

Undergraduate Research Symposium
Saturday, April 27, 2019
University of Kansas, Kansas Union & Spooner Hall

12:45 – 1:20 Presenter registration – 5th Floor Lobby, Union

1:30 – 2:45 Opening Session – Woodruff Auditorium

Welcome: Alison Olcott, Director, Center for Undergraduate Research

Opening Remarks: Chancellor Douglas A. Girod

Presentation: ACE Talk Awards

ACE Talks:

1:45: Rose Argent, Species delimitation in the widespread Northern Philippine Bent-toed gecko, (*Cyrtodactylus philippinicus*), mentored by Rafe Brown

2:05: Olivia Hollman, A Mythos of Belonging: The Curse of Tutankhamen in the British Empire (1922-1932), mentored by Andrew Denning & Erik Scott

2:25: Zachary Wood, Synthesis and characterization of organic molecules for potential applications in nanoelectronics, mentored by Mikhail Barybin

3:00-4:00 Session 2

Oral Presentations – Sessions 2A-2I:

Session 2A: Centennial (6th floor)

3:00: Taylor Allen, Aroog Khaliq, Kyeisha Ross, Cultural variations in the experience of care and obligation to parents, mentored by Darlingtina Atakare

3:15: James Dooley, Track Recommendations and their Impact on Immigrant Students in Germany, mentored by Ari Linden

3:30: Logan Hotz, The Economic Impact of Environmental Regulatory Changes in a Converting Economy, mentored by Dietrich Earnhart

3:45: Erick Oduniyi, Computational Stories Pt 2: Elementary Studies in Systems Architecture, mentored by Folashade Augusto & Jonathan Brumberg

Session 2B: Alderson (4th floor)

3:00: Whitney Young, Audacity, mentored by Elise Kirk

3:15: Jaidan Royal, "Monsters" Short Experimental Fashion Film, mentored by Meg Jamieson & Laura Kirk

3:30: Derek VanWyck, Fictive Truths, mentored by Elise Kirk

3:45: Sarah Kahm, Foster Care Independent Living in Film, mentored by Matthew Jacobson & Nicole Hodges Persley

Session 2C: Crossroads (4th floor)

3:00: D'Arlyn Bell, Political Organizing in Disadvantaged Communities: Nonprofit Social Service Mobilization and Legal Endogeneity, mentored by Charles Epp

3:15: Samiyah Para-Cremer, Working Together: A Comparison of Midwestern Human Trafficking Task Forces Perceptions on Collaboration, mentored by Shannon Portillo

3:30: Andrea Silva-Trejo, "The Pence Problem" – A Content Analysis of Newspaper Coverage of Indiana's HIV Outbreak, 2011-2015, mentored by Sarah E. Deer

3:45: Camila Andrea Mican Rondon, Systems of Oppression or Emancipation? Understanding the Colombian Education System Through Critical Education, mentored by Brian Lagotte

Session 2D: Divine 9 (6th floor)

3:00: Asif Haque, Organizations conducting community-driven food-related research in the Douglas County area., mentored by Dietrich Earnhart

3:15: Mitch Reinig, The Impact of Airport Flight Volume and Hub Status on Metropolitan Area Unemployment, mentored by David Slusky

3:30: Michael Smith, Disaster Resilience Research, mentored by Elaina Sutley

3:45: Karen Vazquez, Analyzing Manufactured Housing Damage Caused by Hurricane Irma, mentored by Elaina Sutley

Session 2E: English (6th floor)

3:00: Lauren Bajorek, Acts of Genocide: How Language Killed the Tutsis, mentored by Bartholomew Dean

3:15: Eric Splavec, From Lawrence to Dar-es-Salaam: a Reflection on the Research Process, mentored by Katie Rhine

3:30: Macie Rouse, Discourses of Sustainability within Models of Foreign Aid: Clashes Between Local and Foreign Experiences, mentored by Kathryn Rhine

3:45: Sara Carlsen, Parents as Participants: Social Media Use Through a Dual Lens, mentored by Germaine Halegoua

Session 2F: Kansas (6th floor)

3:00: Ella Brown Richards, More Harm than Good? The State of Emotional Safety in Female Identifying Students on College Campuses and Their Fear of Victimization, mentored by Ivery Goldstein

3:15: Cienna Cashman, The Lived Experiences of Anti-Fat Prejudice, mentored by Ivery Goldstein

3:30: Lauren Stone, Experiencing Asexuality: A Content Analysis of Forums on the Asexuality Visibility and Education Network, mentored by Ivery Goldstein

3:45: Alicia Whitson, The September Siblings: A Case Study in Student Activist Methods and Results, mentored by Ivery Goldstein

Session 2G: Malott (6th floor)

3:00: Caleb Correll, Blood on the Plow: Extremist Group Activity During the 1980s Farm Crisis in Kansas, mentored by David Farber

3:15: Adrienne Cox, The Qipao: How a Manchu Dress Became Chinese, mentored by Megan Greene

3:30: David Halliwell, Shifts in Tone: The Effects of the First World War on Classical Music, mentored by Andrew Denning

3:45: Elise Klaske, The Great Italian Educator: Maria Montessori and American Nativism in the 1910s, mentored by Jonathan Hagel

Session 2H: Pine (6th floor)

3:00: Sarah Cluff, A Study of Phylogeography and population structure in giant honey bees, *Apis dorsata* and *Apis Laboriosa*, mentored by Deborah Smith

3:15: Grant Johnson, Species Delimitation of the Snake genus *Ahaetulla* in Southeast Asia, mentored by Rafe Brown & Jeff Weinell

3:30: Sophia Sanchez, Establishing a Viable Animal Model for Social Loss Using Male Prairie Voles, mentored by Adam Smith

Session 2I: The Jay (1st floor)

3:00: Jacob Asherman, Investigating the Impacts of Hail Parameterizations on Idealized Supercells in the Weather Research and Forecasting Model, mentored by Justin Stachnik

3:15: Aaron Barrett, Randomized Conjugate Gradient Algorithm to Solve Large Linear Systems for Exascale Computing, mentored by Agnieszka Miedlar

3:30: Nicole Johnson, Baton Twirling into the Fourth Dimension, mentored by Estela Gavosto

3:45: Aldin Tollison, Modeling Global Water Scarcity in Google Earth Engine, mentored by Xingong Li

Themed Poster Session: 2J, The Commons, Spooner Hall

Environment

Ido Kenigsztejn (#1), MOST - Museum of Sustainable Transportation, mentored by Kapila Silva

Jonah Stiel (#2), Understanding the role of sterically bulky diimine ligands during electrocatalytic reduction of CO₂ using [Mn(CO)₃] complexes, mentored by James Blakemore

Nila Khan (#3), Trichome Density Responses to Elevated Carbon Dioxide across *Arabidopsis* Genotypes, mentored by Joy Ward & James Fischer

Chase Toalson, Clark Bee, Hannah Redford, Montanna Hayes, Dotty Gaumer, Dane DeRee (#4), Carbon Sequestration & the Kansas Land Trust, mentored by Kelly Kindscher & Morgan Okeson

Dylan Baile (#5), Museum of Air Sustainability, Dallas, TX, mentored by Kapila Silva

Margo Johnson (#6), The environmental consequence of peacetime Colombia, mentored by Dietrich Earnhart

Autumn Olsen (#7), Dallas Museum of Sustainable Forests, mentored by Kapila Silva

Brennen Hall (#8), Dallas Museum of Sustainability, mentored by Kapila Silva

Chris Gearon, Britney Werth, Alyssa Jenkins, Andrew Farnell, Joey Burnell (#9), Prairie Moon School House Energy Conservation Project, mentored by Kelly Kindscher

Collin Freking (#10), A faster method to detect earthquakes in Sumner County, Kansas, mentored by George Tsoflias & Alex Nolte

Dylan Dennis (#11), The Museum of Sustainable Urbanism, mentored by Kapila Silva

Anjali Pare (#12), Hyperparameter Optimization of the level set 2D layer tracker, mentored by John Paden

Kayleigh Anderson (#13), *Breaking the Cycle: American Culture, Environmental Problems, and the Societal Construct of Menstruation*, mentored by Ivery Goldstein
Ernesto Lopez (#14), *The Museum of the Sustainability of Waste*, mentored by Kapila Silva
Molly Blake, Mikala Grover, Justin Gianares (#15), *Nesting Site Location Influences the Foraging Habits of the bee *Colletes Inaequalis**, mentored by Deborah Smith
Melissa Smith (#16), *Museum of Climate: Texas*, mentored by Kapila Silva

Media & Technology

Kim Harms (#17), *Legislative Rhetoric and Consumer Privacy: A Content Analysis of Lawmaker's Statements After The 2017 Equifax Data Breach*, mentored by Sarah Deer
Farouk Alabed (#18), *Pilot Study of a Digital Patient Education Program for Multiple Myeloma: Learn While You Wait*, mentored by Abdulraheem Yacoub
Megan Carlson (#19), *Technological Distraction on Driving Performance: Security Attachment Priming*, mentored by Omri Gillath
Robert Edberg-Oostdik (#20), *Museum of Sustainable Social Media Interactions, Dallas, TX*, mentored by Kapila Silva
Max Fowler (#21), *Tumblr TERF War: Transforming Transfeminist Discourse in Online Spaces*, mentored by Ivery Goldstein
Jessica Cohen (#22), *How the Russian Media Covers the LGBT Human Rights Issue in Chechnya*, mentored by Brian Lagotte
Sophie Raines (#23), *How Does Pornography Consumption Alter the Roles of Individuals in Intimate Relationships*, mentored by Ivery Goldstein
Madeline Tierney (#24), *The Media's Portrayal of High-Profile Women Candidates*, mentored by Ivery Goldstein & Emily Vietti
Nikita Imafidon (#25), *Gay, Interrupted: Examining Queer Women and Female Hysteria in the Last 30 Years of Film*, mentored by Ivery Goldstein
Deva Freeman (#26), *The Pink Dollar: Capitalism and LGBTQ Identity*, mentored by Ivery Goldstein

Social Movements & Human Rights

Tyler Duggan (#27), *Sustainability of Human Rights Museum*, mentored by Kapila Silva
Silas Sutterby (#28), *Police Use of Force in Prime Time: A Content Analysis of Law and Order*, mentored by Sarah Deer
Brandy Gomez (#29), *"No Damn Flag": What Vietnam-Era Flag Desecration Cases Mean Today*, mentored by Genelle Belmas
Skylar Pryor (#30), *ACT UP, Political Funerals, and the Call for Humanity*, mentored by Sandra Zimdars-Swartz
Grace Stewart-Johnson (#31), *Misuse of Indian Penal Code Section 498A: Legal Terrorism or Anti-Woman Backlash?*, mentored by Ivery Goldstein
Mary Kate Tankard (#32), *White Nationalism of Yesterday and Today: The nature of Ideological Retro-Activism*, mentored by David Heath Cooper
Daniel Lee (#33), *Person, Party, and Politics: Analyzing the Meanings of "Left" and "Right" in European Contexts*, mentored by Brian Lagotte
Anna Jones (#34), *Woman Seeking Woman: The Implication of Kansas City, Missouri's Failed Lesbian-only Neighborhood for LGBTQIA Settlements*, mentored by Ivery Goldstein
Matthew Fawcett (#35), *Germany's Path to Marriage Equality: From East to West to the European Union*, mentored by Ari Linden

Meghan McNamee (#36), The Phoenix Rising from the Ashes?: The Reconstructed Dresdner Frauenkirche and the Fantasy of Healing in Post-Unification Germany, mentored by Ari Linden

