



AUSTIN
COLLEGE

STUDENT SCHOLARSHIP CONFERENCE

March 20 & 21

2015



Welcome

Welcome to the 3rd 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 Hass
President

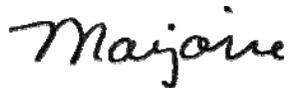
A handwritten signature in black ink that reads "Marjorie". The script is cursive and fluid, with a prominent loop at the end of the word.

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Schedule of Events

Friday

1:30 p.m.

Conference Registration Table Opens

Wright Campus Center Lobby

2:00-3:25 p.m.

Poster Symposium I

Mabee Hall – WCC

3:30-5:00 p.m.

Honors Candidate Presentations

Mabee Hall – WCC

5:00 p.m.

Welcome Reception with

Remarks from Dr. Hass

Mabee Hall – WCC

7:30 p.m.

Austin College Playwrights Showcase

Including Performances by the

Austin College Improv Troupe

Ida Green Theatre

Schedule of Events

Saturday

8:30 a.m.

Conference Registration Table Opens

WCC Lobby

9:00-10:25 a.m.

Poster Symposium II (Breakfast available)

Mabee Hall

10:30-11:55 a.m.

Block I Student Presentations

WCC and IC Classrooms

12:00-1:25 p.m.

Block II Student Presentations (Lunch available)

WCC 231 & 254

1:30-2:55 p.m.

Block III Student Presentations

WCC and IC Classrooms

3:00 p.m.

A.C.T. Bilingual Stage Readings

WCC 231

3:00 p.m.

Instrumental and Vocal Chamber Music

Recital Hall – Craig Hall

4:00 p.m.

Artists & Musicians Reception

Craig Hall Gallery

8:00 p.m.

Star Party

IC Adams Observatory

Student Contributors

Brianna Abramson	Brandon Dang
Zayra Acosta	Devondria Darty
Ali Ahmed	Megan Daugherty
Brittany Alvarado	Sarah Davis
Amy Anderson	Kellie Day
Timothy Anderson	Ilish DeWitt
Saswatha Anireddy	Miguel Diaz-Martinez
Aaron Anwary	Brittany Dimock
Matthew Bagley	Kelsey Dodson
Narendra Balkaran	Luke Dunlap
Joel Barrett	Cody Edwards
Andrea Batchelor	Divisha Eppalapalli
Katherine Battle	Mohamed Faheid
Myranda Baumgartner	Jessica Farra
Dominique Beamon	Kayla Farrar
Emily Bourcier	Brady Flanery
Ethan Brem	Sierra Ford
William Camp	Suzanne Francis
Samantha Carr	Philip Friedman
Sandra Carrasco	Erik Gentzel
Jaime Cervantes	Amy Louise Glazier
Zixian Chai	Courtney Goldstein
Morgan Chaney	Elizabeth Gonzalez
Liliana Chavez	Katie Gowdy
Katherine Chipman	Kailey Gray
Albert Chung	Isaac Groover
Woojun Chung	Emma Grundy
Jaylin Clevenger	Renato Guimaraes
Madeline Cohn	Shelbi Hall
Reed Cook	Noel Hancock
Anna Claire Cooke	John Mark Happel
Marissa Collins	Rebecca Hardegree
Roxanne Crouch	Brianna Harvey
Mayra Cuellar	Colter Headrick
Nicholas Cunningham	Katarina Heidenhofer

Student Contributors

Allison Henry	Rose Massey
Tyler Hicks	Shannon McKelvie
Sophie Higgs	Alexandra McLendon
Caroline Hodge	Alana McLeod
Shane Hodge	William McClinton
Reygan Holloman	Scott McCollum
Angela Huang	Andrew McMillan
Andrea Hudson	Hailee Meiners
Sally Kate Humphries	George Melchor
Laurie Hursting	Michaela Moden
Gideon Ibemere Jr.	Kusha Mohammadi
Nagisa Isa	Eric Mong
Rizwan Jagani	Jameson Moore
Daniel Jessie Janes	Christine Munyoki
Jay Jeon	Ashley Murphy
Rachel Jimenez	Bryce Murphy
Jordan Jones	Dagan Newsome
Jaqueline Jorns	Katrina Ngo
Abhishek Kadiyala	Darcie Nightengale
Peter Keene	Holly Nightengale
Tabatha Keton	Aurora Nugent
Safa Khawaja	Spencer Nystrom
Tejasvi Koka	Alejandrina Ocanas
Stephanie Kutler	Stephanie Ornelas
Jeesoo Lee	Malin Pappas
Minhua Li	Raj Patel
Jesus Loya	Anika Payne
Julio Malave-Torres	Eyram Pleth-Suka
Deepika Mannem	Tamiem Popal
Jonathan Mantel	Steven Prinslow
James Mantil	Gigi Privitera
Grant Marcinko	Walter Rampy
Gaby Margocs	Dayne Read
Daniel Marin	Kalan Reese
Vidur Marwaha	Connor Rigg

Student Contributors

Alicia Rizo-Liu	Matthew Steidle
Akylah Robinson	Cody Stewart
Diego Robledo	Joshua Stowers
Edgar Rodriguez	Pido Tran
Whitney Russell	Shelby Turner
Greyson Sanders	Rebekah Urban
Hunter Sartor	America Vallejo
Andrew Schneck	David Van Amburgh
John-Phillip Seale	Willa Van Camp
Michelle Selmer	Archit Vasan
Akshaya Selvamani	Victoria Walker
Yemisirach Seyoum	Anastasia Wells
Dilan Shah	Blair Whalen
Hailey Shapiro	Will Whitehurst
Kim Shelton	Sarah Wilhelm
Karisma Sheth	Amanda Wise
Jung Shin	Elizabeth Wise
Quinn Sicking	Chance Witherspoon
Michael Sinclair	Priscilla Wolfe
Michael Sistrunk	Lindsey Womack
Charlotte Smart	Carolyn Yao
Chelsea Smith	Erika Zapata
David Smith	Yamna Zaman
Brittney Son	Brian Zhu
Aimee Spearman	Ryan Zimmerman

Committee

Coordinator

Lance Barton

Political Science

Nathan Bigelow

Computer Science and Mathematics

Aaron Block

Psychology

Renee Countryman

English

Carol Daeley

Music

Ricky Duhaime

Theatre

Kirk Everist

Art

Mark Monroe

Chemistry

John Richardson

Student Intern

Jeesoo Lee

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 2015, more Austin College students than ever are engaging in research, scholarship, and creative activities. Among the 200 student participants in this year's ACSC are sixteen 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 underclassmen, 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 2015 ACSC and showcasing thirteen of the 2015 honors candidates in a special set of symposia on Friday, March 20.



2015 Honors Candidate
Oral Presentations

Friday, 3:30 p.m. - 5:00 p.m.

WCC 231

Roxanne Crouch
Nicholas Cunningham
Sarah Davis
Nagisa Isa
Akshaya Selvamani

WCC 254

Jeesoo Lee
Alexandra McLendon
Michaela Moden
Amanda Wise

WCC Johnson Gallery

Amy Anderson
Sophie Higgs
Stephanie Kutler
Shelby Turner

Identifying a Natural Coordinate System for Investigating Gravitational Ripples in a Curved Spacetime

Amy Anderson
Physics Department, Austin College

This project analyzes the geometric nature of an exact gravitational plane wave. Using Riemann scalars to invent an intrinsic coordinate system, I developed a framework for analyzing small amplitude gravitational waves propagating on this curved spacetime.

Faculty Director: Don Salisbury

The Effects of Exercise on Learning and Memory

Roxanne Crouch
Psychology Department, Austin College

The current diet of the western world is contributing to many health problems, including an increased dementia risk. One way to counteract the unhealthy diet of the western world is to exercise regularly. Extensive research has demonstrated the benefits of aerobic exercise on individuals and rodents with improvements in learning & memory; however, substantially less research has examined the efficacy of resistance training for modifying behavior and the neuronal changes that result from resistance training. This is the first resistance training protocol using appetitive motivators, modified from previous aversive resistance training protocols. Male Long-Evans rats (n=36) were randomly assigned into one of three conditions: aerobic training, resistance training, or sedentary control. Aerobic training (voluntary wheel running) lasted for 2 hours every other day, and resistance training lasted for 20 minutes every other day. Resistance training required the rats to climb a 1 M ladder to reach a food reward at the top while carrying weights that increased following each successful trial. Rats performed the Object Discrimination Task at the end of the training protocols. After behavioral testing, rats were transcardially perfused, brains were preserved, and the vastus lateralis was dissected in order to quantify changes in muscle mass due to exercise. Immunohistochemistry identified cellular changes in the hippocampus. Although we did not see any differences in memory as measured by the object discrimination task, exercise caused an increase in muscle mass and led to an increase in exploratory behavior in rats who exercised. More importantly, the successful modification of the resistance training protocol from aversive to appetitive is an important finding to have a variety of exercise protocols available for research in rodents.

Faculty Director: Renee Countryman

Effects of Exercise on Emotion Regulation in the Amygdala

Nicholas Cunningham
Psychology Department, Austin College

Aerobic exercise has been shown to improve a variety of cognitive functions in humans, and may protect from or ameliorate the detrimental effects of a variety of chronic physical and mental illnesses. Resistance weight exercises are increasingly being chosen in preference to aerobic exercise such as running. Resistance exercise provides some protection from chronic disease, and previous research suggests that these benefits arise from a different neurophysiological mechanism than aerobic exercise. Animal models aid in understanding these underlying mechanisms for the physical and mental benefits seen. The present study examined the anxiolytic benefits of resistance training relative to aerobic exercise. Previous studies used aversive procedures as incentive to perform resistance exercises, but we modified protocols into an appetitive format.

The current study seeks to establish a new resistance exercise animal model for future investigations, as well as to compare the effects of resistance training with aerobic exercise on emotion regulation (fear/anxiety) through the use of 7 weeks of progressive resistance exercise and voluntary wheel running. So far we found that there are similar anxiolytic effects produced by both types of exercise in behavioral testing, and cell staining will be used to further investigate neurochemical changes in the amygdala.

Faculty Director: Renee Countryman

The Agency of Ideas in Theatre: A Case-Study

Sarah Davis
Theatre Department, Austin College

This presentation is based on a portion of my departmental honors thesis. Tracing back even to the days of Aristotle, ideas have been a long debated and analyzed topic. The philosophical proposed ontology of ideas ranges from substance to mode to their own third, unique ontological category. For this research, I looked at a fourth, newly emerging category: Flat Ontology. This concept, as explained by Ian Bogost, accepts that all things exist equally, from solid objects to animate beings to abstract transcendental concepts such as ideas. This project looks at ideas placed on a flat ontological scale in regards to their interactions and agency in theatrical practice. This presentation will specifically focus on case studies involving the agency of ideas in theatre, including my direction of Theresa Rebeck's play *Seminar* as part of the Austin College theatre season in Fall 2014. This talk will revolve around the preparation, organization, and process that produced this staging of *Seminar* and how ideas independently emerged, evolved, and shaped it, as well as textual references to this concept within the text of the play itself.

Faculty Director: Kirk Everist

Ten Years of Prairie Restoration

Sophie Higgs
Environmental Studies Department, Austin College

Less than 1% of the Blackland Prairie, the historically dominant ecosystem of much of central Texas, remains today. Most of the prairie was destroyed for cotton farming beginning in the late 1800s. Austin College's Sneed Prairie Restoration is the site of a controlled experiment to assess various restoration techniques through a series of standardized management procedures and measurements. The experimental design consists of eleven fields including a reference field, nine treatment fields, and a small remnant prairie that was formerly invaded by trees. Dr. Schulze and others recorded the first set of standard measurements of above ground indicators during the fall of 2004. I collected data during fall, 2014, ten years after the first set of measurements.

The presence of twelve additional grass species was added to the regular measurements during the fall of 2014. I will describe changes in the composition of the vegetation that occurred between 2004 and 2014 and will discuss how the addition of more species to the monitoring program affects conclusions about the progress of the restoration.

Faculty Director: Peter Schulze

Financial Capital Outflow from China

Nagisa Isa
Economics Department, Austin College

The purpose of this paper is to identify the changes in relatively recent Foreign Direct Investment (FDI) in China, and capture the possible explanatory variables contributing to such change in China's FDI. This research provides a multi-variate regression model to ascertain which economic factors significantly explain why China's FDI has recently decreased. Founded on past scholarly work, and World Bank data, the author includes China's GDP, inflation, foreign exchange rates, and labor costs to hypothesize that these variables hold for explaining changes in FDI into China. Although significant positive correlation was uncovered between FDI in China and China's GDP, as well as a statistically significant correlation between the exchange rate and FDI, the labor cost and inflation variables remain problematic. The author explains his reasoning for why GDP and exchange rates offer insights, while labor costs and inflation fail to correlate with FDI. The study ends by speculating on other possible variables that may aid in explaining changes in FDI into China, along with comments on the relationship between FDI and what some scholars feel to be the reasons for China approaching a damaging speculative bubble, and the resulting predicted contraction in China's economic growth.

