

The overall course is a combination of two complimentary classes: bookbinding and graphic design. In the bookbinding portion we started with Japanese stab binding the first week, a Coptic bind for the second week, and a raised-cord binding the final week. As we worked on our main books we learned to marble paper while listening to Professor Bank's interesting book facts and tips we can carry home if we ever wanted to replicate the types of binds and books. As for the graphic design portion, we learned the basics of the computer program Art Rage, self-exploring this software to create unique artwork. We worked on a main art piece while simultaneously working on additional art pieces and written assignments to incorporate into our final class book. The three writing assignments were a biography, self-reflection, and a class reflection over the entire course. With the graphic and written elements completed, all works were compiled into the final book for a nice presentation.

Correlating chaperone function and Oligomer Dynamics of α B-Crystallin

Anna Nevels, Jiwon Li, and James Hebda
Chemistry Department, Austin College
Abstract #22

α B-Crystallin is a protein that is highly expressed in the eye lens. It exists in a range of oligomeric states with 20-40 subunits. This protein helps prevent misfolding and aggregating of other proteins by acting as a chaperone. Protein aggregation causes a cloudiness of the eye lens, known as cataracts, which without surgical treatment, can eventually lead to blindness. Although cataracts is easily treated with surgical procedures, this treatment is not readily available in developing countries. A method for prevention or a delay of onset would dramatically increase the quality of life for anyone affected by cataracts. The characterization of chaperone function on a molecular level will enable a better understanding of the genesis of this disease. Thoroughly exploring the conditions in which α B-Crystallin functions optimally will provide a background of observations for comparing oligomerization and other features of this protein to determine the interconnected molecular mechanisms that drive function. Chaperone function was tested to determine the effects of temperature and pH levels, using insulin as a model aggregation system. Chaperone efficiency was found to rise with increased temperatures and decreased pH. In parallel, oligomer exchange experiments were also conducted under matched conditions. Oligomer exchange rates and chaperone efficiency both increased from 20-45°C, adding evidence that a common molecular cause gives rise to both observations.

memoirs. The paper also explores the great works of historians Robert Middlekauff and Howard H. Peckham.

**“Perseverance and Spirit Have Done
Wonders in All Ages”: The True
American Heroes in Benedict Arnold’s
March to Quebec, September-November
1775**

Joshua Chanin and Light Cummins
History Department, Austin College

This research paper reinforces the theory that the strong alliance of the everyday volunteers in Benedict Arnold’s march to Quebec would create the American identity as seen today, comprised of bravery, courage, and the notion of never giving in to any difficulty. The American desire to push forward to liberty, even in the face of utter defeat was formed in the roaring river currents, under the harsh blankets of snow and ice, and on the winding dirt tracks to the North. After the surprising victory at Fort Ticonderoga, the rebellious colonists decided to venture into the idea of overtaking Canada, and setting up the province of Quebec as their fourteenth colony. Under the support of the Continental Congress, one brave man, Colonel Benedict Arnold would lead one thousand volunteers from Boston to the city of Quebec, starting in September 1775. This daring expedition of six long weeks through the unknown lands of the north-east led to plagues of illnesses, shortages of food and clothing, desertion on many accounts, and a loss of moral from the soldiers and the general public who had once supported the idea. But beneath the umbrella of cruelty, a fire managed to stay lit throughout the camp; and under the direction of a determined leader, the dwindling rebel army overcame the hardships they faced, continued to feed the spirit, and persevered in a way no other army in the world has ever done before in what would be later named “one of the greatest marches in world’s history”. This paper utilizes multiple diary entries from volunteers in the expedition, including those of Arnold’s, George Washington’s, Privates Jeremiah Greenman’s, and Lieutenant John Montresor’s