Food & Water

Anna Barreda (#37), Predictability of biomethane potential as a result of anaerobic digestion of pure primary sludge and secondary sludge as well as co-digestion of food waste with sewage sludge, mentored by Belinda Sturm

Brandon Martin, Brian Schath, Kaitlyn Foster, Hannah Bohacek, Mary Stites, Hattie Hobart, Kathryn Pamperin (#38), Food Access and Transportation in Kansas City, mentored by Mark Jakubauskas

Isabel Das (#39), Museum of Sustainable Agriculture, mentored by Kapila Silva

Yane Tan (#40), Impacts of conversion from open canals to buried pipes on groundwater recharge in the Republican River Basin, mentored by Andrea Brookfield

Anthony Pham, Hannah Cavanaugh, Nick Leseberg, Abbie Boyer, Nicole Gentry (#41), KU Food Waste, mentored by Kelly Kindscher

Riley Winter, Alisa Childress, Olivia Childress, Reece Knapic, Amy Glattly, Rachel Heitmann, Jared Schmalstieg (#42), Perennial Gardening at Prairie Moon Waldorf School, mentored by Kelly Kindscher

Poster Sessions, Kansas Union:

Session 2K: Big 12/Jayhawk (5th floor)

Bryce Campbell (#45), Runx inhibition and the effects on nerve cell differentiation in regenerating *Nematostella vectensis*, mentored by Paulyn Cartwright

Marissa Duckett (#46), Microbiology and Mineralogy: Investigation of the relationship between microbiome and surrounding sediment, mentored by Jennifer Roberts & Bryan Rodriguez-Colon

Anna Goddard (#47), Effects of Selection on Partial Clonality on Phenotypic Evolution and Evolutionary Lag, mentored by Maria Orive

Emily Kimball (#48), More Bite than Bark: Ancient Dogs as Evidence for Birnirk—Thule Connections in Northwest Alaska, mentored by Lauren Norman

Alexis Paige (#49), Optimization of the Electrophoretic Separation of Nitrated and Non-Nitrated Species, mentored by Sue Lunte & Kelci Schilly

Emily O'Meara, Mara Schlichting (#50), Comparison of Early vs Late Spring Pollen Composition in *Colletes inaequalis*, mentored by Deborah Smith

Henna Mehta (#51), Wear and Tear of Bees Mandibles, mentored by Victor H. Gonzalez Betancourt

Connor Wernimont (#52), An analysis of differential cilia-length in *Tetrahymena thermophila* and temperature-dependent rate of movement, mentored by William Dentler

Ali Ciersdorff (#53), fMRI Connectome: Reexamining the correlations between attachment and brain functioning and structure, mentored by Omri Gillath

Sofia Mildrum Chana (#54), Discrepancies between teacher-and child- reports on proactive and reactive aggression: Does prosocial behavior matter?, mentored by Paula Fite

Joseph Denning (#55), Drop the base: Omission MMN sensitivity to morphological status, predictability, and their interaction, mentored by Robert Fiorentino

Julia Davis (#56), Quality of Life Parameters for Three Medically Complex Infants in the Neonatal Intensive Care Unit, mentored by Deanna Hanson-Abromeit

Samantha Ellis (#57), Interactions of Stress Level, Sleep Quality, and Alcohol Intake in University Students, mentored by Nancy Hamilton

Leonor Ramos-Salamanca (#58), Exposure to Violence, Coping, and the effect on Academic Achievement in Latinx youth, mentored by Omar Gudiño

Mel Saldaña Fuentes (#59), Being Brown, Feeling Down: Mental Health Concerns Among Young Adult Latinx Individuals, mentored by Ivery Goldstein

Landon Sweeney (#60), Comparison of Disease Impact In Refugee Camps After the Rwandan Genocide, mentored by Sandra Gray

Muriel Roith (#61), Environmental effects of the Rwandan Genocide massacres, mentored by Sandra Gray

Thomas Nowatzke (#62), Post Traumatic Stress and Secondary Traumatic Stress on Aid Workers, mentored by Sandra Gray

Mason Goeckner (#63), The Increase in Prevalence of HIV/AIDS in Relation to Commercial Sex Work and the Rwanda Genocide, mentored by Sandra Gray

Anna Harder (#64), A Predictive Model for Determining Epigenetic Transmission of Trauma, Applied to Rwanda Genocide, mentored by Sandra Gray

Margaret Kilday (#65), Understanding PTSD occurrence in perpetrators of the Rwandan genocide, mentored by Sandra Gray

Raegan Billinger (#66), Impacts of Genocide on Maternal Care, mentored by Sandra Gray

Alhamzah Hamzah (#67), The Effect of D(+)maltose on Glycogen Phosphorylase b activity, mentored by Roberto De Guzman

Kenean Assefa (#68), Kinetic Analysis of Glycogen Phosphorylase b in the presence of AMP as well as Proline, mentored by Roberto De Guzman

Hannah Bachman (#69), Lactose Regulation of Glycogen Phosphorylase B, mentored by Roberto De Guzman

Allison Bevel (#70), The Effect of Caffeine on Glycogen Phosphorylase b, mentored by Roberto De Guzman

Molly Bollman (#71), Regulation of Glycogen Phosphorylase B by Fructose, mentored by Robert De Guzman

Tyler Brennan (#72), Regulation of Glycogen Phosphorylase B by Caffeine, mentored by Roberto De Guzman

Muhammed Ciftci (#73), Assessing Allosteric Regulation of Glycogen Phosphorylase by Dextrose, mentored by Roberto De Guzman

Chris Clark (#74), Galactose's Kinetic Effects on Glycogen Phosphorylase b, mentored by Roberto De Guzman

Tyler Corbett (#75), Kinetics Assay of Glycogen Phosphorylase b, mentored by Roberto De Guzman

Benjamin Deatherage (#76), Allosteric Inhibition of Glycogen Phosphorylase B by D- (+)-Galactose, mentored by Roberto De Guzman

Niko Drosos (#77), Effects of Aspirin on Glycogen Phosphorylase Kinetics, mentored by Robert De Guzman

Ryan DSilva (#78), Glycogen Phosphorylase b Function in the Presence of Galactose Inhibition, mentored by Roberto De Guzman

Luan Duong (#79), Allosteric inhibition in the activity of Glycogen phosphorylase b by Dextrose, mentored by Roberto De Guzman

Kate Englander (#80), Glycogen Phosphorylase b Inhibition by Glucosamine, mentored by Roberto De Guzman

William Ervin (#81), Inhibitory Effects of Nicotinic Acid on Glycogen Phosphorylase b, mentored by Roberto De Guzman & Alex Bowman

Mason Fawcett (#82), Effects of D (+) Galactose on Glycogen Phosphorylase B Activity, mentored by Roberto De Guzman

Alondra Garcia-Arevalo (#83), Kinetic assay of glycogen phosphorylase b, mentored by Roberto De Guzman

Rose Argent (#84), Species delimitation in the widespread Northern Philippine Bent-toed gecko, (*Cyrtodactylus philippinicus*), mentored by Rafe Brown

Digital Posters: Session 2L, International (5th floor)

Carly Rosey, Yang Yang, Miran Heo (#85), The Developmental Function of Music for 4-8-Month-Olds, mentored by Deanna Hanson-Abromeit & Katie Martin

Abigail Simonson, Crystal Hung, Alyssa De La Cruz (#86), The Developmental Function of Music for Toddlers (12-24 months), mentored by Deanna Hanson-Abromeit

Stephanie Carvalho, Paloma Infante, Riley Beveridge-Calvin (#87), The Developmental Function of Music for Preschoolers Ages 3 to 5, mentored by Deanna Hanson-Abromeit & Katie Martin

4:00-4:20 – Break

4:20-5:20 - Session 3

Oral Presentations – Sessions 3B-3I:

Session 3B: Alderson (4th floor)

4:20: Molly Hatesohl, Exiled Artists in American Ballet: Chagall and Massine's Aleko, 1942, mentored by James Moreno & John Pultz

4:35: Forest Kinsey, A Measurement of Comedic Abstraction, mentored by Margaret Jamieson

4:50: Jo Sabus, Beyond the Surreal: Deren and Anger as Marginalized Filmmakers, mentored by Margaret Jamieson

Session 3C: Crossroads (4th floor)

4:20: Trevor Lies, The Effect of an Abstract Construal on Perceptions of a School Shooting Scenario, mentored by Monica Biernat

4:35: Corey Monley, Online Gaming Focus Groups, mentored by Bruce Liese

4:50: Michelle Oboro, Stigma and Attitudes Surrounding the Intersection of African American Women, Domestic Violence, and Substance Abuse, mentored by Carl Lejuez

5:05: Connor Dougan, PERIOD, Period: Student Analysis of the Effectiveness of The University of Kansas's and PERIOD's Free Menstrual Products on Campus, mentored by Ivery Goldstein

Session 3D: Divine 9 (6th floor)

4:20: Maisie Conrad, Using EEG data to further investigate the dual process of attention among avoidantly-attached individuals, mentored by Omri Gillath

4:35: Miaomiao Huo, From Overseas to Overwhelmed: A study on Chinese international students' educational and living experiences at The University of Kansas, mentored by Brian Lagotte & Felix Meschke

4:50: Brianna Marsh, Decoding the Neural Substrates of Intent to Speak, mentored by Jonathan Brumberg

5:05: Catherine Pham, Investigating the relationship between individual differences and island sensitivity, mentored by Robert Fiorentino

Session 3E: English (6th floor)

4:20: Owen Brown, The Verein Deutsche Sprache and the Contradictions of German Language Purism, mentored by Ari Linden

4:35: Lauren Hutchinson, Syrian Refugee Education Crisis in Lebanon, mentored by Brian Lagotte

4:50: Rachel Yu Ru Tan, Malaysia Boleh? Examining the Factors of the Malaysian Brain Drain, mentored by Brian Lagotte

5:05: Maya Van Nuys, The Modern Mission Civilisatrice: Cultural Representations in French History Textbooks, mentored by Brian Lagotte & Andrew Denning

Session 3F: Kansas (6th floor)

4:20: Kathryn Ammon, The Body Politic and Body Politics: Lingering Effects of the Irish Troubles on the Irish Eighth Amendment Referendum, mentored by Ivery Goldstein

4:35: Sarah Cluff, Reconstruction of Science and Technology after Reunification in Germany, mentored by Ari Linden

4:50: Morgan Thompson, Animal Welfare in the German Constitution, mentored by Ari Linden

5:05: Hedwick (Heddy) Pierce, Understanding Ideals of Motherhood Amongst Vulnerable Populations: The Implications this has on Community Building and Identity, mentored by Ivery Goldstein

Session 3G: Malott (6th floor)

4:20: Anton Barybin, Development of a microchip electrophoresis-based separation system for on-line analysis of microdialysis samples for neurotransmitters, mentored by Susan Lunte

4:35: Brandon Kinn, NMR relaxation as a method of exploring porous networks in gelatin methacryloyl, mentored by Alan Allgeier

4:50: Tyler Nguyen, Biosensors, Biocatalysts, and Beyond: Putrescine Oxidase Immobilization on Gold Nanostructures via Peptide Tags, mentored by Cindy Berrie

5:05: Eleanor Stewart-Jones, Understanding the Reactivity of a Series of MnIV(oxo) complexes, mentored by Tim Jackson

Session 3H: Pine (6th floor)

4:20: Kasra Alizadeh, Evaluating the Role of Translational Efficiency in Synaptogenesis in *Caenorhabditis elegans*, mentored by Brian D. Ackley

4:35: Alexander Alsup, Treatment of Hospital Privacy Curtains with Zinc Pyrithione as an Infection Control measure in the Healthcare Setting, mentored by Brendan C Mattingly