Faculty Director: Daniel Nuckols

Examining the “Orgasm Gap”

Stephanie Kutler
Psychology Department, Austin College

Previous research by Armstrong, England, and Fogarty (2010) discovered an “orgasm gap,” with college men reporting significantly more orgasms than college women, particularly in casual hookups. They speculate that this gap may be due to gender differences in masturbation. These findings led us to examine possible gender differences in experiencing an orgasm across partnered and un-partnered sexual practices. This study investigated the orgasm gap in terms of masturbation, sexual history, and relationship status. Data collected from college students revealed that women are more likely to report never masturbating (39.2%) than never having sex (31.3%). Further results revealed that 20.9% of female participants versus 0.8% of male participants have never had an orgasm. Of sexually active participants, 28.9% of women versus 4.9% of men have never masturbated. Additionally, of participants currently in relationships, 45.6% of women versus 82.1% of men have masturbated in the past month.

Faculty Director: Lisa Brown

Field Notes: A Poetics Statement

Jeesoo Lee
English Department, Austin College

As I work to develop my own sense of poetics, I find myself constantly returning to two different but related questions: what is the responsibility of poet? And what does an ethical poem look like? In short, as a writer myself, how do I define poethical engagement? My theory of poetics is strongly attuned to the idea that poetry is inherently incantatory with its images, textures, language, and rhythms. And as such, I believe that poetry should be of and in this world as a present experience rather than existing as an art-object. Combining my interest in contemporary women writers with the various ideas proposed by third wave feminist writing, my project will wrestle with the possibilities and limitations of innovative and experimental poetry. My project will imagine what Joan Retallack calls “poethics” — “a practice in which ethics and aesthetics come together to characterize a particular form of life” (Retallack 207) — and what that will look like.

Faculty Director: Greg Kinzer

Factors Influencing Perceptions of Victim Credibility in Mock Child Sexual Abuse Trials

Alexandra McLendon
Psychology Department, Austin College

Research indicates that child sexual abuse (CSA) is severely under-reported. The perceived credibility of the child is crucially important for cases of CSA. In my own past research, I have explored the effects of victim versus witness reporting, victim age and gender, and abuse frequency. Building on that, the present study investigated the mother's role and the child's emotional response in cases of CSA that occurred once or multiple times. 93 undergraduates participated. This study was a 2 (Abuse Frequency: once or multiple times) X 2 (Mother: prompt or no prompt) X 2 (Child Response: Crying or No Crying) between subjects factorial. Participants read one of eight detailed trials based on their randomly assigned condition. The trials included a forensic interview with the child and accounts from various individuals involved. Participants then completed questionnaires where they rendered verdicts and evaluated the credibility of the child and defendant. Analyses showed that participants were more likely to convict the defendant if they felt that the child was convincing. However, regardless of how the participants perceived the believability of the defendant or how caring he appeared, conviction rates were unaffected. Verdicts were significantly correlated with several judgments. This study showed that perceptions of children in trials of CSA could influence a mock juror's likelihood to convict a defendant: mock jurors who are more convinced of the child's veracity are more likely to convict. Due to under-reporting of CSA occurrences, understanding jurors' perceptions is of high importance. This is especially true as the current results found that perceptions of the child, as opposed to those of the defendant, may contribute more to conviction.

Faculty Director: Michelle Helfrich

Effect of Blue-Light Blocking Glasses on Melatonin Levels and Sleep Quality in College Males

Michaela Moden
Biology Department, Austin College

The lack of adequate quantity and quality of sleep is considered a “public health epidemic” in the United States by the CDC (“Insufficient Sleep,” 2014). This issue is especially prevalent among college students, with 70% of first year undergraduates classified as sleep deprived . Melatonin, a well-known sleep promoter hormone , effects many bodily functions by acting as a vital component in sleep quality and bodily health. Previous research has shown that light, especially short-wavelength blue light, suppresses melatonin production. Technological devices such as cellphones, tablets, and televisions emit short wavelengths of light at the peak suppression of melatonin, and because college students are habitual users of these devices, especially after sunset when melatonin levels should begin to increase, their melatonin secretion is very likely affected by this nightly blue light exposure. This research project seeks to understand the effects of blue-light blocking glasses on college students by evaluating the impact of the glasses on melatonin concentration and sleep quality. Melatonin concentration is measured on participant’s saliva samples using ELISA, and sleep quality is measured using the Leeds Sleep Evaluation Questionnaire.

Faculty Director: George Diggs

Elucidating a Role for Glycogen Accumulation in the Calcium Homeostasis Defects Observed in a *pgm2Δ* Strain of *Saccharomyces cerevisiae*

Akshaya Selvamani
Biology Department, Austin College

Phosphoglucomutase (PGM) is a key enzyme in carbohydrate metabolism that interconverts glucose 1-phosphate and glucose 6-phosphate. In *Saccharomyces cerevisiae*, the loss of the major isoform of PGM results in an altered ratio of G1P to G6P when galactose is utilized as a carbon source. Concomitantly, the *pgm2Δ* cells exhibit an increase in total cellular Ca^{2+} levels compared to the wild type and improper folding of ER resident proteins indicative of altered intracellular Ca^{2+} homeostasis. Current work in the lab additionally demonstrates a dominant glycogen accumulation phenotype in *pgm2Δ* cells. Sixteen strains capable of suppressing *pgm2Δ* growth defects were separately identified as *spd* (suppressor of *pgm2Δ* defects) candidates from an EMS mutagenesis screen. Current work indicates that the *spd* strains also suppress the glycogen accumulation observed in *pgm2Δ* cells. The objective of this project is to identify the mechanism linking these two seemingly unrelated processes of carbohydrate metabolism and Ca^{2+} homeostasis. Our approach is to identify key enzymes in glycogen synthesis and degradation whose loss of function could suppress high calcium phenotypes observed in *pgm2Δ* cells. The work presented here characterizes the enzymes involved in glycogen synthesis and degradation as *pgm2Δ* suppressor candidates in the context of calcium and glycogen accumulation.

Faculty Director: David Aiello

Translation of Chu T'ien-Wen's "Little Bi's Story"

Shelby Turner

Classics and Modern Languages Department, Austin College

Chu T'ien-Wen is an influential Taiwanese novelist and screenwriter, who has won the 2015 Newman Prize for Chinese Literature, awarded by the University of Oklahoma. Some of her most famous English-translated literary works are *Notes of a Desolate Man*, and "Fin-de-Siecle Splendor," and her most famous film scripts include *The Puppetmaster* and *City of Sadness*. Although she is a prolific writer, not much of her work has been translated into English. I am translating one of her short stories in order to fill the gap a little more. Chu T'ien-Wen's "Little Bi's Story" is a short story about a young boy and his family. Common themes in the story revolve around nostalgia, nationalisms, and feminism. The final product will be an academic translation with a critical introduction based on translation theory.

Faculty Director: Jennifer Johnson

Specific Psychological Diagnoses within Art Therapy: A Qualitative Study

Amanda Wise
Psychology Department, Austin College

The purpose of this research is to gather exploratory information regarding art therapy professionals' attitudes towards working with specific components of the Expressive Therapies Continuum (ETC) and specific psychological diagnoses. The healing qualities connected to specific components of the ETC could point to psychological diagnoses that would benefit from working with a particular component because the healing qualities may align with goals created during treatment. This pilot study was a qualitative thematic analysis of interviews conducted with four art therapy professionals who were recruited through professional networking. They were interviewed regarding the ETC and diagnoses. Some of the themes found were consistent with the art therapy literature, showing this is a promising topic within art therapy research and should continue to be investigated.

Faculty Director: Ian MacFarlane

Poster Session Abstracts

Mabee Hall
March 20 - March 21



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

Racial Disparity in Breast Cancer Treatment

Elizabeth Wise and Don Rodgers
Nonprofit Organizations and Public Service Department,
Austin College
Abstract #1

There is a striking racial disparity in breast cancer treatment for African American women in Texoma that reflects a national trend. To address this disparity, this research seeks to consider options of capacity-building and faith-based initiatives to provide holistic care for African American women in Texoma. This approach works creatively with resources already existent within the local community and seeks to raise leaders by exploring options with health advocacy programs, faith-based support groups, and partnerships between churches and local breast cancer related nonprofits, healthcare providers.

Determination of Blackland Prairie Vegetation Via Sequencing of Chloroplast trnL Intron

Alejandrina Ocanas, Andrew McMillan, Kayla Farrar,
Kelsey Dodson, Joel Barrett, Isaac Groover and Kelly Reed
Biology Department, Austin College
Abstract #2

Between plant roots and their microbial community there are often identifiable trends that allow further analyses on topics such as the cycling of nutrients, living conditions, and the general health of the ecosystem; this research project attempts to find a method to assess both the microbial community and the plant community from soil samples taken to assess the efforts of prairie restoration. However, since grasses only form seed heads during limited times of the year, the identification of plant species can be difficult when based strictly on morphological qualities, so a molecular technique should be developed in order to allow for easy, year-round, identification of both the plants and microbes present based strictly on data collected from the roots. We separated roots from several soil samples collected from the Sneed and Garnett prairies, isolated a plant specific segment of DNA (trnL Intron) from the chloroplast, and used these to attempt to determine the taxa present in the appropriate prairies. With three different PCR methods and DNA cloning, we amplified root samples from March 2014 (Garnett) and March 2014 (Sneed) and sequenced for identification. Using our sequenced DNA samples we were able to identify several plants of the same tribe from three different genera of the Poaceae family that were growing in the two prairies by comparing our extracted trnL segments to those found in the plants that are known to be present in these prairies. We can conclude that this process was successful in identifying plants on a somewhat specific level, because none of the trnL sequences resulted as plants that were not typically found in tallgrass prairies.

The Determination of Protein Stability Effects of β -2-Microglobulin at Position 60

Kayla Farrar and John Richardson
Chemistry Department, Austin College
Abstract #3

Beta-2-Microglobulin (β 2m) is a small 99 residue protein that is part of the class I major histocompatibility complex (MHC-I). It is shed from the surface of cells into the bloodstream as cells undergo apoptosis and is excreted from the body in people with normal functioning kidneys. However, β 2m cannot be degraded by people with diseased kidneys; therefore the concentration of free circulating β 2m increases and begins to favor the formation of amyloid fibrils. These amyloid fibrils then get deposited into the skeletal joints and bones, leading to the onset of dialysis related amyloidosis (DRA), which is then exacerbated by long term hemodialysis. The goal of our lab is to understand the protein misfolding that occurs because of this phenomenon. Prior research, in the Richardson lab, saw a significant change in the protein's stability when Trp60 was replaced with phenylalanine. Because of this observance in stability, site directed mutagenesis was then performed on Trp60 to express Alanine (W60A), Tyrosine (W60Y), Methionine (W60M), and Serine (W60S). Our project was to determine the effect on stability of each of the mutants. Each mutant was exposed to varying concentrations from 0.0M to 9.25M urea, and left to sit for 24 hours before the fluorescence was measured. Unfolding was monitored using tryptophan fluorescence (W95) by monitoring the change in location of maximum emission versus concentration of urea.

Effects of Anonymity of on Ethical Decision Making

Daniel Marin and Ian MacFarlane
Psychology Department, Austin College
Abstract #4

People are curious whether ethical standards apply when no one is looking. Indeed, little research has been collected in answering the question of how anonymity affects moral behavior. The present study explored the likelihood of anonymous participants' ($n = 38$) and identified participants' ($n = 22$) choosing a moral/immoral action in response to four ethical dilemmas, as well as whether anonymous individuals were more likely to display less socially desirable traits than their identified counterparts. Participants were recruited through convenience sampling via social networking websites (e.g., Facebook.com). The complete survey with all ethical dilemmas, a moral identity measure, and a social desirability scale were distributed via SurveyMonkey.com. Anonymous participants did not give any form of identification, whereas identified individuals were asked for their name, age, and gender. No significant differences were found in responses to ethical dilemmas. In ethical dilemma 4, however, anonymous participants were almost significantly more likely to accept money which was not theirs after feeling cheated at a casino than identified participants ($p = 0.08$). No significant differences were found between anonymous participants' and identified participants' level of socially desirability ($p = 0.40$). Anonymity may have interactive effects with other pressures and may also compromise responsibility rather than morality. Anonymous responses' low reliability appeared to have had less influence in the short survey. Recommendations for future study of anonymity and applications of the results are included.

PA28 γ Contributes to the Mammalian Genotoxic Stress Response

D. Jesse Janes, Dilan S. Shah, Joel H. Barrett,
Rose C. Massey, and Lance F. Barton
Biology Department, Austin College
Abstract #5

Various stressors disturb cellular physiology, causing irregularities in cell cycle regulation and apoptosis. Such abnormalities are characteristic of cancer and Alzheimer's disease. DNA mutations cause irregularities, however, cells respond by repairing DNA. The p53 gene is expressed following DNA damage, halting cell cycle progression and promoting DNA repair. Without this repair mediator, cells would have a lessened ability to repair DNA mutations, propagating abnormal cell physiology. Consequently, p53 mutations are associated with many cancers. PA28 γ activates proteasomes, which are intracellular protein-degrading complexes. PA28 γ also facilitates p53's MDM2-mediated ubiquitination, which is necessary for efficient proteasomal degradation of p53. PA28 γ 's role in p53 regulation suggests a role in cell fate decisions. Genotoxic (DNA damaging) compounds can be applied in vitro to simulate DNA damage that occurs in everyday life (e.g. UV and carcinogen exposure). PA28 γ -proficient (WT) and -deficient (KO) mouse embryonic fibroblasts (MEFs) differentially responded to various genotoxic stressors. The difference in the stressors' mechanisms of action may explain the role of PA28 γ in cell fate decisions following DNA damage. Measures of viability and apoptosis were collected. Differential protein expression between WT and KO MEFs following DNA damage furthers understanding of PA28 γ 's role in cell fate decisions.