**Transformation of MEF Cells:
Investigating the Phenotypes of Cancer
and the Role of PA28 γ**

George Melchor and Lance Barton
Biology Department, Austin College
Abstract #23

Cancer exhibits a level of complexity and variability that makes efforts to combat this family of diseases difficult, which has led to it becoming one of the leading causes of death in the world. Therefore, emphasis has centered on examining the common mutations and expressed phenotypes across cancers in order to lead to better understanding and treatment. In our research, we aimed to study the role of PA28 γ , a commonly overexpressed proteasome activator in cancers, on the acquisition of cancerous phenotypes in MNNG-mutated transformed Murine Embryonic Fibroblasts (MEFs). A single thymine substitution was discovered in the akt1 gene of PA28 γ (-/-) cells that resulted in a serine substitution in the Akt1 protein. Transformed PA28 γ (-/-) cells also demonstrated heightened levels of aneuploidy and migration suggesting genomic instability and contact-independent growth. Transformed PA28 γ (+/+) cells exhibited heightened levels of migratory cells, more characteristic invasiveness, increased levels of apoptosis with SCH 529704 treatment, and decreased levels of viability upon Bortezomib treatment. These suggest a partial transformation amongst the MNNG-exposed cells, and further support the importance of studying the role of PA28 γ in cancers.

Tinder Use and Stigma

Katie Barber and Matthew Findley
 Psychology Department, Austin College
 Abstract #24

Previous research has found that certain negative stigmas can often be associated with people who use online dating apps (Cali, Coleman, and Campbell, 2013). However, no research has examined if such negative stigmas (e.g., rating people who use online dating apps as not being that dateable) also apply to individuals that use the commonly used online dating app, Tinder. The current research aimed to look at whether such stigmas also exist for Tinder users. The participants in the study were randomly assigned to one of two groups: a Tinder group or in person group. All of the participants viewed a picture and read a brief bio of a hypothetical student at Austin College. The bios read the same between the two experimental groups, however they differed in respect to the last line, which stated whether the person preferred to meet people to date in person or on Tinder. The participants then rated how “dateable” the individual in the bio was by answering questions on a scale from 1 to 5 (Not at all to extremely). Based on the stereotype that Tinder is an app for “hooking up,” we hypothesized that people would see the “Tinder dater” as less dateable than the “in person dater”. Results showed no statistically significant difference between the groups to support this hypothesis. However, the failure to find significant results may have been due to a lack of power caused by a small sample.

Oral Session I

10:30 a.m – 11:55 a.m.

History and Classics Presentations
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Biology Presentations
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Theatre Presentations
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Elucidating the role of PA28 γ on Akt and ERK signaling pathways following Staurosporine treatment

Dilan S. Shah, Karisma Y. Sheth, Victoria J. Campbell, and
Lance Barton
Biology Department, Austin College
Abstract #50

Cancer is the second leading cause of death worldwide, costing over \$88 billion in 2011 in the United States alone. Proteasome activator 28 γ (PA28 γ) expression has been found to be increased in several types of cancer and is associated with poor prognosis and aggressiveness of certain cancers. The expression of extracellular signal-regulated kinase (ERK) pathway, found to be regulated by the Akt pathway, is also increased in over 50% of cancers, making it an important target for the therapeutic treatment of cancer. Staurosporine, a cell permeable protein kinase inhibitor with a dose-dependent nature, leads to inhibition of multiple kinase targets, including ERK and Akt. To elucidate the role of PA28 γ on the Akt and ERK pathways, murine embryonic fibroblasts (MEFs) were treated with staurosporine to analyze variations in Akt/ERK expression as well as cell fate decisions. PA28 γ deficient cells demonstrated hypersensitivity to staurosporine treatment, as analyzed by flow cytometry, caspase, and viability assays. Furthermore, western blotting indicated differential expression of phosphorylated ERK1/2 and phosphorylated Akt 308 and 473 between PA28 γ proficient and deficient cells, suggesting an active role of PA28 in regulating ERK and Akt signaling, thereby modulating cell fate decisions. Future studies aim to clarify the mechanism of differential Akt phosphorylation as well as further classify the role of PA28 γ in connecting ERK and Akt signaling to cell fate decision making.