4:50: Phuong Dinh, Will Methylglyoxal have any bacterial resistance as Ampicillin and Streptomycin?, mentored by Randall Logan & Jack Trembl

5:05: Dania Shoaib, Mcr is required for Drosophila egg elongation, mentored by Rob Ward

Session 3I: The Jay (1st floor)

4:20: Justin Lorenz, Tate Bestwick, Optimization of Hybrid Energy Grid, mentored by Kyle Camarda

4:35: Adrian Romero, Sustainability of Algal Biofuels: Selective Fermentation of Algal Biomass and Growth in Aqueous Co-Product, mentored by Sirwan Alimoradi & Belinda Sturm

4:50: Jack Weiner, Broadband Viral Immunotherapy via Antibody Recruiting Molecules, mentored by Mark Farrell & Suresh Kurhade

5:05: Art Vollbrecht, Application of Pyomo Optimization Suite to Solve MILPs in Energy System Optimization Problems, mentored by Kyle Camarda

Themed Poster Session: 3J, The Commons, Spooner Hall

KU & Student Life

Kaitlyn Rohde (#1), Applying a Numeric Definition of Hyper-palatable Foods to the KU Cafeteria Dining Menu, mentored by Tera Fazzino

Sidney Miller, Elliott Renft, James Jeong (#2), Freshman Habits and the Myth of the 'Freshman 15', mentored by Victor Gonzalez

Riley Cooney, Melissa Clemens, Richard Parra, Bret Bergmeier, Daniel Hughes, Alisha Echavarria (#3), KU Edwards Campus Bike Plan, mentored by Mark Jakubauskas & Morgan Okeson

Saron Demeke (#4), Does information about learning strategies change students' motivation?, mentored by Marsha McCartney

Gabriella Bernard, Riley Beveridge-Calvin, Julia Davis (#5), A Systematic Review of Course-based Undergraduate Research Experiences (CURE): Implications for Music Therapy Education and Training, mentored by Abbey Dvorak

Asif Haque, Jackson Leibach, Mackenzie Knox, Colton Rusnak, Pamela Sounnarath, Miranda Watson (#6), Energy Efficiency at the KU Edwards Campus, mentored by Kelly Kindscher

Wade Heger, Claire Byers, Christopher Gough, Elena Khoury, Allison Rozell, Abigail Rozell, Abigail Samuelson (#7), Sustainability Metrics for KU, mentored by Kelley Kindscher

Belinda Flores (#8), Looking Over the Peer: an Analysis of Peer Support in Sexual Violence, mentored by Ivery Goldstein

Nidhi Patel, Naiya Patel, Natalie Danisi (#9), Are Cadavers or Prosections More Effective in Student Retention of Anatomical Structures?, mentored by Victor Gonzalez

Tyler Thornton (#10), Behavioral Economic Intersections of Alcohol and Cannabis Use in Undergraduate Students: Implications for the Reinforcer Pathologies Model of Addiction, mentored by Derek Reed & Gideon Naude

Sex & Gender

Bailey Coolidge (#11), "Are You Sexually Active?": The Conceptualizations of Temporality in Answering This Question, mentored by Charlene Muehlenhard

Kate Mays (#12), He Said, She Said: examining opportunities for gender bias intervention in selecting expert sources for reporting, mentored by Ivery Goldstein

Jennifer Duepner, Sunayna Pillay (#13), Relationship between Self-Reported Attractiveness and Sexual Partner Preference, mentored by Omri Gillath

Lindsey Gollwitzer (#14), Ambivalent Sexism and the #MeToo Movement: How Outgroup Threat Affects Ideologies, mentored by Mark Landau

Susannah Mitchell (#15), Click Me Baby, One More Time: An Intersectional Feminist Analysis of the "Sugar Baby" Phenomenon, mentored by Ivery Goldstein

Kira Karry (#16), Sex Positive Feminism: Intersectionality and Women of Color, mentored by Ivery Goldstein

Catherine Prestoy (#17), All a Part of the Experience: Dating Culture and Masculine Identity of the Male American Study Abroad Student in China, mentored by Ivery Goldstein

Megan Schulte (#18), Investigating the Gender Difference in Trauma Related Nightmare Experiences, mentored by Nancy Hamilton

Rachel Elting (#19), Identifying W-Linked DNA Sequence Reads in the Butterfly, *Heliconius melpomene*, mentored by James R. Walters

Borders & Migration

Mel Saldaña Fuentes (#20), «Ni papeles ni que nada»: Women's Motivations to Immigrate to the US from Mexico, and the Barriers that Interfere with Acquiring Citizenship or Residency, mentored by Rachel Denney

Hayley Nugent (#21), Anti-Immigrant Rhetoric by the United States Government Upholds Colorism: The Impacts on Interpersonal Relationships and Mental Health of Latino Immigrants, mentored by Ivery Goldstein

Reed Boohar (#22), A Legacy of Division: Investigating Demographic Shifts in a Reunified Germany Three Decades Later, mentored by Ari Linden

Kathleen Meeds (#23), The Israel-Palestine Conflict in German and American Media, mentored by Andrea Meyertholen

Health & Illness

Kyley Burkey (#24), Inhibition of DNMT and HDAC6 Together Regulates Macrophage Polarization by FoxO1-HIF2alpha Signaling and Protects Endotoxemia-Induced Inflammation, mentored by Rajasingh Johnson

Deanna Diaz (#25), Utilizing Fluorescent Soluble Antigen Arrays for B Cell Detection, mentored by Cory Berkland

Alexander Fulk (#26), Numerical Study of Disease Epidemic Models with Diffusion, mentored by Huang Weizhang & Estela Gavosto

Christopher Gebhardt (#27), Molecular Target Validation of Active Fragments for RNA-Binding Protein Musashi-2, mentored by Lan Lan

Soyeon Kim (#28), Modeling the Impact of Movement on Methicillin-Resistant *Staphylococcus aureus*, mentored by Folashade Augusto

Katie Zimmerman (#29), A Computational Study of the Amino Terminal Copper and Nickel Antimicrobial Metallopeptide Motif, mentored by Candan Tamerler

Amanda Karas (#30), Employing Achievement Goal Perspective Theory to Examine the Impact of Coaching Climate on the Prevalence of Disordered Eating and Body Dissatisfaction within Collegiate Athletics, mentored by Mary Fry

Abigail Driggers, Emily Doffing (#31), The Relationship Between Negative Affect and Predicted Utilization of High Intensity Interval Training, mentored by Stephen Ilardi

Holly Swearingen (#32), Effects of physical activity on working memory performance, mentored by David Jarmolowicz & Stephanie Stancato
Sarah Rooney (#33), Assessing the Role of Parental Psychological Control in the Relationship Between Alexithymia and Depressive Symptoms in Adolescents in Juvenile Detention, mentored by Paula Fite
Alexis McGhee-Dinvaut (#34), Race Impacts On Mental Illness Stigmatization, mentored by Nyla Branscombe
Natasha LaGrega (#35), Expression of Human Tau Mutants Leads to Synaptic Loss in *Caenorhabditis Elegans*, mentored by Brian D. Ackley & Molly E. Birrer
Elizabeth Aikman (#36), Optimizing Primary Amine Substitution for Gel-Norbornene, mentored by Jennifer Robinson
Lani Martin (#37), Cognitive Decline in Elderly Adults With and Without Hearing Loss, mentored by Cynthia Hunter

Music

Chris Clark, Brooke Wietharn, Chase Charles (#38), Music and Test Performance, mentored by Victor Gonzalez
Abigail Simonson (#39), Does rap music foster meaningful parent-child interactions? An exploratory study of YouTube videos., mentored by Deanna Hanson-Abromeit & Kara Caine
Claire Schumacher (#40), Born Overnight: Techno Music and the Reunification of Germany, mentored by Ari Linden
Brian Locascio (#41), Music & Harm – A preventative model for premature infants in the NICU, mentored by Deanna Hanson-Abromeit
Hollie Mullin (#42), Differences in Experiencing the Speech-to-Song Illusion as a Function of Age, mentored by Micheal Vitevitch
Hannah DePriest (#43), Development of a Process Measure to Evaluate a Music Intervention for Infants with Neonatal Abstinence Syndrome, mentored by Deanna Hanson-Abromeit

Poster Sessions, Kansas Union:

Session 3K: Big 12/Jayhawk (5th floor)

Jacob Hammil (#45), Additive Manufacturing Challenges for Complex Granular Structures, mentored by Anil Misra
Matthew Jaeschke (#46), Bimodal Self Assembled Supramolecular Nanoprobes, mentored by Candan Tamerler
Mattea Keister (#47), Hyperactive Antiforeign Genome Response, mentored by Lisa Timmons
Bryn O'Meara (#48), Canonical Wnt signaling guides motor neuron axon growth in *Caenorhabditis elegans*, mentored by Brian Ackley
Brandon Martin, Shane Hefner, Rain Bruce, Patrick Kennedy (#49), California Wildfires and an expanding Wildland-Urban Interface, mentored by David Rahn
Aldin Tollison, Ethan Tidwell, Kristy Mo, Raffi Hatutian (#50), Lake Pleasant: An Expanding Lake in a Drying Region, mentored by David Rahn & So-Min Cheong
Grant Elias (#51), Allosteric Effects of AMP and Dextrose on Glycogen Phosphorylase b, mentored by Roberto De Guzman
Taylor Flinn (#52), Caffeine's effect on Glycogen Phosphorylase, mentored by Roberto De Guzman
Amen Hailemariam (#53), The effect of D (+) Glucosamine on Glycogen Phosphorylase B, mentored by Roberto De Guzman

Nabil Hossain (#54), Allosteric Regulation of Glycogen Phosphorylase b with Imidazole Inhibits Rate of Product Conversion, mentored by Roberto De Guzman

Kirsten Kent (#55), Allosteric effects of adenosine 5'-monophosphate and D(+)-maltose on Glycogen Phosphorylase B, mentored by Roberto De Guzman

Manahil Khan (#56), Kinetics Assay of Glycogen Phosphorylase b and Allosteric Regulation of D(+)-Glucosamine Effector, mentored by Roberto De Guzman & Priyanka Goyal

Charlie Kircher (#57), Allosteric regulation of D(+) maltose on Glycogen phosphorylase b, mentored by Roberto De Guzman

Henry Kircher (#58), Kinetics Assays of Glycogen Phosphorylase B, mentored by Roberto De Guzman

Emily Kramm (#59), Allosteric inhibition of Glycogen Phosphorylase b by D(+)mannose, mentored by Roberto De Guzman

Zoe Lai (#60), Allosteric Inhibition of Glycogen Phosphorylase b by Nicotinamide, mentored by Roberto De Guzman

Tyler Lamport (#61), The Effect of D (+) – Mannose as an Allosteric Inhibitor of Glycogen Phosphorylase B, mentored by Roberto De Guzman

John League (#62), Allosteric regulation of Nicotinamide on Glycogen Phosphorylase b, mentored by Roberto De Guzman

Nick Lowe (#63), Changes of IpaC secondary structure in micelles by Circular Dichroism spectroscopy, mentored by Roberto De Guzman & Amritangshu Chakravarty

Stephanie Matthews (#64), The Kinetic Effects of Theophylline on Glycogen Phosphorylase B, mentored by Roberto De Guzman

Colin McCue (#65), Kinetics Assay of Glycogen Phosphorylase b, mentored by Roberto De Guzman

Henna Mehta (#66), Inhibition of Glycogen Phosphorylase B by Imidazole, mentored by Roberto De Guzman

Joshua Mitchell (#67), Allosteric Mechanism Evaluation of Glycogen Storage through Inorganic Phosphate Regulation by Dextrose with Glycogen Phosphorylase b, mentored by Roberto De Guzman

