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### UNDERGRADUATE RESEARCH SYMPOSIUM 2014: SESSIONS AT A GLANCE

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12:00 – 12:50 – Registration (sign-in & name tags) – 4th Floor Lobby

1:00 – 1:20 – Opening Session – Alderson Auditorium

Welcome: John Augusto, Center for Undergraduate Research

Opening Remarks: Chancellor Bernadette Gray-Little

Presentation: ACE Research Talk Winners

1:20-1:30 – Break

1:30-2:30 – Session 1: ACE Research Talks

ACE Research Talks, sponsored by the James K. Hitt Award, University Honors Program

Alderson Auditorium:
1:30: Gavin Hanson, The Role of Attention in Goal-Directed Semantic Retrieval: Evidence from Multi-Voxel Pattern Analysis
1:50: Megan Nelson, Tipping: An Economic Anomaly
2:10: Mitchell Newton, Utilizing Microdialysis and Electrocortiography to Understand Seizure Activity in the Brain

ACE Research Talks, sponsored by the Center for Undergraduate Research

Malott Room:
1:30: Josh Russell, Resources and Educational Outcomes: A Look at Kansas and Missouri Public Schools
1:50: Rachel Cross, Ecopoetics and the Academic Ecosystem: A Step-by-Step Guide for the Anti-Colonialist
2:10: Alex Kong, Evaluating Derivatives of Vitamin E as Therapeutic Agents for Alleviating Lysosomal Trafficking Defects Associated with Neurodegenerative Diseases
2:45-3:45 - General Session 2

Undergraduate Student Panel: “Getting Started in Research”

Pine Room
Moderator: Dyan Morgan, Center for Undergraduate Research
Student Panelists:
  Greg Ervin, Interdisciplinary Computing, Biology
  Alex Kong, Pharmacy
  Schuyler Kraus, Environmental Studies

Performances/Creative Works:

Hawk’s Nest (First floor):
  2:45: Tasha Cerny, Princess Poetics: (re)Defining Disney's Social Constructs
  3:05: Magge Boyles, Women of the Yiddish Stage
  3:25: Natalie Sabillon, Jip the Zebra Children's Book Creation

Oral Presentations:

Big 12: Social Science 1
  2:45: Jake Thompson, Dissociating Cognitive and Affective Empathy
  3:00: Max Bearce, Japanese Internment as Collective Memory: Implications on Identity and Identity-Related Outcomes
  3:15: Jeffery Durbin, The Role of Morphemes in Novel Compound Recognition
  3:30: Danielle Siebert, Perception of Religious Discrimination in Judgments of Law Enforcement Behavior

Malott Room: Interdisciplinary 1
  2:45: Hannah Duff, Mining Peru: Robbing Resources or Sustaining Livelihoods?
  3:00: Allison Williams, Natural Gas, A Foundation Fuel for the Future: Inconsistencies and Themes in Hydraulic Fracturing Data
  3:30: Hannah Jayne, Sex Education of the US Military: A Rhetorical Analysis of WWII Propaganda
Centennial Room: STEM 1
2:45: Mackenzie Bloom, Improving Transfection Efficiency via Nucleofection with Umbilical Cord Stem Cell Concentration
3:00: Kyle Lockhause, Ashes to Ashes: The Survey of the Fraxinus Pennsylvanica on the University of Kansas’s Campus
3:15: Caleb Christianson, Development of Custom Staggered Herringbone Microfluidic Chips for Rapid Mixing of Liposomes and Stable Nucleic Acid Lipid Particles
3:30: Holly Lafferty, Hunger Games: Isotope Ratios in Nutrient Stressed Fish

English Room: Building Spaces, Building Ideas
2:45: Adeola Adewale, First Texans Museum, Dallas: Deconstructing the Native American Dwelling Stereotype
3:00: John Stolzle, The Digital Medium: evolving pedagogies
3:15: Corey Boucher, Creating a ‘Homeplace’ in Temporary Living Environments: Residents’ Evaluation of KU Scholarship Halls
3:30: Nicholas Colbert, First Texans Museum - Dancing Informs Design

Jayhawk Room: Interdisciplinary 2
2:45: Melanie Funk, Dimensions of Trust: A Grand Isle, Louisiana Study
3:00: Matthew Hobart, Logging on to New Identities in Contemporary Art: Identity, the Internet and Ambiguity in the Work of Jayson Musson
3:15: Jamie Fuller, Exploring discrepancies between development discourse and social realities in Dakar, Senegal
3:30: Candice L’Ecuyer, Atrazine in our Drinking Water: What is Acceptable and How it is Determined

Poster Session: STEM

Kansas Room:
Thomas Anneberg (#8), Resolving the subspecies status of Drosophila americana americana and Drosophila americana texana.
J. Frank Auten (#16), Microtubule Inactivation with the Drug Paclitaxel
Jeff Bauman (#1), Integration of Microfluidics into Analytical Chemistry Instrumental Analysis Laboratory: Microchip Electrophoresis with Electrochemical Detection for Quantitation of Nitrite in Cured Meat Samples
Tyler Berry (#27), Dielectric Measurements Using A Vector Network Analyzer For Greenland And Antarctica Ice Core Samples
Taylor Broadhead (#13), Acoustic Analysis of a New Species of Shrub Frog in the Genus Platymantis
Qiao Yi Chen (#20), The Synergistic Effect of Arsenic and High Glucose on Mitochondrial Function in Human Cerebral Microvessel Endothelial Cells.
Kimberly Cole (#28), The Differences between the Knee Lowest Point Translations of Three Simulated Walking Profiles
Marika Crider (#26), Comparison of Intact and Meniscectomy Passive Knee Laxity in Cadaveric
Specimens

Erin Evans (#6), Separation optimization of biogenic amines present in C. elegans using microchip and capillary electrophoresis

Erin Evans (#7), Effect of calcium free seawater and p-aminobutyric acid on development of Dendraster excentricus and Strongylocentrotus purpuratus

Cori Fain (#18), Effects of ethynylestradiol on sea urchin embryonic development: adverse effects at relevant oceanic concentrations

Ashley Farris (#29), A Comparison of Two Polymers for Application in 3D-Printed TMJ Implants

Marcus Florez (#21), Investigation of Genetic Links to Alzheimer’s Disease: Analysis of APOE, TOMM40 and Mitochondrial Genome

Alexander Fondaw (#22), The Electricidal Effect - The Treatment of Staphylococcal and Pseudomonal Biofilms Using Low Intensity Exposure to Electrical Current Via Platinum Rods

Joseph Greenbaum (#23), Investigating Biological Crosstalk using Boolean Networks

Ibrahim Gul (#30), Change in Range of Motion envelope of the back and the development of Low back pain

Emily Haynes (#24), Modular tripeptide carrier for targeted molecular imaging with copper

Brad Hutchison (#4), Characterization of the P1 Domain of PvdJ P1 from Pseudomonas aeruginosa

Valerie Paul (#19), Disruption of development of C. elegans through manipulation of canonical Wnt pathways

Pann Pichetsurnthorn (#3), Dual-Electrode Electrochemical Detection for Microchip Electrophoresis: Voltammetric Identification of Chemically Labile Species

Betsy Ramirez (#5), Isolation and Crystallization of PvdJp2, a Non-Ribosomal Peptide Synthetase Domain in Pseudomonas aeruginosa

Julio Ramirez (#11), Shielding Effect of Asexual Reproduction on Mutation Load

Kayla Sale (#12), Evolutionary history underlies plant physiological responses to global change since the Last Glacial Maximum

Abigail Schletzbaum (#15), Numerical Bifurcation Analysis of Climate Change Models

Hadley Sis (#25), Experimentally Analyzing Viscous Fingering Between Microbicide Delivery Gel And Simulated Biological Fluids

Emily Smith (#17), Monte Carlo Modeling of Generator Level Single Top Quark Production in Association with the Higgs Boson

Connor Stultz & Leah Wainstock (#14), Comparative Tadpole Morphology

Bryce Tappan (#2), Reactivity and Photoluminescence Studies of Mercaptoazulenes and Their Complexes with Gold (I)

Anna Tatarko (#10), Investigating the effects of tallgrass prairie restoration and plant diversity on pollinator communities in northeast Kansas

Julia Yang (#9), Understanding microbial response to temperature and relative C and N availability in boreal organic soils

3:45-4:15 – Info Session/Break

Join us in the 4th floor Lobby for snacks, informational tables, and a chance to take your photo with your friends, labmates, mentors, and family.
Undergraduate Student Panel: “Getting Started in Research”

Pine Room

Moderator: Dyan Morgan, Center for Undergraduate Research
Student Panelists:
  Greg Ervin, Interdisciplinary Computing, Biology
  Alex Kong, Pharmacy
  Casey Pederson, Psychology

Oral Presentations:

Big 12: Social Science 2
4:15: Sarah Ekis, Influence of Children’s Misarticulation on Preschoolers' Word Recognition
4:30: Kristina Van Anne, The Role of Lexical Stress in the Word Recognition of English-speaking L2 learners of Spanish
4:45: Meritt Schenk, Behavioral Science Goes to the Arcade: A Translation of the Generalized Matching Law to Predict and Analyze Human Performance in a Simulated Environment
5:00: Seth Brooks, Female Inhibitedness: The Interaction of Interest and Female Sending of False Cues

Malott Room: Interdisciplinary 3
4:30: John Stolzle, Economics of GMOs and The Transgenic Model
4:45: Mugabi Byenkya, No Man’s Land: An analysis of the sustainability of Uganda’s national parks system
5:00: Kira Monet Alexander, Sexual Health Social Policy: Dogma, Responsibility, and Consequences

Centennial Room: STEM 2
4:15: Sam Buchanan, Active-Target Multistatic Receiver Digital Section for CReSIS Radar Calibration
4:30: Seth Polsley, Control System Based on Electromyography
4:45: Alina Zheng & Amy Zheng, Neutrino Detection Using Surface Wave
5:00: Daniel Muccino, Quantifying Diffusion in All-Solid-State Lithium-Ion Batteries

English Room: Humanities
4:15: Candice Crafton, The Marginalization of Midwives
4:30: Kayla Overbey, A Cultural Comparison of 19th-20th c. American and British Children's Literature
4:45: Sean Weston, Protestants and Poverty in Pittsburg, Kansas: 1890-1900
5:00: Joel Bonner, Bringing the Intellectual and Personal Benefits of Epic Literature to Children
Jayhawk Room: STEM 3

4:15: **Adam Miltner**, How MAB-5 Drives Posterior Migration of the Q Neuroblasts in the Model Organism *Caenorhabditis elegans*

4:30: **Jordan Koch**, Calculating Probabilities of Parsimony-Uninformative Patterns on Phylogenetic Trees

4:45: **Kendra Marr**, The Good, the Bad, and the Ugly: Factors that Contribute to Eggshell Defects in a Strain of *Drosophila virilis* That Carries a High Transposon Load

Poster/Displays Session: Interdisciplinary

Kansas Room:

Alex Beck, Raisha Basnyat, & Chris Cooper (#12), Water Quality on Jayhawk Boulevard
Courtney Crites (#13), Spatial Discrimination Enforces Patriarchy and Determines Morality
Michaelyn Everhart (#1), Examining the Effects of Reading Fiction on Empathy
Austin Griffis (#22), Native Texans Cultural Center Design: A metaphorical and contextual interpretation of Native American Experience
Marcella Hangen (#2), Stability of Preschooler’s Preference for and Reinforcing Efficacy of Edible and Leisure Items
Rebecca Howard (#3), Influence of synthesized vowel sounds on neural processing of speech perception
Clint Jensen (#4), Considering the Impact of Analogical Associations on Learning
John Robert Jones (#5), IPA Study
Joseph Keusenkothen, Christina Baker, Will Penner, & Sam Oberkrom (#14), Where We’re Going we Don't Need Roads... We need Bike Paths!
Schuyler Kraus (#15), An Inquiry into the Authenticity of Cleveland Ecovillage
Nick Malley (#17), 86'd - A Short Film
Austen McGuire (#6), Mental Strength's Effect on the Perception of Aurally and Visually Looming Objects
Ruben Medina (#11), Youngsters' Perceptions of the Motivational Climate in Their Recreational Exercise Classes
Kristin Miller (#7), Increasing Child Compliance with Essential Routine Procedures: Acquisition, Generalization, & Maintenance
Julia Nehring (#16), The potential of milkweed floss as a natural fiber in the textile industry
Benjamin Neitzel (#8), Effects of Sexual Arousal on Commitment: The Moderating Role of Threat
Steven Reyes (#19), First Texans Museum in Dallas Arts District of Texas: A Contemporary Interpretation of the Kiva
Adrian Rivera (#9), Subliminal Attachment Security Priming’s Effect on Sexual Strategy Preference
Eric Rivera (#20), Quantifying CO₂ Removal in Living Walls: A Case Study of the Center for Design Research
Elisa Rombold (#21), First Texans Museum
Chloe Seim (#18), M, an Illustrated Novella
Yichi Zhang (#10), Sleep Disruption as a Mediator between Test-taking Anxiety and Exam Performance
5:15-5:30 – Break

5:30 – Symposium Banquet, Kansas Room
*For all student presenters, their mentors, and their guests. RSVP requested.*

**Welcome:** John Augusto, Center for Undergraduate Research

**Presentation of Awards:**
- K. Barbara Schowen Undergraduate Research Mentor Award (faculty)
- Undergraduate Research Mentor Award (grad student/staff)
- Outstanding Presentation Awards
Come on…be a little silly.

Join us in the 4th floor lobby during the break (3:45-4:15) to get your photo taken with your mentor, friends, labmates…or Albert Einstein.

We’ll post the pictures from our Photo Booth on Facebook later for you to download!

Thanks to MoonFire Images for donating photography services for this year’s Symposium photo booth.

FMI: MoonFire Images
Larissa Augusto
moonfireimages@yahoo.com
(785)331-5757
Facebook: MoonFire Images
How to Attend the Symposium

Is this your first time attending the Symposium? Most people haven't been to anything quite like a research symposium. It's an exciting event full of energetic people who care deeply about the topics they're discussing - that's what makes it so fun! But it can also be overwhelming as a first time attendee. Let's start with the basics:

What should I do when I arrive?

If you're attending as an audience member, we recommend finding a seat, silencing your phone, and taking a quick glance at the program booklet. Mark sessions, performances, and poster presentations that you want to be sure to attend. This strategy will help you keep your schedule straight as the day goes on.

If you're presenting today, be sure to check-in. With your extra time, locate your room, prepare your talk, display, or poster, and then take some time to look at the program booklet. As you plan your schedule for the day, make sure to build in some buffer time before your presentation so that you can do any last minute talk practice or relaxation that you may need. We have set aside Alcove G as a student prep room in case you need some space to prepare.

What's this booklet you gave me?

The program booklet is your guide to the day. It lists the times and locations for all of the sessions and breaks. We also include abstracts or artist's statements for each student. This information is a brief description of the project and can be really helpful as you decide which presentations to go see.

What should I do if I want to get involved in research?

Here are our top 3 suggestions of what you should do today if you decide you want to get involved in undergraduate research:

- Make sure to go to one of the “Getting Started” panels in the Pine Room during Session 2 or 3. We’ll have a group of students and staff there to tell you about their experiences and how to get involved.
- Talk to at least two students about how they got involved in research. Poster sessions are an easy place to have this conversation. You can also stick around after an oral presentation session to have a one-on-one conversation with a presenter.
- Go meet the staff at the Center for Undergraduate Research table during the information fair from 3:45-4:15 in the 4th floor lobby. Find out how we can support you as you get involved and develop as a researcher.
What are the unwritten etiquette rules of a research symposium?

Here are some general rules of thumb to help you avoid a symposium *faux pas*:

Oral Presentations and Performances:

- If you want to take photos, be sure to get permission from the presenter ahead of time.
- Make sure your phone is silenced and put away.
- Pay attention to the performance or presentation; so don't whisper to your friend or text your mom.
- Being an active participant by taking notes on intriguing ideas or jotting down questions during each presentation will help you get the most out of the day.
- Applaud the presenter at the end of the talk or performance.
- Ask questions at the end of the talk or performance. You might refer to your notes to help you remember your questions from earlier in the presentation. Questions that spark the best conversation typically follow up on something the presenter talked about; don't set out with a goal of stumping someone.
- If you arrive late or need to leave in the middle of a session, wait to move around until the breaks in between presenters. If that's not possible, try to sit close to the door or at the back of the room.

Displays or Poster Presentations:

- If you see a presenter without an audience, don't just stand there - go find out about that project.
- When you approach a display or poster presentation, introduce yourself and ask the presenter to explain the project.
- Ask questions especially if the project is about a subject that is new to you. Your questions could just be about how the presenter got involved or what the next steps would be.
- Thank the presenter for telling you about the project.
The Honor Society of Phi Kappa Phi is the nation's oldest and most selective honor society for all academic disciplines. More than 114,000 members maintain their active status in Phi Kappa Phi, which affords them numerous benefits associated with dues-paying membership, including access to $1 million in awards and grants each biennium.

The KU Chapter of Phi Kappa Phi is proud to sponsor the Undergraduate Research Symposium and congratulates all selected to present their original work.

Learn more at http://groups.ku.edu/~pkp/

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The University of Kansas
Student Awards

ACE Research Talks
The ACE Research Talks are designed to showcase students who can present their research and creative projects in an (A)ccesible, (C)reative, and (E)ngaging way. Students applied for the awards by submitting a short video of themselves talking about their research. The 2014 winners will receive $500 and be featured today during the first session of the Symposium.

The ACE Research Talks are co-sponsored by the James K. Hitt Award through the University Honors Program and the Center for Undergraduate Research.

Outstanding Presentation Awards
All student presenters (oral presentations, performances, posters, and displays) at the Symposium are eligible to win one of the $50 Outstanding Presentation Awards. Judges will evaluate all presentations, and the award winners will be announced at tonight’s Symposium Banquet. All students will be emailed feedback about their presentation next week.

The Outstanding Presentation Awards are funded by the Center for Undergraduate Research, with some financial support from Phi Kappa Phi Honor Society.

Sigma Xi will also be selecting poster and oral presentations in the health, social, behavioral, natural, and mathematical sciences and engineering for best presentation awards. Sigma Xi is an international, multidisciplinary research honor society. Its mission is to enhance the health of the research enterprise, foster integrity in science, and promote the public's understanding of science for the purpose of improving the human condition. You can learn more about the KU Chapter of Sigma Xi at http://groups.ku.edu/~sigmaxi/. Awards will be announced via e-mail after the symposium. Awardees will be invited to attend the Sigma Xi Award and Induction Ceremony on May 9 at 3:00 pm.
Faculty Involvement Opportunities

The Center for Undergraduate Research is currently looking for faculty interested in being involved with our Center for the 2014-2015 and 2015-2016 academic years to serve as a member of our Faculty Advisory Board or as a Faculty Fellow.

Applications for both positions are due May 9, 2014.