Effects of a High Fat Diet on Physiological Parameters in Prehibernatory Golden-Mantled Ground Squirrels

Isaac Groover, Siena Krueger, Austin Gaddis, and Jessica Healy
Biology Department, Austin College
Abstract #25

The entrance of Golden Mantled Ground Squirrels - *Callospermophilus lateralis* - into seasonal hibernation bouts is preceded and regulated by a complex change in hormones, neuropeptides and morphological characteristics. The orexigenic hormone ghrelin, the female sex hormone estradiol and bloodstream metabolites such as non-esterified fatty acids (NEFAs) are all relevant to the changes occurring during this time, and can be used as part of any effort to measure current metabolic state and demands. Over four weeks in fall 2014 and 2015 we took blood samples from six different squirrels separated into control or high-fat diet groups and measured the levels at which each molecule was present in the blood. During this time we also measured food intake, body fat content and body mass. We hypothesized that a high fat diet would decrease food intake and increase body mass, and body fat deposits. We also hypothesized that a high fat diet would increase NEFAs, decrease ghrelin, and increase estradiol concentrations in the blood. We found that fat content was consistently higher in females than in males, but that males in both years had significantly higher food intake and that average body mass increased significantly in all animals between the beginning and end of the experiment. NEFAs and estradiol levels were not significantly different between high fat and control diet groups. Diet's effects on ghrelin levels varied weekly. Data appear show that a high-fat diet has no effect on the molecules in question, and we suggest repeating the experiment with a larger sample size for verification.

Local Warming? Temperature and Dew Point Change In Grayson County

Nickolas Ashburn, John Happel, and David Baker
 Physics Department, Austin College
 Abstract #26

This project analyzed temperature and dew point near Sherman, Texas, from 2003 to 2014 using the Austin College Weather Station. Monthly average temperature and dew point were analyzed over this time period. Summer high and winter low values for each year were also assessed. These data show an increase in average temperature and decrease in dew point over the past 12 years, but the changes do not exceed measurement uncertainty. However, the increase in summer high temperatures did exceed this uncertainty with a 2.6-degree C increase over the 12-year period. Future work may include gathering more data, including sources that have been operating longer than the Austin College weather station, to extend the time period to 30 years or more. This 30-year period is a minimum recommended time frame, from external sources such as the EPA, when taking temperature change data.

Product Lab

Daniel Mulligan, BreAnna Aikins, Xuanru Ding, Austin Jones, Will Kollet, Domingo Martinez, Aditya Misra, Mychael Parish, John-Phillip Seale, Brittany Stepanski, Robert Wells, Tom Buttine , and David Griffith
 Economics and Business Administration Department, Austin College
 Abstract #49

Product Lab is an course where Austin College students develop entrepreneurial products. The poster will feature a student group pitching its new product idea.

Identification of high complexity palindromic protein sequences in known genomes.

Erik Gentzel and James Hebda
Chemistry Department, Austin College
Abstract #48

Protein motifs derive their function from amino acid sequences. Many of these sequences predict related function and are therefore useful in predicting the function of unknown proteins. A palindromic protein sequence has been hypothesized to have a function in the protein α B-crystallin allowing two nearly identical but inverted intermolecular interactions. We wish to answer the question of whether functional palindromes that allows one stretch of the protein to sample two similar conformations might be evolutionarily favorable. To explore this question, a novel method of identifying and characterizing palindromic sequences through a computer program is being developed using Wolfram Mathematica. This program is being designed to detect palindromes and return the palindrome's position in the amino acid sequence, the complexity of the palindromic stretch and the total length. Additionally, this project will identify and characterize palindromes composed of chemically similar yet non-identical residues. Development of this method will enable whole genome screening of identical as well as non-identical palindromes. Comparison of the probable number of palindromes within an organism's proteome to the number of actual palindrome sequences identified will determine if the palindromic protein motif is evolutionarily favored or disfavored.

Reconstitution and Characterization of Occludin-Incorporated Nanodiscs

Jay Jeon¹, John M. Flanagan², Maria Bewley², and Xingheng Wang²
Chemistry Department, Austin College¹
Pennsylvania State University²
Abstract #27

Nanodiscs are small, well defined structures comprised of two 25kDa engineered membrane-scaffolding proteins derived from Apolipoprotein A1 and lipids. These complexes have been used in studies examining the effects of lipids in membrane on a number of lipid-modulated biological reactions and for reconstituting membrane proteins into native-like environments. For membrane proteins, they have many advantages over the more traditional, small liposome reconstitutions or detergent solubilization including greater stability of the incorporated protein over detergents, increased membrane protein activity due to more native-like curvature, increased specific binding conformation, and single orientation with respect to the disc and a smaller lipid:protein ratio. These aspects make them preferable for electron microscopic analysis. In this study, we demonstrate the reconstitution of Occludin, a membrane protein found in tight junctions into nanodiscs. Additionally, we show the initial characterization of these discs by EM, CD, and SEC-MALS.