Mariaelena Nabors (#68), Sucrose and Diphenhydramine as effectors of Glycogen Phosphorylase b, mentored by Roberto De Guzman

Priyanka Radadiya (#69), Inhibitory Effect of Sucrose on Glycogen Phosphorylase b, mentored by Roberto De Guzman

Amanda Rebori (#70), The Allosteric Effects of Adenosine 5'-mono Phosphate and Epinephrine on Glycogen Phosphorylase b Kinetics., mentored by Roberto De Guzman

Fabian Requesnes (#71), Interaction of D(+)Mannose on Activity of Glycogen Phosphorylase b, mentored by Roberto De Guzman

Lauren Ryan (#72), Allosteric regulation of Glycogen Phosphorylase b with effector Proline, mentored by Roberto De Guzman

Xavier Scherschligt (#73), Effect of Sucrose on The Kinetics of Glycogen Phosphorylase b, mentored by Roberto De Guzman

Kameron Sharp (#74), Kinetic Activity of Glycogen Phosphorylase b In the Presence of Nicotinamide, mentored by Roberto De Guzman

Zachary Shaw (#75), Kinetic Effects of Lactose and 5'-AMP on Glycogen Phosphorylase B, mentored by Roberto De Guzman

Benjamin Smith (#76), Theophylline's positive allosteric effect on Glycogen Phosphorylase b, mentored by Roberto De Guzman

Emily Smith (#77), The Effect of Caffeine and Aloe Vera on Glycogen Phosphorylase, mentored by Roberto De Guzman

Samuel Steuart (#78), Allosteric Effects of AMP and Epinephrine on in vitro Glycogen phosphorylase b Activity, mentored by Roberto De Guzman & Sanjana Sundararajan

Jason Tran (#79), Kinetics Assay of Glycogen Phosphorylase b and the Effects of Proline and *Rosmarinus officinalis* Oil, mentored by Roberto De Guzman

Bryan Vasquez (#80), Characterizing the role of Glycogen Phosphorylase b, mentored by Roberto De Guzman

Daniel Villarreal Acha (#81), Allosteric Activity of D-Fructose in Glycogen Phosphorylase b, mentored by Roberto De Guzman

Kate Weis (#82), Kinetics Assay of Glycogen Phosphorylase B, mentored by Roberto De Guzman

Kevin Xie (#83), Effect of D-fructose inhibitor on the kinetics of Glycogen phosphorylase-B, mentored by Roberto De Guzman

Cong Zhao (#84), The effects of sucrose for Glycogen phosphorylase b, mentored by Roberto De Guzman

Digital Posters: Session 3L, International (5th floor)

Sarah Hunter, Anna St. Pierre, Tessa Wornor (#85), The Developmental Function of Music for Children Ages Nine to Twelve, mentored by Deanna Hanson-Abromeit

Abria Fisher, Kena Flood, Sarah Morrill (#86), The Developmental Function of Music for Adolescence ages 13-18 years, mentored by Deanna Hanson-Abromeit & Katie Martin

Aneka Zarger, Jakob Moberly, Tabitha Bassett (#87), The Developmental Function of Music for Adults Ages 29-45, mentored by Deanna Hanson-Abromeit & Katie Martin

Malorie Kuker, Carly Graefe, Cameron Wilson (#88), The Developmental Function of Music for Aging Adults 66 and Above, mentored by Deanna Hanson-Abromeit & Katie Martin

5:30 – Symposium Banquet, Ballroom (5th floor)

For all student presenters, their mentors, and their guests. RSVP requested.

Welcome & Presentation of Awards: Alison Olcott, Director, Center for Undergraduate Research

K. Barbara Schowen Undergraduate Research Mentor Award

Undergraduate Research Mentor Award

Outstanding Presentation Awards

Elizabeth Aikman

Optimizing Primary Amine Substitution for Gel-Norbornene

Mentor(s): Jennifer Robinson

Osteoarthritis is a degenerative disease that effects joints in the body, where cartilage that cushions bone wears down over time. Techniques to help prevent, treat, and repair osteoarthritis damage are limited, especially in the meniscus of the knee tissue. Scaffolds made of hydrogels are increasing in popularity in biomaterials research. Gelatin is a natural biopolymer that does not generate harmful byproducts upon its degradation. Creating a biomaterial hydrogel scaffold that is tunable and behaves similarly to the meniscus can be a proactive step in meniscus repair and regeneration. This study looked at creating a gelatin hydrogel scaffold that can mimic the extracellular matrix of the meniscus. Gel-Norbornene (Gel-NB) is a substituted gelatin that can easily be crosslinked through a step-growth reaction in the presence of a crosslinking agent. The crosslinked structure will provide a tunable scaffold. Optimizing the primary amine substitution within the hydrogel will allow for modulation of a higher crosslinking density and improving the physical properties of the hydrogel. The quantity of primary amines in gelatin and Gel-NB were analyzed by NMR (n=1) and o-Phtalaldehyde assay (OPA). With the data collected in this study, a library of hydrogels will be generated to effectively tune the scaffold for different cell encapsulations.

Farouk Alabed

Pilot Study of a Digital Patient Education Program for Multiple Myeloma; Learn While You Wait

Mentor(s): Abdulraheem Yacoub

We aim to determine if evidence exists to suggest that a digital multiple-myeloma educational software increases patients' knowledge of their disease, determine perceived impact of the educational program on their understanding of the information provided to them by their oncology care providers, to determine whether patients believe that the software's target population should be expanded to family members and determine whether patients would prefer to receive a video form of this program to review at home.

Kasra Alizadeh

Evaluating the Role of Translational Efficiency in Synaptogenesis in *Caenorhabditis elegans*

Mentor(s): Brian D. Ackley

Nidogen is a conserved basement membrane protein required for the proper formation and organization of synapses. In *C. elegans*, nidogen functions to efficiently localize the presynaptic scaffold protein SYD-2/ α -liprin at synaptic active zones. The synaptic phenotype in nidogen mutants is suppressed by loss-of-function in genes that encode a calcium channel (*unc-2* or *unc-36*), the calmodulin kinase (*unc-43*), or calmyrin (*calm-1*), demonstrating that calcium signaling is important in synaptic morphogenesis. Previous work identified proteins that associate with CALM-1 in a calcium-dependent fashion, including RACK-1 and multiple ribosomal proteins. Loss of function in *rack-1* results in a synaptic phenotype equivalent to the loss of nidogen, and this phenotype can be suppressed by the loss of *calm-1*. Interestingly, RACK-1 is known to be a translational inhibitor in many contexts, although whether this is how it is functioning in synaptic nidogen pathway is unclear. To test this, we are using RNA interference to inactivate the ribosomal proteins isolated in our biochemical screen. Furthermore, there is the question of the range of activity of RACK-1. While the role of RACK-1 in synaptic development might be through global translation inhibition, this protein could also be associated with only certain ribosomes, in which case, identifying the mRNAs associated with these ribosomes can point at new genes that are important in synaptic development. We are planning to purify and further study these mRNAs using immunoprecipitation and sequencing. The findings of this study will identify the role of CALM-1 associated proteins, and potential new genes that are involved in the nidogen synaptic pathway. This information will be important in better understanding synaptogenesis in invertebrates and vertebrates.

Taylor Allen, Aroog Khaliq & Kyeisha Ross

Cultural variations in the experience of care and obligation to parents

Mentor(s): Darlingtina Atakare

Familial interdependence continues to underpin intergenerational relations and familial caring responsibilities and obligations. Interdependence may be especially problematic in cultural settings that afford the experience of independence, voluntary connections, and freedom from constraints. Present research draws upon empirical research conducted across US and Ghanaian settings to illuminate cultural ecological variation in the conceptualization of relationality and the implication for obligation to parents. Result support our hypothesized pattern that individualistic conceptualization of relationality leads to a narrowing sense of obligation toward elderly parents. We discuss implications of results for theories about relationality and for evolving patterns of eldercare provision within close interpersonal networks. Our discussion will show how cross-cultural studies can help to reveal the typically unstated assumptions about family obligation and eldercare that vary across human societies and help alter modern individualism to provide a better quality of life, assurance, and support for elders.

Alexander Alsup

Treatment of Hospital Privacy Curtains with Zinc Pyrithione as an Infection Control measure in the Healthcare Setting

Mentor(s): Brendan C. Mattingly

Hospital Acquired Infections (HAI's) are a long standing concern within the medical community. One possible source of HAI's are through hospital privacy curtains contaminated with pathogenic bacteria. Recent studies have demonstrated that hospital privacy curtains can harbor pathogenic bacteria, that this bacteria can be transferred to a healthcare worker's hands after contact, and that contaminated curtains can lead to outbreaks in the healthcare setting. New developments in antimicrobial technologies for hospital privacy curtains have been sparsely tested and when they are, it is often in a study funded by the producer of the curtains. This study seeks to analyze the ability of Antimicrobial curtains treated with Zinc Pyrithione to prevent contamination by three common bacterial causes of HAI's when compared to Traditional curtains. To this end, 1 inch squares of Antimicrobial or Traditional curtains were placed in TSA plates inoculated with one of the three bacteria and observed for four days afterward. Antimicrobial squares exhibited contact inhibition and a zone of inhibition in response to all three bacteria where as Traditional curtains demonstrated neither contact inhibition or a zone of inhibition and were contaminated within one day. This data suggests that curtains treated with Zinc Pyrithione can provide extra protection against contamination when compared to Traditional curtains. The next step would be to analyze Zinc Pyrithione against additional pathogenic bacteria, in different concentrations, and in different time frames.

Kathryn Ammon

The Body Politic and Body Politics: Lingering Effects of the Irish Troubles on the Irish Eighth Amendment Referendum

Mentor(s): Ivery Goldstein

This paper looks at the effects of nationalism, state sovereignty, and pro-natalist birth policy on abortion and reproductive rights in Ireland following the Irish Troubles (1968-1998). While many researchers have examined nationalism, state sovereignty, and state formation during and immediately after the Irish Troubles, fewer researchers further examined these topics with a feminist lens, and how these ultimately pro-natalist policies impacted reproductive rights, and specifically abortion. In May 2018, the Republic of Ireland repealed the Eighth Amendment via popular referendum, and legalized abortion for the first time since 1983. However, articles have not yet been written connecting the patriarchal pro-natalist era of the Irish Troubles and any lingering effects this had on the legalization of abortion twenty years later. This paper is concerned with exploring those questions. By re-evaluating many of the earlier works on Irish state sovereignty and natalism and undertaking a content analysis of The Irish Times this paper intends to evaluate whether these themes reappear in current day discourse on abortion rights in the Republic of Ireland, and to what extent they may have influenced the repeal of the Eighth Amendment. This content analysis involved examining issues of The Irish Times in a set time frame before and after the May 2018 referendum, to see if references to nationalism or the Troubles appear, and if so, which stakeholders allude to it most frequently. As Ireland, an EU member state, moves into a post-Brexit Europe, questions of state sovereignty and its impact on reproductive rights will stay as salient as ever. This work will update earlier frameworks to better understand abortion rights in the current era.