Intermolecular Borylation of C-H bonds using Diamido Borenium Ions

Megan Daugherty and Ryan Felix
Chemistry Department, Austin College
Abstract #6

N-heterocyclic carbene (NHC) borenium ions have the potential to act as “super” Lewis acids in organic chemistry. By using poorly electron donating NHCs as ligands for borenium ions, boron’s electrophilicity should increase, making it a more reactive species. Inspired by previously reported, selective intramolecular C-H borylation by borenium ions, it is hypothesized that once synthesized, these compounds may be reactive enough to perform intermolecular alkyl C-H borylation. Current attempts to synthesize a diamido NHC-borenium ion have been unsuccessful, but further exploration is ongoing. However, exploration with more electron donating NHCs allowed for facile formation of NHC-borenium ions. This formation allowed for hydroboration of alkenes and has the potential for other synthetically useful transformations.

Exploring the Preparation and Activation of N-Heterocyclic Carbene Boranes

Raj Patel and Ryan Felix
Chemistry Department, Austin College
Abstract #7

Direct C-H bond borylation reactions are an important part of synthetic chemistry however, current protocol generally requires expensive transition metal catalysts as well as high reaction temperatures. Recent research has shown that intramolecular C-H bond borylation is possible, without the use of transition metal catalysts, through the utilization of borenium ions. The goal of this project was to explore the preparation of N-heterocyclic carbene (NHC) borenium ions and, ultimately, to test the reactivity of these compounds towards intermolecular C-H borylation. Attempts to prepare the precursor NHC-boranes from a group of poorly electron donating NHCs were unsuccessful, however addition of a borane source to a commercially available NHC was accomplished in a 16% yield. Further research is ongoing to explore the conditions under which poorly electron donating NHCs can be attached to borane.

Light Curves and Physical Properties of RR Lyrae Stars in Globular Cluster M13

Renato Guimaraes, Albert Chung, Jonathan Mantel,
Malin Pappas, Ryan Zimmerman,
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Physics Department, Austin College
Abstract #8

RR Lyrae stars are variable stars with predictable periods (from 0.2-2 days) and known luminosities; knowing their luminosity makes them "standard candles" for distance determinations. We observed RR Lyrae stars in the globular cluster M13 with the 24-inch telescope at the Adams Observatory, both to test the limitations of the telescope due to external conditions (e.g., light pollution) and to measure certain physical properties of these stars. A Charge-Coupled Device (CCD) was used to take 15-minute exposures over the course of six nights in the V-band. Stellar magnitudes were then computed for our targets using the fully reduced dataset. These results were used to create phase diagrams, with which we determined the period of variability for each star. Our determined periods were the same within errors to previously published results, with one exception. We were then able to estimate masses and distances for all of our sources, and find that our estimates are similar to previous studies. We conclude that, while light pollution especially due to sports field lights can add significant error to our reduced data, we are still able to carry out significant photometric studies with the 24-inch telescope at Adams Observatory.

Increasing Dye-Sensitized Solar Cell Efficiency by Controlling Dye Orientation: Preparation and *in situ* Characterization of Dye Precursors by IR Spectroscopy

Steven Prinslow and Karla McCain
Chemistry Department, Austin College
Abstract #9

Dye-sensitized solar cells are a potentially cheaper and more efficient way to harness solar energy than traditional silicon based solar cells. In order to maximize the efficiency of DSSC's controlling the orientation of the dye molecules on the surface of titanium dioxide is important in order to promote electron transfer. Our overall goal is to build up an inorganic dye complex on the surface so that the HOMO to LUMO transition moves the electron closer to the semiconductor surface. Attenuated total reflectance IR spectroscopy was used to monitor the concentration of the molecules on the surface of the titanium dioxide. First, an azide terminated silane was attached to the surface of the TiO_2 . The terminal azide was then reacted with an alkyne using click chemistry. Hexyne was used as a model system before moving on to using ethynylpyridine, which will form a bidentate, nitrogen-based ligand on the surface to serve as the LUMO of the dye complex. The kinetics and extent of the click reaction were measured by monitoring the disappearance of large azide band. Hexyne reached $61 \pm 6\%$ completion in 60 minutes with a rate constant of $k = 0.10 \pm 0.05 \text{ min}^{-1}$. The ethynylpyridine reaction reached 70% completion in 25 minutes with a rate constant of $k = 0.22 \text{ min}^{-1}$. The two reactions varied in kinetics due to sterics and are not expected to reach 100% completion also due to this reason. After the 1,2,3-triazole is formed on the surface, we will bind a transition metal ion to it. Lastly, a sulfur ligand will cap the other end of the metal to form the HOMO of the dye complex. Building our molecule from the surface up like this will allow us to control the directionality of the dye on the surface of the TiO_2 , which will favor injection of excited electrons into the surface of the TiO_2 and will hopefully increase the efficiency of DSSC's.

That Word Does Not Mean What You Think It Means: Casual Use of Mental Illness Language and Perceptions of Mental Illness

Kalan Reese, Aurora Nugent, Allison Henry and Peter Marks
Psychology Department, Austin College
Abstract #10

In conversations today, it is commonplace for people to make informal use of mental illness terms, saying things like “I’m so depressed today” or “That guy is so retarded.” Casual use of mental illness language could reflect or contribute to simplistic and inflexible biases toward people with mental illnesses. We hypothesized that people who used more casual mental illness language would have more negative perceptions of individuals with mental illnesses. Fifty-nine Austin College undergraduate students completed three questionnaires on SurveyMonkey.com, measuring casual use of mental illness, political correctness, and perceptions of mental illness. We created the 14-item Casual Use of Mental Illness questionnaire, which included statements like “I am so OCD sometimes,” where the label of a mental illness is describing something or someone that is not mentally ill. Correlational analyses demonstrated that the Casual Use of Mental Illness questionnaire correlated negatively with the Political Correctness questionnaire, supporting the validity of our created questionnaire. As hypothesized, the Casual Use of Mental Illness questionnaire was significantly correlated with the Perception of Mental Illness questionnaire, indicating that participants who use more casual mental illness language tended to have more negative views of mentally ill individuals. Our results suggest that language some may consider harmless could reflect (or affect) our perceptions of mentally ill individuals. Ultimately, research on this topic may help us to understand the stigma of mental illness, and how this stigma is supported and demonstrated through communication and social relationships.

Predictors of Relationship Satisfaction Among College-Aged Dating Couples

Kailey Gray, Elizabeth Gonzalez,
Katherine Battle and Matthew Findley
Psychology Department, Austin College
Abstract #11

Interacting with one another is an important predictor of romantic relationship satisfaction. Indeed, previous research has even found that different forms of interaction (e.g., face-to-face, talking on the phone, text messaging) predict increased relationship satisfaction. However, the majority of previous research has been examined among married couples, thus neglecting an examination of whether such forms of interaction predict increased relationship satisfaction among other groups (i.e., college-aged dating couples). The current study sought to remedy this by examining if various forms of interaction also predict increased amounts of relationship satisfaction among college-aged dating individuals. Further, the current study was interested in understanding which specific type of interaction (i.e., face-to-face, talking on the phone, text messaging) is the most predictive of relationship satisfaction among college-aged individuals. 64 undergraduate students enrolled at Austin College, and also in an exclusive romantic relationship, completed an online survey that contained various questionnaires. Among them was a questionnaire that assessed relationship satisfaction. Participants also completed a questionnaire that assessed the average amount of time that participants spent face-to-face, on the phone, and text messaging with their romantic partner in a typical week. In line with previous research, the current results provide some indication that the more time college-aged dating couples spend interacting with each other, the more satisfied they will be in their relationship. More specifically, the current results suggest that the amount of time spent conversing on the phone may be a very important factor in predicting relationship satisfaction among college-aged individuals. Surprisingly, time spent talking on the phone seems to be a better predictor of satisfaction than even text messaging among college-aged couples.

Can We Make Cancer? Cancer Phenotypes of PA28 γ Deficient Cells

Madeline Cohn, Anna Claire Cooke and Lance F. Barton
Biology Department, Austin College
Abstract #12

Cancer is a family of diseases, which is caused when host cells “go wrong”. PA28 γ is a proteasome activator that is highly expressed in some types of invasive cancers, however the role of PA28 γ in cancer is not yet well defined. PA28 γ -deficient cells were tested to see if they displayed phenotypes consistent with some of the hallmarks of cancer, including enabling replicative immortality, resisting cell death, genomic instability, and invasiveness and metastasis. As cancer is caused by the accumulation of mutations, we attempted to create novel mutations in a PA28 γ ^{-/-} cell line via mutagenesis in order to promote cancerous growths. In order to look for preexisting mutations, we sequenced cDNA from three different genes known to be involved in various types of cancer. Because the selected genes have been previously shown to be mutated in a number of cancers, mutations to these genes in the PA28 γ -deficient cell line could give more evidence for the oncogenic potential of these cells. Genomic instability is a hallmark of cancer which can be evaluated through karyotyping of the PA28 γ ^{-/-} cell line genome. Ability for cellular migration is a hallmark of invasive cancer cells and, therefore, was tested in PA28 γ ^{-/-} cells through scratch and filter assays. After investigating oncogenic phenotypes of the PA28 γ ^{-/-} cell line, the next step is to determine potential treatments. Two assays which detect cellular activity and apoptosis were performed following treatment by three different chemotherapies to determine which ones were effective against the PA28 γ -deficient cells. While significant progress was made to further characterize PA28 γ ^{-/-} cells, further work needs to be done to replicate these experiments for more definitive results.

Geared Motion: The Study and Synthesis of Molecular Rotors

Erik Gentzel and Stephanie Gould
Chemistry Department, Austin College
Abstract #13

The purpose of this research is to synthesize and characterize molecular rotors, as well as study the mechanical motion of the coordination-complexed rotors. Organic metalloporphyrin caps with coordinated bidentate pyrazine ligands, and 1,4-ethynylbenzene rotors provide an ideal dyad to form surface-mounted porous coordination polymers. These complexes will then be characterized, and used to study geared motion at a nanoscale level. Synthesis of a meso-substituted dipyrromethane is supported by proton NMR. The synthesis of meso-substituted A3B aryl porphyrin was carried out via the Lindsey method. Contained within this paper is evidence of successful porphyrin synthesis, as well as zinc insertion. Future work includes coordination of the ligand, as well as cross-coupling to form the final dyad, and characterization of the rotor with X-ray crystallography, and solid-state NMR.

PA28 γ 's Effect on Cancer Formation in MEF Cells

Archit Vasan, Rose Massey and Lance F. Barton
Biology Department, Austin College
Abstract #14

PA28 γ is a proteasome activator that determines the degradation of specific proteins in the cell by the ubiquitin-proteasome system. PA28 γ expression is correlated with the stability of several key cell cycle regulators in normal cells and PA28 γ expression is increased in several forms of cancer. To further investigate the role of PA28 γ in cancers PA28 $\gamma^{+/+}$ and $^{-/-}$ cell lines were mutated with *N*-Methyl-*N'*-Nitro-*N*-Nitrosoguanidine (MNNG) and tested for properties associated with cancer. The cell line this poster examines is WT clone 2 cells, which descended from PA28 $\gamma^{+/+}$ cells. Clone PA28 $\gamma^{+/+}$ 2 cancer cells were tested for aneuploidy, mutations in key oncogenes and tumor suppressors, and for migration as an indicator of metastatic potential. Clone PA28 $\gamma^{+/+}$ 2 cancer was also treated with four chemotherapeutics: butyrate (HDAC inhibitor), vinblastine (microtubule disruptor), bortezomib (proteasome inhibitor), and PX866 (PI3K inhibitor), for 3 hours to test for sensitivity to current cancer therapies. Clone 2 cancer was found to exhibit increased aneuploidy compared to WT PA28 $\gamma^{+/+}$ cells. The clone 2 cells did not exhibit more migration than controls. The PX866 showed the highest effect on the transformed cells, decreasing viability and increasing apoptosis.

Investigating Constitutive Activity of the Orphan G Protein-Coupled Receptor, Gpr161

Karisma Sheth¹ and Saikat Mukhopadhyay²

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University of Texas Southwestern Medical Center
Abstract # 15

G protein-coupled receptors (GPCRs) are fundamentally important for signal transduction in a variety of cellular responses. The orphan GPCR, Gpr161 is a rhodopsin family GPCR that is found in vertebrates. Gpr161 is localized to the primary cilium, a specialized microtubule-based compartment that serves as a cellular antenna in sensing external signals in most cells. Gpr161 is controlled by trafficking mechanisms that regulate localization to the cilium, including the ciliary complex IFT-A, and the tubby family protein Tulp3. Gpr161 is also expressed early during neural tube development, and is a negative regulator of the Sonic hedgehog (Shh) pathway. By definition, orphan GPCRs have no known ligand. Interestingly, Gpr161 also exhibits high levels of constitutive activity (i.e. basal activity in the absence of ligands) in cAMP assays, and is G_{αs}-coupled. The cAMP signaling activity of Gpr161 suggests it to be a candidate GPCR for establishing the basal cAMP gradient during PKA activation in the Shh pathway. Understanding the molecular mechanisms underlying GPCR activity can help increase the odds of identifying ligands. Alternatively, studying constitutive activity of Gpr161 can help us understand its role in Shh signaling. The objective of this project is to design specific mutants of Gpr161 to analyze differences in constitutive activity, which will help us understand the basis of how the receptor functions. Based on these results, future experiments will be designed to understand the role of Gpr161 in carcinogenesis. In addition, the activity profile of Gpr161 may provide insights in identifying agonists and/or antagonists of Gpr161. In conclusion, studying molecular mechanisms underlying Gpr161 activity promises to help us understand the role of this important GPCR in health and disease.