Comparison of Tissue-Interface Pressure in Healthy Subjects Lying On Two Trauma Splinting Devices: the Vacuum Mattress Splint and Long Spine Board

Mark N. Pernik and John Richardson
Biology Department, Austin College
Abstract #28

Most emergency transport protocols in the United States currently call for the use of the rigid spine board (SB) to help immobilize the trauma patient. However, there are concerns that their use is associated with a risk of pressure ulcer development. Pressure ulcers are localized injuries to the skin and/or underlying tissue as a result of prolonged tissue-interface pressure over a bony prominence. The VMS has been shown by previous investigations to be a viable alternative to the SB, but no single study has explicated the tissue-interface pressure in depth. Our objective was to determine if the vacuum mattress splint (VMS) will exert less pressure on areas of the body susceptible to pressure ulcers than a SB. Twenty-one healthy subjects were enrolled lie on the SB and VMS in random order while pressure measurements were recorded. Sensors with 1,024 pressure-detecting ‘cells’ were placed underneath the occiput, scapulae, sacrum, and heels of each subject lying on each device. Three parameters were used to analyze differences between the two devices: 1) mean pressure of all active cells, 2) number of cells exceeding 9.3 kPa, and 3) maximal pressure (Pmax). In all regions, there was significant reduction in the mean pressure of all active pressure cells in the VMS. In the number of pressure cells exceeding 9.3 kPa, we saw a significant reduction in the sacrum and scapulae in the VMS, no difference in the occiput, and significantly more pressure cells above this value in the heels of subjects on the VMS. Pmax was significantly reduced in all regions, and was less than half when examining the sacrum (104.3 vs. 41.8 kPa, $p < .001$).

Romantic Relationship and the Use of Relationship Maintenance Strategies

Cassi Tullier, James Hemen, and Peter Marks
Psychology Department, Austin College
Abstract #47

This study investigated the relationship between college students’ preferences for open or closed relationships and their use of relationship maintenance strategies. We sampled 109 students from a small, liberal arts college. We created a questionnaire with scales measuring relationship preference, relationship fears, commitment, openness, supportive communication, assurance, joint activities, and sexual intimacy. We analyzed the data using Pearson correlations. Relationship fears were positively correlated with a higher preference for open relationships. Commitment, openness, supportive communication, joint activities, and assurance were negatively correlated with a higher preference for open relationships. Sexual intimacy was not found to be statistically associated with the preference for open relationships. Our results suggest that students who prefer open relationships invest less in romantic relationships and maintenance strategies, and experience more anxiety about relationships than students who prefer closed relationships. These results can further our understanding of college students’ romantic relationships and the strategies used to maintain them.

Characterizing oligomer dynamics of α B-crystallin using fluorescence resonance energy transfer (FRET)

Jiwon Lee and James Hebda
Chemistry Department, Austin College
Abstract #46

The 175-residue protein α B-crystallin naturally populates a range of diverse oligomeric states and is expressed throughout the body, including the eye lens. As a small heat shock protein (sHSP), α B-crystallin plays an essential role in the eye lens maintaining proper protein homeostasis and acting as a chaperone to prevent the aggregation of misfolded, non-native state proteins. Aggregation of soluble lens proteins (accelerated by mutations that reduce α B-crystallin chaperone function) leads to small light scattering particles that are the hallmark of cataracts disease. A thorough characterization of α B-crystallin structure and function will provide valuable insight into understanding and potentially preventing cataracts. Previous research has implicated the intermolecular strand exchange of the C-terminus of α B-crystallin as a possible mechanism contributing to both oligomer exchange rates and chaperone function. The functional relevance of oligomer exchange rates in relation to chaperone function is still undetermined. This research explores oligomer exchange rates by utilizing a fluorescent dye-labeling technique with the cysteine residue containing variant of α B-crystallin, S85C, to observe Forster resonance energy transfer (FRET) between monomers. Using this technique, oligomer exchange rates as a function of varying temperature and pH are being determined to provide valuable experimental evidence to correlate with chaperone function under matched conditions. This data will further the understanding of sHSP oligomer formation and chaperone function in a protein whose loss of function is linked to cataract disease.