Kayleigh Anderson

Breaking the Cycle: American Culture, Environmental Problems, and the Societal Construct of Menstruation

Mentor(s): Ivery Goldstein

Menstruation, though typically defined as a biological process, has garnered a reputation through many societal constructs as a taboo topic unworthy of discussion. Such ingrained ideas have allowed disposable menstruation products to dominate the marketing world of women. Promises of discreet packaging, pocket-able tampons, and odor free sanitary napkins have found their place in nearly billions of homes across the nation. By buying into these products, people are often overlooking a much more serious problem. Allowing aspects such as spirituality, popular culture, and advertising control the image of menstruation allows large disposable companies to keep their consumers in the dark about what their products contain. This project aims to shed light on how religion, literature, film, and advertising have shamed menstruation as well as create a barrier for menstruating individuals to talk about their bodies. This project will also look at disposable menstrual products, the toxins they contain, the environmental impact they have, and why their capitalistic motives prevent sustainable methods from becoming more mainstream. This project will also be inclusive of menstruating individuals who adhere to different pronoun or use these products for aesthetic gender conforming reasons.

Rose Argent

Species delimitation in the widespread Northern Philippine Bent-toed gecko, (*Cyrtodactylus philippinicus*)

Mentor(s): Rafe Brown

The Philippines has long been known as a biodiversity hotspot because of its many islands and interesting geographic history. My research has been looking into a certain gecko found on the mainland, and more specifically a population on a deep-water island just off its coast. This island endemic gecko, *Cyrtodactylus philippinicus*, has been wrongly assumed as a single species due to lack of research into its origin, a convoluted written history, and lack of morphological data. First clued into its diversity in the field researchers decided to take tissue samples to better understand these geckoes' differences. The phylogenetic tree that was produced from that collected data gave me a starting point for assessing what seemed to be multiple lineages of geckos from what was assumed to be one. This assumption, caused mainly due to its original description, has only been more ingrained by researchers who don't investigate primary literature. Using the primary sources, I've been able to narrow the previous locality of the first collected specimen from just "The Philippines" to a single city/faunal region. This starting point, the basic phylogenetic tree that was produced, and new morphological data will allow this species to finally be recognized for its true diversity. With conservative estimates putting the true species count at 7 instead of the original 1 this inconspicuous gecko holds its own in the renowned diversity hotspot and could be indicative of cryptic diversity in other animal groups.

Jacob Asherman

Investigating the Impacts of Hail Parameterizations on Idealized Supercells in the Weather Research and Forecasting Model

Mentor(s): Justin Stachnik

Supercell thunderstorms remain one of the prominent weather hazards in the U.S., given the disproportionately high amount of severe weather (tornadoes, hail, and severe wind) these storms produce. As such, a great deal of emphasis in severe weather research has focused on the accurate forecasting of supercells with the intent of providing longer warning times for communities. Within the past twenty years, simulations of supercells utilizing high resolution numerical weather models including the Weather Research and Forecasting (WRF) model have emerged as powerful tools for predicting the timing, placement, and intensity of severe weather. While these models simulate atmospheric phenomena at a high spatial resolution (typically several kilometers or less), physical processes of cloud droplet growth into larger cloud drops and ice happen at scales far too small (millimeters or less) for the model to explicitly calculate, leading to these values being estimated (parameterized). However, preliminary experiments show a sensitivity of modelled storm type based off of choice of these parameters, a result previously not found in other studies. Through better understanding of how these processes affect model simulations of supercells, we hope to improve prediction of these storms, in turn providing more lead time for communities under risk in present and potentially future climates.

Kenean Assefa

Kinetic Analysis of Glycogen Phosphorylase b in the presence of AMP as well as Proline

Mentor(s): Roberto De Guzman

Glycogen is a polymer of glucose used for energy storage. When the cell needs energy, it breaks down the stored glycogen using glycogen phosphorylase by the process called Glycogenolysis. Glycogen phosphorylase is a compound that has two monomers and is allosterically regulated by phosphorylation. In this experiment, we studied the behavior and characteristics of Glycogen phosphorylase b(GPb). We applied a three-part approach. In the first part, we analyzed the optimal temperature and enzyme titration of GPb. We also determined the standard curve for the concentration of inorganic phosphate. The extinction coefficient for inorganic phosphate, using linear regression was also resolved. In the second part, we analyzed the effect of different concentration of AMP on glycogen phosphorylase using Michalis-Menten curve; measuring the changes in the enzymatic activity based on different substrate concentrations and effector. AMP is an allosteric effector of GPb and as its concentration increases, the activity of GPb increases as well. In the last part of the experiment, we tested the effect of Proline on the kinetic activity of GPb at different concentration to determine whether it is an activator or inhibitor. It turns out that, proline is an inhibitor of GPb and the kinetic activity of GPb decreases as the concentration of proline increases.

Hannah Bachman

Lactose Regulation of Glycogen Phosphorylase B

Mentor(s): Roberto De Guzman

Glycogen phosphorylase is an enzyme used to breakdown glycogen into free glucose that can travel throughout the body and be used for fuel for different tissues. The inactive form must be activated under hypoglycemic conditions in order to maintain blood glucose levels. This enzyme is activated and inhibited by different metabolites under allosteric regulation, where the molecule binds to a site other than the active site. It is known that glucose is an inhibitor for the enzyme as if excess glucose is present, glycogen does not need to be cleaved. The regulatory activity of a lactose, a structurally similar molecule to glucose, is not known however. Lactose is a disaccharide composed of galactose and glucose molecules. To determine the regulation of glycogen phosphorylase by lactose, assays of different concentrations of the effector were used to determine the difference in kinetic activity of the enzyme. The changing velocity of the reaction was measured using spectrophotometry to determine the changing concentration of the glucose-1-phosphate released from cleaving glycogen. It was found that the molecule lactose decreased kinetic activity of the enzyme, indicating that lactose acts as an inhibitor to glycogen phosphorylase. This could indicate that other similar glucose structures could be used to control the activity of glycogen phosphorylase, and therefore blood sugar levels.

Dylan Baile

Museum of Air Sustainability, Dallas, TX

Mentor(s): Kapila Silva

Air pollution is a major problem worldwide that is linked to the sustainability of public health, agriculture, global climate, and more. My intention in this design project is to inform people about causes, effects, and solutions of air pollution and to demonstrate how to build for air sustainability through the design of the museum itself. The entire facade surrounding the building is designed to act as an air purification system – to bring in dirty air from the streets and cycle it through a series of natural and mechanical purification methods. This system provides clean air to the entire building and eventually distributes that clean air back into the environment. The system is not only functional but educational, as it is the primary ‘exhibit’ of the entire museum. The walls of glass allow museum visitors to observe the purification system from almost any point in the museum. The building is placed above Highway 366, adjacent to Klyde Warren Park across North Pearl Street in the Arts District of Dallas, Texas. Because of this unusual location, an unconventional structure is designed to support the seemingly floating ‘tower-like’ building. The entire volume of the building is rotated diagonally on site to form an iconic presence against the highway and the park. An exoskeleton steel structure with three primary structural columns holds the building on three corners with the fourth corner suspended on air, accentuating the floating presence of the museum. The site conditions also demand innovative spatial programming and vertical circulation. Five galleries sit atop of the museum while lower levels accommodate non-public spaces. The ground level is an accessible public space to act as a continuation of Klyde Warren Park. At the heart of the Dallas Arts District, this design adds another urban landmark that activates the proposed Art Walk along Pearl Street and punctuates the eastern end of the park.

Lauren Bajorek

Acts of Genocide: How Language Killed the Tutsis

Mentor(s): Bartholomew Dean

Twenty-five years ago, nearly a million people died in the span of one hundred days in a country hardly bigger than Vermont in the heart of Africa. The Rwandan Genocide was largely dismissed for weeks as a tribal war and only classified as a genocide in the end. In fact, the massacre was a product of political disputes and racial divisions set in motion by colonial powers in the early twentieth century. Propaganda within the country pit neighbors against neighbors, mothers against their children, and leveled entire communities. International authorities refrained from labeling the slaughters a genocide to circumvent getting involved. In this paper, I analyze and try to understand the ways that language works not only as a catalyst, but also as continued fuel for humanitarian crises. Using Critical Race Theory in combination with the Sapir-Whorf Hypothesis and Complicity Theory, I question how race, otherization, and dehumanization created the circumstances that lead to the Rwandan Genocide, and why so many people have still never heard of it. I argue that colonialism caused the genocide in Rwanda, and the genocide was not stopped as a result of racism and contemporary economic imperialism.

Anna Barreda

Predictability of biomethane potential as a result of anaerobic digestion of pure primary sludge and secondary sludge as well as co-digestion of food waste with sewage sludge

Mentor(s): Belinda Sturm

Biogas, which is primarily methane along with carbon dioxide, is produced through a variety of natural processes, including anaerobic digestion, where micro-organisms break down organic material in the absence of oxygen. The objective of this project was to create equations that would predict the maximum percentage of biomethane produced from primary sludge, secondary sludge, and the co-digestion of food waste and sludge. Triplicates tests measuring the volume of biomethane as a function of time were performed for each of the three sludge compositions studied. The hypothesis was that primary sludge would show greater biomethane potential than secondary sludge, due to fact that secondary sludge experiences a loss of carbon as a result of the production of carbon-dioxide. The co-digestion of sludge with food waste also measured the protein, volatile solid content, and the carbohydrates of the food, to be incorporated into the equation that predicts biomethane potential. The co-digestion of food results in an increase of carbohydrate and protein in the organic matter which hypothesized to have a greater biomethane yield compared to primary sludge or secondary sludge. The next steps would be to further characterize the food waste predict the biomethane potential.

Aaron Barrett

Randomized Conjugate Gradient Algorithm to Solve Large Linear Systems for Exascale Computing

Mentor(s): Agnieszka Miedlar

Large data sets common to modern applications has motivated the search for fast and accurate algorithms to solve linear systems. Since direct methods are not feasible for solving many of these problems, iterative methods were developed so that an approximate solution could be obtained with a prescribed degree of accuracy. This allowed the user to control the amount of time and memory allocated to the particular task. These advantages motivated the search of linear system solvers using sampling methods which give a sketch of the original system that lessens the computational burden. Of those methods, randomized iterative methods where the original system would either be stochastically manipulated or sampled became of interest due to the fast convergence and significantly improved running time. This is of particular interest in the context of petascale and exascale computing where the time to perform floating point operations is becoming exponentially less than the time it takes to move the data and communicate the results of the intermediate calculations. In this presentation, the focus will be on randomized projection type methods, presenting some preliminary results using large scale benchmark matrices. In particular, this will include convergence and computation time comparisons with previously used randomized algorithms, as well as including some theoretical connections to established deterministic methods such as the conjugate gradients method for further research.

Anton Barybin

Development of a microchip electrophoresis-based separation system for on-line analysis of microdialysis samples for neurotransmitters

Mentor(s): Susan Lunte

Neurotransmitters are chemical messaging compounds within the brain that have been shown to be linked with neurodegenerative disorders (e.g., Parkinson's disease) and behavioral disorders (e.g., depression). The development of methods for continuous monitoring of neurotransmitters such as dopamine, norepinephrine, epinephrine, and serotonin in the brains of living animals will allow for better understanding of these disease states and aid in drug development. The simultaneous monitoring of the above-mentioned neurotransmitters and hydroquinone (internal standard) was conducted using microchip electrophoresis (ME) with electrochemical detection (EC). When coupled with microdialysis sampling, ME-EC systems can be used as separation-based sensors. This study utilized a polydimethylsiloxane (PDMS) microchip with a 5 cm long separation channel and "double-t" design with flow-gated injection. Electrochemical detection was performed using a 35 μm wide pyrolyzed photoresist film electrode (PPF) at +1.00 V (vs Ag/AgCl). Separation was carried out using a background electrolyte consisting of 15 mM phosphate at pH 7.4 and 15 mM SDS at a field strength of 222 V/cm. Sample was continuously delivered to the chip from the microdialysis probe at 1 $\mu\text{L}/\text{min}$. Complete separation of the analytes was achieved within 100 s with a baseline resolution. Limits of detection (LOD) for the analytes were determined to be approximately 100 – 250 nM. On-line monitoring of the neurotransmitters was also investigated by coupling microdialysis sampling with a pneumatic valve-based PDMS/glass ME-EC hybrid device with a PPF electrode. The developed sensor will ultimately be used for monitoring changes in neurotransmitters in rat animal models of neurodegenerative disease.