Learn more and apply at: http://ugresearch.ku.edu/about/facultyinvolvement
Mentor Awards

The mentor awards honor the contribution of outstanding undergraduate research mentors to their students’ development and to their own discipline. Mentors are nominated through a two-part process: students, faculty, or staff submit recommendations for a mentor to be considered for the award, then home departments and supervisors submit full application packets. The 2014 nominees will be honored at the Symposium Banquet tonight. Congratulations to all of this year’s nominees!

2014 Barbara Schowen Undergraduate Research Mentor Award
(faculty)

2014 Award Winner
Kostas Kokkinakas, Speech-Language-Hearing

Honorable Mention
Renee Perelmutter, Slavic Languages & Literatures

Nominees
Glen Adams, Psychology
Jeff Krise, Pharmaceutical Chemistry
Joy Ward, Ecology and Evolutionary Biology

2014 Undergraduate Research Mentor Award
(grad students/ staff)

2014 Award Winner
Rachel Bowes, Ecology and Evolutionary Biology

Honorable Mention
Jacob Carter, Ecology and Evolutionary Biology

Nominees
Kate Buckeridge, Kansas Biological Survey
Dulan Gunasekara, Chemistry
Carla Harper, Ecology and Evolutionary Biology
Kelley Harrison, Applied Behavioral Science
Amber Smith, Molecular Biosciences
Jon J. Smith, Kansas Geological Survey
Terese Thonus, KU Writing Center
Presenting today? Publish tomorrow!

Ready to publish your research in KU’s 2013 - 2014 undergraduate research journal? Share the results of your hard work and stand out as an undergraduate researcher on applications and resumes!

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Submit your research by May 23, 2014

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ABSTRACTS

Adeola Adewale
First Texans Museum, Dallas:
Deconstructing the Native American Dwelling Stereotype
Advisor: Kapila Silva, Architecture

In terms of architecture, many associate Native American dwellings with the teepee even though there are other forms of residential styles, including the mesa, adobe home, longhouse, or brush shelters. This stereotypical imagery of the teepee indicates the lack of awareness of the Native American experience within mainstream American society. In designing the First-Texans Museum in Dallas to house artifacts of fourteen tribes native to Texas, the goal of my project was to challenge this “myth of the teepee” and to create a new interpretation of this stereotypical image. By using the form of the teepee, I created a series of abstractions to decipher a new arrangement that could be seen as a modern building design but, with closer observations, the form of the teepee could be uncovered. The interior of the building speaks to this analogy. The layout of the museum has been created using an overlay of nexus between different visual and spatial associations from the city of Dallas and beliefs shared by the fourteen tribes. The interior is comprised of four major internal volumes representing the cardinal directions, a belief shared by most Native Americans. Each of the volumes houses different programmatic functions. The design of the internal volumes capture the essence of a teepee through their usage of minimal lighting, inclusion of a center or hearth, and non-symmetrical shape of exterior walls.

Kira Monet Alexander
Sexual Health Social Policy: Dogma, Responsibility, and Consequences
Advisor: Rachel Vaughn, Women, Gender & Sexuality Studies

For my capstone research project I explore the topic of sexual health and sexual education, diving into the themes of dogma, responsibility, and consequences. I examine sexual health—and its link to sexual acts—as a social and policy construct. I argue that our cultural conceptions of sexual health have more to do with social agendas and public health scare than with real issues of bodily health. Sexual health and responsibility language enforce behavioral and moral sexual norms rather than protect sexual bodies from infections. There is much research about sexual health policy, sex education, and sexual attitudes, but I add to this research by connecting those to the feminist understanding of the body. To examine social attitudes about sex, sexual health, and sex education, I deconstruct social attitudes and values surrounding sex, sexual health, and the personal responsibilities and consequences that are carried with it. I then explore how the intersections of gender, class, and race...
complicate the issues. I separate sex from other health factors in bodies, and apply the idea toxic bodies to sexual bodies. I analyze cultural expectations of sexual behavior when it comes to sexual health (as a public health issue); sexual health messages given by sex education and public health organizations; and the social versus embodied consequences of sexual activity.

Thomas Anneberg

Resolving the subspecies status of
Drosophila americana americana and
Drosophila americana texana
Advisor: Jennifer Gleason, Ecology and Evolutionary Biology
Collaborators: Kaila Colyott, Paula Roy

In the genus Drosophila, sexual preference and post-mating isolation are said to define reproductively isolated species. It is the behavior of the organism and not morphological barriers to reproduction that defines sexual preference; members of the genus Drosophila rely heavily on behavioral mechanisms in mate choice. Drosophila americana americana and Drosophila americana texana have historically been classified as two distinct subspecies which will not interbreed in nature. A single X4 chromosomal fusion distinguishes the genome of D. a. americana and D. a. texana and is the primary basis for the subspecies designation. Testing whether or not two sample strains will readily mate is important in establishing if the X4 chromosomal fusion is sufficient grounds of classifying them as subspecies. The C1 (D. a. texana) strain which has been observed to have unfused chromosome in all individuals and the IR (D. a. americana) strain which has been observed to have a 97% frequency of X4 chromosomal fusion in the population were used to test pre-mating and post-mating isolation. In this study, we show that the two strains show no pre-mating isolation and have resolved them as karyotypes instead of subspecies based on mating tests.

J. Frank Auten

Microtubule Inactivation with the Drug Paclitaxel
Advisors: Paulyn Cartwright, Ecology and Evolutionary Biology; Jeniffer Hueston, Biology Lab Director
Collaborator: Camille Smith

In this experiment, we streaked an agar plate with Paclitaxel and the model organism Dictyostelium discoideum. According to the research and literature, it is hypothesized that Paclitaxel will inactivate the model organisms’ microtubules. Microtubules are important for mitosis and reproduction. Microtubules are also used for the movement of Dictyostelium in the slug stage. The microfilaments act like muscles that allow the slug to transform into other stages of the life cycle.

The drug Paclitaxel is an antiproliferative that works by stabilizing the microtubule polymer, preventing its disassembly. When the microtubules disassemble, the cell is permitted to move onto the next stage in the cell cycle, however if they are inhibited mitosis cannot proceed, halting cell reproduction. We hypothesize that if Dictyostelium discoideum is treated with the drug Paclitaxel, the slime mold will not be able to divide mitotically, therefore no reproduction will occur and the slime mold will have a disrupted phenotype in the sorocarp.
This research is important when applied to more Catholic applications. Cancer cells have mutations that immortalize the cell and cause these cells to have unlimited proliferation.

Drugs like Paclitaxel can be applied to these cancer cells to return them to a mortal state, and allow the cancer to be contained.

Jacklyn Baillergeon

_The New Get Out the Vote? Effects of Data Targeting on Voter Turnout_

Advisor: Mark Joslyn, Political Science
Collaborator: Mark Sump

Data mining creates and stores digital profiles about consumers’ demographic information and past behavior to model against other information to predict future behavior. Corporations began using data mining to more accurately segment customers into groups and target each group with specially crafted advertisements to reach them through the best mediums and at the times in which consumers would be most likely to act or respond.

Candidates for political office have employed similar practices in their quest to appeal to the electorate, particularly undecided voters and voters in “battleground” states. In the early 2000s, political scientists helped candidates such as George W. Bush and Howard Dean establish some of the first political science-related data mining applications.

President Obama’s 2008 and 2012 campaigns now serve as a model to how campaign communications strategies centered around data mining can drive voter activity, ranging from donations to social media support to mobilization to the polls.

Through exploring the commercial uses of data mining, early data mining practices in American Presidential Elections, and President Obama’s newest data mining strategies, this project seeks an answer to whether data mining is an effective tool for engaging American voters.

Christina Baker

_Were Going, We Don’t Need Roads... We Need Bike Paths!_

Advisors: Johannes Feddema, Geography; Shannon O’Lear, Geography
Collaborators: Joseph Keusenkothen, Sam Oberkrom, Will Penner, Reuben Worthington, John Young

Despite earning annual recognition as a bronze-level “Bicycle Friendly Community” every year since 2004 by the League of American Bicyclists (LAB), Lawrence, Kan., continually lags behind other similarly designated communities in several areas, including route connectivity. Feedback provided by LAB in 2012 recommended the continued expansion of the city’s bicycle route network to foster improved connectivity. Our research examines this issue of route connectivity. Through interviews and directed research we determined that, due to their spatial distribution, focusing on connecting Lawrence’s many schools by designing a series of ideal routes would best promote improved connectivity. We designed a survey aimed at parents of children who attend
these schools. This survey helped us identify and understand barriers that currently prevent individuals from cycling to school. We also researched the best practices for designing bicycle routes that diminish these barriers. Furthermore, we identified several communities with extensive bicycle route infrastructure that could serve as models for our project. Equipped with this knowledge, we employed geographic information system technology to design a series of routes. Our model includes terrain and elevation data, traffic counts, accident data, existing routes, easement data, and population data. Whenever possible, our model extensively utilizes shared-use paths that are separated from the road because of safety concerns identified through our survey and research. The result is a series of maps that illustrate ideal bicycle routes that improve the connectivity of Lawrence’s current bicycle route network while lessening barriers that currently limit some individuals from cycling.

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**Raisha Basnyat**

*Water Quality on Jayhawk Boulevard*

Advisors: Johannes Feddema, Geography; Shannon O’Lear, Geography

Collaborators: Alex Beck, Chris Cooper

We are a group of three Geography students enrolled in GEOG 500, the senior capstone course, who decided to pursue an on-campus water research project. Our objective is to examine water quality issues in older buildings on campus. The following six buildings were tested for hazardous materials: Lindley Hall (1905), Marvin Hall (1909), Strong Hall (1924), Snow Hall (1930), Malott Hall (1943), and Lippincott Hall (1949). We selected these six buildings to get a wide variety of building construction on campus. Our research was centered on having a better sense of water quality in these buildings which would lead to determining the cause for the varied concentration levels of each of these chemicals in our samples. In each of the six buildings we selected three water sources; the samples varied from water fountains and laboratory sinks to bathrooms and spigots. We believed it was important to get a wide variety of sample locations to create a general understanding of water quality on Jayhawk Boulevard. We believe the results of our research will open the door for further exploration of water quality issues present on campus. With help from a number of mentors, we received training and/or guidance to use various tools and equipment that helped us determine the concentration levels of seven chemicals. In addition to turbidity, we analyzed the concentrations of magnesium, iron, copper, zinc, lead, uranium, and nitrate in each of the sample. The hazard levels are based on a comparison of the concentration of chemicals present in our samples with the EPA’s standard concentration levels. The results are compelling – high concentrations of various chemicals exist in every building. Does the University of Kansas meet these standards consistently? See you on April 26th.

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Jeff Bauman

Integration of Microfluidics into Analytical Chemistry Instrumental Analysis Laboratory: Microchip Electrophoresis with Electrochemical Detection for Quantitation of Nitrite in Cured Meat Samples
Advisors: Susan Lunte, Chemistry; Joe Siegel, Chemistry
Collaborators: Dulan B. Gunasekara, Andrew Holtzen, Michelle Bonebright-Carter, Xian Hu, Jakki Stevens, Travis Witte, Michael A. Johnson

Nitrite is commonly used in the curing process of meats as a preservative by inhibiting the growth of potentially harmful microorganisms and maintaining a natural pink-red color in cured meats. Additionally, nitrites produce carcinogenic nitrosamines when meat is overcooked or under acidic conditions, such as within the stomach. In this project, a method based on microchip electrophoresis coupled with electrochemical detection (ME-EC) has been developed to detect the presence of nitrite in bacon samples cured with sodium nitrite and with “no added nitrite except for that naturally occurring.” ME-EC was chosen over the more typical Griess assay due to a great degree of cross-reactivity with the Griess reagent because of common interferents present in meat samples. In addition, ME-EC can be made portable and allows for sub-minute analysis times. This method employed the use of a 5 cm simple T PDMS microchip with a 15 µm platinum band electrode aligned end-channel. The separation conditions were optimized to separate nitrite from interferences, such as azide, ascorbic acid, hydrogen peroxide, and iodide, which was used as an internal standard in this study. A LOD of 4.9 µM and a sensitivity of 2.6 mM-1 were obtained for nitrite under optimized conditions. Preliminary results indicate that both cured bacon samples and samples with no added nitrite did contain detectable amounts of nitrite. In the future, this method will be utilized to monitor both nitrite and nitrosamines.

Max Bearce

Japanese Internment as Collective Memory: Implications on Identity and Identity-Related Outcomes
Advisor: Ludwin Molina, Psychology

This purpose of this research is to examine the psychological impact of the salience of in-group negative history on group individuals. The history being examined is Japanese internment history of World War II. Research suggests that individuals base their identities on which groups they belong to and that group identity is largely determined by a group’s history. Therefore, it could be expected that when group history is made salient, identity is affected. When negative group history, such as Japanese internment history, is made salient, what emotions arise amongst American individuals? More importantly, how does this effect group identity and what are the outcomes of these “attacks” on in-group identity?

Alex Beck

Water Quality on Jayhawk Boulevard
Advisors: Johannes Feddema, Geography; Shannon O’Lear, Geography
Collaborators: Raisha Basnyat, Chris Cooper

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examine water quality issues in older buildings on campus. The following six buildings were tested for hazardous materials: Lindley Hall (1905), Marvin Hall (1909), Strong Hall (1924), Snow Hall (1930), Malott Hall (1943), and Lippincott Hall (1949). We selected these six buildings to get a wide variety of building construction on campus. Our research was centered on having a better sense of water quality in these buildings which would lead to determining the cause for the varied concentration levels of each of these chemicals in our samples. In each of the six buildings we selected three water sources; the samples varied from water fountains and laboratory sinks to bathrooms and spigots. We believed it was important to get a wide variety of sample locations to create a general understanding of water quality on Jayhawk Boulevard. We believe the results of our research will open the door for further exploration of water quality issues present on campus.

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**Tyler Berry**

*Dielectric Measurements Using A Vector Network Analyzer For Greenland And Antarctica Ice Core Samples*

Advisor: Fernando Rodriguez-Morales, Electrical Engineering

Sea level is strongly linked to the growth and shrinkage of the large ice sheets in Greenland and Antarctica. There is an urgent need to improve both knowledge of ice dynamics and accuracy of ice-sheet models to predict the ice-sheets’ response to a warming climate and their contribution to sea level rise. A key component to improve the ice sheet models through the use and interpretation of radar data is the knowledge of the dielectric properties of the ice. Most of the measured data on the dielectric properties of ice available today is based on measurements performed at low frequencies with the technology available in the 1960s and again in the 80s. In this project we will design and fabricate a set of test fixtures to characterize relative permittivity of dielectric materials using a vector network analyzer. One technique to be used relies on a planar transmission line in contact with the sample, where the sample acts as a dielectric loading to the line. By measuring the change in the transmission and reflection coefficients of the transmission line, the relative permittivity of the sample can be retrieved. The method will serve as a basis for dielectric measurements on dielectric materials in the 10-1000 MHz range and will be used as a test bench for future measurements on ice cores.
Mackenzie Bloom

Improving Transfection Efficiency via Nucleofection with Umbilical Cord Stem Cell Concentration

Advisors: Michael Detamore, Chemical Engineering; Adam J. Mellott, Bioengineering

The most efficient concentration of umbilical cord stem cells for transfection using a nucleofector is explored in this study. Umbilical cord stem cells have exciting potential in the area of tissue engineering due to their accessibility without harm to the donor. Gene delivery is when genetic material is directly delivered to a cell so that that cell can produce desired proteins, creating a more specific cell that will be useful to engineer the desired tissue. Nucleofection is a gene delivery method that allows genetic material to enter the cell by using a combination of electrical parameters to create "holes" so that the material can pass through the cellular membrane. Cells communicate using chemical signaling; because of this they often stay healthier when they grow in a concentrated, confluent population. In this study, four different groups were examined side by side to find if Nucleofection is more efficient in more concentrated populations. One group was a control where no transfection was done. The other three groups ranged from 50,000 to 5,000,000 cells per well and were transfected with a pmaxGFP plasmid. Each group was viewed and compared using fluorescent microscopy after being stained with a live/dead stain and an actin stain.

Joel Bonner

Bringing the Intellectual and Personal Benefits of Epic Literature to Children

Advisor: Giselle Anatol, English

The epic is one of the most established and recognizable forms of literature. This project aims to make epic literature more easily accessible and understandable for children ages 5-10 years. Through the research of classic and modern epics, including "The Odyssey," "Paradise Lost," and Derek Walcott's "Omeros," as well as children's tales, including Rudyard Kipling's "Just So Stories," I adapt the most crucial features of the established literature and apply them to the writing of my own narrative poetry. Based on my research, the most important elements are the employment of diction that is understandable, yet pushes the boundaries of the young reader's vocabulary, simplicity and straightforwardness in the motives of the characters within the plot, and an enticing and captivating writing style (a rhyming couplet structure). Readers will be able to trace the parallels between my writing and the classic epics and determine how effectively they are incorporated into the story, and how valuable their inclusion is to the overall experience of the young reader. Children will be exposed to the major themes of epic literature through a story written with them in mind, catered to their learning capabilities and attention spans. Writing an epic for a young audience will shed light on this specific genre of literature and inspire an interest in epic literature in children.
Corey Boucher

Creating a “Homeplace” in Temporary Living Environments: Residents’ Evaluation of KU Scholarship Halls
Advisor: Kapila Silva, Architecture, Design, and Planning

One of the major obstacles for students in adjusting to college life is the task of creating a temporary living environment for themselves, and establishing a “sense of homeplace” in college away from home. Traditionally this has been left to the student to resolve themselves in a traditional residence hall, but in recent years there has been a shift towards using more community-driven living environments to create a unique temporary home in college. KU has a special scenario for this – the scholarship halls. The scholarship halls provide smaller communities within the massive campus of KU that allow residents to live in a more interactive way than traditional residence halls. The scholarship halls have been very successful in their goal to achieve a progressive living environment, as twelve of them have been built in the last century. The aim of this study was to find out just how successful the architecture of scholarship halls has been in helping to create a “sense of home,” and what residents have done to accomplish this in response to the halls’ design. Data were gathered through a series of specially coordinated activities and interviews involving the halls’ residents. This study found out that design features (such as shared rooms and large public spaces) contribute to creating a swift and strong bond between residents, and in turn create a sense of homeplace based on those bonds. There are improvements that can be made, but the success of the scholarship halls to this point is still undeniable.

Maggie Boyles

Women of the Yiddish Stage
Advisor: Renee Perelmutter, Slavic Languages & Literatures

This project looks at how the early Yiddish theatre transitioned from male-only to mixed gender troupes. Through the use of Yiddish and English-language archival materials, I explore the work of early actresses in the Yiddish theatre. In addition to research and analysis, I have constructed a play showcasing the stories of those women and their struggle for a theatrical career.