Synthesis of Polycyclic Compounds using NHC-Borenum Ions

Kendall Heitmeier and Ryan Felix
Organic Chemistry Department, Austin College
Abstract #29

The purpose of this research is to replicate the cyclization of polycyclic compounds in nature from acyclic carbon chains, using NHC-borenum ions. NHC's have shown to be good ligands for borenum ions that create a very strong Lewis acid due to the combination of a positive charge with electrophilic boron's empty p-orbital. Literature precedents show that cyclization can be performed with large platinum catalysts, which have known issues with steric hindrance, and by using acid catalysis only when there is one electron source to attack the proton. It is hypothesized that NHC-borenum ions may enable a new method for the synthesis of polycyclic compounds. This work presents the initial results of substrate synthesis towards the investigation of polyene cyclization.

Lubrizol

Emily Low and Aaron Block
 Computer Science Department, Austin College
 Abstract #30

My career study off campus with The Lubrizol Corporation included shadowing higher level computer scientists, building graphics, and translating old code to a newer language. My job was extremely detailed oriented, especially when I was building graphics. The graphics I built were computer models of the chemical plant systems for the engineers to take quick looks at to check level, pressure, temperature, and many other attributes associated with a system. It was a great learning opportunity and it helped me narrow down what I want to do after college. I was also given the responsibility of educating a new intern and supervising them at the beginning of their term.

Investigation of Ion Sensitivity of *cks1Δ* yeast cells with varying media

Aardhra Venkatachalam, Jason Shin, Kristin McCamy, Spencer Hankins, and David Aiello
 Biology Department, Austin College
 Abstract #45

In *S. cerevisiae*, CKS1 is an important protein in the regulation of the cell cycle with its interactions with cyclin-dependent kinase, Cdc28. While CKS1 null strains (*cks1Δ*) were originally thought to be inviable, recent studies have revealed viability of *cks1Δ* with new phenotypes such as slowed growth, temperature sensitivity, and ionic sensitivity (Yu and Reed, 2004). In human cells, CKS1 overexpression has been associated with aggressive breast cancer tumors as a component of the SCF^{Skp2} ubiquitin ligase, which plays a major role in the regulation of the cell cycle through proteasome degradation of p27^{Kip1}, which is a cell cycle inhibitory protein (Westbrook et al., 2007). In other words, an increase in degradation of p27^{Kip1} via CKS1/SCF^{Skp2} activity has shown unchecked cell growth. Therefore, by investigating possible ways to limit the expression of the CKS1 protein in breast cancer cells while still enabling the cell to go through normal cell cycles, one could discover new therapy methods for breast cancer patients. Fortunately, *S. cerevisiae* provides a cheap and easy way for researchers to investigate the homologous human CKS1 protein. One way to limit the expression of CKS1 protein is through one-step gene replacement to form *cks1Δ* cultures of yeast. In this study, the successful formation of *cks1Δ* strain will be characterized and confirmed through its differences in thermosensitive properties in comparison to the wild type, as discovered in past studies. Isolated *cks1Δ* colonies will then be exposed to previously uninvestigated ionic environments in hopes of discovering an environment where the colonies start to thrive again with growth rates similar to those of the CKS1 control colonies.

Towards Understanding Variability in Be Stars

Archit Vasan, Amy Glazier, Brian Schrandt, and David Whelan
 Physics Department, Austin College
 Abstract #44

Emission-line B-type (Be) stars exhibit emission lines in their spectra caused by a circumstellar disc. For many Be stars, the emission signatures vary in strength and character over time, but the causes of this variability are not well understood. In order to shed light on the question of why Be stars' discs vary in the ways that they do, we have studied a subset of Be stars surveyed by the Apache Point Observatory Galactic Evolution Experiment (APOGEE). We find that spectral type and rotational velocity do have a possible influence on variability in Be stars. Although stars with early spectral types and large ratios of rotational to critical velocity are not exclusively coincident with both V/R variability and disc dissolution/reemergence, the majority of our stars that depicted either type of variability could be classified as such. Further, stars that show shorter periods of variability also tend to have earlier spectral types and rotational velocities that are closer to their critical velocities.