D'Arlyn Bell

Political Organizing in Disadvantaged Communities: Nonprofit Social Service Mobilization and Legal Endogeneity

Mentor(s): Charles Epp

People in poverty are limited in their capacity to influence the political process because they lack connections to organizations that shape policy. Although economically disadvantaged populations are not networked in political organizations, they are connected to nonprofit social service agencies which are emerging as a potential structure with the capacity to mobilize for social rights. During my previous study analyzing neoliberal welfare policies, I learned that nonprofits are involved in a range of political activities. Some of these activities appear to push the limits of tax law. Nonprofits heavily involved in political organizing can be accused of fiduciary misconduct and lose tax-exempt status, keeping many on the sidelines of political activity. Although restrictive, tax law limitations on political activity are ambiguous. How do nonprofits reconcile their need to abide by tax law and their desire to politically organize? To answer this question, I will conduct interviews with nonprofit administrators and analyze political mobilization documents and professional publications that guide nonprofit practices. My analysis will be informed by a neo-institutional model of organizational responses to law and legal endogeneity theory (Edelman 2016). This theory suggests that ambiguous legal language allows organizations to construct the meaning of law and develop symbolic structures for representing legal compliance. Nonprofits are restructuring their mission as they absorb the effects of growing economic inequality. Pressure from below is creating key conditions for organizational adaptation. This study will contribute to discussions about the role of nonprofits in promoting civic engagement among communities in poverty.

Gabriella Bernard, Riley Beveridge-Calvin & Julia Davis

**A Systematic Review of Course-based Undergraduate Research Experiences (CURE):
Implications for Music Therapy Education and Training**

Mentor(s): Abbey Dvorak

Course-based undergraduate research experiences (CURE) engage whole classes of students in addressing research questions or problems of interest to the scientific community. The purpose of this study was to systematically examine available literature for course-based undergraduate research experiences and explore implications and best practices for inclusion in music therapy education and training. The research questions include: (a) What are the characteristics of course-based undergraduate research experiences (i.e., participants, grade level, course, field of study, study design, study duration)? (b) What are the outcomes of course-based research experiences and how are these outcomes measured? (c) What are the implications and best practices for inclusion of course-based research experiences in music therapy education and training? Searching ERIC, PubMed, and Web of Science, authors identified articles published between 2000-2017 meeting inclusion criteria. Of 5809 articles, 54 met review criteria: published quantitative, qualitative, or mixed methods study; involved undergraduate students; intervention met the five dimensions of CURE models. The majority of CUREs were implemented in one-semester required courses in the life sciences for a variety of student grade levels. CURE outcomes frequently included increased research knowledge, increased course content knowledge and skills, improved attitudes and beliefs, general perceptions of the learning experience, and improved course satisfaction. CURE measurement tools were varied, but many used a researcher-created posttest, standard university course evaluations, researcher-created pretests/posttests, or standardized research skill development surveys. The majority of studies indicated a positive student response to CURE implementation. Implications and recommendations for music therapy education and training are discussed.

Allison Bevel

The Effect of Caffeine on Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen is responsible for storing glucose in cells and is cleaved to provide glucose when the cell needs energy. The enzyme responsible for this cleavage is glycogen phosphorylase and exists in equilibrium in two forms, a and b. This enzyme is regulated via allosteric regulators in muscle cells. This experiment explored the effects of caffeine as an effector on glycogen phosphorylase b. The reaction being catalyzed is the reverse reaction in which inorganic phosphate is the product, which is normally consumed in the reaction to form glucose 1-phosphate. By measuring the absorbance of the reactions, we were able to find the concentrations of Pi produced with increasing glucose 1-phosphate added. It was found that with increasing concentrations of caffeine the reverse reaction of glycogen phosphorylase was inhibited. A concentration of 4 mM caffeine was found to have the largest impact on Vmax. Because the reverse reaction is inhibited by caffeine the forward reaction, i.e. the breakdown of glucose, would be activated by this effector. Given that glycogen phosphorylase is active when there is a shortage of glucose in muscle cells, which can occur during strenuous exercise, this could mean that caffeine could be a way of replenishing glucose concentrations after exercise.

Raegan Billinger

Impacts of Genocide on Maternal Care

Mentor(s): Sandra Gray

Though the genocide in Rwanda by the Hutu against the Tutsi occurred a quarter of a century ago, the health impacts of it continue to leave lasting effects. Children of the survivors of the Rwandan genocide experience consequences stemming from their parent's or parents' mental and physical health issues from the genocide. The trauma of the genocide combined with the sexual assault against many, if not most, of the female survivors of the genocide have had far-reaching consequences. The hypothesis of this research is that due to the widespread sexual violence perpetrated against the Tutsi women during the Rwandan genocide, sexual violence victims' maternal care and mother-child bonding have been negatively affected, especially with those children conceived through genocidal rape. Mothers whose children are the consequence of sexual violence are usually shunned by the general population, along with their families, especially if the woman was unmarried at the time of the sexual assault and consequent pregnancy. Instances of infanticide, child abandonment, and child abuse have occurred in households with survivors of sexual assault towards their children conceived through rape. However, these occurrences of a lack of maternal care and bonding have also been observed with mothers and their children who were not conceived as a direct result of sexual assault. A combination of a meta analytical approach and a systematic review will be used. This research is for Sandra Gray's class ANTH 391/400 to be presented at the University of Kansas's 2019 Undergraduate Research Symposium.

Molly Blake, Mikala Grover & Justin Gianares

Nesting Site Location Influences the Foraging Habits of the bee *Colletes Inaequalis*

Mentor(s): Deborah Smith

Colletes Inaequalis is a polylectic bee that nests in the ground. We examined how the location of a ground nesting site influenced the foraging habits of *C. Inaequalis*. Two nesting sites were chosen for this study: one in a high traffic area due to humans and vehicles and one in a secluded, low traffic area. Pollen samples were collected from bees from both sites. The samples were stained and compared to known samples collected within a certain distance from their respective nest sites. The goal of this study was to determine if the level of traffic in an environment plays a role in what makes *C. Inaequalis* polylectic.

Molly Bollman

Regulation of Glycogen Phosphorylase B by Fructose

Mentor(s): Robert De Guzman

Glycogen phosphorylase is an enzyme used in glycogenolysis to cleave glycogen to produce glucose-1-phosphate, which is further broken down to glucose and organic phosphate. Breaking down glycogen is important during times when glucose is needed as an energy source, resulting in glycogen phosphorylase being activated when energy requirements are high and available glucose is low. In order to measure the isolated enzyme, we studied the breakdown of glucose-1-phosphate to glycogen and inorganic phosphate. The amount of phosphate ions released was measured by combining with the molybdate in the stopping reagent, causing a blue colored product to form that was measured with a spectrophotometer. Glycogen phosphorylase is an enzyme that is allosterically regulated by different effectors that indicate that glucose is needed or that there is sufficient energy levels and glycogen should be formed. The purpose of this experiment was to test the allosteric effects on glycogen phosphorylase with the addition of fructose. After examining the kinetics assays it was determined that fructose was an inhibitor of glycogen phosphorylase, as the amount of glycogen breakdown was decreased.

Reed Boohar

**A Legacy of Division: Investigating Demographic Shifts in a Reunified Germany
Three Decades Later**

Mentor(s): Ari Linden

State divisions and subsequent state mergers have occurred throughout history and can introduce drastic change to local demographics in a relatively short amount of time. This challenges the normal, gradual flow of people into or out of a region and can spur further changes in regional economies and culture. One prominent example of this is with the reunification of West Germany and East Germany. In 1949, four years after Germany's defeat in World War II, the three Western zones of military occupation in Germany established themselves as the Federal Republic of Germany, while the Soviet-controlled Eastern zone became the German Democratic Republic. While independent countries, these two states could be viewed as proxies and buffers in the ideological battle between Western capitalism and Eastern communism during the Cold War that dominated the latter half of the 20th century, and thus, they developed into two very different nations. This experiment in ideologies and governments finally ended in 1989, when the borders between the East and the West were dismantled, and in 1990 a divided Germany became whole again. This paper uses the German reunification model to investigate how a momentous event like a state merger can affect regional demographics, and how those shifts can persist or change over subsequent years. Data on socioeconomic changes and patterns of internal and external migration obtained from the Federal Statistical Office of Germany were used to compare demographic trends of the newly reunified Germany to its present-day counterpart nearly thirty years later to determine the extent to which Germany still exhibits evidence of its divided past.

Tyler Brennan

Regulation of Glycogen Phosphorylase B by Caffeine

Mentor(s): Roberto De Guzman

Glycogen phosphorylase b (GPb) is an enzyme that participates in glycogenolysis. Glycogenolysis plays an important role in providing glucose to muscle tissue and in the regulation of blood glucose levels by the liver. GPb catalyzes the release of glucose-1-phosphate from glycogen. GPb is highly regulated through allosteric control. Here, the allosteric effects of caffeine on GPb were studied. To examine the effects of caffeine, various kinetic assays were performed where the reverse reaction of GPb was measured. The reverse reaction releases inorganic phosphate that reacts with a stopping reagent to create a blue colored product. The absorbance of the product was read by a spectrophotometer at 600 nm. After all the data was collected and calculated to represent appropriate concentrations of inorganic phosphate, it was determined that caffeine is an inhibitor of GPb.

Owen Brown

The Verein Deutsche Sprache and the Contradictions of German Language Purism

Mentor(s): Ari Linden

In the field of linguistics, it is commonly agreed that language is value-neutral in and of itself. Any positive or negative evaluations of language are ultimately rooted in social, political, and historical factors, even if the arguments in favor of them are linguistically oriented on the surface. Linguists refer to these socially situated evaluations of language as “language ideologies,” the construction of which is of particular interest to sociolinguists. The Verein Deutsche Sprache (VDS), or German Language Association, can be used as a case study for how a language ideology can develop and function in a specific cultural context, in this case post-reunification (post-1989) Germany. The VDS is an organization that seeks to preserve the German language by discouraging the use of Anglicisms, which are words and phrases either borrowed from or influenced by English. It is the most prominent representative of its side in an ongoing debate about Anglicisms in Germany. While linguists have already established ways in which the VDS's positions contradict linguistic knowledge, my research delves into how the VDS's misconceptions about language work against the very goals that motivate it. It first suggests that the historical and sociopolitical situation of the VDS heavily informs its conception of language, finding that the VDS's ideology is rooted in concerns about the relative status of English and German and a desire for a unified national identity. It then argues that the actions the VDS takes based on this conception fail to constructively address these motivating issues.

Ella Brown Richards

More Harm than Good? The State of Emotional Safety in Female Identifying Students on College Campuses and Their Fear of Victimization

Mentor(s): Ivery Goldstein

Overwhelmingly female students are more fearful of being a victim of crime than male students are despite the amount of crimes that take place on college campuses typically involve male students as the victim. This project investigates the perceived emotional safety of female identifying college students on college campuses in specific regard to fear of victimization. While little is known about how female students experience emotional safety in the field of higher education, even less is known about how this impacts their ability to be successful students. Additionally, the effects of the programming and legislation that have been put in place to help ease fears and create a safer environment are relatively unknown. By examining these factors I emphasize the need for more research in this arena to better prepare and support female students instead of the overarching social construction of the need to be fearful. This paper examines socialization, media portrayal, legislation, and educational programming as contributors to the disproportionate levels of female student fear on college campuses. To create an equitable learning environment for all students it is important that these contributions to the safety narrative are addressed and examined.