The Yiddish theatre finds its roots in 18th and 19th century intellectual closet dramas and in Purim shpiln—religious plays performed around the holiday of Purim, often dealing with specifically Biblical themes. Like many other European theatres, the Yiddish theatre began with men playing women’s roles and later inducted female performers. The actresses that are the primary focus of this research, Sarah Sigal, an unnamed orphan, and Esther Rukhl Kaminska, all shared similar stories of how they became part of the Yiddish stage. These three women all encountered various obstacles of both personal and societal nature, and, while not all of them were successful—the orphan, as far as we know, only performed once—these women opened the possibility of successful theatre careers for other Yiddish actresses. My presentation will include research and analysis, as well as short excerpts from the play I wrote about the lives of these women.
Acoustic advertisement calls are the primary form of mate recognition and mate attraction in Anurans. Acoustics can provide useful insight into the phylogenetic relationships between groups of frogs. The particular species of interest is a new species of shrub frog from the island of New Britain Island in the genus *Platymantis*. Together with the data from morphology and DNA sequences, the study of the new species’ mating call informs us of the primary mate-recognition differences between the species. The purpose of this research is to determine whether call characters are similar or different between closely related species of frogs. The advertisement call of the new species was compared to the advertisement call of a closely related species, *Platymantis macrosceles*. We performed the acoustic analysis using prerecorded calls from five different individuals of the new species and two recording segments of *P. macrosceles*. The new species possesses unique advertisement call characteristics that distinguish them from *P. macrosceles*. The defining characteristics of the advertisement call of the new species are the high frequency, slower rate of note repetition, and lack of a rapid introductory pulse series. Our study of the advertisement call of this new species of shrub frog reinforces data from morphology and DNA sequences and confirms the validity of the new taxon because acoustic signals are the primary mechanism for mate recognition in anurans.

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Seth Brooks

*Female Inhibitedness: The Interaction of Interest and Female Sending of False Cues*

This study examines how females send false cues during interactions with potential mates. Since females have a greater investment in child-rearing, they may take greater caution in communicating romantic interest, which can result in sending false cues when they are interested. This leads to a flirting female’s interest being harder to perceive by potential mates and third parties. In order to test this, 164 participants were recruited to contrast the readability of flirting females versus their non-flirting counterparts. Flirting females’ interest was found to be more difficult to read for third party observers. In contrast, flirting males were found to be more easily read than their non-flirting counterparts with regards to interest.

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Sam Buchanan

*Active-Target Multistatic Receiver Digital Section for CReSIS Radar Calibration*

The purpose of this project was to implement the digital signal processing (DSP) section of the active-target multistatic receiver (ATMR) proposed by CReSIS for use starting in August 2014 with a new 450 MHz bandwidth radar depth sounding system. The ATMR system can be deployed to receive radar pulses and store them to disk, which enables researchers to precisely determine the antenna patterns and
transmit amplitude/phase offsets for each element in the aircraft-mounted antenna array used by the radar system and apply corrections to actual radar data. The implementation of the ATMR’s DSP section consists of a Virtex-5 SX50T FPGA application programmed in NI Labview performing digital down conversion, matched filtering, and data buffering, as well as a software application running in Windows to store buffered data to disk and enable real-time control of the FPGA application. Because the FPGA cannot completely accommodate the 450 MHz radar signal on a single sequential data channel, the FPGA application uses an 8-parallelized structure to reduce the data rate at the cost of increased processing latency. This necessitated the research and utilization of parallel algorithms for computing convolution in the matched filter and down conversion stages. The FPGA application and host software that were implemented provided a versatile interface that can readily be reprogrammed for a variety of signal bandwidths, and integration of the work done on this project with the rest of the ATMR system will be completed by June to prepare for the system’s deployment in August.

Mugabi Byenkya

No Man’s Land: An analysis of the sustainability of Uganda’s national parks system

Advisor: Byron Caminero-Santangelo, English and Environmental Studies

This thesis is focused on two interrelated questions:

1) What have been the relationships among environmental injustice in Uganda, biodiversity loss, how Ugandan national parks were shaped by colonial interests and conservation, the ways colonial conservation continued after independence (in 1962), and the impact on the parks and surrounding communities of post-independence political upheaval and violence?;

2) How successful have the implementation of community-based forms of conservation, begun by the newly formed Uganda Wildlife Authority in 1994, been in terms of moving away from failed colonial and neocolonial models, increasing environmental justice, effects on tourism, and improving biodiversity protection?

In particular, I focused on the ways Ugandan national parks connect with and differ from parks elsewhere in Africa and to pinpoint the ways reforms in the ways the parks are managed represent important departures from the past but also are held back by lingering neocolonial ideas and structural conditions.
This project started out as an analytical look at the social contexts and constructs of Disney fairy tale films processed through the creative lens of a collection of poetry. However, it became quickly apparent that the more applicable research question within this project was, “How do these stories affect us now?” The subsequent collection of poems I have created for this project are all informed by the critical approach I took to these films in asking that question. There is a certain, unexplainable fascination society has with the fairy tale story. At the heart of this fascination in American culture is Disney. Both man and corporation, Disney has taken root in our minds and hearts as a society—particularly within our children. But like all fairy tales, the Disney texts have a very strong social commentary that both reflects, and rewrites, our values and the way we view society. Particularly strong in its gender commentary and marketed to extremely young and impressionable audiences, what exactly are we telling our children, and what cultural values are we perpetuating, when we show them these films? My collection of poetry seeks to reveal the true beast—good or bad—beneath Disney’s candy-coated, musically intoxicating narratives. In doing so, my poems ask to redefine how we look at Disney films as a cultural informant, and what it means to be a Disney princess.
correlation between chronic exposure of arsenic and increased risk of Type 2 Diabetes (T2D), but specific mechanisms are yet to be known. This research presentation seeks to explain the synergistic effect of Arsenic and high glucose on brain injuries.

Caleb Christianson

*Development of Custom Staggered Herringbone Microfluidic Chips for Rapid Mixing of Liposomes and Stable Nucleic Acid Lipid Particles*

Advisor: Judy Wu, Physics and Astronomy
Collaborator: Dan Peer

Nanoparticles have a wide range of uses in biomedical applications, including diagnostics, drug delivery, medical imaging, targeted cell destruction, and theranostic technologies. An exciting application of lipid-based nanoparticles (LNP) includes the ability to deliver small interfering RNA (siRNA) into cells in order to cause silencing of specific genes, which is of great value to biomedical research and drug development efforts. One method for manufacturing siRNA-containing LNPs involves mixing two solution streams in a microfluidics device. The two streams, typically lipid-in-ethanol in one stream and siRNA-in-aqueous solution in the other, need to be fully mixed in order to produce functional siRNA-containing LNPs. As the solutions mix, a precipitate containing the LNP-siRNA complex is formed, which can be collected downstream. The LNP-siRNA product can then be characterized and used for controlling gene expression in cells. However, one key issue of mixing micro- and nano-liters of solutions is the ability to quickly and thoroughly mix the two streams. Staggered herringbone mixers (SHM) are a simple, effective solution for rapidly and efficiently mixing the two streams, allowing the formation of LNPs. The course of this project concerns the development and fabrication of a SHM mixing chip for nanomedicine research at Tel Aviv University as well as the establishment of protocols and methods to enable the TAU researchers to fabricate their own custom SHM mixing chips in the future tailored to their ongoing research needs.

Nicholas Colbert

*First Texans Museum - Dancing Informs Design*

Advisor: Kapila Silva, Architecture

What if rhythmic foot tapping began to order and define space? What if fluid body movements inspired a façade? What if dance informed design? Originally asked to design a museum to celebrate the history, culture, and experiences of the Native Americans of Texas, I looked to Native American dances to inform my design process. The sheer rhythm of Native American dance can be almost mesmerizing. The potential of an intriguing design based on such dances became apparent from the get go. In order to yield a meaningful solution that could play a significant social and cultural role within the Dallas community, I employed a constant and reflective process. After studying and dissecting the movements of Native American dances, a repetitive rhythm of 2, 4, and 8 was found to be a common theme. These movements also occur in circular patterns, and usually going around the edge of a space whose shape is eventually defined into a circle by the dance movements. Placing these findings on a modulated, circular grid allowed for a slight undulation that would ultimately shape the
building. However, this shaping of space does not only occur in plan, but also in the building’s three-dimensional profile, inspired by the fact that dance is very much a three-dimensional act. The constant change in the volumetric size of spaces allowed for an intelligent layout of a strict program. Rounding out the design is a centralized pow-wow plaza and a courtyard. Site landscaping was also based on Native American beliefs. The design thus creates a visitor experience akin to Native American dance movements within a space of contemporary aesthetic and tectonic sensibility.

Kimberly Cole
The Differences between the Knee Lowest Point Translations of Three Simulated Walking Profiles
Advisor: Lorin Maletsky, Mechanical Engineering
Collaborators: Benjamin Wong, Fallon Fitzwater, Sami Shalhoub

The purpose of this research is to explore the effects that different loading profiles have on knee motion during simulated walk cycles. The anterior-posterior translations of the medial and lateral lowest points of the femur’s condyles, in relation to the tibia, were determined for nine cadaveric knee specimens (seven left, two right) mounted on the Kansas Knee Simulator (KKS). The KKS is a five-axis hydraulically controlled knee simulator that applies programmed physiological loads to specimens. Three loading profiles were used on each knee; the resulting data from the profiles were recorded with a motion capture system and then compared using MATLAB. Walk One is an industry standard of knee joint loadings for walk cycle simulation, Walk Two adds medial and lateral loads to Walk One’s profile, and Walk Three uses data obtained from instrumenting the tibia. Graphs of lowest point translation difference over cycle duration suggest that Walk One and Walk Three produced the steadiest amounts of deviation from each other throughout their cycles, and the same pairing deviated differently between left and right knees in medial lowest point shift. The noise in graphs that compare Walk One to Walk Two imply that adding loads to the knee have an effect on the resulting kinematic data. Several potential improvements include using more knees from a diverse section of the general population, testing more profiles, and improving data collection to increase sample usability.

Chris Cooper
Water Quality on Jayhawk Boulevard
Advisors: Johannes Feddema, Geography; Shannon O’Lear, Geography
Collaborators: Raisha Basnyat, Alex Beck

We are a group of three Geography students enrolled in GEOG 500, the senior capstone course, who decided to pursue an on-campus water research project. Our objective is to examine water quality issues in older buildings on campus. The following six buildings were tested for hazardous materials: Lindley Hall (1905), Marvin Hall (1909), Strong Hall (1924), Snow Hall (1930), Malott Hall (1943), and Lippincott Hall (1949). We selected these six buildings to get a wide variety of building construction on campus. Our research was centered on having a better sense of water quality in these buildings which would lead to determining the cause for the varied concentration levels of each of these chemicals in our samples. In each of the six buildings we
selected three water sources; the samples varied from water fountains and laboratory sinks to bathrooms and spigots. We believed it was important to get a wide variety of sample locations to create a general understanding of water quality on Jayhawk Boulevard. We believe the results of our research will open the door for further exploration of water quality issues present on campus.

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Candice Crafton
The Marginalization of Midwives
Advisor: Rachel Vaughn, Women, Gender & Sexuality Studies

In this research project, I will argue that the shift from natural, midwife-led childbirth to the medical model of obstetricians working in hospital settings in the late 19th century and early 20th century is the result of societal policing of the body as a means to take control over a previously woman-led field for economic and social gains. My primary sources for this research will include firsthand accounts of childbirth from midwives, mothers, and physicians, newspaper articles, childbirth training resources, and other materials from the same time period. I will be using these sources to analyze the narratives about childbirth, midwifery, and medicine that were pervasive in culture at that time. With these resources, I will analyze the cultural change that led to the marginalization of midwives.

Marika Crider
Comparison of Intact and Meniscectomy Passive Knee Laxity in Cadaveric Specimens
Advisors: Lorin Maletsky, Mechanical Engineering; Sami Shalhoub, Mechanical Engineering
Collaborator: Adam Cyr

The purpose of this study was to compare the passive laxity of the knee joint in a natural intact state and after medial meniscectomy. Data was collected from nine healthy fresh-frozen cadaveric knee specimens. For testing, the proximal femur and distal tibia were potted in aluminum fixtures with bone cement. These specimens were manually flexed from 0 to 120 degrees flexion while internal-external (IE) torques (±10 Nm), varus-valgus (Vr-Vl) torques (±10 Nm), and anterior (ANT) forces (80 N) were applied slowly to limit viscoelastic effects. First, testing was conducted with the medial meniscus intact. Next, the medial meniscus was removed and kinematic data for this case was retrieved. From this data, tibiofemoral kinematics were calculated using the Grood and Suntay joint coordinate system. Data were analyzed by comparing the isoline plots for the two cases, with and without the medial meniscus, to show the trends associated with each data set, and to study how these trends contribute to the wider scope of this research topic concerning knee biomechanics.


Courtney Crites  
*Spatial Discrimination Enforces Patriarchy and Determines Morality*  
Advisor: Rachel Vaughn, Women, Gender & Sexuality Studies

Coming from a women's studies perspective, as well as having a deeply rooted interest in fat-shame, I decided to focus on how these two interact in terms of space. Confinement in public spaces, designed for living out every day life, effects people in a variety of ways. Specifically focusing on women with larger bodies, the emphasis of my research is to examine different spaces, and determine how the microagression of spatial restriction implies patriarchy, enforces ideas of normality, and overall determines morality.

Rachel Cross  
*Ecopoetics and the Academic Ecosystem: A Step-by-Step Guide for the Anti-Colonialist*  
Advisors: Megan Kaminski, English; Mary Klayder, English

"Ecopoetics" is a new school of literary criticism, formally started in 2003 by poet Jonathan Skinner, who first defined it as “a space that ideally functions as an edge (as in edge of the meadow, or shore) where different disciplines can meet and complicate one another.” My research seeks to explore ecopoetics as nature writing with a point, as a political form, and to use these ideas to create my own portfolio of ecopoetic writing.  
Keeping ecopoetics in mind, a part of my research was a short-term study abroad program in Costa Rica, cataloguing how ecopoetics as a framework changed my experiences as a traveller. I discovered that it’s not just environmental poetry, but rather an entire ecosystem of academic disciplines where poets can use specific scientific language and concepts to explore their own experiences, a kind of inter-disciplinary dialogue not seen before. Ecopoetics isn’t just nature, it’s the way we inhabit our spaces, the way we interact with our environments, and how to travel deliberately.

I created this: a portfolio of poems and other writings.

Listen:
this is for the author of that guidebook you read on the plane,  
who- roving, devoted- fell in love,  
only to abridge his country  
into a glossary of tourist destinations,  
for the 12 species of South American bird  
that have gone extinct since you and I were born,  
for every person who knows  
that when God told Noah “save my animals,”  
we figured out what we were put on this earth to do.
Hannah Duff

*Mining Peru: Robbing Resources or Sustaining Livelihoods?*
Advisor: Paul Stock, Sociology

Gold mining has historically entangled ecology, economy and society. Though mining creates wealth and jobs for many Peruvians, it also damages the biodiversity of the Amazon and poisons water supplies. Current mining protests in Peru embody the clash between humans and nature, local and global decision-making, and economy versus ecology. While gold mining in Peru cannot be completely prohibited nor fully endorsed; community-based conservation solutions may offer pathways to mitigate the degradation of local ecologies and livelihoods.

Jeffery Durbin

*The Role of Morphemes in Novel Compound Recognition*
Advisor: Robert Fiorentino, Linguistics

Morphemes are the smallest unit of meaning in language and combine to form larger units, such as “tea” and “cup” within the word “teacup.” At the intersection of competing theories regarding the organization of the mental lexicon, or the mental dictionary, a substantial body of psycholinguistic research exists to address the fundamental question regarding the role of morphemes in lexical access. The present study aims to investigate the role of morphological representation in lexical access using novel compounds (e.g. flagstep, a never-before-seen nonword with compound-like structure such that it contains morphemes) in comparison to novel nonwords (e.g., hanpreme, a never-before-seen nonword with no internal structure). The study utilized a delayed match-to-sample task (Task 1) in which participants were presented with two words (a prime and target) and asked to decide if the words were identical. Reaction times and accuracy rates were measured as a function of prime type. A recognition memory task (Task 2) containing stimuli from the previous task and new stimuli was included to evaluate the potency of representations formed with the stimuli presented in Task 1. A preliminary dataset of ten native English speakers (n = 10) was collected. Emerging numerical patterns in the response time and accuracy data from both tasks suggest that words are recognized and stored via their morphemes, consistent with models of word recognition in which the morpheme forms basic word representations. Data collection is ongoing; we aim to achieve a larger sample size to determine whether the emerging patterns are robust.
Sarah Ekis

*Influence of Children’s Misarticulation on Preschoolers’ Word Recognition*

Advisors: Holly Storkel, Speech-Language-Hearing; Rouzana Komesidou, Speech-Language-Hearing

Purpose: Previous research has shown that children generally perceive misarticulations in speech as phonetic variations of real words as opposed to a novel “unnamed” object, but there is a processing cost in accommodating these variations from the canonical production (Krueger, 2013). Previous studies have presented stimuli to the children in an adult’s voice, but misarticulations are associated with children’s speech. The purpose of this study is to investigate whether adults or children perceive misarticulations differently when naturalistic misarticulations from child speech are used as stimuli.

Method: Twenty-four adult participants heard minimal pairs of words that were the canonical production (e.g. ring) or a production with a common substitute (e.g. wing) spoken by a child. A forced-choice paradigm required the participants to click either on a real object picture or a novel object picture after hearing each word. Data collection for children is ongoing.

Results: Adult participants selected the real object picture significantly more frequently for the canonical production than the misarticulated production. Adult’s reaction time was significantly shorter for the canonical production than the misarticulated production. Adult’s mouse trajectories were significantly straighter (i.e., less variable) for the canonical production than the misarticulated production. Child data will also be presented.

Conclusions: These findings suggest that the adults generally perceive child misarticulations as phonetic variations of real words, but incur a processing cost. This finding bolsters the previous finding that used adult imitated misarticulations, suggesting that the added cues provided by child speech did not alter the effect of misarticulation on processing.

Erin Evans

*Separation optimization of biogenic amines present in C. elegans using microchip and capillary electrophoresis*

Advisor: Susan Lunte, Chemistry
Collaborators: Rachel Saylor, Brian Ackley

_Caenorhabditis elegans (C. elegans)_ is a small roundworm and model organism due to its simplicity. _C. elegans_ has a minute number of neurons compared to humans, which allows for easier understanding and mapping of the neurons and synapses, making it useful for studying neurobiology. These simple worm analogs have the potential to provide information that will help to better understand and treat neurological diseases in humans. In order to further understand the important neurochemicals in _C. elegans_, a fast, cheap, and efficient separation and detection strategy must be developed. Because _C. elegans_ is so small, a limited sample volume is available, making microchip and capillary electrophoresis ideal analysis methods. In this study, a separation of seven analytes, dopamine, serotonin, octopamine, L-dopa, tyramine, tryptophan, and
tyrosine, found in *C. elegans*, are described. Microchip electrophoresis was initially used to test multiple buffers and pH conditions. A 10mM phosphate buffer at pH 4.5 with 5mM SDS was found to give the best separation. Next, capillary electrophoresis was used to further optimize the concentrations of phosphate to 20mM and SDS to 17.5mM. Finally, buffer modifiers were investigated. In the future, knockout worms will be analyzed to determine the effectiveness of the knockout procedure. For example, a serotonin deficient worm, GR1321 (tph-1), will be analyzed to confirm that the worm is unable to produce serotonin.