Affectionate Communication's Association with Relationship Satisfaction and Commitment

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 Abstract #31

Previous research has shown that affectionate communication, commitment, and satisfaction are all important characteristics of romantic relationships. The purpose of this study was to see whether affectionate communication (the expression of emotional feelings of endearment, care, fondness, or liking to another individual) was linked with the romantic relationship characteristics of satisfaction and commitment. We hypothesized that people who score higher on affectionate communication, measured by the Affectionate Communication Index (ACI), would score higher on satisfaction measured by the Investment Model Scale. It was also hypothesized that people who were higher on affectionate communication would be higher on commitment, also measured by the Investment Model Scale (IMS). 164 college students participated in our study. The participants had to complete an online survey with questions from the ACI and IMS. As expected, our findings showed that affectionate communication was positively correlated with satisfaction as well as being positively correlated with commitment. Satisfaction and commitment were also positively correlated. The data indicates that individuals' open demonstrations of feelings of love not only increases the perceived level of effort their partner is willing to give to prolong their relationship, but also positively influences their personal views of the quality of a relationship.

Towards Understanding the Be Phenomenon: Observations of Enigmatic, Massive Stars with the Adams Observatory 24-inch Telescope

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Abstract #32

This year marks the 150th anniversary of the discovery of emission-line B-type (Be) stars. Be stars are massive (5-15 times the mass of our Sun), fast-rotating stars that lose mass from their surfaces, forming circumstellar discs of gas. These discs often show variability in the gas density distribution around the star over time. The rate at which they lose mass has also been observed to vary over time, and in many cases, these gaseous discs disappear entirely only to reappear at a later epoch. A physical explanation for Be stars' behavior remains elusive despite decades of research, but spectral class and rotational velocity are thought to influence the variability of Be stars' discs. Towards a better understanding of these stars, the Apache Point Observatory Galactic Evolution Experiment (APOGEE) recently published preliminary findings on a systematic near-infrared survey of Be stars. Many stars in the survey have incomplete, outdated, or nonexistent spectral classifications; many more do not have known rates of rotation. Using visible-wavelength spectra taken at Adams Observatory in Sherman, Texas and at Apache Point Observatory in Sunspot, New Mexico, we have studied a sample of 62 APOGEE Be stars. We have classified 43 of these stars on the Morgan-Keenan classification system by temperature, luminosity class, and disc emission state (when possible). We have also calculated the projected rotational velocity, or $v \sin i$, for 45 of the stars in our sample. The results of our study are presented here in an effort to contribute data toward a theoretical model for Be star physics.

Number of Siblings as a Predictor of Romantic Relationship Factors

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Abstract #43

In our study, we examined the influence of growing up with siblings on several romantic relationship factors. More specifically, we were interested in examining if the number of siblings predicts varying amounts of relationship commitment, quality of alternatives, relationship investment, and several types of communication styles (e.g., expressiveness, preciseness, verbal aggressiveness, questioningness, emotionality, and impression manipulativeness). An online survey was created and sent out via Survey Monkey. It contained three questionnaires: The Communication Styles Inventory, The Investment Model Scale, and The Couples Satisfaction Index (Funk and Rogge, 2007; Reinout et al., 2011; Rusbult et al., 1998), as well as some demographic questions. Among the demographic questions was a question assessing the number of siblings that participants have. Participation was limited to Austin College students that were currently enrolled in a psychology course, and currently in a romantic relationship. A correlation analysis and a multiple regression analyses were conducted. Results found that the number of siblings was not correlated with and did not predict any of the outcome variables.

The effects of double bond placement in c-18 tails in a variety of *bis*-urea organogelators

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Abstract #42

Bis-urea organogelators have been studied for over two decades, however in this time frame only straight chain alkyl tails have been incorporated into the structure. In general it is believed that the ureas are the primary functional groups to initiate monomer aggregation. The aggregation continues to grow until you have a thread, which interacts with other threads to create fibers. Once the fibers associate a complex matrix is set and a solid gel is produced. It is the role of the alkyl tails to interact/entangle that ultimately has bearing on the strength of the organogel. The more the threads and fibers entangle the stronger the gel should be. It is believed that by creating more disorder in the alkyl tails more entanglement can be generated and stronger gels may be created. It is the goal of this research to synthesize a variety of *bis*-urea molecules that incorporate cis double bonds between the 9,10 carbons of an octadodecyl tail to create more disorder in the alkyl tails of these organogelators and test this hypothesis. *Bis*-urea molecules that contain a cis double bond will then be evaluated for their organogelation capability and compared to the straight chain derivatives. The synthesis of double bond containing gelators as well as the straight chain derivatives will be presented as well as their respective critical concentration for gelation.