Kyley Burkey

Inhibition of DNMT and HDAC6 Together Regulates Macrophage Polarization by FoxO1-HIF2alpha Signaling and Protects Endotoxemia-Induced Inflammation

Mentor(s): Rajasingh Johnson

Acute lung injury (ALI) is a common inflammatory disease caused by bacterial infection leading to an imbalance between pro-inflammatory and anti-inflammatory immune responses. Studies have shown that macrophage polarization (M1 and M2) during ALI plays a key role in regulating these responses. In this study, we hypothesized that lipopolysaccharide (LPS)-induced macrophages treated with the combination of 5-Aza-2'-deoxycytidine (Aza, a DNA methyl transferase (DNMT) total inhibitor) and Tubastatin-A (TBSA, a histone deacetylase 6 (HDAC6) inhibitor) would shift the M1 (pro-inflammatory) macrophages to the M2 (anti-inflammatory) phenotype through the mitogen activated protein kinase (MAPK)-hypoxia inducible factor 2alpha (HIF2alpha) and forkhead box transcription factor O1 (FoxO1) signaling pathways. We also hypothesized that exosomes would contribute to the modulation of the M2 phenotype. Our results revealed that Aza and TBSA together significantly reduced the LPS-induced expression of inflammatory cytokines. We also found a protective effect of Aza+TBSA mediated by the activation of HIF2alpha in LPS-induced macrophages and this protective effect involves an increase in the expression of FoxO1, indicating its involvement in the repression of M2 polarization. Exosomes extracted from the LPS-induced macrophages treated with Aza+TBSA demonstrated a higher expression of anti-inflammatory markers when compared to the untreated group or the group treated with Aza alone or TBSA alone. These data suggest that combination therapy with Aza+TBSA induces macrophage polarization via MAPK-HIF2alpha and FoxO1 signaling to produce a significantly increased expression of M2 macrophage and exosome markers. Thus, epigenetic modifiers may provide a novel therapy for ALI.

Bryce Campbell

**Runx inhibition and the effects on nerve cell differentiation in regenerating
*Nematostella vectensis***

Mentor(s): Paulyn Cartwright

The sea starlet *Nematostella vectensis* has become a popular model organism among biologist because of its utility in exploring developmental evolution, developmental patterning, and cellular differentiation/regeneration in a laboratory setting. *Nematostella* is capable of performing epimorphosis, a process of regeneration that requires cell division and differentiation to replace lost tissue. The Runx/CBFbeta transcription factors have been shown to be expressed during *Nematostella* development and following induction of oral regeneration. Runx is expressed in neurons and neural progenitors. In cnidarians nerve cells can develop into neurons or cnidocytes – the stinging cells that are unique to jellyfish, sea anemones, and corals. However, the formation of the Runx/CBFbeta heterodimer can be blocked by the introduction of the drug benzodiazepine, which retards the process of oral regeneration in *Nematostella*. In this experiment we seek to test the hypothesis that Runx plays a role in nerve cell differentiation during oral regeneration by exposing regenerating *Nematostella* to benzodiazepine. We qualitatively confirm that inhibiting Runx does not influence the formation of neurons and quantitatively assess the effects on cnidocyte development by observing stinging and feeding behavior.

Sara Carlsen

Parents as Participants: Social Media Use Through a Dual Lens

Mentor(s): Germaine Haleboua

This project explores the multifaceted role parents embody in regard to social media use. As parents approach discourse surrounding social media, there are often perceived affordances which form their understanding of each platform. Affordances are what features a platform implements in order to shape the user's interaction or experience. With these opportunities or

constraints in mind, parents personify their commonly known role of police or mediator of their children's social media usage. However, while acknowledging these affordances and limiting their children's social media practices, they often participate themselves. Why do parents participate in specific social media platforms and not others? Do their perceptions of platforms that they do not use impact the policing of their children? In this paper, I intend to examine the contradictions and tensions that arise between the role of the parent as social media "user" and "parent." Through an examination of parents' personal experiences online via focus groups and in-depth interviews, and collection of data involving parent's use of social media, I seek to better understand the conflicting internal relationship between parenting and participation. In turn, I expect to find results that portray discrepancies between these various roles while contributing vital information to studies of social media use from the perspective of parents.

Megan Carlson

Technological Distraction on Driving Performance: Security Attachment Priming

Mentor(s): Omri Gillath

The use of mobile phones has increased drastically in industrialized countries during the last decade (Billieux, 2012). Mobile phones enhance our ability to communicate with one another and provide efficient ways of staying connected with our social circles. Previous research have however shown that mobile phone use is associated with dangerous and antisocial behaviors as well as with symptoms of uncontrolled use and dependence (addiction; REF). One of the dangerous behaviors associated with mobile phone use is texting while driving. A recent meta-analysis (Caird et al., 2014) showed that drivers who exhibited prolonged and frequent glances away from the road, had slower responses to hazards, were involved in a higher number of crashes and did not control their vehicles within the lane as accurately as compared to when they were not texting. Despite the clear findings regarding the dangers involved in texting while driving, people continue to engage in such behaviors (Nemme & White, 2010). It is therefore crucial to identify the underlying mechanisms of technological distraction and find interventions to reduce this type of risky behavior. Past research found associations between a sense of attachment insecurity (a tendency to be worried about rejection and abandonment) inattention and risky driving (Gillath et al., 2018). It is hypothesized that participants primed with secure attachment primes will be less likely to engage in risky behaviors as compared to controls. Half of the participants will be primed with both subliminal and supraliminal security primes whereas the other half will be exposed to neutral primes. They will then be asked to complete a series of surveys and driving simulations. Tendency to look and engage with the phone, and driving violations and accident will be used as DVs.

Stephanie Carvalho, Paloma Infante, Riley Beveridge-Calvin

The Developmental Function of Music for Preschoolers Ages 3 to 5

Mentor(s): Deanna Hanson-Abromeit & Katie Martin

Research about typical developmental expectations is abundant. Literature on music development is available for children, but is limited in its scope across the lifespan. Music therapy students preparing for a career in the delivery of music interventions must be equipped with a strong foundation in developmental capabilities of music with people and how music is integrated with other developmental domains (e.g. motor, cognitive, emotional). There are currently no known comprehensive resources that combine typical developmental expectations across the lifespan with music development expectations. Thus, the purpose of this research project is to develop a theoretical framework for how music functions to support development for preschoolers 3-5 years of age.

We will use developmental milestones, neurologic foundations and uses of music for people who are preschoolers 3-5 years of age. This information will be organized by music characteristics (e.g. rhythm, melody, dynamics) to provide a rationale for how music elements relate to typical development. This information will then be applied to pre-composed music appropriate for the different age ranges and we will assess how well pre-composed music represents the theoretical rationale we identify.

This project is part of a course-based research experience in MEMT 250 Human Development and Music Learning Across the Lifespan. The project is partially supported by a Graduate Research Consultant from the Center for Undergraduate Research.

Cienna Cashman

The Lived Experiences of Anti-Fat Prejudice

Mentor(s): Ivery Goldstein

Research about prejudice and the significantly negative effects it can have on people has existed for many years. Over the past two decades, a field of research examining anti-fat prejudice has emerged. This is still a fairly new area of research, meaning that mainly, research has to do with understanding if anti-fat prejudice is a significant issue, and how it functions in our society. Despite the understanding that anti-fat prejudice is an issue, the lived experiences of fat people have been largely ignored. This project seeks to empower and spread these voices in order to expand understandings of the experience of being discriminated against because of one's weight or body type. This project also seeks to understand what some of the long-term outcomes of experiencing this prejudice are, such as negative mental health effects or difficulty in the professional world. In order to give voice to the lived experiences of prejudice that fat people have experienced, an online survey was conducted which asked a number of questions about participants' experiences with a variety of kinds of anti-fat prejudice or discrimination. Questions covered many subjects, including but not limited to childhood bullying, relationships, jobs and careers, interpersonal discrimination, and mental health issues. The implications for this research are significant, because little to no research of this kind has been performed. Unlike other research about anti-fat prejudice, this project will provide concrete evidence related to the lived experiences of prejudice and discrimination among fat people.

Ali Ciersdorff

fMRI Connectome: Reexamining the correlations between attachment and brain functioning and structure

Mentor(s): Omri Gillath

Previous studies on the neural underpinnings of attachment style have used small samples and failed to provide consistent results. The goal of the current project is to solve these limitations by using a large database of brain images to reexamine the correlations between individuals' levels of attachment anxiety and avoidance and their brain structure and functioning. To achieve this, I created a measure assessing attachment style that could be used within the fMRI connectome project database. Currently there is no measure to assess attachment in that database. In study 1, I identified items that could be used to assess attachment from existing questionnaires within the database, then compared the scores from 300 participants on these items with their scores on a well-studied attachment measure the Experiences in Close Relationships (ECR, Brennan et al., 1998). In studies 2 and 3, I used the measure created in study 1 and two new samples of $n = 150$ to run an exploratory factor analysis, followed by a confirmatory factor analysis. My hypotheses include: (1) insecure individuals will have lower cell density (less volume) in the hippocampus; (2) anxiously attached individuals will show higher activation in limbic areas (e.g., ATP, hippocampus, amygdala, dorsal anterior cingulate cortex) and less activation in control regions (e.g., orbitofrontal cortex in the PFC); (3) avoidant individuals will show higher activation in the subcallosal cortex (SCC). The results of the studies will reveal possible correlations between attachment style and brain structure and functioning, and the neural underpinnings of close relationships.

Muhammed Ciftci

Assessing Allosteric Regulation of Glycogen Phosphorylase by Dextrose

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase (GP) is an enzyme that cleaves glucose residues of a glycogen chain to produce glucose 1-phosphate. Glycogen is the main storage form of glucose in animal cells. It is characterized by chains of glucose residues linked by $\alpha(1-4)$ glycosidic bonds, which branch occasionally through $\alpha(1-6)$ glycosidic bonds. Glycogen Phosphorylase activity is regulated by glucose levels in the cell. During normal glucose concentrations, Glycogen Phosphorylase is in the inactive b state (GPb). Lowered glucose concentrations trigger the active a state (GP_a). In addition to glucose, the state of Glycogen Phosphorylase is regulated by many allosteric effectors, one example being the positive effector adenosine monophosphate. In this study we examine the role of dextrose as a regulator. Studies suggest that dextrose is a negative effector of glycogen phosphorylase. To examine the effect of dextrose, we assayed the rate of the reaction at increasing dextrose concentrations ranging from 0mM to 10mM. Michaelis-Menten kinematics were used to examine the results which provided evidence suggesting dextrose is a negative effector of glycogen phosphorylase.

Chris Clark

Galactose's Kinetic Effects on Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Most animals use glycogen as an energy storage mechanism. Branched chains of glucose (called glycogen) are made when glucose is abundant in the organism. Those chains are broken down when glucose is scarce in the organism. Both of these processes are facilitated by specific enzymes: glycogen synthase to build glycogen, glycogen phosphorylase to break glucose from the chains. This process is prevalent in many organisms, so understanding the molecular interactions between these enzymes and other molecules commonly found in the same biological systems helps illuminate the nature of these enzymes. In this experiment we observed the effects of galactose on glycogen phosphorylase activity. This was accomplished by assaying the activity of glycogen phosphorylase in reverse (glucose-1-phosphate \gg elongated glycogen + inorganic phosphate) at varying concentrations of galactose. Glycogen phosphorylase activity was higher in the presence of galactose than in the absence of galactose, suggesting some sort of activating effect. The activating effect did not scale directly, as an increase in galactose concentration did not always result in an increase in glycogen phosphorylase activity. These results can be combined with knowledge of glycogen phosphorylase environment to suggest reasons for the enzyme's directional disposition and interactions.