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**Erin Evans**

*Effect of calcium free seawater and p-aminobutyric acid on development of Dendraster excentricus and Strongylocentrotus purpuratus*

Advisor: Paulyn Cartwright, Ecology and Evolutionary Biology
Collaborator: Brooke Gunter

Calcium plays an important role in sea urchin fertilization and development, including prevention of polyspermy using what is called a slow block mechanism. Calcium also plays a role in cell adhesion of blastomeres throughout embryogenesis, involving calcium dependent cadherins. Cadherins are adhesion receptors required for mutual association of cells. Without calcium, cadherins are unable to bind, leaving blastomeres only loosely connected. p-aminobutyric acid (PABA) keeps the fertilization envelope from hardening by preventing it from covalently cross linking bonds that link polymer chains to one another. We investigated the effects of PABA and calcium free seawater on sea urchin fertilization and development. In this study, sea urchins were placed into four conditions, (normal seawater, calcium free seawater, PABA and normal seawater, and PABA and calcium free seawater) and development was observed. Conditions with calcium free seawater caused blastomeres to fail to adhere to each other. Conditions with calcium free seawater also saw an increase in the rate of division of cells. Abnormal embryos formed in calcium free seawater, though were more likely to form in PABA plus calcium free seawater. Our investigations into the role of calcium and PABA in early development could have implications about the fertilization and development processes in other organisms, such as humans.

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**Michaelyn Everhart**

*Examining the Effects of Reading Fiction on Empathy*

Advisor: Christopher Ramey, Psychology

Previous studies have shown a link between the amount of fiction one reads over a lifetime and one’s level of empathy. The idea that reading more fiction could indicate a higher level of empathy makes sense on the surface when one considers the idea that fiction allows readers to put themselves in another character’s (or person’s) place and feel what that character feels. Reading more fiction, in effect, works as practice for interactions in the the real social world. One measure that quantifies one’s level of empathy is the Reading the Mind in the Eyes Task. In this task, participants are asked to identify in a black and white photograph of a pair of eyes what the person is thinking or feeling. The current study focuses on refining a commonly used measure of exposure to
literature (the Author Recognition Task) and investigating its relation to empathy as measured by the Reading the Mind in the Eyes Task. Although higher scores on the former measure correlate with higher scores of empathy, the manner in which the original authors constructed the measure is somewhat unclear (e.g., the criteria used to select authors to-be-recognized). The revised version we propose expands the list of authors, adds additional genres, and uses clear and objective selection criteria for authors.

F

Cori Fain

*Effects of ethynylestradiol on sea urchin embryonic development: adverse effects at relevant oceanic concentrations*

Advisors: Paulyn Cartwright, Ecology and Evolutionary Biology; Jennifer Hueston, Director of Laboratories

Collaborators: Steve Sanders, Patreece Powell

Estrogenic compounds (endocrine-disrupting chemicals; EDCs) can alter hormonal and homeostatic systems that enable communication with the environment by either mimicking or inhibiting the action. In bodies of water world-wide, estrogenic compounds are being increasingly introduced by human industrial and agricultural activities, and are not effectively removed from drinking water sources. This causes concern that marine and terrestrial organisms may be impacted. Estrogen activity is mediated by estrogen receptors, which are known to be present in countless organisms, including mammals, sea urchins and other echinoderms. Estrogen receptors appear in mammals very early in development, even preceding maternal estrogen exposure in pre-implantation development. Echinoderms are deuterostomes, and thus display similar developmental patterns to chordates. Due to these similarities we can assume that EDCs are capable of activating embryonic receptors in both echinoderms and chordates. Previous studies have documented these adverse affects, but little is known of the impact this exposure will have. In this study, the effects of exposure to varying concentrations of ethynylestradiol on the development of newly fertilized embryos of two sea urchin species, *Dendraster excentricus* and *Strongylocentrotus purpuratus*, were tested. Using two different experimental approaches, we tested how the embryos responded. Our results indicate that development was affected in the embryos in a dose-dependent manner, with very high concentrations causing significant developmental delay and malformation. Less drastic morphological changes were seen in the lower concentrations, as well as very low levels possibly accelerating development.

Ashley Farris

*A Comparison of Two Polymers for Application in 3D-Printed TMJ Implants*

Advisor: Michael Detamore, Chemical and Petroleum Engineering

Collaborators: Marilyn Barragan, Lindsey Ott

The temporomandibular joint (TMJ) refers to the small hinge-like jaw joint near the front of the ear that allows your mandible to move. In a
patient with a TMJ disorder (TMD), everyday functions such as eating and talking become painful; the disorder is common, affecting approximately 10 million Americans. One of the current methods of treatment in patients with TMD is insertion of a metal prosthetic into the joint; however, these implants can sometimes cause severe pain and further damage the joint. One potential alternative to metal prostheses is using 3D printed biodegradable materials that encourage cell regeneration of the lost tissue. In order to determine likely materials for engineering the TMJ, cell compatibility of two polymers were compared: polycaprolactone (PCL) and polylactide (PLA). Cylindrical scaffolds were generated from PCL and PLA filament using a Mendel RepRap Tricolour 3D printer and sterilized in ethylene oxide. Cells were plated onto scaffolds at a seeding density of 200,000 cells/sample and data was collected at three hour and ten day time points. The data demonstrated that human umbilical cord mesenchymal stromal cell (hUCMSC) adhesion was similar between the two groups, but metabolism of cells on the PCL scaffold was significantly lower than the other groups. Preliminary fluorescence results show possible infiltration of cells into the scaffold, which is promising for tissue engineering applications. Although cells cultured on PLA scaffolds showed higher metabolic rates than those cultured on PCL, it is likely that either material could be developed into an implant for TMD treatment.

Marcus Florez

Investigation of Genetic Links to Alzheimer’s Disease: Analysis of APOE, TOMM40 and Mitochondrial Genome

Advisor: Eli Michaelis, Pharmacology and Toxicology
Collaborator: Xinkun Wang

Mitochondrial dysfunction and decline is well known to be a prominent event in the development of Alzheimer’s disease (AD). It has also been strongly suggested that both nuclear and mitochondrial DNA (mtDNA) variation contribute to mitochondrial dysfunction and AD pathology. Inheritance of the nuclear DNA variant of APOE, the APOE e4, is known to be a leading risk factor in AD. Recent studies have found that specific lengths of the variable-length poly-T sequence polymorphism in the TOMM40 gene are also associated with AD. Evidence from studies with cybrids strongly suggests a role for mitochondrial genes in the development of AD. However, previous studies that have investigated mtDNA variation and the risk of AD have reported mixed results. By examining the TOMM40, APOE, mtDNA haplogroup status, and other potential mtDNA mutations and heteroplasmy of each AD and non-AD subject, we hope to develop a better understanding of the role of each genetic factor in the development of AD. Thus far, a total of 430 subjects with a diagnosis of AD, minimal cognitive impairment, or no cognitive deficits, and of various ages, were recruited. DNA was isolated from blood samples from all subjects. APOE and TOMM40 genotypes were determined by Polymorphic DNA Technologies (polymorphicdna.com, Alameda, CA). I pursued the sequencing of the mtDNA. mtDNA was amplified from each of the previously isolated DNA samples. The amplified fragments were used to generate sequencing libraries for Illumina’s Genome Analyzer II. This is an ongoing process and after all sequencing is complete, the data will be combined with the TOMM40 and APOE data for statistical analysis.
Alexander Fondaw  
*The Electricidal Effect - The Treatment of Staphylococcal and Pseudomonal Biofilms Using Low Intensity Exposure to Electrical Current Via Platinum Rods*  
Advisor: Robin Patel, Department Infectious Diseases  
Collaborator: Cassandra Brinkman

Biofilms are present in a high number of infections on medically implanted devices, almost 1.5-2.5% of all prosthetic joints. They are 10-1000 times more resistant to effects of antimicrobial agents due to the thickness of the biofilms and slow growth. Electrical current has been shown to be effective in removing significant amounts of biofilm from Teflon and titanium with various types of electrodes for delivery, stainless steel, graphite, and titanium. The objective of this study was to test the ability of 200 µA direct current applied with platinum rods over 4 days to reduce *Pseudomonas aeruginosa*, *Staphylococcus epidermidis*, and *Staphylococcus aureus* biofilms grown on Teflon or titanium coupons. We also evaluated if the platinum electrodes exhibited the same effectiveness as stainless steel, graphite, and titanium electrodes, but with less side effects (corrosion) than produced by stainless steel electrodes.

Jamie Fuller  
*Exploring discrepancies between development discourse and social realities in Dakar, Senegal*  
Advisor: Kathryn Rhine, Anthropology

This two-part project investigated the relationship between discursive assumptions and social realities in development discourse. Phase one analyzed the role of discourse in constructing developing nations as “objects of knowledge” to be acted upon by aid agencies and NGO’s. Data was collected from primary resources on the popular conceptualization of the West African nation of Senegal, which has received foreign aid from a number of sources, including the structural adjustment programs. Of particular interest were assertions of democratic dominance, relative political and economic stability, and participatory interest, extrapolated from voter turnouts during the 2012 election cycle. Idealizations of the Senegalese citizen took her to be relatively engaged in the process of structuring new democratic institutions and ensuring the functioning of the democratic system. Part two of the investigation entailed field research in the fall of 2014, during a brief stay in Dakar, the nation’s capital. Observational data was collected and analyzed against the aggregate of information structuring the Senegalese “object of knowledge.” Results revealed that protest movements led by disenfranchised youth were primarily responsible for increased voter turnouts; further investigation of the origins of these movements called into question assumptions of Senegalese democratic stability. Largely a response to civic unrest stemming from systemic failures, protest movements provide evidence for a necessary restructuring of our assumptions of Senegal, and of the role of protest movements in democratizing nations.

Melanie Funk  
*Dimensions of Trust: A Grand Isle, Louisiana Study*  
Advisor: So-Min Cheong, Geography

This research project was conducted in Grand Isle, Louisiana in January 2014 with a grant from
the National Science Foundation. It focused on how the community has changed and adapted since the 2010 BP Deepwater Horizon Oil Spill. After interviewing residents that lived on the island, the issue of trust stood out as a major theme of this project. This trust or mistrust is one factor in a complex relationship the townspeople have with each other, outsiders, non-governmental organizations, governmental agencies, and other institutions. Trust is defined in various ways and is examined through three different types: thick interpersonal trust, thin interpersonal trust, and institutional trust. By examining these types of trust, we can further understand how this community has adapted after the oil spill and how forms of resiliency will continue in the future.

Joseph Greenbaum

*Investigating Biological Crosstalk using Boolean Networks*

Advisor: Eric Deeds, Bioinformatics
Collaborator: Michael Rowland

Generally, biological signaling pathways are hugely extensive and complex, especially when viewed at a “global” or cell-wide level. Simulating such systems proves computationally intensive, and requires efficient tools to analyze these daedal systems. To handle the massive size and complexity of the systems, we developed Boolean network models. These models generally represent the activity of proteins in the network using a single Boolean variable for each protein, cast in a Boolean state of either “on” (i.e. in state 1) or “off” (i.e. in state 0). Though this approach characterizes the protein species in the network in limited detail, the Boolean framework proves useful in generating computationally efficient simple models of biological networks that are useful for determining global qualitative behaviors of the system. This research ultimately aims to help explain the presence of large amounts of crosstalk in signaling networks exhibited by human cells, however this product can describe other qualities for biological systems. Several Boolean network simulators have been developed and are openly available, however none exhibit the computational efficiency to handle the networks as large and complex as those that we wish to model. Our model will be released as an open-source project to the community, so that other researchers can benefit from an efficient and robust Boolean simulation approach.

Austin Griffis

*NATIVE TEXANS CULTURAL CENTER DESIGN: A metaphorical and contextual interpretation of Native American Experience*

Advisor: Kapila Silva, Architecture

The proposal’s objective was to design a cultural center to honor the history of Native American heritage in the southern United States while celebrating the future resilience of a suppressed society. The center also had to blend with the modern landscape of central Dallas, while simultaneously standing out from the nearby cultural landmarks of the Dallas Arts District.
The project was approached from metaphorical and contextual directions simultaneously; a final concept was reached after synthesizing the results of each.

After analyzing the Arts District, I realized there was a lack of street life. The district is home to a group of isolated landmark buildings, vying to be connected. A series of circulation routes were superimposed on the oddly shaped site in order to guide visitors through the district and the cultural center. These paths also informed the form of the building.

In order to avoid preconceived forms of Native American buildings, the center was conceived as an extension of Texas’ native landscape. The cliff-inspired exterior forms a conceptual canyon inside the building, with the functions suspended inside the canyon. A palette of weathered steel and concrete was used for the exterior surface, furthering the building’s integration with the historic landscape.

Theoretically, the project created a link between the present reality and historical narrative of both Texas and its native people. This link would allow all people to come together and commemorate the true meaning of heritage.

Ibrahim Gul
Change in Range of Motion envelope of the back and the development of Low back pain
Advisor: Sara Wilson, Mechanical Engineering

Low back pain (LBP, including pain in the lumbosacral region of the spine and sciatic pain radiating to the legs) is a common and costly public and occupational health problem that has been associated with the performance of repetitive lifting tasks in the workplace. While sports injuries or accidents can cause back pain, sometimes the simplest of movements—for example, picking up a pencil from the floor—can contribute to the development of LBP. LBP is the single leading cause of disability worldwide, according to the Global Burden of Disease 2010 [1]. Moreover, 31 million Americans experience LBP at any given time [2]. The objective of the proposed study is to study how range of motion envelope of the back changes after a period of cyclic lifting. The long-term goal of the research is to identify how such changes can potentially contribute to the development of LBP and to identify safe lifting strategies, which can reduce the likelihood of developing LBP.

Marcella Hangen
Stability of Preschoolers’ Preference for and Reinforcing Efficacy of Edible and Leisure Items
Advisor: Pamela Neidert, Applied Behavioral Science
Collaborators: Isaac Nzuki, Kelley L. Harrison, Courtney R. Moore, Brian D. Greer

Few applied studies have examined the stability of preference assessment data over long periods of time. In this study, one multiple stimulus without replacement (MSWO) preference assessment was conducted each week with 22 typically and atypically developing
children. Preference was evaluated for edible and leisure items in separate MSWO preference assessments. The items in each child’s preference assessment remained constant across assessments. The total number of edible and leisure preference assessments conducted varied for each child. However, preference assessments were typically conducted over an extended period of time. Results from these preference assessments do not assess whether the preferred items function as reinforcers. Therefore, this study will include reinforcer assessments, which are also conducted once a week for each item included in the preference assessment for an extended period of time. The reinforcer assessment will test whether the item the child preferred is a strong enough motivator to motivate the child to engage in a certain behavior (i.e. a button press) in order to obtain the item. Results will be discussed in terms of the stability of preschoolers’ preference across time as well as differences in preference stability across children and assessment type (edible or leisure). Results will also be discussed in terms of whether items identified in preference assessments continue to predict items that can be used as reinforcers. Finally, recommendations on how frequently to assess preschooler preference will also be discussed.

Gavin Hanson  
*The Role of Attention in Goal-Directed Semantic Retrieval: Evidence from Multi-Voxel Pattern Analysis*
Advisor: Evangelia G. Chrysikou, Psychology

Neuroimaging studies of semantic memory have revealed different cortical networks supporting semantic retrieval for different kinds of information about common objects. For example, tasks requiring judgments of semantic similarity based on specific object properties, such as color or shape, tend to be associated with activity in the left intraparietal sulcus (IPS). Evidence from transcranial magnetic stimulation studies also shows that disruption of activity in left IPS impairs performance on semantic tasks that require comparisons between such perceptual features. Moreover, semantic judgments can be made with respect to more abstract object properties, such as thematic context or function. However, the functional networks that underlie judgments based on such abstract object features have not been systematically investigated. Here, we use multi-voxel pattern analysis of functional magnetic resonance images to examine the neural representations of both specific and abstract object properties. Participants were required to complete a series of semantic judgment tasks, wherein they were asked to match a target object to one of two response object options along one of five dimensions, namely, color, shape, function, theme, or mode of manipulation. In addition, participants performed a visual search task, requiring attention to color or shape. Results show that activation patterns within the IPS can reliably differentiate between semantic dimensions, both perceptual and abstract. In addition, differences in classification performance within left ventrolateral prefrontal cortex suggest a biasing role of this region for different object attributes. These results are discussed in the context of partially distributed models of semantic memory for object concepts.
Emily Haynes

*Modular tripeptide carrier for targeted molecular imaging with copper*

Advisor: Jennifer Laurence, Pharmaceutical Chemistry
Collaborators: Echogen, Inc., Mary E. Krause

Radioactive metal complexes are commonly administered in Medical Resonance Imaging (MRI) for their enhanced contrasting capabilities. However, metal complexes currently in use frequently become unstable after dilution in the blood, resulting in the early release of metals into serum. Once free in the body, these metals can freely exchange with other ligands. This diversity in product results in the reduction of contrasting specificity in the region of interest. In addition, the increased concentration of free metal in the body can have toxic effects.

We have discovered a novel metal abstraction peptide sequence (MAP) with an extremely high affinity for binding metal. The MAP tag is comprised of the peptide sequence asp-cys-cys, which we have shown binds Nickel and Platinum in a square planar 2N 2S geometry. This coordination has shown to be extremely stable, even in the presence of other chelators. We are working to characterize non-radioactive copper-MAP complexes in order to understand how copper binds to the MAP sequence, how the complex is affected by other flanking peptide sequences, as well as how it is affected by other ligands in the body. This understanding will help to control the complex formation of the MAP tag with the imaging agent Copper-64.

A stable copper-64 complex that can be sequenced inline targeting proteins could provide efficient, targeted metal delivery. Tissue or tumor targeted delivery of radioactive copper would greatly enhance the contrasting specificity of the medical imaging agent, while reducing the potential for toxic free metal accumulation in the body.