Hill Country Germans and Red River Germans: A Comparison

Quinn Sicking and Hunt Tooley
History Department, Austin College
Abstract #16

My project will be a presentation that compares historical, cultural, economic, and religious aspects of two different groups of German immigrants to Texas in the 19th Century. The first group will be the well established and documented group of Germans established by the Adelsverein in the Texas Hill Country in the 1840s, while the second group will be the smaller group of German Catholics established in Cooke and Denton County in the 1890s and its subsequent development. The goal will be to look for similarities and differences between the two groups.

Leadership and Sexuality

Whitney Russell and Jill Schurr
Psychology Department, Austin College
Abstract #17

This project, the second in a series, is designed to better understand perceptions of homosexuality among college students. In my first study, I investigated students' perceptions about the basis for homosexuality. In this study, I examine how stereotypical perceptions of homosexuality impact perceptions of traits related to leadership. I predicted that on traits, such as interpersonal skill, the homosexual candidate for student government would be rated more highly, and on traits, such as being authoritarian, the heterosexual candidate would be rated more highly. My predictions were not supported. These findings are discussed in light of post hoc analyses, as well as, the results of my previous study.

Increasing Dye-Sensitized Solar Cell Efficiency by Controlling Dye Surface Concentrations: Preparations and in Situ Characterization of Model Dyes by IR Spectroscopy

Dominique Beamon and Karla McCain
Chemistry Department, Austin College
Abstract #18

Dye-sensitized solar cells are a potentially cheaper and more efficient way to harness solar energy than traditional silicon based solar cells. In order to maximize the efficiency of DSSC's controlling the concentration of the dye molecules on the surface of titanium dioxide is important in order to maximize electron transfer. Attenuated total reflectance IR spectroscopy was used to monitor the concentration of the molecules on the surface of the titanium dioxide. First, an azide terminated silane was attached to the surface of the TiO_2 . The terminal azide was then reacted with an alkyne using click chemistry. Hexyne was used as a model system before moving on to using ethynylferrocene, a model inorganic dye complex. The kinetics and extent of the click reaction were measured by monitoring the disappearance of large azide band. Hexyne reached 61 ± 6% completion in 60 minutes with a rate constant of $k = 0.10 \pm 0.05 \text{ min}^{-1}$. The ethynylferrocene reaction reached 50% completion with a rate constant of $k = 0.10 \text{ min}^{-1}$. The extent of the two reactions varied due to sterics and is not expected to reach 100% completion also due to this reason. After the ferrocene is attached to the surface, its visible spectrum will be acquired using diffuse reflectance sampling. Lastly, in order to absolutely quantify the concentration of the dye complex on the surface, acid will be used to strip the ferrocene from the surface where it can be quantified using atomic absorbance. Being able to measure the surface concentration absolutely will allow us to estimate the average distance between dye centers and test our hypothesis about the effect of surface concentration on solar cell efficiency.

Preparation and Characterization of J-aggregates of a Phenyl Functionalized Cyanine Dye

Yemisirach Seyoum and Katie Walker
Chemistry Department, Austin College
Abstract #19

In this research we report on the preparation and characterization of a phenyl functionalized cyanine dye J-aggregate for use in electrogenerated chemiluminescence (ECL). Electrochemical stability of cyanine dyes has been achieved by stabilizing the dye radical that forms on the polymethine chain by the addition of functional groups. We hypothesize that by inserting a functional group (in our case a phenyl functional group) we will be able to stabilize the dye radicals in the supramolecular J-aggregates. We conducted optimization studies (solvent type, dye concentration, aggregation time) to form J-aggregates from phenyl functionalized cyanine dye monomers. We formed H-aggregates and J-aggregates in water and salt solutions, respectively. Further spectroscopic (absorbance, fluorescence) characterization of the aggregates was performed to confirm their unique optical properties characteristic of J-aggregates (red shifted absorbance, narrowed absorbance band, resonant fluorescence). We also conducted electrochemical studies to investigate the stability of phenyl functionalized cyanine dye J-aggregates.

Testing *the Mere Exposure Effect*

Zixian Chai and Hank Gorman
Psychology Department, Austin College
Abstract #20

Some theorists think that liking for complex materials increases with familiarity induced by repeated contact with the material, a phenomenon they label *the mere exposure effect*. Many consider liking, like familiarity, a measure of implicit memory. Implicit memory measures are thought to be more sensitive than explicit measures such as recognition or recall. Recognition of material increases with practice and increased spacing (lag) between presentations. The present study varied lag (4 levels—0, 1, 2, or 3 intervening poems) orthogonally with frequency (2,3, or 4 presentations); after the students viewed poems they completed test booklets on recognition, liking, and familiarity. The results were analyzed by a repeated measures ANOVA and multiple regression. These showed the expected effects of frequency and lag on recognition but yielded no evidence for *the mere exposure effect*.

Energy Balance in Ground Squirrels that Hibernate

Peter Keene, Gigi Privitera and Jessica Healy
Biology Department, Austin College
Abstract #21

Hibernating mammals go through a series of physiological changes throughout the year, including those involved with the secretion of hormones like leptin and ghrelin. Sex related hormones also have an effect on the metabolic activity of hibernating mammals. Estradiol is the primary sex-related hormone in females, and negatively affects food intake in mammals. These hormones in turn have effects on the levels of AMP-activated protein kinase (pAMPK) in the body. The purpose of this study was to explore the different concentrations of ghrelin, leptin, estradiol, and pAMPK in peripheral tissues of two species of hibernator, the thirteen-lined ground squirrel (*Ictidomys tridecemlineatus*) and the golden-mantled ground squirrel (*Callospermophilus lateralis*). Free-living individuals of each species were trapped and blood and tissue samples were taken in the field. Enzyme immunoassays (EIA's) and western blots were run in the lab to investigate the relative levels of the previously mentioned hormones and proteins in both species. *I. tridecemlineatus* had the highest ghrelin concentrations. There was no direct relationship between ghrelin and mass in each species. Additionally, there was no correlation between ghrelin and pAMPK in white adipose tissue (WAT) or gastrocnemius muscle. These results indicate that pAMPK stays relatively stable in the peripheral tissues of these small hibernators no matter how much ghrelin is present. There was a weak positive correlation between estradiol and mass and a weak negative correlation between estradiol and pAMPK in WAT. These findings may lead to insights on how to deal with many diseases that humans face that are connected to endogenous energy balance.

Preparation and Characterization of an Ethyl Functionalized Cyanine Dye

Jung Shin and Katie Walker
Chemistry Department, Austin College
Abstract #22

We investigated an ethyl functionalized cyanine dye (S2278) for use in electrochemical studies. Previous studies have shown that having a functional group on the polymethine chain of a cyanine dye increases its radical stability, which would make it more useful in spectroelectrochemical techniques such as electrogenerated chemiluminescence. We utilized S2278 to determine if the addition of the ethyl functional group to the cyanine dye would result in more electrochemically stable J-aggregates. First, we prepared and optimized formation of J-aggregates of S2278 through an alcoholic route with the aqueous salts NaCl, Na₂SO₄⁻, and NaNO₃. We determined that our J-aggregates stay in solution best when formed in 0.05 M NaCl with an aggregation time of 6 hours. Spectroscopy (absorbance and fluorescence) was performed to confirm red shifted absorbance and resonant fluorescence characteristic of J-aggregate formation. Additionally, we used cyclic voltammetry to investigate J-aggregate radical stability in electrochemical processes by observation of the reversibility of oxidation and reduction peaks of S2278 J-aggregates.

Introvert & Extrovert's Mate Preference & Sex Life.

Lillana Chavez, Alana McLeod and Ian MacFarlane
Psychology Department, Austin College
Abstract #23

Introverts and extroverts differ in more complex ways than just their social tendencies. Research is currently limited, however, on their sexual habits and mate preferences, thus the present study explores these variables. This study used an online survey to investigate 173 undergraduate students from a small, private, liberal arts college. Introversion was measured using the McCroskey Introversion Scale, desirable qualities in potential mates were assessed using the Mate Preferences Questionnaire. Sexual preferences were measured using the Sexual Relationship Questionnaire. A MANOVA indicated significant effects based on participants' gender (male vs. female; $p < .001$) and sexual orientation (hetero vs. non-hetero; $p = .009$). Race (White vs. non-White) approached significance ($p = .06$). The effect of introversion (high vs. low) was not significant ($p = .23$), nor were there interaction effects involving introversion (p ranged from .45-.75). Some limitations of our research include our limited participant pool might have skewed our results and the preliminary nature of the sexual preferences scale, which needs validation. These results do provide a foundation for further research to be done on other various differences between introverts and extroverts. Such research could explore differences in partner preferences due to race or sexual orientation, or use a measure of introversion/extroversion which would identify ambiverts as well.

Sequencing 16S rRNA from Soil Samples to Compare Microbial Diversity Across Tallgrass Prairies

Isaac Groover, Joel Barrett, Yemisirach Seyoum,
Kelsey Dodson, Kayla Farrar, Andrew McMillan,
Alejandrina Ocanas and Kelly Reed
Biology Department, Austin College
Abstract #24

Tallgrass prairies used to occupy a large portion of the United States. An estimated 99% of the Blackland tallgrass prairie ecosystem (a specific southern subset) has been destroyed by agricultural expansion. Additionally, prairie plant diversity is reduced due to the absence of natural disturbances (e.g. fires and grazing). This is primarily through the cycling of nutrients, which is also facilitated by microbial communities present in the soil. Previously, plant identification and diversity were used as measures of prairie restoration. However, recent studies suggest that plant root microbial communities are indicative of prairie restoration progression. In this study, 16S rRNA sequencing was used to characterize microbial communities in samples collected from Garnett and Sneed prairies, local prairies to Sherman. A previous study found an increased prevalence of the *Verrucomicrobia* phylum in Midwestern United States relative to Southern or Northern prairies. We confirmed this trend after finding a decreased prevalence of the *Verrucomicrobia* phylum in Garnett and Sneed prairies (Southern prairies) relative to previous findings in the Midwest.

The First Wave of Democracy: A Comparative Study of the Portuguese Revolution of 1910

Priscilla Wolfe and Hunt Tooley
History Department, Austin College
Abstract #25

The first wave of democratization, as the widespread revolutionary activity between 1905-1911 has been designated, has featured scholarship that has traditionally focused only on the uprisings that occurred in Russia, the Ottoman Empire, Mexico, Iran, and China. This paper argues that the Portuguese Republican Revolution of 1910 is part of the first wave of democratization phenomena, and uses a comparative methodology based off of overarching similarities of all five revolutions to evaluate Portugal's consistency with the other revolutions. The use of a selective historical narrative based on primary and secondary sources confirms the thesis, demonstrating that the Portuguese Revolution features participant motivations, revolutionary trajectory, and revolutionary outcomes that conform to the other revolutions of this time period.

Methylglyoxal Suppresses *pgm2Δ* Defects in *Saccharomyces cerevisiae*

Pido Tran and David Aiello
Biology Department, Austin College
Abstract #26

Previous studies indicate that altered Ca^{2+} homeostasis is observed in *Saccharomyces cerevisiae* strains lacking the major isoform of phosphoglucosyltransferase (*pgm2Δ*), which interconverts glucose-1-phosphate (G1P) to glucose-6-phosphate (G6P). By knocking out PGM2, an altered ratio of G1P/G6P occurs, which studies indicate to cause Pmc1p, a vacuolar Ca^{2+} ATPase, to hyper-sequester Ca^{2+} into the vacuole and deplete cytosolic Ca^{2+} . In response to low cytosolic Ca^{2+} , an influx of Ca^{2+} into the cell occurs via Cch1p and Mid1p through a capacitative Ca^{2+} entry (CCE) like mechanism. This influx of Ca^{2+} gets hyper-sequestered into the vacuole through Pmc1p, causing a cycle of high total cellular Ca^{2+} accumulation. Methylglyoxal (MG) is a toxic byproduct of glycolysis that could raise cytosolic Ca^{2+} , and thus could potentially rescue *pgm2Δ* growth defects. Preliminary studies in the lab show that MG partially rescues *pgm2Δ* growth defects on high Ca^{2+} and fully rescues defects on low Ca^{2+} , and high sodium. In order to explore how MG rescues *pgm2Δ*, growth assays and changes in cytosolic Ca^{2+} were explored in strains lacking YVC1 to determine if MG affects vacuolar Ca^{2+} release to restore cytosolic Ca^{2+} . In the *yvc1Δ* background, *pgm2Δ* growth defects are still rescued with the addition of MG. Preliminary data suggests that *pgm2Δ* strains in the *yvc1Δ* background exhibit a 5-fold lower increase in cytosolic Ca^{2+} as compared with the *pgm2Δ* mutation alone. With the addition of MG, the *pgm2Δ yvc1Δ* strain exhibits a 2-fold lower increase in cytosolic Ca^{2+} . These results suggest that MG is affecting either Cch1p/Mid1p or an unknown Ca^{2+} channel in either the vacuolar membrane or plasma membrane.