Characterizing structure-function relationships in *bis*-urea organogelators using infrared spectroscopy

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Abstract #35

Transmission infrared spectroscopy was introduced for characterizing the structure-function relationships in *bis*-urea organogelators. Organogelators were classified into 2 major categories: those with a core based on vanillin and had varying lengths of carbon tails and those with C18 tails containing a cis double bond and without it. Organogels were prepared by dissolving the gelators in benzene using heat and stirring. The lowest concentration that led to the formation of a rigid gel was defined as the critical concentration and was determined by inverting the vial after the samples were given time to cool. A demountable liquid cell with sodium chloride windows was used to acquire transmission IR spectra. The degree of hydrogen bonding can be determined by examining the amide II band and the relative number of conformational defects in the tail groups can be determined by examining the methylene bending region. While strong hydrogen bonding is required for gelation, it is not sufficient on its own. The entanglement of the tails of the molecules is also necessary to form the strong junction zones between fibers that give the organogel rigidity. The organogelators with the vanillin core do this through forming conformational defects in their alkyl tails. The organogelator with a cis double also helps with the entanglement of the tail groups, leading to lower critical concentrations.

The Relationship Between Relationship Satisfaction and Well Being

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 Abstract #36

A 1981 study by Glenn Norval entitled "The Contribution of Marital Happiness to Global Happiness" found evidence to suggest that marital satisfaction may be more important to your overall happiness than a number of other factors including your physical health, financial situation, and satisfaction with friends. The goal of my study is to replicate the research done by Glenn but with college students and romantic relationships instead of marriages. Participants will be given a survey to measure a number of different psychological variables including relationship satisfaction and happiness. Statistical analyses will be done to determine the variance of these different variables in relation to happiness.

Predicting summer temperatures with spring net radiation

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 Abstract #41

Net radiation is the total radiation reaching the Earth's surface from the Sun combined with the thermal energy leaving the ground. The highest net radiation for each day occurs around the middle of the day, at noon, when the most radiation is being absorbed from the Sun's rays. On the other hand, the highest temperature is usually around 4 PM when the radiation has built up enough to increase the temperature. This means that a day with high net radiation at noon should have relatively high temperatures at 4PM. This project applies the concept of a lag in temperature, but this time in months instead of hours. Using the Austin College Weather Station net radiation and temperature measurements, we were able to develop a predictive relationship between these two quantities. The highest average annual net radiation happens during the spring months, while the highest temperatures happen a few months later during the summer. With more data, we hope to develop a robust equation that can predict summer temperatures using springtime net radiation measurements.

Purification of β 2m W60A mutant

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Abstract #40

β -2-microglobulin (β 2m) is a small, globular 99-residue protein that is part the major histocompatibility class I complex (MHC-1). MHC-1 is important in the immune response and is found on every nucleated cell. Normally, when a cell undergoes apoptosis, β 2m is shed from the surface of the cells, released into the blood, filtered through the kidneys, and excreted. When kidney failure occurs, the protein can not be cleared from circulation and the increased β 2m levels triggers the disease dialysis-related amyloidosis (DRA). In DRA, β 2m will misfold and aggregate into insoluble amyloid fibers that will aggregate in the joints; this will result in joint pain and decreased mobility. Our goal is investigate why β 2m misfolds in the disease DRA. In order to understand the misfolding process, we first have to understand the normal folding and unfolding process. Prior research in our lab has shown that when replacing Trp60 with phenylalanine greatly increases the protein's stability. Mutagenesis was performed on Trp60 to express tyrosine (W60Y), methionine (W60M), and serine (W60S). Our next project is to express and purify Try60A mutant (replacing tryptophan with alanine at site 60) to obtain a mutated purified protein and unfold/refold the protein to characterize it thermodynamically. The purpose of this mutation is to test the effect of substituting a small aliphatic residue on the protein folding dynamics of β 2m.