Matthew Hobart

*Logging on to New Identities in Contemporary Art: Identity, the Internet and Ambiguity in the Work of Jayson Musson*

Advisor: David Cateforis, Art History

My work focuses on Jayson Musson, an artist whose work consists of videos posted on YouTube called Art Thoughtz. In these works Musson assumes the identity of a person named Hennessy Youngman, who, through humor and the use of slang, deconstructs and satirizes issues in contemporary art, and issues of identity within the art world. In my research, I intend to show how, though Musson’s adoption of an alternate persona for institutional critique might be influenced by other artists, his work, largely because of his use of humor and the Internet, is unique. The structure and style of the videos, coupled with their accessibility on YouTube, allows for a wide audience. The autonomous nature of social media, as a representation of ourselves, and not a true reflection, means that Jayson Musson, simultaneously, is and is not Hennessy Youngman. Much like his use of humor, this allows Musson to step outside of institutions and to make mistakes. This lends the videos a sense of ambiguity, as the viewer is unsure what to view as satire and what is serious critique. The viewer is also unsure who they are listening to; whether Musson is speaking through Hennessy, or Hennessy himself is speaking. Though we could view Art Thoughtz as an attempt to critique, or to be educated
about, the art world, I think my research will ultimately show that the ambiguous tone of the work, and its use of the internet, are meant to provoke and spur conversation, instead of offer didactic criticism.

Rebecca Howard
Influence of synthesized vowel sounds on neural processing of speech perception
Advisor: Jonathan Brumberg, Speech-Language-Hearing

Advances in speech synthesis technology are increasingly becoming part of our daily lives. For example, both iOS and Android smartphones are capable of producing synthesized speech output in response to user queries. Human listeners can often quickly determine whether a voice is natural (e.g., from another human) or synthetic. In this study, we examine how the nervous system processes natural speech versus synthesized speech. Auditory processing of speech occurs at multiple levels of the nervous system, including the periphery (i.e. cochlea), brainstem and cerebral cortex. The Auditory Brainstem Response (ABR) is a measure of brainstem (and peripheral) processing that has been used to diagnose hearing loss. ABR is performed using electroencephalography (EEG) during which electrodes are placed on the participant’s head and a computer program tracks the brain waves resulting from each presented stimulus. So-called “click” or “tone” ABRs are used in clinical settings, typically with infants who cannot behaviorally communicate whether or not they can hear a stimulus sound. More recently, ABRs have been used to determine brainstem processing of speech stimuli as opposed to tones resulting in the complex ABRs (cABR). The current study focuses on brainstem responses to determine whether differences in natural versus synthesized speech are present from the earliest stages of auditory processes, or whether these differences emerge only after cortical processing. These findings will improve our knowledge about the neural processing of natural and synthesized speech.

Brad Hutchison
Characterization of the P1 Domain of PvdJ from Pseudomonas aeruginosa
Advisors: Audrey Lamb, Molecular Biosciences; Kathy Meneely, Molecular Biosciences
Collaborators: Annemarie Chilton, Blake Balcomb

Pseudomonas aeruginosa is an opportunistic gram-negative pathogen that is a cause of nosocomial infections. P. aeruginosa can be found on surfaces within hospital settings, and commonly infects patients with Cystic Fibrosis, those with HIV/AIDS and burn victims. One virulence factor for this bacterium is its ability to survive in iron-deficient conditions. P. aeruginosa secretes iron-chelating molecules, known as siderophores, to scavenge iron from the human host, which allows for survival in these conditions. P. aeruginosa synthesizes two siderophores known as pyoverdin and pyochelin. The synthesis of pyoverdin is carried out by a number of non-ribosomal peptide synthetases. One of the enzymes in this biosynthetic pathway is PvdJ, which is a large protein of 240.2 kDa. Although a protein of this size can be characterized by crystallization, it can often be difficult. Thus, we will attempt to characterize the domains of PvdJ separately. Each module in a non-ribosomal peptide synthetase contains multiple domains, and each domain carries out its own function. The
peptidyl carrier protein (PCP) domain in each module provides the tethering site for the growing peptide chain. The goal of my project is to characterize the first PCP domain, or the P1 domain, of PvdJ through X-ray crystallography.

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**Hannah Jayne**

*American Sex Education of the 1940's: A Rhetorical Analysis*

Advisor: Rachel Vaughn, Women, Gender & Sexuality Studies

When World War Two historians discuss the ramifications the United States experienced following the conclusion of the war, issues of economics, governmental policies and citizenship are common topics. The effects of World War Two were felt in many spaces historians oftentimes overlook, specifically educational institutions. I argue US involvement in WWII affected the marketing, messaging and rhetoric of sex education in the 1940’s. Although proponents argue the necessary reclamation and defense of the domestic sphere in a post-WWII America was essential in educating students about safe sex practices, these messages promote a consequence-centric model, fear narrative and the heteronormative. Utilizing a rhetorical analysis theory application to these artifacts, we are able to identify the audience, the barriers and advantages to the sex education campaigns of the 1940’s - a theory yet to be applied to this topic. I believe the research surrounding safe sex rhetoric of the 1940’s has not delved deep enough into issues of gender, sexuality, behavior analysis, nor has it been rhetorically analyzed from a communication studies background. In the following pages, I hope to fill some of these gaps to understand fully the rhetorical relevance of these images; understanding and conceptualizing norms in sex education from this rhetorical background as opposed to historical, can alter how educational institutions shape their messages in a contemporary time.

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**Clint Jensen**

*Considering the Impact of Analogical Associations on Learning*

Advisor: Evangelia Chrysikou, Psychology

A common goal of teaching is to impart knowledge that can be generalized beyond basic classroom lessons to wider conceptual understanding. To support students’ comprehension, instructors often use analogical associations to extend previously learned categories of information to new—and perhaps initially abstract—ideas. As example, a science teacher may use students’ prior knowledge about the structure of the solar system to explain features of an atom. In this way, despite a clear difference in physical size, concepts such as mass, gravity and ellipses can be discussed, while simultaneously further informing both how a student imagines the bounds of outer space, as well as the makeup of the particles composing their earthly home. However, students are also often taught to categorize based largely on the differences between otherwise similar objects. Consider an early reader attempting to discern the important features marking the letters ‘d’ ‘p’ ‘b’ and ‘q’.
Though research on categorization has been well documented concerning the subject of classification, the ability to infer new associations is less understood. This project considers how exposure to unrelated analogical associates may impact participants’ abilities in subsequent classification and inference tasks through reaction time and accuracy measures during a computer-based categorization task. Additionally, this project explores the impact of pairing semantically-related elements alongside the paired analogical associates, to better understand how a potentially more difficult analogical association may encourage or impede deeper understanding. We will discuss the findings of this study in the context of their potential impact for different educational contexts.

**John Robert Jones**

*IPA Study*

Advisor: Libby Harfmann, Psychology  
Collaborator: Rick Ingram

This study is checking the validity of a new questionnaire. There are few scales that examine one's past history of depression, and many depression scales use a categorical approach which simply assesses whether depression is or is not present. Therefore, our lab developed a dimensional scale of past depression, the Inventory of Past Affect (IPA), that assesses the degree and severity of symptoms. This present study seeks to examine whether the IPA is a valid measure for assessing past depressive symptoms. In the lab, we tested this questionnaire alongside other questionnaires. We had participants complete a demographic survey (age, gender, etc.), the IPA, a self-report version of the Structured Clinical Interview for Diagnosis, the Inventory to Diagnose Depression, the Depression Proneness Rating Scale, the Beck Depression and Anxiety Inventories, and the Multiple Affective Adjective Checklist. We expect the IPA to be closely correlated with the Structured Clinical Interview for Diagnosis, the Inventory to Diagnose Depression, the Depression Proneness Rating Scale, the BDI, and the depression score from the Multiple Affective Adjective Checklist. We expect the IPA to show discriminant validity, or not be correlated strongly with the BAI.

**Joseph Keusenkothen**

*Where We’re Going, We Don’t Need Roads... We Need Bike Paths!*

Advisors: Johannes Feddema, Geography; Shannon O’Lear, Geography  
Collaborators: Christina Baker, Sam Oberkrom, Will Penner, Reuben Worthington, John Young

Despite earning annual recognition as a bronze-level “Bicycle Friendly Community” every year since 2004 by the League of American Bicyclists (LAB), Lawrence, Kan., continually lags behind other similarly designated communities in several areas, including route connectivity. Feedback provided by LAB in 2012 recommended the continued expansion of the
city’s bicycle route network to foster improved connectivity. Our research examines this issue of route connectivity. Through interviews and directed research we determined that, due to their spatial distribution, focusing on connecting Lawrence’s many schools by designing a series of ideal routes would best promote improved connectivity. We designed a survey aimed at parents of children who attend these schools. This survey helped us identify and understand barriers that currently prevent individuals from cycling to school. We also researched the best practices for designing bicycle routes that diminish these barriers. Furthermore, we identified several communities with extensive bicycle route infrastructure that could serve as models for our project. Equipped with this knowledge, we employed geographic information system technology to design a series of routes. Our model includes terrain and elevation data, traffic counts, accident data, existing routes, easement data, and population data. Whenever possible, our model extensively utilizes shared-use paths that are separated from the road because of safety concerns identified through our survey and research. The result is a series of maps that illustrate ideal bicycle routes that improve the connectivity of Lawrence’s current bicycle route network while lessening barriers that currently limit some individuals from cycling.

Jordan Koch

Calculating Probabilities of Parsimony-Uninformative Patterns on Phylogenetic Trees
Advisor: Mark T. Holder, Ecology & Evolutionary Biology

A wide variety of evolutionary analyses are based upon the pairing of phylogenetic trees with models of how evolution affects biological traits over time. It is necessary in some contexts to calculate the probability of observing any member of a class of patterns arising on the tree, as exemplified in research conducted by Waddell et al. (2009) and Lewis (2001). In the Waddell et al. (2009) model adequacy approach, calculating the probability of several classes of patterns is required. Calculating the probability of any parsimony-informative pattern arising is also required in order to extend Lewis’s (2001) morphological models to handle several datasets ('parsimony' referring to the simplest explanation of the data, and 'parsimony-informative' referring to those patterns which affect phylogenetic estimation). We recently published an algorithm that includes a general approach applicable to any standard model of character evolution. We performed run-time performance tests and validated our results against Waddell’s simulations, and have recently been developing efficient, dynamic programming algorithms which calculate the probabilities of a parsimony-uninformative pattern in one pass down a tree. We are currently running our algorithms through PAUP, a widely-used software package for inferring phylogenies, to ensure they are accurate. After testing our algorithms on several datasets and polishing our code to ensure it is optimally efficient, we will draft a second article for publication.
Neurodegenerative diseases such as Alzheimer's and Niemann-Pick disease exhibit some degree of dysfunction within lysosomes: the cellular organelles responsible for the digestion of macromolecules. Under these conditions, lysosomal trafficking and catabolic activity are thought to be impaired, leading to lysosomal aggregation, lysosomal volume expansion, and severe perturbation of homeostatic balance. Cationic amphiphilic drugs (CADs) are weakly basic drugs that permeate lysosomal membranes, becoming charged in the acidic environment and trapped within. Thus, CADs can induce lysosomal impairments similar to those of diseased cells. Previously, researchers have shown that vitamin E can mitigate lysosomal impairments in both diseased and drug-impaired cells. We sought to characterize this mechanism in our pursuit of a novel therapy of neurodegenerative diseases.

We hypothesized that vitamin E recovers lysosomal function by improving impaired lysosomal trafficking and reducing the aqueous volume of lysosomes. Our findings support our hypothesis, but while the molecule has therapeutic potential, it is limited by its own antioxidant qualities. These qualities are prized in medicine, but they lead to the relatively rapid degradation of vitamin E within the body. Seeking a more drug-like molecule with an increased biological half-life and activity, we collaborated with a medicinal chemistry laboratory to replace the molecular feature responsible for much of vitamin E's antioxidant traits with a more stable functional group. These molecules exhibited enhanced activity despite the antioxidant feature being removed. Further stability studies could lead to the creation of a novel therapeutic treatment for the neurodegenerative diseases that claim millions of lives every year.

Schuyler Kraus
An Inquiry into the Authenticity of Cleveland Ecovillage
Advisor: Chris Brown, Environmental Studies

Over the last three decades, the global ecovillage network has expanded to include over 700 ecovillage projects. Ecovillages are sustainability-minded intentional communities that are collectively governed by all those involved. Typically, those who join or start ecovillages are frustrated with the limits mainstream political and economic systems impose on sustainability initiatives. They seek an environment that, not only allows, but facilitates experimenting with avant-garde and sometimes rather eccentric techniques to cultivate a more socially and ecologically mindful society.

In Cleveland, Detriot-Shoreway Community Development Organization has taken a unique approach to integrating sustainability into the urban landscape by joining the international ecovillage movement. This research investigates to what extent their project, Cleveland Ecovillage, is consistent with values that shape the Global Ecovillage Network (GEN). It considers what perceived limitations might
account for a failure to realize overarching ecovillage goals, as well as provides recommendations for overcoming them.

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**Holly Lafferty**  
*Hunger Games: Isotope Ratios in Nutrient Stressed Fish*  
Advisor: James H. Thorp, Ecology and Evolutionary Biology  
Collaborator: Rachel Bowes

In aquatic ecology, studying food chains is important when looking into the overall health of an ecosystem. A popular method for determining where an animal falls in the food chain is the use of stable isotopes, specifically the nitrogen isotopes found in animals’ tissues. Animals take in both 14N and 15N when they eat, but the reactions in the excretion pathways preferentially excrete the lighter 14N isotope, leaving an organism relatively enriched in 15N compared to its food source. When using the stable isotopes, the change in 15N, or δ15N, is measured. While a change in an animal’s δ15N is usually attributed to a change in prey, increasing δ15N signatures have also been shown to correlate with starvation and nutritional stress. This could cause stable isotope analysis to inaccurately predict the food chain position of starving animals. To examine this, a project with a lab and field component was implemented. In the lab study, fish that were fed every six days for an extended period registered half a trophic level higher than fish that were fed every day. Fish collected from the same location in the Kansas River throughout different seasons also showed varying amounts of nutritional strain influences by environmental stressors and food availability. This shows body and environmental conditions must be taken into account when using stable isotopes in order to accurately determine food chain structure.

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**Candice L’Ecuyer**  
*Atrazine in our Drinking Water: What is Acceptable and How it is Determined*  
Advisor: Shannon O’Lear, Geography

My research project addressed how the safe level of atrazine in drinking water was determined, and what the difference is between national limits on atrazine and Kansas limits on atrazine. After becoming concerned about my family drinking water with atrazine in it, I decided to research this topic further. I utilized public information available through the environmental protection agency and looked at scholarly journals and books with the guidance of my research mentor. Atrazine is a pesticide used primarily for agricultural purposes starting after World War II that acts as an endocrine disruptor in animals, including humans. It has been linked to cancers, heart, liver and kidney problems, and feminization of male frogs and fish. There are strict regulations in place for application of this pesticide for commercial agriculture, which has reduced the amount of atrazine to enter the watershed for consumption downstream. The national safe level is 3 parts per billion, which is monitored by each state, and they work with the public works department in violation to ensure quality drinking water, leaving fines as a last resort for serious noncompliance. The safe level of
Atrazine was determined by thousands of studies funded by Syngenta, the maker of atrazine. This included testing on animals that was found to not be able to be extrapolated to human cases. My findings were that the basis for the safe level of atrazine is determined by emphasizing scientific uncertainties, and they do not take into account synergies of multiple endocrine disruptors.

Kyle Lockhause

Ashes to Ashes: The Survey of the Fraxinus Pennsylvanica on the University of Kansas’s Campus

Advisor: Robert Hagen, Environmental Studies
Collaborators: Jeff Severin, Peg Livingood, Ken Snow, Marion Paulette, Scott Cambell, Emily Donachie, Blaine Blengtson, Thomas Mulinazzi, Blaine Chelsey Raymer

In 2002 the Emerald Ash Borer was discovered in Michigan, becoming the first time that this species was known to be within North America. It was found in Kansas during the summer of 2012, making the spread of this invasive pest a local and national threat. The Emerald Ash Borer larvae feed under the bark of the tree family Fraxinus, commonly known as ash, creating bores that disable the tree from transporting nutrients throughout it. These beetles are so aggressive they can kill the ash tree within two or three years. In an attempt to protect and conserve the ash trees throughout the University of Kansas’s campus, it is essential to survey the campus to locate and determine the dimensions, conditions and future of the ash community. I used ArcGIS to analyze this data and create a detailed visual representation that will be used by professionals to decide if individual trees are worth the investment of protection. GIS is a multipurpose and progressive program that is becoming increasingly applicable with preserving different species. Using survey equipment, such as a handheld GPS, as well as more precise GPS’s in cooperation of KU’s facility services, tools to measure the tree’s circumference, and a range finder for the height, ArcGIS can be utilized to present this information in a comprehensive manner. This project used a web-based map among layers of location, dimensional and conditional data to enhance overall knowledge and conservation efforts on KU’s campus.

Kimberly Lopez

The Politics of Female Breasts: The Social Stigma Behind Breastfeeding

Advisor: Rachel Vaughn, Women, Gender & Sexuality Studies

While breasts are mammary glands and breastfeeding is the simplest act of providing nourishment for an infant, women are often shamed for breastfeeding in public as an act of “exposure” in the public. These contemporary attitudes towards breastfeeding also coincide with past attitudes towards breastfeeding in regards to wet nurses—which were once used as a commodity, then later shamed for their work. Historically, wet nurses were also women of color or of lower socio-economic status than those who employed them, so social class, race, and ethnicity play a major role in the original concept of wet nurses. This research explores and compares how the historical attitude towards breastfeeding and the contemporary attitude towards breastfeeding interrelate.
Nicholas Malley

86’d - A Short Film
Advisor: Bob Hurst, Film & Media Studies
Collaborators: Brandon Fawcett, Ethan Hrabe, Jacob Baughman

86’d is short film about Ronnie, a young man on his first day working in a surveillance room at a shopping center. He monitors the mall with Winston, a senior employee who is in charge of training him. Through a series of events, Ronnie sees something on the cameras that he wished he hadn’t. This ultimately forces him to make a decision that might put his new job in jeopardy. Drawing on themes of responsibility through surveillance, the film offers the perspective of what it’s like to be the fly on the wall. Our cast was hired from Kansas City’s great selection of commercial actors, while our crew comprised of both former and current KU film students. The budget for the project totaled at $1,700 and was made possible by an Undergraduate Research Award and a crowd sourcing website called “Indiegogo”. 86’d is an ongoing collaboration that is in the post production phase where we edit and polish over the film. The project started pre-production in the summer of 2013, which lasted until January. Production took one month over four different weekends, filming both on location and in KU’s Old Father Studios. 86’d is slated to be completed in the following weeks, when we plan to submit to local and national film festivals.