Use of Cosmetics and Self-Esteem

Brianna Abramson, Alicia Rizo-Liu and Matthew Findley
Psychology Department, Austin College
Abstract #27

This study investigated the use of cosmetics, self-esteem, and confidence. A survey was developed to give to participants that asked questions related to self-esteem, attractiveness and media usage. 39 Female Austin College students were randomly assigned to one of two conditions: Complete a survey on attractiveness and self-esteem or complete a survey on attractiveness and self-esteem while reading an article. The article that the participants in the latter condition received gave more detail on the makeup routine of a celebrity. By giving this article to some participants, we predicted that their self-esteem and confidence would be higher than those not given the article since it opened their eyes to how many cosmetics one uses to look attractive. The results of this study show that those with the article on average have a higher self-esteem and confidence than those without the article, although the difference were not significant.

Synthesis and Characterization of Vanillin Derived Bis-Urea Organogelators

Andrew Schneck and Andrew Carr
Chemistry Department, Austin College
Abstract #28

This research focused on the synthesis and characterization of novel bisurea compounds employing aromatic spacers containing only one long-chain alkoxy (figure 1) substitution are described. The advantage of such molecules chiefly arises from the availability of the starting material, 3-methoxy-4-hydroxybenzaldehyde (vanillin), and the facile reaction conditions. This is in contrast to the more esoteric precursors and expensive reagents used in the synthesis of bisurea organogelators with 3,5-disubstituted aromatic spacers employing two long-chain alkoxy groups as seen in Dr. Carr's first generation of organogelators.

Dodecyloxyvanillyl-substituted bisurea was obtained in an overall yield of 55.2% over four synthetic steps displayed a minimum gelation concentration of 2.33 wt% or less in toluene, forming a weak gel. Hexadecyloxyvanillyl-substituted bisurea was obtained in overall 67.2% and displayed a minimum gelation concentration of no more than 2.41 wt% in toluene, forming a strong gel. Octadecyloxyvanillyl-substituted bisurea was obtained in overall yield of 72.5% based on starting material and displayed a minimum gelation concentration of no more than 2.05 wt% in toluene, forming a strong gel.

Trends observed in the data suggest that increasing the tail length of the derivatives increases the over of the ureas. Presumably this trend is due to the increased hydrophobic nature of the material, making it easier to isolate by precipitation. The critical concentrations appear to be approximately 2 wt% for the three derivatives isolated, indicating a similar mechanism of gelation and insensitivity to the gelation to tail length.

Synthesis and Characterization of 3,4-dialkoxy Bis-Urea Organogelators

Ali Ahmed and Andrew Carr
Chemistry Department, Austin College
Abstract #29

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 ($R=C_{10}$ to C_{18}) 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 high yield by either a solid state method or standard solution chemistry. The oxime can then be reduced to the benzylic amine either by catalytic hydrogenation or molybdenum catalyzed hydride reduction. The benzylic amine is then reacted with diisocyanatohexane to generate the desired bis-urea. Preliminary synthetic yields of the intermediate aldehydes, oximes, amines and final bis-ureas will be presented. Initial critical concentration studies of the bis-ureas will be presented along with our interpretation of the molecular interactions responsible for the gelator behavior. Of particular note, one of the bisurea compounds forms a solid gel well below 1 wt/wt% in toluene placing it in a class of supergelators.

College Students' Attitudes Towards Gender Differences in Depression

Chelsea Smith, Matthew Bagley,
Willa Van Camp, and Ian MacFarlane
Psychology Department, Austin College
Abstract #30

Depression is something that affects millions of people; especially teens and young adults. Many of these young adults who suffer from depression also are in committed relationships. This study looked at the relationship between college students' gender, current depression status, relationship status, and impressions of whether or not someone who is depressed should be in a relationship. A sample of 152 students from a private, liberal arts college completed an online survey containing demographic items, the Center for Epidemiological Studies Depression Scale-Revised (CESD-R), and one of three possible scenarios where a male/female/gender neutral student who is depressed may be entering into a romantic relationship. Participants answered seven questions related to the student's potential relationship. Relationship status was found to be negatively correlated with relationship status ($\phi = -.17$, $p = .04$). Logistic regression analyses found being female ($p = .01$; OR = 3.02) and spending more time in college ($p = .05$, OR = 1.49) were significant predictors for participants to classify the student in the scenario (regardless of gender) as emotionally ready for a relationship. No significant predictors were found for participants' judgments of whether or not the student in the scenario should enter a relationship at this time. Future research should seek to replicate and extend the present findings, especially as they suggest stereotypes about mental health may be shifting and time spent in college may play a role in these shifts.

Synthesis and Characterization of 2-oxo-1,3-dithiole-4,5-dithiolatobis(pyrazine) platinum(II)

Abhishek Kadiyala and Bradley W. Smucker
Chemistry Department, Austin College
Abstract #31

In our continued quest to synthesize a light-harvesting dye, we have synthesized $[\text{Pt}(\text{dmid})(\text{pz})_2]$ (pz= pyrazine, dmid = 1,3,4,6-tetrathiapentalene-2,5-dione) and measured its photophysical and electrochemical properties. We have also explored its reaction with a bridging metalloligand under various solvent conditions.

Butyrate's Impact on PA28 γ Deficient MEFs is Time and Dosage Dependent

Rose Massey, Vidur Marwaha and Lance F. Barton
Chemistry Department, Austin College
Abstract #32

Butyrate is a short chain fatty acid known to function as an Histone Deacetylase Chromatin Remodeling Complex (HDAC) inhibitor to inhibit cell cycle progression from G₁ to S phase. Butyrate exposure is also known to decrease the expression of PA28 γ among a number of other proteins. PA28 γ is a proteasome activator involved in ubiquitin-independent protein degradation. PA28 γ deficient cells have also been shown to have slowed cell cycle progression at the G₁ to S phase transition. PA28 $\gamma^{+/+}$ and PA28 $\gamma^{-/-}$ MEF cells were used to examine the potential mechanistic link between PA28 γ expression and butyrate-mediated inhibition of the cell cycle. A dosage curve was performed to determine the optimum time frame and amount of butyrate with which to stress the cells. PA28 $\gamma^{+/+}$ and PA28 $\gamma^{-/-}$ MEF cells responded to the butyrate treatment in a time and dosage dependent manner. The optimum dose of butyrate was between 2 and 8mM for 4 days. Under these conditions PA28 $\gamma^{+/+}$ and PA28 $\gamma^{-/-}$ cells showed significant reduction of viability and increase in caspase activity compared to controls. The PA28 $\gamma^{-/-}$ cells under butyrate stress showed slightly lower viability in 2 day trials compared to PA28 $\gamma^{+/+}$ under the same treatment. However, in trials running for 3 to 6 days with butyrate the PA28 $\gamma^{-/-}$ cells performed better than the PA28 $\gamma^{+/+}$ with higher viability.

Depletion, Invasion, and Destruction: Environmental Ramifications in Europe after World War II

Morgan Chaney and Hunt Tooley
History Department, Austin College
Abstract #33

The environmental cost of World War II was significant across all of Europe. Restrictions created after World War I in the attempt to reduce the level of possible destruction, if similar events were to occur again, were ignored. Both Allied and Axis powers indiscriminately disrupted human and natural ecosystems. Natural resources, like timber, were rapidly depleted for the war effort. Restrictions protecting endangered species were ignored. Human areas of habitation were intentionally destroyed to weaken the opponent or prevent their access to resources. Significant unintended destruction of deciduous forests and orchards occurred through the spread of nonnative invasive pests. The British experimentally flooded Gruinard Island with Anthrax spores when testing possible biological weapons. At the end of the war, these actions left lasting legacies on human and ecological environments, making restoration, recovery and rebuilding an arduous task for years to come.

Dynamics of Soil Enzymes and Fungal Communities at the Sneed Prairie Restoration

Minhua Li, Andrew McMillan and Kelly Reed
Biology Department, Austin College
Abstract #34

The Blackland Prairie once covered a large area extending from the Texas-Oklahoma border to San Antonio, but now less than 1% remains due to urbanization and agricultural changes. The Sneed Restoration Experiment is looking at the field managements of cattle (CM), fire (FM), and the combination of fire and cattle (FCM) and its effects on the vegetation as well as the soil microbial communities. This project examined changes in the soil fungal communities and enzyme activities over time and managements. The soil enzymes (β -glucosidase (BG), N-acetylglucosaminidase (NAG), and phosphatase) were measured using fluorescent substrates and fungal communities were analyzed by terminal restriction fragment length polymorphism (TRFLP) analyses. The prairie remnant had significantly higher levels of BG and NAG activity than the other managements, while BG and phosphatase activity showed seasonal variation between March and June for all managements. A comparison of the fungal community structure at three different time points indicated that the communities clustered by time. However, there was no clustering of fungal communities by field management when each dataset was analyzed independently. These results are not surprising since previous studies have shown it takes many decades to observe changes in microbial communities during prairie restoration.

Production and Expression of β -2-microglobulin Mutations at Position 60

Jay Jeon and John Richardson
Chemistry Department, Austin College
Abstract #35

Beta-2-Microglobulin (β 2m) is a small 99 residue protein that is part of the class I major histocompatibility complex (MHC-I). It is shed from the surface of cells into the bloodstream as cells undergo apoptosis and is excreted from the body in people with normal functioning kidneys. However, β 2m cannot be degraded by people with diseased kidneys; therefore the concentration of free circulating β 2m increases and begins to favor the formation of amyloid fibrils. These amyloid fibrils then get deposited into the skeletal joints and bones, leading to the onset of dialysis related amyloidosis (DRA), which is then exacerbated by long term hemodialysis. The goal of our lab is to understand the protein misfolding that occurs because of this phenomenon. Prior research, in the Richardson lab, saw a significant change in the protein's stability when Trp60 was replaced with phenylalanine. Because of this observance in stability, site directed mutagenesis was then performed on Trp60 to express Alanine (W60A), Tyrosine (W60Y), Methionine (W60M), and Serine (W60S). Our project was to express and purify these mutants. Next we will determine the effect on stability of each of the mutants. Each mutant was exposed to varying concentrations from 0.0M to 9.25M urea, and left to sit for 24 hours before the fluorescence was measured. Unfolding was monitored using tryptophan fluorescence (W95) by monitoring the change in location of maximum emission versus concentration of urea.

The Role of PA28 γ in the Cellular Stress Response to Anisomycin

Myranda Baumgartner, Samantha Carr, Brandon Dang, Miguel Diaz-Martinez, Teju Koka, George Melchor, Christine Munyoki, Chance Witherspoon and Lance F. Barton
Biology Department, Austin College
Abstract #36

Anisomycin is an antibiotic that inhibits the ribosome, decreasing protein synthesis in the cell. Anisomycin is known to activate several stress-activated kinase pathways in response to the reduced effectiveness of protein synthesis. Defective Ribosomal Products and other damaged or misfolded proteins must be removed from the cell through the proteasome system. PA28 γ is an ATP- and ubiquitin-independent activator of proteasome function that has previously been investigated to affect cell fate decisions in response to cell stress. This semester-long research project in the course, investigated the effects of PA28 γ expression on the cellular stress response to anisomycin and cell fate decisions. Specifically the role of the p38 Mitogen Activated Protein Kinase pathway in the activation, translocation and enhancement of p53-mediated gene transcription was investigated.

Morphology, Migration, and Resistance Phenotypes of Transformed MEF Cells

Brian Zhu, Eric Mong and Lance F. Barton
Biology Department, Austin College
Abstract #37

Cancer is a class of diseases which result from the uncontrolled cellular proliferation and invasion into the surrounding circulatory and lymphatic systems which allow the cells to colonize other parts of the body. Mouse Embryonic Fibroblast (MEF) cells were mutagenized and transformed into cancer cells. Phenotypes including karyotype, wound response, and chemotherapy resistance were analyzed and compared with normal control cells. Karyotypes displayed numerous aneuploid and tetraploid cells of the cancer line, indicating genomic instability. Transwell and scratch migration assays provided evidence that cancer cells displayed greater invasiveness. Additionally, cancer cells were generally much larger than normal cells. These results along with the high frequency of abnormal karyotypes suggest defects in cell cycle control. Cancer cells responded to an AKT inhibitor drug, but were unaffected by proteasome inhibition (bortezomib) or PI3K inhibition (PX866), suggesting over-expression and activation of AKT independent of PI3K, as well as metabolic alterations that allow the cell to escape the effects of proteasome inhibition, subsequent poly-ubiquitinated protein accumulation, and ER stress-induced apoptosis.

Synthesis and Characterization of
Supramolecular Squares Composed of
Dithioleneplatinum(II) Bridged by
Bis(4'-(4-pyridyl)-2,2':6'2''-terpyridine)iron(II)

Philip Friedman and Bradley Smucker
Chemistry Department, Austin College
Abstract #38

In the synthesis of building blocks for light harvesting molecules, the new Pt(bdt)(pz)₂ (pz = pyrazine, bdt = 1,2-benzenedithiolate) molecule was successfully synthesized. The reactions of Pt(bdt)(pz)₂ or Pt(mnt)(pz)₂ (mnt = dimercaptomaleonitrile) with the bridging *bis(4'-(4-pyridyl)-2,2':6'2''-terpyridine)iron(II)* hexafluorophosphate metalloligand were investigated. The photophysical and electrochemical properties of all of these compounds were measured.