Glycogen Phosphorylase Overexpression Rescues $\text{pgm2}\Delta$ Calcium Homeostasis Defects

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Abstract #37

Phosphoglucomutase (PGM) plays an important role in yeast carbohydrate metabolism. It is responsible for interconverting glucose-1-phosphate and glucose-6-phosphate. Pgm2 is the major isoform of PGM in *Saccharomyces cerevisiae*. Yeast that lack PGM2 exhibits slow growth, high glycogen accumulation and calcium homeostasis defects. The purpose of this investigation is to determine whether or not the hyper accumulation of glycogen contributes to the other phenotypes. This was accomplished by rescuing the high glycogen accumulation and determining if the other defects were rescued. The high glycogen accumulation can be rescued using two different methods, hindering synthesis or increasing glycogen breakdown. Work presented here focuses on increasing the rate of glycogen breakdown in $\text{pgm2}\Delta$. The enzymes GPH1, PSK2 and SGA1 were over expressed to enhance glycogen breakdown. Gph1 and Sga1 are responsible for catalyzing the breakdown of glycogen into either G1P or free glucose, respectively. Psk2 phosphorylates Ugp1, changing its subcellular localization. Plasmids allowing for over expression of each gene were inserted into wild type, and knock out strains lacking, in various combinations of single, double or triple mutants of, PGM2, GSY1, GSY2, and REG1. The glycogen accumulation and calcium accumulation phenotypes of each strain, with each plasmid were analyzed. We report here that GPH1 overexpression rescues $\text{pgm2}\Delta$ defects on galactose media.

Comprehending Visualizations of Narrative Through Maps

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 Abstract #38

Storytelling has become a focus in both visualization and written discourse. With many stories that range from having a single battlefield to many different worlds as a setting, visualizing these narratives have become easier to comprehend when placing events and characters on a physical map of the story's setting. Having a physical map that places the characters and major plot events in the setting over a given time of a story, allows the audience to gain a better understanding of the narrative and visualization of the story's discourse. Through maps, the audience is able to follow characters and formations so that they may be able to see major events in a story unfold, causing the events to become more salient.

In this work we look at how the segmentation and organization of story elements in single-map or multiple-map panels affect narrative comprehension over a given story's timeline. We look at previous works that focus on different elements of narrative comprehension and visualization, such as the sequence of narrative visualization, salience of narrative events as a story unfolds, events in a story and the relationships between them, a player's agency in a given narrative. We also examine maps based on fiction and nonfictional battles and stories such as the historic battle of Gettysburg and the Middle-Earth Atlas from the Lord Of The Rings series.

Through this, we can see how users interact with maps and comprehend the narrative given the physical maps and other forms of discourse through multimedia platforms in addition to the maps in order to promote understanding of the story.

Investigating the Roles of PA28 γ and Akt in Cancer Development

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 Abstract #39

Elevated PA28 γ expression in breast, colon, and thyroid cancers is associated with increased rates of cell proliferation and prognosis. Akt, as an oncogene, can promote cell proliferation through changes in regulatory protein activity at the G1 checkpoint. Both PA28 γ and Akt share molecular targets, such as GSK-3 β and p53, and demonstrate similar roles in cancer growth, however, it is unknown whether or not there is a synergetic role of PA28 γ and Akt in the transformative process of cancer. The relationship between PA28 γ and Akt was investigated by quantifying levels PTEN and phosphorylated Akt in the PI3K pathway, assessing the contribution of the PI3K pathway to cell growth, and analyzing migration rates of embryonic and epithelial mouse cells. Data suggest that the PI3K pathway is important to cell survival and that immortal cells may be independent of Akt for survival due to altered physiology. PA28 γ deficient MEF cells also exhibit lower transformation efficiency than Wildtype, which is consistent with previous findings. Additionally, PA28 γ -deficient thyroid cells exhibit a lower viability when treated with VO-OHpic, a PTEN inhibitor. In response to Akt inhibitors, mutagenized cells increased expression of Akt, and decreased levels of PTEN to compensate for the lack of active Akt, yet no differences in migration patterns were detected. These results establish a foundation for identifying a synergetic role between PA28 γ and Akt in the transformative process.