Kendra Marr

The Good, the Bad, and the Ugly: Factors that Contribute to Eggshell Defects in a Strain of Drosophila virilis That Carries a High Transposon Load
Advisor: Justin Blumenstiel, Ecology & Evolutionary Biology
Collaborators: Michelle Wickersheim, Mauricio Galdos, Jennifer Kaberline, Lucas Hemmer

Strain 160 of Drosophila virilis has a genome loaded with transposons and lays eggs with persistent dorsal axis defects, indicating a failure of dorsal axis specification during oogenesis. Previous studies on a related species, Drosophila melanogaster, have shown that a failure mobilize piRNAs to suppress transposon activity and the subsequent activation of a DNA damage response are likely causes of dorsal axis specification defects during development, but have yet to look into the case of D. virilis axis development. Little has yet to be known about the mechanisms of these axis determination defects in strain 160, but our insight shows a possible environmental impact of temperature on the ability of flies to lay correctly dorsalized eggs. Genetically, we show that egg defects are not caused by the presence of any specific strain 160 chromosome and are likely a multi-chromosome effect. We also show a lack of involvement of an ATM-dependent DNA damage response and a DNA damage response-independent insulin/insulin-like growth factor signaling (IIS) in the induction of defective eggs. Further studies are needed to elucidate the causes behind the failure of strain 160 to produce properly developed eggs, but the apparent non-involvement of pathways that
were previously shown to affect oocyte patterning may indicate the involvement of redundant pathways in strain 160, whereas when one pathway is inactivated, the other assures the production persistent egg defects.

**Austen McGuire**

*Mental Strength’s Effect on the Perception of Aurally and Visually Looming Objects*

Advisors: Omri Gillath, Psychology; Juwon Lee, Psychology

Collaborator: Michael Vitevitch

The ability to detect approaching objects in one’s environment, either based on their looks or the sound they make, is crucial for survival. Approaching (looming) objects can be a sign of danger (e.g., approaching predator or weapon), and therefore tend to take precedence over other objects, to help people prepare for that danger (Neuhoff, Planisek, & Seifritz, 2009; Seifritz et al., 2002; von Mühlener & Lleras, 2007). Although the looming effect is robust and well-studied, (Neuhoff, Long, & Worthington, 2012; Neuhoff, Planis), relatively little is known on the role of mental strength in this effect. I will test the effects of mental strength, or more precisely the lack of mental strength, on the ability to detect looming objects. On the one hand, people in a state of ego depletion (low mental strength) may respond sooner to looming objects as compared to people in a normal mental state, because they need more time to react to danger. Alternatively, if the looming effect is an effortful process, participants in a state of ego depletion might not have enough mental strength and show a weaker effect similar to the case with cognitive load and cognitive performance (Lee, Lee, & Boyle, 2007).

**Ruben Medina**

*Youngsters’ Perceptions of the Motivational Climate in Their Recreational Exercise Classes*

Advisor: Mary Fry, Health, Sport, and Exercise Sciences

Collaborator: Susumu Iwasaki

Research employing Achievement Goal Perspective Theory (Nicholls, 1989) and a caring framework (Newton, et al., 2007) has revealed that youngsters are more likely to have positive experiences in recreational exercise settings (i.e., sport, exercise) when they perceive a caring and task-involved climate. Limited research has considered youngsters’ experiences in recreational exercise classes. The purpose of this study was to examine the relationship between participants’ perceptions of the climate (caring, task, and ego) to their sense of enjoyment, participation outside of class, and their attitudes toward their teacher, peers, and activity. Participants (N=45; age 9-17 years) enrolled in recreational exercise classes through their community recreation center volunteered with parental consent to complete a survey at the end of their 12-week session. The survey included the following measures: caring, task-, and ego-involving climate; enjoyment; participation outside of class; as well as their attitudes toward their teachers, peers, and the activities. Results revealed the participants perceived a highly caring, moderately task-involved, and neutral ego-involving climate in their classes. Canonical correlation results revealed one significant function (L=.37, F (18) = 2.30 (p<.005)), with a
canonical correlation of .70 with 50% overlapping variance. Perceptions of a high caring and task-involving climate, with low emphasis on an ego-involving climate, were positively associated with participants reporting high enjoyment, and positive attitudes toward their teachers and peers. Results suggest that recreational classes for children and adolescents that foster a caring and task-involving climate may be an important consideration for professionals who administer these community programs.

Kristin Miller
Increasing Child Compliance with Essential Routine Procedures: Acquisition, Generalization, & Maintenance
Advisors: Pamela L Neidert, Applied Behavioral Science; Kelley Harrison, Applied Behavioral Science
Collaborators: Kimberley L. M. Zonneveld, Courtney R. Moore

Routine healthcare procedures (e.g., haircuts, dental exams, etc.) commonly evoke noncompliance in children with intellectual and developmental disabilities (Shumacher & Rapp, 2011). This can be a serious problem, particularly when a procedure requires the use of sharp objects (e.g., scissors). This study evaluates the use of a behavior analytic training procedure for increasing compliance with healthcare procedures both in a contrived setting and in the actual setting (e.g., hair salon). A multiple baseline across subjects design, combined with a multiple probe design, was used to evaluate the effectiveness of the intervention. To date, eight children with developmental disabilities have participated. Results indicate that mere exposure to the simulated environment increased compliance for three children. However, training was necessary to increase compliance for five children. Generalization (transfer of skills) of compliance from contrived setting to actual healthcare settings was observed for two children. Maintenance of compliance in the training environment and actual healthcare environment is currently being assessed. Training is still in progress for one child. However, decreases in negative vocalizations and use of physical restraint in the actual setting (e.g., hair salon, dental office) have been observed across all participants. This research extends the literature by assessing the extent to which treatment effects generalize to the actual setting with the relevant professional implementing the procedure, by identifying relevant stimuli to facilitate generalization, and by assessing maintenance of treatment effects in the actual setting.

Adam Miltner
How MAB-5 Drives Posterior Migration of the Q Neuroblasts in the Model Organism Caenorhabditis elegans
Advisor: Erik Lundquist, Molecular Biosciences
Collaborators: Matthew Josephson, Eric Struckhoff

Proper neuron migration is crucial to a developing organism. Improper neuron migration results in many human disorders, including mental retardation. In order for the billions of neurons in a human brain to correctly find their way, developing neurons send out protrusions to sample the environment. The protrusions encounter different signals that can attract or repel them; these environmental cues guide the neuron to the proper position in the organism. We use the model organism Caenorhabditis elegans to study neuron
migration. MAB-5 is a Hox transcription factor that drives posterior migration of the Q neuroblasts in C. elegans. We investigated how MAB-5 induces posterior migration through its regulation of spon-1. spon-1 encodes the C. elegans homolog of the human protein F-spondin. In vertebrates, F-spondin is secreted and acts as an extracellular guidance cue. We report here that mab-5(gof) (gain of function) mutants express higher levels of SPON-1. However, mab-5(lof) (loss of function) mutants do not express notably variable amounts of SPON-1 relative to wild type animals. Thus, we tested the posterior Hox transcription factor egl-5 for redundancy with mab-5 in spon-1 regulation. We observed a marked decrease in Pspon-1::GFP expression in egl-5(lof);mab-5(lof) double mutants, but not in single mutants for either egl-5(lof) or mab-5(lof). These results suggest a novel redundancy between Hox transcription factors EGL-5 and MAB-5 in positively regulating spon-1 expression.

Daniel Muccino  
Quantifying Diffusion in All-Solid-State Lithium-Ion Batteries  
Advisor: Lin Liu, Mechanical Engineering

Lithium-ion batteries are widely chosen to power a variety of electrical devices, primarily due to their high energy density. However, standard lithium-ion technology suffers from a variety of drawbacks that are increasingly limiting. The demand for smaller, safer, cheaper energy storage options increases with new technology and a growing interest in sustainable/renewable energies. Many of these problems stem partially from electrochemical interactions within the ion transport medium of the battery, or electrolyte, which is a liquid solution in typical lithium-ion cells. One promising solution is the use of all-solid-state lithium-ion batteries which replace the problematic liquid electrolyte with a solid one. Not only does this eliminate a majority of the electrochemical interaction problems, but it also improves some important characteristics of the battery, such as energy density, meaning that the solid state battery can offer more stored energy per unit area. However, these batteries are not perfect. Therefore a detailed knowledge of how they behave is important to the design and optimization of all-solid-state lithium-ion cells and is critical to describing the potential of these batteries. Current investigations into solid state battery performance are relatively limited, and quantitative evaluations of behavior are rarer still. The goal of this research is to couple experimental data of solid electrolyte lithium-ion batteries with a theoretical diffusion model in order to quantify the diffusion of ions and predict performance degradation changes over time and at varying temperatures.
Julia Nehring

The potential of milkweed floss as a natural fiber in the textile industry
Advisor: Mary Anne Jordan, Visual Art

The “fluff” found in milkweed seedpods is actually durable fiber that can be blended with other raw materials to make yarn. There is currently no large-scale market for milkweed floss, but I want to show that it could be both an economically and environmentally sound fiber in textile manufacturing. My ultimate goal is to create a woven product that shows, side-by-side, different ratios of milkweed-to-cotton and milkweed-to-wool used to make handspun yarn, in addition to giving a presentation about the potential for milkweed floss in the sustainable textile industry.

Outside of a small community of blogging craftswomen on the Internet, it is not widely known that milkweed fibers can be combined with other fibers to make yarn. If milkweed could be used to replace even a small fraction of cotton fiber, there would be several benefits. First off, planting milkweed in mass would create butterfly habitats (beloved monarch larvae only feed on milkweed), meanwhile rows of cotton seem to only invite pests. Secondly, since it can grow all over the country, there could be less reliance on a select few regions for cotton, which can only grow in certain eco-zones.

My objective is to make a finished product that displays different ratios of milkweed-to-cotton and milkweed-to-wool side by side. By spinning the fibers together I will make yarn, which can then be woven into a cloth that shows the different ratios.

Benjamin Neitzel

Effects of Sexual Arousal on Commitment: The Moderating Role of Threat
Advisor: Omri Gillath, Psychology
Collaborator: Juwon Lee

When encountering a sexually arousing potential mate, people may get aroused and attracted to that person. If already in a relationship, such attraction may threaten the stability of the relationship, as it may lead to feeling less committed, and eventually to relationship dissolution. Previous research from our laboratory (Lee et al., in prep.), however, has shown that people who are highly satisfied in their close relationships actually report higher commitment following such encounters. Lydon and colleagues (1999) suggested that encountering an alternative mate threatens people’s relationship, and as a reaction they engage in relationship maintenance behavior. For example, they showed that when highly satisfied people felt their relationship was threatened, they were likely to devalue an alternative mate. Lydon et al’s research may also explain the increase in commitment reported in our previous studies. We will test this possibility using a two-part study. In the first part, we will get a baseline measure of the participant’s levels of satisfaction and commitment. In the second part of the study, participants will be exposed to either a sexually arousing potential mate or neutral control image. After the manipulation, participants will report their level of threat, as well as levels of satisfaction and commitment. I predict
participants who report higher levels of threat will also report higher levels of commitment, when sexually aroused by an alternative.

Megan Nelson
Tipping: An Economic Anomaly
Advisor: Neal Becker, Economics

When dining in a restaurant or having a drink at a bar, do you tip? If yes, what do you base the tip amount on? Does it depend on the other individuals you are with? Do men tip more than women? Do you tip less when your actions are masked by a larger group? The goal of my work is to shed light on these questions. Tipping behavior and its implications on human behavior is something that economists have struggled to explain, the most difficult question being, why do people pay an additional amount to complete strangers when they have absolutely no legal obligation to do so? It is no mystery why tipping research is of particular interest: in the U.S. alone, an estimated $42 billion was generated by tips. In the U.S., tipping is an understood necessity of the service industry to balance out the standard server wage of approximately $2.13 per hour. With millions of workers reliant predominantly on tips in order to support themselves, it is safe to say that tipping has become a deeply ingrained cultural norm. This paper will explore the variables that lead to higher or lower tip amounts in the service industry.

Mitchell Newton
Utilizing Microdialysis and Electrocortiography to Understand Seizure Activity in the Brain.
Advisor: Craig Lunte, Chemistry
Collaborators: Sara Thomas, Amanda Furness

Seizures can cause impaired function of the brain through irreversible cellular death for neurons. Understanding seizures in the brain requires real-time collection of chemical and electrical changes in a brain as it undergoes seizure activity. Collection through microdialysis can provide information about the levels of key neurotransmitters, like glutamate and GABA: the excitatory and inhibitory chemicals in brain signaling. Use of electrocortiography allows for the tracking of verified over-excitation in the brain's signals, the hallmark of a seizure. Together, these two strains of information provide a holistic map of the brain during a seizure. In this study, live male Wistar rats were induced into seizures with the injection of 3-mercaptopropionic acid, a known convulsant. Microdialysis probes in the brain collected samples during the seizure which were analyzed through liquid chromatography with fluorescence detection for the concentrations of glutamate and GABA. Simultaneously, electrical probes in the brain were used by electrocortiographic equipment to analyze the electrical discharge of the neurons affected by the convulsant. This information was overlaid with the chemical analysis to determine seizure activity in the brain.
Sam Oberkrom  
*Where We’re Going, We Don’t Need Roads... We Need Bike Paths!*
Advisors: Johannes Feddema, Geography; Shannon O’Lear, Geography  
Collaborators: Christina Baker, Joseph Kelesenkoten, Will Penner, Reuben Worthington, John Young

Despite earning annual recognition as a bronze-level “Bicycle Friendly Community” every year since 2004 by the League of American Bicyclists (LAB), Lawrence, Kan., continually lags behind other similarly designated communities in several areas, including route connectivity. Feedback provided by LAB in 2012 recommended the continued expansion of the city’s bicycle route network to foster improved connectivity. Our research examines this issue of route connectivity. Through interviews and directed research we determined that, due to their spatial distribution, focusing on connecting Lawrence’s many schools by designing a series of ideal routes would best promote improved connectivity. We designed a survey aimed at parents of children who attend these schools. This survey helped us identify and understand barriers that currently prevent individuals from cycling to school. We also researched the best practices for designing bicycle routes that diminish these barriers. Furthermore, we identified several communities with extensive bicycle route infrastructure that could serve as models for our project. Equipped with this knowledge, we employed geographic information system technology to design a series of routes. Our model includes terrain and elevation data, traffic counts, accident data, existing routes, easement data, and population data. Whenever possible, our model extensively utilizes shared-use paths that are separated from the road because of safety concerns identified through our survey and research. The result is a series of maps that illustrate ideal bicycle routes that improve the connectivity of Lawrence’s current bicycle route network while lessening barriers that currently limit some individuals from cycling.

Kayla Overbey  
*A Cultural Comparison of 19th-20th c. American and British Children’s Literature*
Advisors: Giselle Anatol, English; Mary Klayder, English

In 1865, with the publication of "Alice's Adventures in Wonderland," children's stories experienced a shift that forever changed literature for kids. While the British side of this "golden age of children's literature" has undergone close examination, not many studies exist comparing British children's novels to American children's novels, which differ greatly in tone and themes. I've chosen to analyze "Alice's Adventures in Wonderland," "Mary Poppins," "The Adventures of Tom Sawyer," and "Little House on the Prairie." My research explains how 1) cultural movements of the Midwestern United States/urban Britain are depicted through the plots, setting, and nuances of the texts; and 2) how those details can be read as values that are projected onto children.
Through the progression of my research, I not only discovered the societal/cultural impact that books have on children, but also how societal events impact literature in a cyclical way. Events or movements that affect cultures/societies inspire reaction in many forms, one of which is occasionally children's literature. The inspired pieces of work are read and shallowly understood for children, who feel the impression of very memorable texts long after they finish a book. Eventually (and hopefully) the chain of events ends with positive change from individuals who learned from the texts they enjoyed as children.

My research encapsulates not only a textual analysis of the four selected children's books, but also an examination of the intrinsic influence of children's literature and how it encourages progression.

Valerie Paul

*Disruption of development of C. elegans through manipulation of canonical Wnt pathways*

Advisors: Pauly Cartwright, Ecology & Evolutionary Biology; Jennifer Hueston, Undergraduate Biology
Collaborators: Justin Davis, Rachel Bowes

Wnt signaling plays an essential role in the early development of many organisms to help establish body axis formation, cell differentiation and migration, and many other functions. Wnt signaling involves a series of signal transduction pathways that are comprised of various proteins that pass signals from the outside of a cell to the inside to regulate gene expression. These Wnt pathways are highly conserved in evolution. Alsterpaullone is a cyclin-dependent kinase inhibitor, meaning it alters a cell’s ability to properly complete the cell cycle. Alsterpaullone also up-regulates Wnt signal transduction by blocking GSK3β. Wnt normally blocks GSK3β, so treating an organism with alsterpaullone up-regulates Wnt expression. Because Wnt controls cell polarity and migration, we hypothesized that treatment of alsterpaullone to *Caenorhabditis elegans*, a small, free-living, non-parasitic nematode, would cause the organism to exhibit various defects with cell organization and migration. Our results show drastic abnormalities, particularly in the formation of the intestines and oocytes, which then lead to further developmental or reproductive issues.

Will Penner

*Where We’re Going, We Don’t Need Roads... We Need Bike Paths!*

Advisors: Johannes Feddema, Geography; Shannon O’Lear, Geography
Collaborators: Christina Baker, Joseph Keusenkothen, Sam Oberkrom, Reuben Worthington, John Young

Despite earning annual recognition as a bronze-level “Bicycle Friendly Community” every year since 2004 by the League of American Bicyclists (LAB), Lawrence, Kan., continually lags behind other similarly designated communities in several areas, including route connectivity. Feedback provided by LAB in 2012 recommended the continued expansion of the
city’s bicycle route network to foster improved connectivity. Our research examines this issue of route connectivity. Through interviews and directed research we determined that, due to their spatial distribution, focusing on connecting Lawrence’s many schools by designing a series of ideal routes would best promote improved connectivity. We designed a survey aimed at parents of children who attend these schools. This survey helped us identify and understand barriers that currently prevent individuals from cycling to school. We also researched the best practices for designing bicycle routes that diminish these barriers. Furthermore, we identified several communities with extensive bicycle route infrastructure that could serve as models for our project. Equipped with this knowledge, we employed geographic information system technology to design a series of routes. Our model includes terrain and elevation data, traffic counts, accident data, existing routes, easement data, and population data. Whenever possible, our model extensively utilizes shared-use paths that are separated from the road because of safety concerns identified through our survey and research. The result is a series of maps that illustrate ideal bicycle routes that improve the connectivity of Lawrence’s current bicycle route network while lessening barriers that currently limit some individuals from cycling.

Pann Pichetsurnthorn

Dual-Electrode Electrochemical Detection for Microchip Electrophoresis: Voltammetric Identification of Chemically Labile Species

Advisors: Susan Lunte, Chemistry; Dulan Gunasekara, Chemistry

Reactive nitrogen species, such as nitric oxide (NO.) and peroxynitrite (ONOO-), are chemically labile species that have been implicated in several cardiovascular and neurodegenerative diseases. The short life time of these molecules makes them difficult to detect, often requiring indirect methods of analysis. Microchip electrophoresis coupled to amperometric detection (ME-EC) offers fast separations and sensitive detection—allowing these species to be characterized before significant degradation. In ME-EC, migration time is commonly utilized to identify analytes in a sample. For complex samples such as cell lysates, analyte identification solely utilizing migration time becomes problematic when contamination protrudes. Therefore, a ME-EC method with dual electrodes was developed for identification of analytes by voltammetric characterization. Voltammetric information for analytes was obtained through a current ratio generated by employing two working electrodes in a series configuration. The current ratio can be unique to analytes with different half-wave potentials and deviations from such can imply impurities. The electrodes were integrated into a 5 cm simple-T microchip. In this setup, the first electrode is in in-channel configuration while the second electrode is in end-channel configuration. Nitrite, tyrosine and hydrogen peroxide standards were used to optimize the system. Current ratios for these standards were generated by correcting sensitivity differences between two working electrodes. It was found
that test samples were contaminated with hydrogen peroxide, which is used in peroxynitrite synthesis. This method will be employed to identify RNS production in bulk cell lysates.