Counteracting Bias Towards Gay Men

Erika Zapata, Emily G. Bourcier, Katherine Chipman, and
Matthew Findley
Psychology Department, Austin College
Abstract #39

While a bias has historically existed toward gay men, some recent evidence suggests that the bias toward LGBTQ members has decreased among certain populations. Possible reasons for a decrease in bias toward LGBTQ individuals include programs and clubs on college campuses that enhance knowledge and awareness of the LGBTQ community. The current study was interested in examining whether or not portraying gay men as personable would reduce homophobic attitudes in general.

This experiment randomly assigned college students ($N = 53$) to complete one of three conditions. In all three conditions participants saw a picture of a fictional male, Jeffery Thompson, and a brief biography. The three conditions differed based on whether the male was subtly identified in the biography as being 1) heterosexual, 2) gay, or 3) gay but with additional information (i.e., in his free time Jeffery enjoys traveling with his family and volunteering at the boys and girls club of America.) Participants then completed Write, Adams, and Bernat's homophobic scale.

The study was primarily interested in knowing whether or not homophobic scores would be reduced for participants assigned to the "gay personable" condition as compared to the other conditions. The results of the homophobic scale showed those who were exposed to the gay individual, had scores significantly higher than those who were exposed to the personable gay individual. No other significant difference was found.

The results of the current study suggest that portraying LGBTQ individuals as more personable and "human" can directly reduce homophobic attitudes and provides another means by which current homophobic attitudes may be changing among certain populations in society.

Identifying Proteases that Facilitate Enterohemorrhagic *E. coli* Pathogenesis in the Presence of the Microbiota

¹Joel Barrett, ²Meredith M. Curtis, and ²Vanessa Sperandio

¹Biology Department, Austin College

²Department of Microbiology,

University of Texas Southwestern Medical Center

Abstract #40

Enterohemorrhagic *E. coli* (EHEC) is a pathogen capable of causing diarrheal outbreaks worldwide. Its infectious dose is as low as ten bacteria. EHEC's low infectious dose is attributed to its possession of type-three secretion system (T3SS) machinery, allowing for the translocation of its effectors into human gut epithelial cells. Upon translocation of its effectors, EHEC modifies the epithelial cell cytoskeleton and signal transduction pathways, enhancing its colonization through formation of actin pedestals. This study examined how *Bacteroides thetaiotaomicron* (*B. theta*), a commensal gut microbe, increases protease activity that may be necessary for maturation of T3SS machinery. EHEC strains lacking *B. theta*-augmented proteases exhibited differences in processing of the T3SS machinery in vitro. This study suggests that microbiota-augmented protease activity is involved in T3SS-mediated pathogenesis.

Investigating the Effects Of Cancer on PA28 γ Deficient Mouse Culture

Mohamed Faheid, Stephanie Ornelas and Lance F. Barton
Biology Department, Austin College
Abstract #41

Cancer is a class of diseases characterized by uncontrolled cell proliferation. The hallmarks of cancer are properties that aid in identifying cancer, because they are consistent outcomes. Through defining the key characteristics of cancer, and understanding the mechanisms of transformation of normal cells into cancerous cells, it is possible to then connect current therapies for cancer to underlying mechanisms of cell biology. In order to characterize these hallmarks in a PA28 γ -deficient cancer cell line, genomic instability through karyotyping, anchorage dependence and motility through wound healing were examined. Following this, the sensitivity of this cancer cell line to specific chemotherapeutics was determined. This specific PA28 γ -deficient cancer cell line displayed three distinct hallmarks of cancer including increased motility, abnormal karyotypes, and decreased contact-inhibition.

Adolescents' Participation in Extracurriculars: Parents' Influences and Future Plans

Katie Gowdy, Brianna Harvey,
Reygan Holloman and Ian MacFarlane
Psychology Department, Austin College
Abstract #42

Parents, mentors, and guardians (PMGs) all have an impact on the extracurricular activities children choose to participate in, along with having an impact on how those children wish to influence their future children. While previous literature has explored the effects of parental involvement on adolescents' participation in activities, we could not find any empirical data connecting parental involvement with the children's planned involvement with their own future children. This study serves as a preliminary investigation of this connection. This study investigated college students ($n = 151$) currently enrolled in psychology courses at a small, private, liberal arts college. They answered 18 questions on an online survey to see how much of an impact their PMG involvement had in their extracurricular activities and if their parental/guardian/mentors will have an influence on their plans to be involved with their future children. A multinomial logistic regression found presence of siblings, parents' marital status, amount of time spent participating, gender, and age at which participation began to be significant predictors. Results need to be replicated in samples with more diversity, especially in terms of race and SES. This research has potential implications for parents, coaches, and family therapists, as it provides a basis for thinking about the long-term impacts of parental involvement in extracurriculars. Future research needs to separate out types of extracurricular activities and conduct interviews to investigate more nuanced relationships between one's parents and one's (hypothetical) children.

Properties of Thin Films

Albert Chung, Connor Rigg and Andra Troncalli
Physics Department, Austin College
Abstract #43

In this study, we investigated the properties of gold thin films. We synthesized samples thinner than 50 nm by sputtering gold onto glass substrates. We subsequently characterized the electrical properties of the thin films between room temperature and 10 K. The optical properties were determined through spectroscopy measurements between 300 to 1,000 nm by recording transmission and reflection data and extracting the absorption coefficient of our samples. We consider a method of using the absorption coefficient to determine the thickness of thin films.

Project X Porphyrin Pentad

Deepika Mannem and Stephanie Gould
Chemistry Department, Austin College
Abstract #44

Dye-sensitized solar cells (DSSC) successfully harness solar energy and provide an alternative to traditional coal and oil fuels. Ideal dyes for a DSSC will effectively absorb a broad spectrum of light. Porphyrins have continued to be used as alternatives to metal based dyes because of their large-stable aromatic ring has a high molar absorptivity. In this study five porphyrins were covalently assembled to create a broad spectrum dye. The target porphyrin pentad was synthesized by using two different types of porphyrin, Zinc 5,10,15,20-Tetra(4-bromo phenyl)porphyrin and 5, 10, 15-Tri(4-carbomethoxyphenyl)-20-(4-(trimethylsilyl)ethynylphenyl) porphyrin. Herein, the synthesis of the target molecule will be discussed. This short synthetic pathway has the potential to produce a large variety of organic based solar cells dyes.

Determining What Mediates the Relationship Between Ca^{2+} Homeostasis and Carbohydrate Metabolism in *Saccharomyces cerevisiae*

Katrina Ngo, Angela Huang, Rachel Jimenez,
Courtney Goldstein and David Aiello
Biology Department, Austin College
Abstract #45

Calcium is an ion utilized in the cell as a second messenger for the maintenance of various vital cell functions. Disruptions in Ca^{2+} homeostasis can be harmful and have been linked to diseases in mammalian cells such as Alzheimer's disease and Huntington's disease. *Saccharomyces cerevisiae* serves as an efficient eukaryotic model organism to study Ca^{2+} homeostasis because of its rapid growth and genetic tractability. By working with *Saccharomyces cerevisiae*, researchers have found that mutants lacking phosphoglucomutase 2 (*pgm2Δ*), an enzyme which interconverts glucose-1-phosphate (G1P) and glucose-6-phosphate (G6P), have a high G1P to G6P ratio due to high accumulation of G1P when grown on galactose. Evidence from past studies strongly suggests that this altered ratio of G1P to G6P leads to growth and Ca^{2+} homeostasis defects in *pgm2Δ* on galactose. The present research focuses on further understanding the mechanism linking Ca^{2+} homeostasis and carbohydrate metabolism. Budding off of the work of previous students who performed an EMS mutagenesis screen to identify candidates that display suppression of *pgm2Δ* defects (*spd*), present research focused on identifying the *spd* allele in three of the candidate strains, 598, 608, and 609, through a plasmid genomic library screen on glucose, galactose, and galactose + cyclosporin A media types.

Synthesis of Porphyrin Dyes for Dye-Sensitized Solar Cells

Yamna Zaman, Stephanie Gould and Bradley Smucker
Chemistry Department, Austin College
Abstract #46

The goal of this study is to develop new porphyrin-based dyes for dye-sensitized solar cells (DSSC). Nature has selected chlorophylls in plants as antennae to harvest light for the conversion of solar energy in photosynthetic successes. Inspired by the natural process of photosynthesis, scientists have utilized porphyrins as artificial chlorophylls to harvest light for solar cells. Herein the synthesis of a new dye containing a porphyrin capped with tert-butylterpyridine platinum groups. A convergent synthesis was used with final the key step being coordination of the porphyrin to the platinum atoms. This efficient synthetic route holds the potential to produce a variety of metal-organic solar cell dyes.

Synthesis of Bisurea Organogelators Using Varying Alkane Chains

Saswatha Anireddy, Ethan Brem, Jaime Cervantes, Woojun Chung, Mayra Cuellar, Divisha Eppalapalli, Safa Khawaja, J. Daniel Loya Flores, Eyrarn Pleth-Suka, Tamiem Popal, Hunter Sartor, Karisma Sheth, Matthew Steidle, America Vallejo, Anastasia Wells, and Andrew Carr
Chemistry Department, Austin College
Abstract #47

Organogelators are organic molecules that immobilize an organic solvent. New organogelators were synthesized by varying alkane chain lengths from C₁₀ to C₂₂ on the edges of the molecule. Synthesis of the organogelator involved alkylation of 3,4-dihydroxybenzaldehyde, oxime formation, reduction to amine, and urea formation. In order to maintain controlled heating in the alkylation reaction, a Lab Armor bead bath was used. In the oxime formation, the ratio of hydroxylamine hydrochloride to the sodium hydroxide (NaOH) was 3:2, which reduced the impurities in the oxime product. In the reduction reaction, the solvent used during the workup was changed from ethyl acetate to dichloromethane (DCM). The most effective workup method was to add NaOH (1M) followed by DCM, which resulted in higher yields of amine. Byproducts in the amine synthesis resulted in impurities in the urea, and produced inconsistent critical concentrations when tested in toluene. Critical concentrations varied from 0.15 wt% to 0.76 wt% for the gelators synthesized.

Notes:

Austin College Playwrights Showcase

Friday, March 20 at 7:30 p.m.
Ida Green Theatre
Ida Green Communication Center

Description

Authors studying the craft of playwrighting in a course taught by Liz Banks in Fall 2014 submitted samples of their work for presentation at this conference. The four short works selected capture their authors' structural experimentation with dramatic scope and action. Their varying styles embody the wide-ranging interests, experiences, and imagination of Austin College students, from existential meta-drama to psychological realism and miracle plays.

These are original compositions appearing here for the first time anywhere, performed as staged readings by volunteers from the AC community.

Playwrights featured:

Caroline Hodge
Rebekah Urban
Cody Stewart
Greyson Sanders

The Showcase will also feature performances by the Austin College Improv Troupe, providing samples of the unscripted as well as the scripted, as a demonstration of just some of the experimentation and research explored by Austin College theatre students.

Austin College Improv Troupe

Friday, March 20
Ida Green Theatre

The Austin College Improv Troupe explores cutting-edge improvisation for the theatre. Including among its members students with majors from all divisions of AC, student improvisers combine Chicago-style long-form and short-form techniques with the benefits of a liberal arts curriculum. Sometimes called “Sherman Style” improv, the troupe specializes in bringing a constantly-widening range of fields through a space shaped by curiosity, exploration, and constant experimentation. Audience interests and suggestions are incorporated by the performers to construct an entirely spontaneous and utterly unique performance that has never existed before, and might never appear again. The troupe is coached by Dr. Kirk Andrew Everist and operated by student facilitators Spencer Nystrom and Lindsey Womack.

We are the Austin College Improv Troupe and we are:

Reed Cook
Sarah Davis
Emma Grundy
Caroline Hodge
Julio Malave-Torres
Jameson Moore
Spencer Nystrom
Sarah Wilhelm
Lindsey Womack

Notes:

Student Oral Presentations
Block I
10:30 a.m. - 10:50 a.m.



Developing a Framework for
Future Research in
Political Science:
Theory and Hypothesis Creation

Moderator: Dr. Nathan Bigelow
Block I: 10:30 a.m. – 11:55 a.m.
Wright Campus Center 254

The Presidential Candidate: Using New and
Unconventional Media to Get Elected
Suzanne Francis

Scandal in the White House: Finding an Optimal
Response
Tyler Hicks

Legislative Professionalism and Economic
Regulation
Grant Marcinko

Immigration, Christianity, and Nationalism
Shannon McKelvie

Are Exiting Judges Less Punitive?
Aimee Spearman

Accelerate Your Startup: Panel Discussion and Entrepreneurial Pitches

Moderator: Dr. David Griffith
Block I: 10:30 a.m. – 11:55 a.m.
Wright Campus Center 231

Sally K. Humphries, Jaqueline C. Jorns,
Bryce C. Murphy, and David M. Van Amburgh
College Care

Aaron S. Anwary and Walter J. Rampy
NeedaHand

William M. Camp, Scott A. McCollum,
David A. Smith, and Joshua L. Stowers
InvestNinja

Colter D. Headrick, William T. McClinton,
Dagan D. Newsome, and Dayne L. Read
HETA

**World War II and the Postwar World:
History, Politics, and
International Politics**

Moderator: Dr. Hunt Tooley
Block I: 10:30 a.m. – 11:55 a.m.
IDEA Center 127

**Student Presenters:
(In Order of Presentation Time)**

**Brady Flanery
James Mantil
Shane Hodge**

Churchill's Finest Hour: Losing the 1945 Election Immediately After Winning World War II

Brady Flanery
History Department, Austin College

Winston Churchill led the British to victory in WWII, however immediately after the war he lost the election by a landslide. This research paper discusses the context of the election, the circumstances of his campaign, and newly elected Labour Prime Minister Clement Attlee. Conclusions were drawn from newspaper articles surrounding the election, as well as primary diaries and academic journals.