**Seth Polsley**  
Control System Based on Electromyography  
Advisor: James Rowland, Electrical Engineering and Computer Science

Technology is continually evolving, and so is the way we interact with it. In the growing trend of the "Internet of Things," electrical devices are being filled with more sensory and computational capabilities than ever before, allowing intelligent systems --like voice-controlled cell phones -- that can interface with humans very naturally. Electromyography (EMG), which is the acquisition and analysis of a muscle's electrical activity due to movement, is an increasingly popular technology that could potentially be used to build such intelligent systems. Traditionally, EMG has been used in research and medicine, not making its way into the consumer market due to cost. Yet, the components of an EMG sensor are based on fairly inexpensive parts. The goal of this research has been to design and construct a complete system for EMG collection and analysis using inexpensive circuit parts and microcontrollers. While this is not a "new" idea, it is intended to demonstrate the capabilities available with modern technologies, hopefully providing a glimpse into the types of devices we may see in the near future. Systems equipped with EMG-based control systems can be much more natural and interactive than other technologies, especially when applied to certain devices. Using machine learning techniques to "learn" a user's movements, EMG-based systems could be used for everything from rehabilitation to protective exoskeletal systems.

**Betsy Ramirez**  
*Isolation and Crystallization of PvdJp2, a Non-Ribosomal Peptide Synthetase Domain in Pseudomonas aeruginosa*  
Advisor: Audrey Lamb, Molecular Biosciences

During times of iron deprivation, many bacteria produce low molecular weight compounds called siderophores, which have the ability to scavenge iron from the host environment. Pyoverdin is a siderophore produced by *Pseudomonas aeruginosa* during extreme iron starvation. The biosynthesis of pyoverdin involves several multi-modular Non-Ribosomal Peptide Synthetases (NRPSs). The NRPS PvdJ incorporates two amino acids into the growing pyoverdin. PvdJp2 is a structural domain within the second module of PvdJ that acts as a scaffold and tether for the incorporation of formyl-hydroxyornithine. Present work is focusing on the expression, purification, and crystallization of PvdJp2. PvdJp2 was determined to express best after induction at 30°C for 22 hours, and is purified using standard chromatography techniques, exploiting the His-tag. Current methods of crystallization have not yet yielded diffraction quality crystals. Future
work will focus on alternative methods of crystallization, such as increasing the protein concentration and changing the incubation temperature.

Julio Ramirez

_Shielding Effect of Asexual Reproduction on Mutation Load_

Advisor: María Orive, Ecology and Evolutionary Biology

In a previous theoretical study by Marriage and Orive (2012), models of mutation load (the decrease in fitness seen under recurrent deleterious mutations) for finite and infinite populations were investigated. The models considered three forms of reproduction: outcrossing, self-fertilization, and asexual reproduction. A “shielding effect” due to the avoidance of meiotic mutations was found for the portion of the population undergoing asexual reproduction. Current work focuses on altering the amount of mitotic mutations received under asexual reproduction. We explore the idea that asexual reproduction that exposes offspring to a greater accumulation of mitotic deleterious mutations (due to the accumulation of somatic mutations) partially or completely eliminates the “shielding effect” of asexual reproduction that was observed by Marriage and Orive (2012). Such findings are supported by a study finding greater inbreeding depression in clonal herbaceous plants than in non-clonal species (Vallejo-Marín et al. 2010), presumably due to the accumulation of a greater number of somatic mutations.

Steven Reyes

_First Texans Museum in Dallas Arts District of Texas: A Contemporary Interpretation of the Kiva_

Advisor: Kapila Silva, Architecture

This poster presents the design research process followed for creating a First Texans Museum in the Dallas Arts District in Texas. The goal was to design a public building that would make Native Americans feel at home and to represent their culture respectfully and accurately. My analysis of the Arts District’s urban space revealed that while the District has intriguing art-related buildings, it lacks invigorating outdoor public spaces for people to gather. There exists a large outdoor space at one end of the District around the Opera House, yet it is mostly inactive, as there are no activities around it to attract people, other than food trucks during the lunch time. I wanted this Museum to act as a counterpoint to the Opera House’s public plaza. I reversed the form and order of the Opera House’s public plaza to generate the character of this new public space of the Museum. It is also inspired by the kiva, the ceremonial gathering place for Native Americans. The kiva is dug into the ground with an opening above, which allows light to pass in and spiritual energy to flow out. My public plaza is thus sunken into the ground; the museum’s public functions such as café, temporary exhibit gallery, and bookstore surround this sunken plaza, while the galleries levitate above the plaza. The design thus responds to both the urban space of the Arts District as well as to Native American cultural ideas and imagery.
Indoor air quality (IAQ) is a good indicator of a healthy building environment, as it looks at how indoor air affects the health and comfort of building occupants. This research investigated a living wall, designed for the conference room of the Center for Design Research (CDR), located on the West Campus at the University of Kansas. The living wall is constructed of several fern species and was installed as a means to improve indoor air quality. This research tested for the effectiveness of the living wall in reducing CO2 concentration levels indoors as well as the impact the supply and return diffusers have in the amount of CO2 concentration being removed by the living wall. Data for CO2 source volume was gathered from 3 previous studies, using the plant species Bird’s Nest Fern as a base-case, and Ixora Chinensis, Peace Lily, Weeping Fig, and Areca Palm as experimental controls. Data was inputted inside a building model of the CDR designed in the computational fluid dynamics (CFD) program, FloVENT. A building model of the CDR without the living wall was also tested in FloVENT to compare results. The impact of the supply and return diffusers in the CO2 removal rate of the living wall was then tested, by comparing the models with the original diffuser layout and with the return diffusers placed behind the living wall. Finally, concentration flowrate results were compared to each other.

According to Life History Theory, there are two types of sexual strategies; short –term and long-term. People tend to adopt one type of strategy over the other as a function of their environment. Feeling secure and safe in one’s environment is associated with long-term strategy, whereas feeling insecure is associated with short-term ones. In line with these claims, correlational research has shown that people with a secure attachment style (or relationship style) tend to adopt long-term strategies, whereas, people with insecure attachment styles are more likely to adopt short term strategies. Recently, Gillath and colleagues have started using experimental designs to study the associations between attachment style and preference of sexual strategies. They found initial evidence, using self reports and implicit security priming, that making people feel more secure results in a stronger preference towards long-term strategies. In the current study, building on these initial finding, we examine the effects of attachment security priming on selection of potential mates. Potential mates will be depicted as either looking for short- or long-term relationships. We predict that security priming will make participants prefer long-term strategies, and hence, select partners who look for long-term relationships.
In this presentation I discuss the research approach taken in designing a Native American museum for the Dallas Arts District. I focused on the Native Americans’ resourcefulness and deep connection with the Earth by constructing the museum out of rammed earth. To highlight the intimate nature of their culture, I kept the museum to a small scale by limiting the height to one story while placing the administrative offices and storage spaces in the basement. The Nasher Sculpture Center located next door has just that intimate scale I was looking for. Thus, my design follows the 35 feet wide bays of the Nasher, yet creating a spatial arrangement that is different from the Nasher. I treated the museum as a series of solid earthen walls sliding past each other to create a series of suggested spaces rather than rooms. Moving in a circle around the museum, almost every gallery looks into a different courtyard, creating new interesting views at every turn. The ritual space, which doubles as an auditorium, is differentiated for its importance by its elliptical shape. The curve of the wall of this space also smoothly guides guests into the main entrance. The entire ceiling of museum is made of glass and shaded by louvers. A geometric wooden screen based on Native American arts hides the louver system. The screen is only located in the lobby and above the galleries. The louvers have been removed over the lobby to allow direct light to hit the screen and cast geometric shadows.

Josh Russell

Resources and Educational Outcomes: A Look at Kansas and Missouri Public Schools
Advisor: Donna Ginther, Economics

Ever since the 1966 Equality of Educational Opportunity (Coleman) Study, the role money plays in determining educational outcomes has been an important topic of research. With impending cuts to education in Kansas, the role resources play in determining educational outcomes is even more important to understand. Previous work in this field has focused primarily on how money has a direct impact on test score improvements by looking at differences in resources between school districts. This district approach does not allow for dissimilarities between schools to be taken into account and focuses on too narrow a range of educational outcomes. My research emphasizes the effects of money on other educational outcomes—such as graduation rates, discipline rates, dropout rates, and retention rates—while looking at the variances in resources between schools. Regression analysis was used to link the explanatory variables to each outcome and determine its significance. Similar to previous work, initial testing shows no significant link between monetary resources—expenditure per student, average teacher salary, and pupil teacher ratio—and educational outcomes. Explanatory variables linked to socioeconomic background—such as school location, racial composition, the percentage of students with limited English language proficiency, and the percentage of students eligible for free and reduced lunch—are consistently significant among all outcomes. This suggests that the district based method of previous research is correct in the theory that
In my project, I worked with a second grade class at Hillcrest Elementary School on creating a children's book called, "A Day in the Life of Jip the Zebra." The kids created the text and storyline and I illustrated and designed the book. Throughout the process, I helped them edit their work and improve their writing and thought process, as well as included them in a behind-the-scenes view of how a book is put together. I will also be using this research to improve teaching methods for children in regards to writing and reading, as well as art. I will be including supplementary educational activities throughout the project to tie in with the book. In the end, each child, school, and others involved will receive their very own professionally and beautifully bound book to keep.

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Money is not significantly correlated with educational outcomes.

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Natalie Sabillon

*Jip the Zebra Children's Book Creation*

Advisor: Barry Fitzgerald, Architecture and Design
Collaborators: Leellyn Tuel, Beth Cigler

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Evolutionary history underlies plant physiological responses to global change since the Last Glacial Maximum

Advisors: Joy K. Ward, Ecology & Evolutionary Biology; Perry Alexander, Electrical Engineering and Computer Science
Collaborators: Katie M. Becklin, Juliana S. Medeiros

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Behavioral Science Goes to the Arcade: A Translation of the Generalized Matching Law to Predict and Analyze Human Performance in a Simulated Environment

Advisor: Derek Reed, Applied Behavioral Science
Collaborators: Steven D. Bauer, Scott C. Collier, Josh Harsin, Mark Rinehart

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Assessing family- and species-level variation in physiological responses to global change across geologic time is critical for understanding factors that underlie changes in species distributions and community composition. Here, we used stable carbon isotopes, leaf nitrogen content and stomatal measurements to assess changes in leaf-level physiology in a mixed conifer community that underwent significant changes in composition since the last glacial maximum (LGM) (21 kyr BP). Our results indicate that most plant taxa decreased stomatal conductance and/or maximum photosynthetic capacity in response to changing conditions since the LGM. However, plant families and species differed in the timing and magnitude of these physiological responses, and responses were more similar within families than within co-occurring species assemblages. This suggests that adaptation at the level of leaf physiology may not be the main determinant of shifts in community composition, and that plant evolutionary history may drive physiological adaptation to global change over recent geologic time.
principle of reinforcement, which simply states that behavior may be modified as a result of contingent consequences (Skinner, 1938). Herrnstein, a researcher trained by Skinner, understanding that reinforcement dictates behavior, introduced a mathematical equation that when fit to a set of data showed that behavior rates are directly related to rates of reinforcement (Herrnstein, 1961). This equation is known as the Matching Law, and the event of behavior rates being nearly equivalent to reinforcement rates is known as matching. My project was designed in order to test the external validity of behavioral matching principles as described by the matching law (Reed & Kaplan, 2011). Specifically, I demonstrate that the matching law is more than an equation that can be fitted to a set of numbers, but can, in fact, be used to predict some human behaviors in the natural environment. Toward this, my project moves the matching relation beyond simple correlations between behavior and consequences and presents a functional account of response-consequence relations using experimental manipulation within video games.

Abigail Schletzbaum
Numerical Bifurcation Analysis of Climate Change Models
Advisor: Erik Van Vleck, Mathematics
Collaborator: Andrew Steyer

An important question in climate science is when and how climate change will occur. The goal of this research was to identify the scenarios under which tipping points, irreversible and dramatic changes in climate, will occur, specifically analyzing ocean currents with Stommel’s Two Box model (a model of ocean temperature and salinity where the boxes are the North Polar region and the equatorial region) and a Three Box model that adds the South Polar region. In addition, we analyzed Aerosol Cloud Precipitation Predator/Prey models. Models are coded in MatLab, and analyzed and tested using numerical bifurcation analysis tools CoCo and DDE Biftool. Once the data is compiled, numerical bifurcation analysis was used to identify tipping points. These tipping points are being compared to those from more complex models. This research will further advance our ability to use bifurcation analysis to analyze dramatic changes in climate models.

Chloe Seim
M, an Illustrated Novella
Advisors: Mary Klayder, English; Jon Swindell, Visual Art

M is an illustrated novella created with the aid of an Undergraduate Research Award from the University of Kansas allocated during the summer of 2013. It is a story about one person, known throughout different parts of their growth by different names and different identities, who struggles to find their place in modern American society after years of being forced to cross-dress as a child, homelessness, and the psychological cost of their experiences. M is an exploration of various gender identities and how human sexuality may be experienced after childhood abuse. The novella also pursues the stigma around and collective perception of mental health in contemporary American society, while also focusing on characters’ personal experiences with mental disorders.
Pairing long-form prose with hand-drawn imagery in a form reminiscent of both graphic novels and illustrated novels, this work also aims to unite the visual and the textual into a rich, engaging literary experience. *M* draws influence from such works as Alison Bechdel’s *Fun Home*, David Small’s *Stitches*, Lynda Barry’s *Crux*, and *The Invention of Hugo Cabret* by Brian Selznick. With the cooperation of these two media, this work continues the dialogue of the relationship between image and text and the often multimedia nature of storytelling.

**Danielle Siebert**

Perception of Religious Discrimination in Judgments of Law Enforcement Behavior  
Advisor: Glenn Adams, Psychology  
Collaborator: Sahana Mukherjee

In study one, I considered how people perceive the use of profiling based on the target’s religious identity. I conducted an online survey in which participants read a scenario about an incident where an officer pulls over a foreign-born driver for speeding, requests documentation of citizenship status, and takes the driver into custody when he fails to produce identification. I manipulated identity of the driver (Muslim, Jewish, or Christian Cypriot, or Cypriot national- no religious affiliation). Participants rated the suspicion that the driver was in the U.S. illegally and the appropriateness of the officer’s actions. At the end, participants indicated how “truly American” the driver seemed and completed a measure of nationalism. Results revealed hypothesized effects of the manipulation such that participants expressed more suspicion of the driver, considered the officer’s actions as more appropriate, considered the driver as less “truly American” in the Muslim condition compared to the Christian and Jewish conditions. Results also showed moderating effects of nationalism. The control condition was viewed similarly to the Muslim condition. Results suggest that Jewish and Christian religious identity softens the responses to foreign-born individuals in the U.S. in a way that Muslim religious identity does not. I’m currently in the process of analyzing data for a follow-up study where I manipulated the identity of the driver as Muslim, Jewish, or Christian Canadian, and Canadian national (no religious affiliation). I expect to find similar results, however I believe that the control condition will be viewed similarly as the Christian and Jewish conditions.

**Hadley Sis**

*Experimentally Analyzing Viscous Fingering Between Microbicide Delivery Gel And Simulated Biological Fluids*  
Advisor: Sarah Kieweg, Mechanical Engineering

The growing HIV epidemic has motivated research for the development of vaginal microbicides. Microbicides are a topical formulation, such as a gel, and a drug that can kill or neutralize viruses like HIV. Microbicides are inserted onto the vaginal canal to create a barrier between the virus and the tissue; however, a woman’s body produces a combination of approximately eight grams of vaginal fluid and cervical mucus each day, and these biological fluids have the possibility of altering the shape of the gel as it spreads on the epithelium. “Fingering” patterns – spreading patterns with a corrugated shape at the interface with air or other fluids – are of interest because they may result in unprotected bare spots over the epithelium. The objective of
this project is to combine microbicidal gel with vaginal fluid simulant (VFS) and mucin powder in experiments for an analysis of how the addition of VFS and mucus changes the fingering patterns of the gel. These experiments were completed using a Hele-Shaw cell, an apparatus where one fluid is bounded by another when both are injected into a shallow geometry, and observations of the viscous fingering patterns. Thus far, a correlation has been observed between large concentrations of mucin in the VFS and a greater amount of viscous fingering patterns arising in the cell. This implies that when the body is producing more mucus, the probability of more bare spots occurring on the epithelium decreases, as more surface area is covered by the increase of fingering patterns. The findings gathered from this project will help garner a better understanding of how microbicidal gels will react when placed in a vaginal environment. This project was supported by NIH Grant No. R21/R33 AI082697.

Emily Smith

Monte Carlo Modeling of Generator Level Single Top Quark Production in Association with the Higgs Boson
Advisors: Phil Baringer, Physics and Astronomy; Alice Bean, Physics and Astronomy
Collaborator: Danny Noonan

This study looks at the associated production of a top quark and Higgs boson at an 8 TeV energy level and how the standard model top-Higgs Yukawa interactions differ from those in theories beyond the standard model. The overall goal of the analysis is to find kinematic variables that differentiate the processes. Monte Carlo data and cross sections were generated using MadGraph, and analyzed using ROOT. The resulting plots of certain kinematic variables are used to highlight differences between the standard model and non-standard model processes.

John Stolzle

The Digital Medium: Evolving Pedagogies
Advisors: Kathleen Dahl-Nuckolls, Environmental Studies; Madison Davis Lacy, Film and Media Studies

My research has focused on the utilization of digital media as a means for the dispersal of scientific data. Through first hand experience and an analysis of common methodologies, I will present on the current state and efficacy of digital media as a tool for education. The speed in which the internet has evolved is staggering; professors use online classes, textbooks and assignments to instruct students, Youtube channels appeal to scientific minds, Ted Talks, Podcasts, and info-tainment apps, all are working to educate citizens and bring scientific information to the populous.

By challenging old structures of thought and aging pedagogies, I have asked the question, “Can film be used to effectively communicate a scientific paper to a public audience?” And I have investigated ethical questions such as, “is this something which should even occur or does it somehow go against the ever-changing nature of science?” In order to understand the environment in which we live, it is important to first understand the components which make up our daily lives; and given digital media’s rapid development, I feel it is important to examine where it is going, and how it may be most effectively used to communicate meaning.
In my research I have examined the economics of genetically modified (gmo) soy beans and the prosperity of the transgenic model. Genetically Modified Organisms, specifically transgenic crops, can offer farmers less costly and more productive varieties of plants; however, some scientists have refuted the claims that transgenic crops are a net-benefit creation and instead argue that they are a detriment to the environment and ultimately our way of life.

GMO crops are not only widely used within the United States, but all around the world, and with little exception their use is increasing drastically every year. I have looked into the economics of development, implementation, recurring costs of use, as well as some of the non-monetary costs (e.g. damage to insects and the biosphere) and will present on my findings as well as posit a few theories as to why gmos have experienced such proliferation within the US and World respectively. The science on GMOs is “a work in progress;” it is a very polarized field of research, with respected scientists on both sides of the argument: for and against their use. My intent in conducting this research was not to bolster my opinions of GMOs, but rather to illuminate some of the turmoil which surround them.

Connor Stultz
Comparative Tadpole Morphology
Advisor: David McLeod, KU Undergraduate Biology
Collaborator: Leah Wainstock

Amphibians, and anurans (frogs and toads) in particular, are well known for their biphasic lifestyle in which larvae are generally aquatic and adults tend to be terrestrial. Larvae can be found occupying a variety of ecological niches and adaptation to these niches can be seen in their morphology. This study compares the larvae of two old world taxa, Rhacophorus dulitensis and Meristogenys jerboa, that live in strikingly different environments. Rhacophorus dulitensis is a treefrog (family Rhacoporidae) that lives in subtropical or tropical forests on the island of Borneo. Like other Rhacophorids, this frog builds foam nests above water and its larvae develop in the nest, emerging as free-swimming tadpoles that complete metamorphosis in ponds and temporary bodies of water. Meristogenys jerboa, is a “true frog” (family Ranidae) endemic to rocky streams in the lowland rainforests of Matang in western Sarawak (Malaysia), Borneo. Eggs are laid in shallow water at the edge of fast flowing streams and the larvae live at the bottom of these same streams throughout metamorphosis. This species, and its congeners, possess a ventral sucker that allows the tadpole to cling to rocks in these streams. The goals of this study are to produce 3-Dimensional models of these two tadpoles using AMIRA ResolveRT v. 5.4.3. Using these 3D models, we are able to explore morphological differences and their relationship to life history strategy.
Bryce Tappan

Reactivity and Photoluminescence Studies of Mercaptoazulenes and Their Complexes with Gold (I)

Advisor: Mikhail V. Barybin, Chemistry
Collaborator: Andrew D. Spaeth

Azulene is a nonbenzenoid aromatic hydrocarbon that consists of an edge sharing combination of five-and seven-membered carbon rings. Azulenic compounds often exhibit unusual photophysical properties due to their emission from the second singlet excited state, which violates Kasha’s Rule. This project investigates the synthetic accessibility and photoluminescent behavior of several mercaptoazulenes and their gold(I) complexes. These compounds constitute attractive platforms for developing new, relatively non-toxic, photoluminescent materials for possible applications in optical sensing.

Anna Tatarko

Investigating the effects of tallgrass prairie restoration and plant diversity on pollinator communities in northeast Kansas

Advisors: Bryan Foster, Ecology & Evolutionary Biology; Kathy Roccaforte, Ecology & Evolutionary Biology

Over 80% of flowering plants worldwide rely on animal-mediated pollination. Unfortunately, the invaluable ecosystem service pollinators provide is being threatened by habitat destruction, degradation, and fragmentation. Historically, tallgrass prairies throughout the Midwestern U.S. supported diverse pollinator communities, but less than 4% of native tallgrass prairies remain. Although there has been significant effort to restore prairies, little is known about the effects of habitat restoration on pollinator communities. In 2013, we recorded over 2500 plant-pollinator interactions across northeast Kansas prairie remnants (n = 5) and prairie restorations (n = 5). We used linear models to assess whether plant diversity is positively associated with pollinator diversity. In addition, we used linear models and PERMANOVAs, respectively, to compare plant and pollinator diversity and composition between prairie remnants and restorations.

Flowering plant richness was significantly positively associated with bee diversity (P = 0.001) but not with the diversity of the entire pollinator community (P = 0.369). We also found that prairie remnants and restorations were distinct in plant species composition (P = 0.018) and that remnants had greater plant richness (P = 0.044) and diversity (P = 0.036). Despite this, pollinator community composition did not differ significantly between remnants and restorations (P = 0.924). These preliminary results suggest that floral resources may drive the diversity of bees, an important group of pollinators in ecosystems worldwide. However, other factors, such as management regime, nesting site accessibility, and landscape-scale resource availability, may strongly regulate the diversity and composition of pollinator assemblages on prairie remnants and restorations.
Jake Thompson

*Dissociating Cognitive and Affective Empathy*

Advisor: Evangelia Chrysikou, Psychology

One aspect of higher order social cognition is empathy, a psychological construct comprising a cognitive (i.e., recognizing emotions) and an affective (i.e., responding to emotions) component. Empathy deficits have been linked to executive and emotion regulation dysfunction in depression that might underlie a patient’s interpersonal difficulties. However, most studies measure empathy through the Interpersonal Reactivity Index (IRI), which may not accurately capture affective empathy. Critically, prior studies have not examined a potential dissociation between cognitive and affective empathy in depressed individuals. In Study 1, a factor analysis determined the appropriateness of using the IRI to measure affective empathy. Results showed poor model fit with the affective empathy factor. In Study 2, we developed a behavioral measure of empathy, and examined differences in empathic processing as it relates to depression and ruminative thought. Results revealed differences in empathy between depressed and healthy controls, as well as differences by level of rumination. We discuss the implications of these findings for depression treatment.

Kristina Van Anne

*The Role of Lexical Stress in the Word Recognition of English-speaking L2 learners of Spanish*

Advisor: Annie Tremblay, Linguistics

A cross-modal word-identification task in Spanish addressed the exploitation of suprasegmental stress cues in the lexical activation process by English-speaking “late” L2 learners of Spanish. English-speaking L2 learners were expected to be less efficient than native Spanish speakers in exploiting suprasegmental cues due to the vowel reduction that occurs in English. Participants heard auditory non-constraining sentences that ended with two-syllable word fragments. In the experimental condition, the fragments were stressed on the penultimate syllable (e.g., peLO-) or they were unstressed (e.g., pelo-), and the participants were asked to choose the corresponding word on the screen (e.g., “pelota” ‘ball’ vs. “pelotón” ‘platoon’). In the control condition, the fragments differed in one consonant (e.g., infec- and inyec-) and the participants were asked to choose the corresponding word on the screen (e.g., “infección” ‘infection’ vs. “inyección” ‘injection’). Responses were compared between stress-contrast and consonant-contrast fragments and, within the stress-contrast condition, between stressed and unstressed fragments. Accuracy of the L2 learners was compared to that of native Spanish speakers to examine the ability of each group to exploit suprasegmental stress cues in word recognition. Results showed that both groups were more sensitive to segmental cues than suprasegmental stress cues, and that both groups experienced difficulty recognizing words in the absence of stress cues. However, results
also showed that L2 learners performed with significantly lower accuracy than native Spanish speakers in the presence of stress. These results indicate that L2 learners have more difficulty than native speakers in utilizing suprasegmental stress cues in word recognition.

Leah Wainstock
Comparative Tadpole Morphology
Advisor: David McLeod, Undergraduate Biology
Collaborator: Connor Stultz

Amphibians, and anurans (frogs and toads) in particular, are well known for their biphasic lifestyle in which larvae are generally aquatic and adults tend to be terrestrial. Larvae can be found occupying a variety of ecological niches and adaptation to these niches can be seen in their morphology. This study compares the larvae of two old world taxa, *Rhacophorus dulitenis* and *Meristogenys jerboa*, that live in strikingly different environments. *Rhacophorus dulitenis* is a treefrog (family Rhacoporidae) that lives in subtropical or tropical forests on the island of Borneo. Like other Rhacophorids, this frog builds foam nests above water and its larvae develop in the nest, emerging as free-swimming tadpoles that complete metamorphosis in ponds and temporary bodies of water. *Meristogenys jerboa*, is a “true frog” (family Ranidae) endemic to rocky streams in the lowland rainforests of Matang in western Sarawak (Malaysia), Borneo. Eggs are laid in shallow water at the edge of fast flowing streams and the larvae live at the bottom of these same streams throughout metamorphosis. This species, and its congeners, possess a ventral sucker that allows the tadpole to cling to rocks in these streams. The goals of this study are to produce 3-Dimensional models of these two tadpoles using AMIRA ResolveRT v. 5.4.3. Using these 3D models, we are able to explore morphological differences and their relationship to life history strategy.

Sean Weston
Advisor: Cheryl Lester, English & American Studies

In my research I will discover and analyze the conversation and debate among Protestant communities in Pittsburg, Kansas, in response to the poverty and related issues, between 1890 and 1900. With other parts of southeast Kansas, Pittsburg was a major mining district in the United States. Given the poverty and working conditions, the area was quickly organized by the United Mine Workers of America (UMWA). The first major coal strike took place there in 1893, with a second occurring five years later. This occurred in the midst of tremendous turmoil in Kansas, with the insurgent labor-friendly Populists struggling for power with the Republicans. Both Populists and Republicans found religious support.

Few researchers have sought to understand the role of religion during these tumultuous years in the region. However, it is clear that religion and religious questions were woven into the life of the community. Bound up in unionization efforts and strikes of this period were questions about economics, immigration,
and the nature of society. At the same time, the social gospel movement, seeking to apply Christian principles to the social issues of the day, was finding traction nationally.

This project draws on archival sources from the Kansas State Historical Society, Pittsburg State University, University of Kansas, local church records, union records, and local and national histories. It seeks to address the diverse approaches taken by different congregations, their relation to state and national trends, and how these religious approaches contributed to wider political discussion and debate in the region.

Allison Williams

Natural Gas, A Foundation Fuel for the Future: Inconsistencies and Themes in Hydraulic Fracturing Data
Advisor: Shannon O'Lear, Geography

Objective: My goal is to find the overarching themes and messages in hydraulic fracturing and natural gas data to analyze how natural gas is either encouraged or discouraged in society and for what reasons. This investigation includes a focus on the label of natural gas as a “transition fuel,” which demonstrates the inconsistencies in the themes, perspectives, and meanings of the data available.

Method: My project analyzes the data on public perception and media coverage of hydraulic fracturing completed in various studies across the nation and specific to regions in which hydraulic fracturing is dominant. The second set of analysis focuses on and summarizes quantitative data on production and development, along with energy projections for the future of natural gas.

Results/Conclusion: My results thus far indicate that the “transition fuel” label for natural gas is a means for the oil and gas industry to further the dependence on fossil fuels while distracting from the use of renewables. The actions of the gas industry demonstrate that natural gas is in fact a foundation fuel for American’s energy future, ignoring criticism from the general public and scientific uncertainty regarding the environmental and human health impacts of natural gas and fracturing. By investing in and expanding natural gas technologies, production, and uses, we undermine renewable, alternative energy sources by encouraging fossil fuel usage. Natural gas merely serves as a “transition fuel” away from oil and towards a solidified fossil fuel dependence.

Julia Yang

Understanding microbial response to temperature and relative C and N availability in boreal organic soils

Advisors: Sharon Billings, Ecology & Evolutionary Biology / Kansas Biological Survey; Kate Buckeridge, Kansas Biological Survey

Nitrogen (N) transformed into plant-available forms by soil microbes is a rate-limiting step in
the N-cycle, controlling net primary productivity in many ecosystems. Despite the importance of N to global carbon (C) cycling, we know little about how microbes respond to warming when the relative availability of resources varies. Recent work suggests that microbial 15N enrichment correlates negatively with the C:N ratio of the soil soluble fraction and positively with net N mineralization. We tested this concept, and assessed the value of using microbial biomass d15N as an indicator of soil N cycling responses to warming. Using organic soils from three boreal forests along a latitudinal gradient in Newfoundland, we assessed how varying C:N ratios in available substrates influenced microbial temperature response. We altered the C:N ratios of each of the three soils and aerobically incubated them at 5°, 15°, and 25° for 96hrs. Gas samples were taken throughout the incubations to measure changes in concentration of two products of microbial metabolism, CO2 and N2O. We performed the chloroform-fumigation-extraction procedure to determine microbial biomass C and N content, extractable [NO3] and [NH4], and d15N of microbial biomass. Ongoing work will reveal the extent to which microbial biomass d15N responds to the relative availability of C and N in substrates valuable for microbial functioning as temperature varies. If microbial d15N indeed declines with the C:N ratio of these soils, it can serve as a proxy for qualitatively determining the degree to which plant-available N may vary with warming in these forests.

Z

Yichi Zhang

Sleep Disruption as a Mediator between Test-taking Anxiety and Exam Performance
Advisor: Nancy Hamilton, Psychology

Test-taking anxiety has been considered a big issue in education and ample research articles show that test-taking anxiety affects students’ confidence, graduation rate and academic development. Although anxiety may have a direct effect on performance, it may be that anxiety interferes with performance in a second way, by interfering with sleep. Few studies have examined both anxiety and sleep as predictors of exam performance and none have used a daily diary format to assess sleep, anxiety, and study habits immediately before an exam. Thus, the purpose of the current longitudinal study is to identify strategies and behaviors that enhance exam performance in the face of test taking-anxiety. Fifty five students who are enrolled in the introductory statistics classes are expected to participate in the pilot study. Participants’ state anxiety is going to be measured the night before the exam and their sleep disruption is going to be measured the morning before the exam. Participants’ exam scores are going to be released after the exam. The primary hypothesis of the study is that the relationship between test-taking anxiety and exam performance is mediated by sleep disruption, a potentially modifiable problem for anxious students. The longitudinal structural equation modeling is expected to show a directional effect from pretest anxiety to test performance, with sleep disruption as the mediator. In other words, it is anticipated that improving sleep quality alone would increase
test performance. Practical treatment for pretest sleep disruption is urgently in need to improve students' test performance.

Alina Zheng

**Neutrino Detection Using Surface Wave**
Advisor: Dave Besson, Physics
Collaborators: Jordan Hanson, Amy Zheng

The objective of this study was to identify the characteristics of surface waves for detecting ultra high energy neutrinos (UHEN). UHEN emit charged particles when they hit a dense electrical insulator. These charged particles emit a cone of radiation. The waves that are trapped in the space between the insulator and air are referred to as surface waves. There is scientific evidence that surface waves are more efficient than bulk waves that are currently used to detect UHEN. Surface waves are believed to be more resistant to absorption, which makes them easier to detect; they are characterized by their higher speed. In addition, surface waves reside in the superficial layer, eliminating the need for drilling. Observations were made on waves propagating through the surfaces of various dense dielectric media. Initially, we ran small scale, near field measurements and the surface waves appeared to travel less than the speed of light. However, once we changed to the larger far-field experiment, the surface waves appeared to travel significantly faster than bulk waves. These results provide the evidence that surface waves can be effective in detecting UHEN because they are not absorbed as quickly by the material. To accompany these measurements, we conducted experiments on Zenneck waves to fortify the validity of our experimentation, due to previous research on this type of surface wave. These measurements were focused on detecting surface waves over various salinities in water.

Amy Zheng

**Neutrino Detection Using Surface Waves**
Advisor: Dave Besson, Physics
Collaborators: Jordan Hanson, Alina Zheng

The objective of this study was to identify the characteristics of surface waves for detecting ultra high energy neutrinos (UHEN). UHEN emit charged particles when they hit a dense electrical insulator. These charged particles emit a cone of radiation. The waves that are trapped in the space between the insulator and air are referred to as surface waves. There is scientific evidence that surface waves are more efficient than bulk waves that are currently used to detect UHEN. Surface waves are believed to be more resistant to absorption, which makes them easier to detect; they are characterized by their higher speed. In addition, surface waves reside in the superficial layer, eliminating the need for drilling. Observations were made on waves propagating through the surfaces of various dense dielectric media. Initially, we ran small scale, near field measurements and the surface waves appeared to travel less than the speed of light. However, once we changed to the larger far-field experiment, the surface waves appeared to travel significantly faster than bulk waves. These results provide the evidence that surface waves can be effective in detecting UHEN because they are not absorbed as quickly by the material. To accompany these measurements, we conducted experiments on Zenneck waves to fortify the validity of our experimentation, due to previous research on this type of surface wave.
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NOTES
Acknowledgements

The Center for Undergraduate Research would like to thank the following individuals and organizations for supporting this year’s Symposium:

Phi Kappa Phi
Sigma Xi Honor Society
Staff from the KU Unions
University Honors Program
KU Office of Research
KU Writing Center
The volunteer judges and room monitors for today’s event.
KU’s Research Leaders
The instructors who supported this event by offering extra credit to their classes.
The family of James K. Hitt, whose contribution funded part of the ACE Research Talks.

Finally, we’d like to thank the faculty, postdocs, graduate students, and staff who mentor undergraduate researchers at KU. Without you, this day would not be possible.
Overview: By attending three sessions, undergraduate students can enter for a chance to win a $25 gift card and get extra credit if they are enrolled in a participating class.

Instructions: Fill out the information below. At each session you attend, see the room monitor to get a stamp. You must be a current KU undergraduate and attend all three sessions to be eligible for one of the $25.00 gift cards. After the third session, turn in this completed form at the registration table on the 5th floor of the Kansas Union. Winners of the gift cards will be notified on Monday, April 28th. Instructors who are offering extra credit will receive a list of student attendees by Wednesday, April 30th.

Name: _______________________________

KU Email: _____________________________

Phone #_______________________________

Extra Credit for Classes:

If you are enrolled in any of the following classes, check the box next to the class. These instructors have emailed us to say they would like us to document which of their students attend the Symposium; see your instructor for further details about any course credit that is being offered. Note: this is not a full list of the classes that are offering extra credit, so please fill in your class information if it is not listed. Your information will be emailed to the instructor of the class by Wednesday, April 30th.

____ ART 540: Professional Activities Seminar; TR 10:00; Instructor: Prof. Maria Velasco

____ BIOL 152: Principles of Organismal Biology; MWF 2:00; Instructors: Prof. Mark Mort, Prof. Rob Moyle, GTAs

____ HIST 128: History of the US through the Civil War; MW 2:00; Instructors: Prof. Kim Warren, Prof. Adrian Finucane, GTAs

____ HSES 375: Neuromuscular Physiology and Motor Control; TR 2:30; Instructor: Prof. Joseph Weir

Other: _________________________________________________________________________________________________________________
### Session 1: ACE Talks

**1:30 pm to 2:30 pm**

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<td>ACE Research Talks, sponsored by Center for Undergraduate Research</td>
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### Session 2

**2:45 pm to 3:45 pm**

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<td>STEM 1</td>
<td>Building Spaces, Building Ideas</td>
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<td>Creative Works</td>
<td>Posters: STEM</td>
<td>Getting Started in Research Panel</td>
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### Session 3

**4:15 pm to 5:15 pm**

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<td>STEM 2</td>
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<td>Getting Started in Research Panel</td>
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