Faculty Director: Hunt Tooley

Rommel vs. the German General Staff: An Analysis of the Relationship Between Erwin Rommel, Adolf Hitler, and the German Officers Before and After the Invasion of Normandy

James Mantil
History Department, Austin College

An examination of the dynamic relationship between Field Marshall Erwin Rommel, his fellow officers, and the German General Staff which by 1943 was Adolf Hitler in the buildup to the Normandy invasions and directly after it. Germany had become aware of an imminent British and American attempt to create a Western Front, Rommel, one of Hitler's favorites was placed in command after presenting a grand coastal defense that impressed Hitler. However the relationship between the two would deteriorate as Rommel faced obstacles with obtaining necessary resources and troops that Hitler was either slow to give or denied. Rommel was greatly frustrated by the fact that while he was in charge of the coastal defenses, he was forced to answer to officers above him in the chain of command, many whom opposed his plans. Hitler's "resolutions" to these disputes would often leave both sides with insufficient forces to carry out their plans. Many of Rommel's predictions, ignored by Hitler and his fellow officers would come true when the Allies began their assault on June 6th 1944. Despite this, his future strategies were rejected by Hitler whose own strategies led to more defeats. The relationship hit its low point when at a war conference Rommel bluntly asked Hitler how he imagined the war could be won. Hitler, offended at this remark began leveraging generals against Rommel who was now an opponent to Hitler.

Faculty Director: Hunt Tooley

Cold War Alignments: From the Forming of NATO to the Warsaw Pact 1949 to 1955

Shane Hodge
History Department, Austin College

This paper is an examination of the decisions and events that led from the forming of NATO to the Warsaw Pact. The beginning of the Cold War was an extremely tricky situation in which events could have ended up going in a much different direction than they transpired. The Western allies and namely the United States were bent on preserving the west and their interests and this meant the inclusion of West Germany and its rearmament to provide a buffer state to counter the Soviets. This was seen as a slight to the Soviet Union who in turn after failed or bluffed peace attempts decided for the betterment of their own interests to sign the Warsaw Pact joining them all their satellite states into an alliance dominated by the Soviet Union. Although it wound up in opposing alliances the question remains had agreements been reached would we have had to endure through thirty years of Cold War.

Faculty Director: Hunt Tooley

Student Panel I: Research about Culture, Community, and Philosophy

Moderator: Dr. Lisa Brown
Block I: 10:30 – 11:55 a.m.
IDEA Center 125

Student Presenters:
(In Order of Presentation Time)

Tabatha Keton
Gideon Ibemere
Charlotte Smart

Cultural Revitalization and Identity in Indigenous Communities

Tabatha Keton
Political Science Department, Austin College

Cultural revitalization is a wide-spread phenomenon, as societies are beginning to seek the roots of their past and bring back many aspects of their culture. From dance and songs to even entire languages, cultures are using these aspects of their once almost forgotten past to reassert their rights as a cultural group. Despite the advances a number of cultures have made, cultural revitalization is not without problems. Often times, conflicts arise when the values of the traditional culture do not match up to the modern lifestyle of those in the society. Cultures must choose what to revitalize, creating potential conflict on what it means to truly be Choctaw or Sirayan, and creating rifts between different sectors in the society due to conflict of interests. I experienced this first hand when visiting two very different, but also similar in some aspects, groups: the Choctaws of Oklahoma and the Siraya of Taiwan. Based on my research, I have began researching the broader range of cultural revitalization movements and the scholars that have written about them. As I dig deeper, I find that there are many ways anthropologists have been addressing the issue of cultural revitalization from looking at language changes to placing more emphasis on the item and how its use has changed over the years. I am focusing specifically on cultural revitalization, and how it alters the identity of those in the culture in question and how it alters how the larger society views the social group.

Faculty Director: Don Rodgers

KangaCompost

Gideon Ibemere, N. Reed Hancock
Environmental Studies Department, Austin College

Currently, our school does a phenomenal job of composting pre-consumer food waste such as the ends of lettuce, apple cores, or bits of unwanted tomatoes. What it doesn't include is post-consumer food waste or the food from student's trays after they put them on the conveyor belt. This project is a revised plan on how we can include that post-consumer food waste, keep the current process going, and reduce the environmental impact of our institution.

Faculty Director: Peter Schulze

Shakespeare's Prospero as Plato's Philosopher King

Charlotte Smart
English Department, Austin College

In "The Republic," Plato's "philosopher king" is he who blends political power and philosophy (1100). William Shakespeare, undoubtedly, drew from the writings of those who preceded him, so it only seems natural that he would intertwine the theories of the famed classical philosopher into his magnum opus "The Tempest." At the center of his play stands the aging Prospero. And so the question arises: Is Prospero the Philosopher King? I intend to explore this query, by looking at Prospero's relationship with his servants, his child, his books, but also himself.

Faculty Director: Alex Garganigo

Student Panel II: New Knowledge from Old Artifacts

Moderator: Dr. Ian MacFarlane
Block I: 10:30 – 11:55 a.m.
IDEA Center 124

Student Presenters:
(In Order of Presentation Time)

Ilish DeWitt
Timothy Anderson
Albert Chung, Renato Guimaraes, and
Malin Pappas

Chemical Analysis on turn of the 20th Century Doctor's Bag from North Texas

Ilish DeWitt and Justin Banks
Chemistry Department, Austin College

Dr. G.A.L. Kusch was a physician in North Texas during the early 20th century and his doctor's bag is part of the archives at Austin College. Its contents were examined in order to better understand the history of this artifact, as well as to inform how to safely store and dispose of any dangerous contents. The bag contained 33 samples which were mostly solids or tablets, while 2 of the samples were liquid. Attenuated total reflection Fourier-transform infrared spectroscopy (ATR-FTIR) was used to do an initial screen of the samples. Spectra were matched to several libraries of both chemicals and common household materials. Several of the matches were to food-like components, so a series of chemical tests were performed to identify sugars, proteins, and lipids. Additionally, HPLC and melting points were used to confirm the identity of the pure compounds and assess their purity. A series of analgesics, placebos, and possible hysteria medications were identified. The anthropological significance of these medicines allows for insight into the influences of advertising, immigration patterns in Texas, and the development of modern medicine through its precursory drugs.

Faculty Director: Karla McCain

Deinonychus antirrhopus Reconstruction

Timothy Anderson
Biology Department, Austin College

Life-size reconstruction of *Deinonychus antirrhopus*, based on the original fossil discovered by John Ostrom and Grant Meyer in 1964. *Deinonychus* was the inspiration for the Jurassic Park villains (Crichton chose to use the name of its Asian relatives). *Deinonychus* was an apex predator in the terrestrial ecosystems around the inland sea that covered most of Texas and Oklahoma in the Mesozoic Era.

Reconstruction Team Members

Brittany Alvarado,
Jaylin Clevenger,
Jessica Farra,
Hailee Meiners,
Darcie Nightengale,
Holly Nightengale,
Diego Robledo,
and
Hailey Shapiro

Faculty Director: Kim Snipes

Studying Galaxies with the 24-inch Telescope at Adams Observatory

Albert Chung, Renato Guimaraes, and Malin Pappas
Physics Department, Austin College

The main purpose of this research project was to test the 24-inch Adams Observatory telescope for deep-space imaging. The two galaxies we studied were NGC 7331 and M31 (the Andromeda galaxy). We chose these objects because they closely resemble our own Galaxy, the Milky Way. A Charge-Coupled Device (CCD) was used to take images of 600-second exposure in three different filters, Red, Green, and Blue. Systematic noises were removed from each image using the MaxImDL software package, and a final image was created by combining the three reduced exposures into a 3-color image. The ImageJ software was used to perform a Fast Fourier Transform (FFT) on the final frames of each galaxy to highlight their galactic structure; this technique also revealed the shape of nearby galaxies and star positions. Using the final frames, we were able to calculate the bulge diameter of NGC 7331 as well as identify an unexpected gas cloud near Andromeda's super massive black hole (SMBH).

Faculty Director: David Baker

Notes:

Student Oral Presentations
Block II
12:00 p.m. - 1:25 p.m.



Lunch sponsored by Acumen and
Robert & Joyce Johnson Center

StoryVoices: Readings from Suspension

Moderator: Dr. Kirk Everist
Block II: 12:00 p.m. – 1:25 p.m.
Wright Campus Center 231

"Suspension" magazine is Austin College's award-winning literary magazine. Student-run, and totally focused upon work produced by Austin College students, alumni/ae, and, occasionally, faculty, it has reached a level of quality and achievement that places it among the best in the nation. This presentation will feature readings from the current issue, together with a brief lecture by the editor on the aims of the journal as a cultural representative of Austin College. This reading also features the top and third prize winners from the first annual 'Roos Who Write Short Story Contest.

Stories by:
Anika Payne,
Marissa Collins,
Devondria Darty,
Cody Edwards,
Shelbi Hall
and
Laurie Hursting

Selections from Media Studies Productions

Moderator: Dr. Brett Boessen
Block II: 12:00 p.m. – 1:25 p.m.
Wright Campus Center 254

This session will feature a selection of video short films produced by students in the Digital Video Production I course and the Music Video Production and Media Industry Studies course. The session will include a question and answer panel with the producers.

Digital Video Production:

College Love, Akylah Robinson and
N. Prince Balkaran

La Placita, Gaby Margocs

Elephant on Your Back, Luke Dunlap, Kim Shelton,
and Carolyn Yao

Music Video Production and Media Industry Studies:

John-Phillip Seale

Notes:

Student Oral Presentations
Block III
1:30 p.m. - 2:50 p.m.



Recent Research in East Asian Languages and Cultures

Moderators: Drs. Jennifer Johnson and
Scott Langton
Block III: 1:30 p.m. – 2:55 p.m.
IDEA Center 127

This panel will be an interdisciplinary showcase of independent student work and research from various courses in the East Asian Languages and Cultures program. Students will present portfolios developed as part of their participation in the Language House Program, teaching modules developed through participation in topics courses on Journey to the West and Kung Fu, art pieces developed through the Mellon partnered course on Asian Ceramics and Pre-Modern Japanese Culture and Aesthetics, and projects developed through language courses. This panel will also include presentations of works-in-progress by students from the Mellon Partnered Courses "Pre-Modern Japanese Culture and Aesthetics & Asian Ceramics," "Studies in Japanese Poetry," "Translation and Adaptation: The Case of Journey to the West," and "Kung Fu."

Brittany Dimock
Michelle Selmer
Blair Whalen
Will Whitehurst

German Immigrant Letter Writing in Texas in the 19th Century

Moderator: Dr. Ruth Cape

Students: Andrea Batchelor, Katarina Heidenhofer,
Akylah Robinson, Michael Sistrunk, Brittney Son, and
Chance Witherspoon

Block III: 1:30 p.m. – 2:55 p.m.

Wright Campus Center 231

The project is an examination of parts of two letter collections. The first one was written over a period from 1850 to 1875 by the German immigrant Franz Kettner, who arrived by himself in Texas in 1848, in an attempt to escape persecution due to his participation in the failed 1848 Revolution in German lands. The second letter collection was written between 1854 and 1885 by German immigrant Christian Friedrich Bergmann and his family, upon their arrival in Texas. The letters give information about numerous aspects of immigration that can be placed in the larger context of German immigration to Texas in the nineteenth century. Research on questions of how, historically speaking, 'Americanization' has taken place on both the American and the European continents, is also conducted in the context of this project. Students will analyze immigrant letters, practice the art of translation, produce creative writing projects, and explore individual aspects of the topic of German immigration to Texas, including visual materials, based on these letter editions. At the same time, they will also reflect upon their own immigrant roots. The results of this research will be presented in a bilingual reading presentation, supported by digital media.

The Effects of Government Policy On Civil Rights in the United States 1945-1970

Moderator: Dr. Jackie Moore
Block III: 1:30 p.m. – 2:55 p.m.
Wright Campus Center 254

This panel will examine the effects of government policy in supporting or denying civil rights in the broad sense for American citizens. It will discuss the how the "Lavender Scare" of the McCarthy Era led to persecution of homosexuals, how women's organizations responded to equal rights legislation in the 1960s, and how African Americans benefited from Lyndon Johnson's War on Poverty and used it to gain more political and economic power.

Student Presenters:
(In Order of Presentation Time)

Ashley Murphy
Andrea Hudson
Victoria Walker

Homosexuals and the Cold War

Ashley Murphy
History Department, Austin College

During the period of the Cold War when tensions were high due to the fear of communism, the United States government began to persecute civil servants who were perceived to be homosexuals. This time period is known as “The Lavender Scare.” Homosexuals in the 1950s were seen as weak individuals who would be an easy target for communists to blackmail, which ultimately made them a threat to national security. A presidential executive order, multiple laws, and even a Senate report detailing different qualities that federal agencies had to look at in order to determine if one of their employees is a homosexuals, were created for this witch-hunt. Thousands of homosexuals who worked for the United States government including the Armed Forces were affected by these policies. Even though society viewed homosexuality as a huge threat to national security, there was never a sufficient reason for homosexuals to be persecuted by the government because there was never any hard evidence that proved homosexuals were a threat to this nation’s security.

Faculty Director: Jackie Moore

The Role of Private and Federal Organizations in Women's Liberation in the 1960's

Andrea Hudson
History Department, Austin College

Fed up with lower pay and unequal employment opportunities, women in the 1960's began to fight for change within the legislation governing employment. John F. Kennedy created the President's Commission on the Status of Women to investigate discrimination against women within the workforce. The report released by this federal organization influenced the passing of the Equal Pay Act in 1963 and Title VII of the Civil Rights Act in 1964. These acts provided working women rights for equal pay and equal employment opportunities. Another federal organization, the Equal Employment Opportunity Commission (EEOC) was created in 1964 to enforce the Civil Rights Act. However, it often ignored complaints filed by women. Frustration with being ignored, led a group of women to form a private entity –the National Organization of Women (NOW)– to pressure the EEOC into enforcing the employment rights for women guaranteed to them under Title VII. Organizing marches and sit-ins, NOW spread awareness for women's liberation and helped influence the formation of several other private organizations that fought for women's rights.

Faculty Director: Jackie Moore

The War on Poverty as an Instrument in the Civil Rights Movement

Victoria Walker
History Department, Austin College

Following World War II, many Americans were facing poverty, particularly African Americans. With the implementation of President Lyndon B. Johnson's War on Poverty, many African Americans were able to get back on their feet. More than that, African Americans were able to use the War on Poverty, specifically the Community Action Programs, to gain political and economic power to continue to fight for Civil Rights. The research centers on the "maximum feasible participation" clause in the Economic Opportunity Act and how African Americans used this to challenge institutionally racist systems.

Faculty Director: Jackie Moore

Student Panel I: Intersections of Mathematics, Art, and Science

Moderator: Dr. Aaron Block
Block III 1:30 p.m. – 2:55 p.m.
IDEA Center 125

Student Presenters:
(In Order of Presentation Time)

Kusha Mohammadi
Spencer Nystrom
Amy Louise Glazier

Piecewise Domains in Staircase Metric Space-Times

Kusha Mohammadi
Mathematics Department, Austin College

Further results in the category, staircase metric geometry. After an introduction to and overview of this new general category of geometric systems, and of its associated natural methodology, we focus on the most recent extension of the category. Both in the positive definite and signature cases, $(2,0)$ and $(1,1)$, we consider parameter spaces that, while topologically path connected, are comprised of unions (possibly countably infinite) of specific non-convex subsets of planes, with each featuring a different 'scale factor' (or, 'index of refraction'); the connection scheme for these subsets is straightforward. New angle change laws for geodesics are derived (governing the transitions across the parameter space pieces) in both cases. Then, a variety of complete geodesics are constructed and exhibited, notably time-like in the signature case. These can be used further to construct, in some specific systems, asymptotic polygons. Finally, we include a brief discussion of the breadth of the category: staircase metric geometry.

Faculty Director: Jack Mealy

Elucidating the Stress Signaling Pathways Involved in the Growth of *pgm2Δ* *Saccharomyces cerevisiae* on Galactose

Spencer Nystrom
Biology Department, Austin College

Saccharomyces cerevisiae deficient in the phosphoglucomutase-2 enzyme (*pgm2Δ*) exhibit significant stress when grown on galactose containing media. Deletion of the general stress response factor, MSN2, does not affect wild type cell growth on galactose, however, *pgm2Δmsn2Δ* yeast are completely unable to grow on galactose. These data implicate the general stress response pathway in *pgm2Δ* survival during the shift from growth on glucose to galactose. By analyzing changes in gene expression over time in *pgm2Δ*, *msn2Δ*, and *pgm2Δmsn2Δ* yeast, I will characterize and assess the effects the MSN2 deletion has on specific stress response pathways to determine which pathways are necessary to allow the *pgm2Δ* strain to adjust to growth on galactose.

Faculty Director: David Aiello

Tile Design Using Mathematics for an Aesthetically Pleasing Tile

Amy Louise Glazier
Mathematics Department, Austin College

The melding of mathematics with art is an oft-underappreciated pairing that yields not only supreme elegance, but practical applications as well. The elegance of an equation can be reflected and amplified when modeled graphically; conversely, an artistic design embodies qualities of grace, fluidity, and exceptional symmetry when based upon a mathematical expression. Designs using sweeping curves and mathematical precision in two dimensions can be used to create and adorn objects in the real world. In the spirit of these ideas, this project explores myriad patterns, proportions, and color combinations that can be generated using a variety of mathematical functions, their integrals, and the aid of Wolfram Mathematica computer modeling software. The parameters of each design, such as the areas enclosed by each curve, and their accompanying analytical work are used to compile a catalog of bicolor square floor tile designs in order to show how the art inherent in math, and the math underlying art, can be used for practical purposes.

Faculty Director: Andrea Overbay

Student Panel II: The new 3Rs: Reading, Writing, and Research

Moderator: Dr. Carol Daeley
Block III 1:30 p.m. – 2:55 p.m.
IDEA Center 124

Student Presenters:
(In Order of Presentation Time)

Rebecca Hardegree
Tyler Hicks
Kellie Day

Reading Fluency Intervention: A Study on Second Grade Reading Ability and Improvement

Rebecca Hardegree
Education Department, Austin College

In this project, I worked with students in a second grade classroom during my semester period of student teaching for the Austin College Teacher Program. I used both pre and post test surveys to assess student dispositions regarding different reading intervention methods (designed to improve student reading skills). I used student monthly scores on the elementary school's program, i-Station, in which students were assessed on their reading ability, in order to track student improvement throughout the intervention period. I received positive results in which many of my students improved in their reading ability, and was able to determine which reading intervention methods were enjoyed most by the students.

Faculty Director: Julia Shahid

What is Water?

Tyler Hicks
English Department, Austin College

What is David Foster Wallace's theory of fiction, writing, and existence? My paper aims to answer these questions, applying them to my work as a writer.

Faculty Director: Peter Anderson

Self-Efficacy, Confidence, and Writing Growth Through Writing Journals

Kellie Day
Education Department, Austin College

Graduate and in-field research that explored if writing journals could affect confidence, writing growth and self efficacy in the elementary school classroom. The study was conducted for about 5 weeks using both qualitative and quantitative research.

Faculty Director: Julia Shahid

Instrumental and Vocal Chamber Music

**Saturday, March 21, 3:00 p.m.
Recital Hall – Craig Hall**

**Reception immediately following the
performance in Craig Hall Gallery**

Musical collaborations by Austin College students and faculty; the program will consist of vocal and instrumental works by Gerald Finzi, Paul Hindemith, Karl Friedrich Abel, and Mike Sinclair.

**Performed by Austin College
Students and Faculty**

Student Performers:

Megan Daugherty
Rizwan Jagani
Deepika Mannem
Mike Sinclair

Faculty Performers:

Ricky Duhaime
John McGinn
Cathy Richardson

Bilingual Stage Reading

SOLO SE NECESITAN DOS
(IT JUST TAKES TWO)

12 short plays
from
ONE HUNDRED ELEVATOR TRIPS
by
Alfonso Zurro

March 21 at 3:00 p.m.
WCC 231

Directed by Lourdes Bueno

Performance by
Zayra Acosta,
Sandra Carrasco,
Julio Malave-Torres,
and
Edgar Rodriguez

The Creative Mind

Moderator: Mark Monroe
4:00 p.m.—5:00 p.m.
Craig Hall Gallery

Individual Artists

Sierra Ford
Gideon Ibemere
Jordan Jones

Refreshments sponsored by
Suspension

Free Form Color In Free Form Graphite

Sierra Ford
Art Department, Austin College

My work includes multiple pieces of graphite drawings next to or in between two contrasting pieces of colors in mediums such as paint, colored pencil or marker. The colored pieces have less definitive form as they follow the flow of lines on a page with small excerpts of poetry. The graphite drawings are more concrete with well planned form as witnessed on a page as they are perceived.

Faculty Director: Mark Smith

Millennial Chatter

Gideon Ibemere
Art Department, Austin College

As I progressed with ceramics, one thing had always troubled me: throwing on the potter's wheel. As a part of Generation Y, I tend to learn things through watching YouTube videos. After extended periods of YouTube scouring and studying, I have finally been able to throw various forms with my prominent form being bowls.

For these works I was interested to see what clay medium would be the most elegant when thrown. I decided that using porcelain not only eased my throwing woes, but also provides the blankest of canvases for my pieces post throwing.

The ice white porcelain provides the base for my choice to try to juxtapose a few classic chattering textures with glazes and washes that suit my millennial tastes. So by making chattering tools with a few hacksaw blades, spinning the wheel, and letting the tool(s) bounce on and off the outside of the bowl, I was able to quite quickly create a texture, completing the trimming process.

Currently, I have two ongoing projects. I am working on a series of porcelain sculptures each with a painting on wood panels, each representing my life as a millennial. Additionally I am using similar techniques to collaborate with fellow artist Jordan Jones on a few pieces that involve porcelain sculpture and paper-making. These forms will reference our joint interest in the environment.

Faculty Director: Mark Monroe

The Mattress Piece

Jordan Jones
Art Department, Austin College

My work generally expresses the conjunction of my interests in Environmental Studies and 3-D art. Natural themes and biomorphic forms are represented in the majority of my pieces. I am very interested in the way that humans interact with their environment, and much of my art explores that interaction.

This interest is illustrated most clearly in a work that has as a primary component an old mattress spring. This element is then combined with nettles native to the Blackland prairie and roofing tar. The mattress is bent in a way meant to represent the undulation of a landscape. Some of the nettles are left unaltered, while others are enveloped completely by the messy, difficult to remove, man made goo.

Faculty Director: Mark Monroe

Notes:

Congratulations to

Arthur Yang

The Winner of the
2015 Abstract Book
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Design Contest

ACUMEN

Call for Papers

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

How to Submit

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

Submission Guidelines

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

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

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Carnegie Mellon University
Florida International University
Kansas State University
Oklahoma City University*
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Texas Tech University
UNIBE (Dominican Republic)
Universidad Autónoma de Querétaro (Mexico)
Universidad Piloto (Colombia)
University of North Texas*
University of Texas at Arlington
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* indicates presence at the Austin College Scholarship Conference

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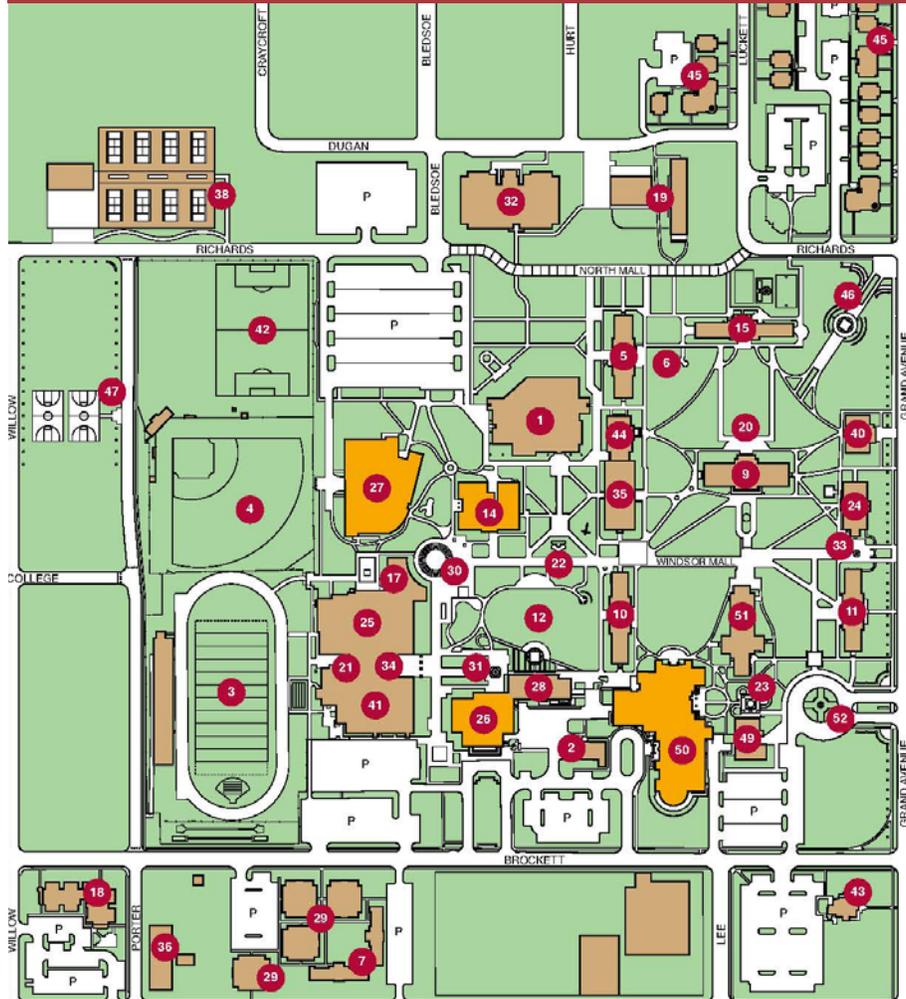


Acumen (Student Research Journal)



Suspension Literary Journal

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 Brocklett 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. Caruth Guest House | 21. Hannah Natatorium | 35. Moody Sciences Center | 48. Windsor House |
| 9. Caruth Administration Building | 22. Hersh 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 | | |