Chris Clark, Brooke Wietharn & Chase Charles

Music and Test Performance

Mentor(s): Victor Gonzalez

Many students use music as a study aid to block out surrounding noise and to focus, but the use of music could have adverse effects on academic performance. We are testing the effects of auditory stimulus on test performance through the use of two miniature generic math exams. Participants received one of the two exams and were given two minutes to complete as many problems as they could. After receiving a brief "cool down" survey, the participants completed the second test in two minutes. The order of tests taken and the addition of an instrumental music clip were set in a randomized fashion. Accuracy and level of completion for each participant were noted. Our research was conducted to test our hypothesis, which states that auditory stimulus alters test performance. Our research proved our hypothesis correct.

Sarah Cluff

Reconstruction of Science and Technology after Reunification in Germany

Mentor(s): Ari Linden

The fall of the Berlin Wall in 1989 had a lasting impact on German culture, politics, and legislation, and it raised questions of how a nation should begin to deal with merging funds and resources. This was a multifaceted issue that influenced even the most “German” parts of the culture/economy: science and technology. In fact, merging science and technology industries and educational systems from East and West Germany was handled much like the merging of two large companies; compromises had to be made, and many researchers from East Germany did not meet the West German standard. Several large organizations, such as the German Science Council, were selected to review research conducted in East German institutes, whose scientists, in turn, believed these organizations to be arrogant. However, West Germans were given the task of evaluating institutes that, for 40 years were cut off from international collaboration, which, in research, is vital for progress and the exchange of scientific ideas. This task required decentralizing many organizations while preserving and respecting the history of East German institutes and scientific foundations, and required the help of other countries, such as the US. My project explores precisely how merging the fields of science and development after reunification was only achieved through the sacrifice of scientific positions and organizations in the former East and required assistance from other countries. It furthermore examines how this process has had a lasting impact on the German economy and the notorious German science and technology standard.

Sarah Cluff

A Study of Phylogeography and population structure in giant honey bees, *Apis dorsata* and *Apis laboriosa*

Mentor(s): Deborah Smith

There are two known species of giant honey bee: *Apis dorsata* and *Apis laboriosa*. These are not only the largest honey bees, measuring at around 1.8 cm in body length, but they are also the only honey bees that migrate annually. *Apis dorsata* is distributed across tropical and subtropical Asia and migrates laterally, up to 200 km, on an annual basis depending on nectar supply. *Apis laboriosa* has a smaller range and is concentrated in the Himalayas and other mountain ranges in southern Asia. These bees also migrate, but in altitude as opposed to wide-range migration, occupying lowlands in the winter and highlands in the summer. Giant honey bees are particularly important to study, because deforestation of the Asian tropics poses a major threat to the giant honey bee, as it significantly disrupts the migration track of these pollinators. The objective of this study is to determine how migration affects the population structure of these two species. Bees that migrate far distances will most likely mix more with other populations and have more variation in their mitochondrial as well as nuclear DNA. Since mitochondrial DNA is maternally inherited from the queen bee's egg, this DNA will provide information about queen bee lineage. Female-mediated gene flow is predicted to be high in *Apis dorsata* and lower in *Apis laboriosa* because queen bees do not migrate far distances in vertical migration. Studying these trends of genetic similarity or dissimilarity will provide a clearer image as to how nest aggregations migrate to different locations.

Jessica Cohen

How the Russian Media Covers the LGBT Human Rights Issue in Chechnya

Mentor(s): Brian Lagotte

As the discrimination grows against the LGBT community in Russia, the media coverage tends to disappear and look the other direction. The project will examine how the current environment of the media in Russia frames LGBT issues specifically in Chechnya and if the media covers the topic at all in order to determine if there are restrictions in place and how this impacts a journalist's ability to accurately report. Authoritarian Media Theory will be the best theory for the paper because the theory explores the media environment in direct relation with people of power and how important information lacks overall coverage in the media as a result. To conduct the research, collection of product data will take place by way of personal interviews and in depth research online of personal blogs belonging to members of the LGBT community in Russia. Thematic coding and analysis of official government documents of Russia are two additional methods used to supplement the research and organize the findings. The research will hopefully shed light on the media practices in Russia and how the restriction affects the LGBT community along with the consequences for the journalists trying to speak the truth. The research offers answers for understanding why there is a lack of media coverage over human rights issues, specifically LGBT issues in Chechnya.

Maisie Conrad

Using EEG data to further investigate the dual process of attention among avoidantly-attached individuals

Mentor(s): Omri Gillath

Attachment style – the way people feel, think, and behave in relationships – is known to be associated with cognitive processes such as attention to cues, specifically threatening cues. Those who are avoidantly attached tend to avoid intimacy and suppress relationship-related emotions; they also show a distinct bias away from emotional or threatening cues. According to Niedenthal, Brauer, Robin, and Innes-Ker (2002) dual process model, avoidant individuals are first hypervigilant to threatening cues, and then very quickly shift that attention away. It is still unclear, however, how avoidant individuals can engage with the model or why it fails under increased distraction (cognitive load; Mikulincer, Dolev, & Shaver, 2004). In the current study, I will utilize ERPs, EEG asymmetry, and an x task to identify the neural mechanisms underlying avoidants' responses to threatening emotional stimuli. Using brain imaging will allow me to clarify the early processing of emotional threats to a finer degree than previous studies, and provide further insight on the avoidant attachment dual process model.

Bailey Coolidge

“Are You Sexually Active?”: The Conceptualizations of Temporality in Answering This Question

Mentor(s): Charlene Muehlenhard

When college students get medical exams, they are typically asked, “Are you sexually active?” The medical professionals’ goal is to get information that could influence discussions about contraception and safe sex. However, this question lacks specificity regarding type of behavior and time. Patients need to decide (a) what sexual activities would make them “sexually active” and (b) what timeframe they should use. Regarding behaviors, college students have varied opinions about what behaviors count as “having sex”; they might also have varied opinions about what behaviors count as being sexually active. Regarding the timeframe, the question, “Are you sexually active?” is worded in the present tense, but patients are not engaging in sexual activity while in the physician’s office. Do they interpret this question as including anything in their history, or in the last month, or in the past year? Do they consider their expectations about sexual activity in the near future? The results of this research could help professionals clarify likely sources of miscommunication between medical professionals and patients.

Riley Cooney, Melissa Clemens, Richard Parra, Bret Bergmeier, Daniel Hughes & Alisha Echavarria

KU Edwards Campus Bike Plan

Mentor(s): Mark Jakubauskas & Morgan Okeson

Bicycles are a means of transport that can get commuters to their destinations in a timely manner; however, many obstacles prevent the average commuter from relying on bicycles as a primary mode of transportation. The areas around and between the University of Kansas-Edwards Campus and Johnson County Community College (JCCC) could greatly benefit from an increase in cyclists. Many students attend classes at both campuses and are forced to either walk the mile-long distance, wait on public transportation, or use their personal vehicle to get between campuses. We plan to collect survey data from commuters from both campuses to gather information on the demand for improved bicycle accessibility. We will then utilize this data to form a three-tier plan to implement improved bike infrastructure, including bike racks, maintenance stations, appropriate signage. Additionally, we will propose a plan for implementation of a bike share program. A shift toward reliance on biking as a primary means of transport could help this community transition toward sustainability. Additionally, increasing bike usage could improve the overall experience of attending these two small campuses. The commute between the Edwards Campus and JCCC can be drastically improved if a community-wide acceptance of biking takes place.

Tyler Corbett

Kinetics Assay of Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase b converts glycogen and glucose into a glycogen chain that is one glucose unit larger and inorganic phosphate. The maximum velocity of glycogen phosphorylase can be increased or decreased by adding effectors to the solution. Such effectors are deemed activators or inhibitors respectively. A few such effectors are, AMP, Niacin, and caffeine. Determining how much the concentration of an effector, such as Niacin, influences the V_{max} can be a challenge to uncover. To study the influence on Niacin on the V_{max} of Glycogen Phosphorylase, we used a protocol that measured absorbance of inorganic Phosphate mixed with molybdate. By adding Niacin to the reaction in varying concentrations during each assay the impact of Niacin on the V_{max} can be determined. With the increase of Niacin concentration during the experiment the V_{max} increased a relatively small amount. The collected data for Niacin suggests it is a positive effector, however Niacin is a known inhibitor thus, time should be spent evaluating the lab protocol and lab techniques to assess what may have gone wrong.

Caleb Correll

Blood on the Plow: Extremist Group Activity During the 1980s Farm Crisis in Kansas

Mentor(s): David Farber

Farmers in the Great Plains states in the 1980s faced an economic downturn of epic proportions, unseen since the Great Depression. Kansas farmers felt the brunt of the 1980s farm debt crisis with record numbers of farm foreclosures. Out-of-state far-right extremist groups used the 1980s farm debt crisis to spread their ideology to rural Kansans and primarily, financially distressed farmers. These extremist groups fused traditional agrarian populism with emerging white nationalist ideologies and conspiracy theories to give an outlet to rural Kansans who felt left behind economically and politically amid an economic crisis. The numbers of Kansans who joined these far-right extremist groups were small and made little impact on saving family farms. However, violent threats and incidents and the groups' ability to spread extremist rhetoric through new technologies of easily reproducible media such as video and audio cassettes gave Kansas law enforcement officials much cause for concern in the 1980s. The rise of an anti-corporate, anti-government conservative strain of populism from these extremist groups in the 1980s farm crisis marked the beginning of a new political order in Kansas.

Adrienne Cox

The Qipao: How a Manchu Dress Became Chinese

Mentor(s): Professor Megan Greene

This historical project explores social movements within Republican Era China (approx. 1910s-1940s) through the lens of women's fashion, specifically the qipao or cheongsam. By analyzing primary and secondary sources, I place the qipao—known today as the traditional ethnic dress of Chinese women—into the wider social context of the early 20th century and research how the garment transformed over time and how various social and political movements within China led the qipao to be internationally recognized as a marker of Chinese identity, despite strong anti-Manchu sentiments among the Chinese people. I argue that the modern qipao is not in fact a purely Manchu garment, but rather a culmination of many different stylistic influences, including Manchu, Han, and Western European fashion culture, and the stylistic changes in the garment followed social and political movements that were occurring within China during this time period. By using the qipao as the guiding feature of research of this time period, one can better understand the various mediums used to build an outwardly expressed Chinese identity, as well as how social movements in this time period interacted and built on each other in this period of social and political chaos.

Isabel Das

Museum of Sustainable Agriculture

Mentor(s): Kapila Silva

Agriculture has immense impact in the daily life of society; beyond the simple task of providing food, the agricultural industry has deep seeded roots in the formation of modern culture. As one of the largest producers of grain and cattle, Dallas is the perfect candidate for a deeper exploration of how agriculture has evolved towards more sustainable practices. At the core of sustainable agriculture is a reversion to traditional, pre-industrial practices, improved utilization of water and sunlight, variability of spatial function, and increased unification of livestock and crop production. With these key goals in mind, the museum becomes a center for education on sustainable agriculture and an embodiment of the sustainable techniques through spatial relations, programming, materiality, and sustainable technology. Located near the heart of the arts district of Dallas, an opportunity presented itself to extend a pedestrian sculpture garden as a catalyst for expansion of the popular arts district. Four main silo-like structures serve as the anchor points to create a familiar experience that connects back to a vernacular silo structure. These silos are deconstructed in the same manor that sustainable architecture seeks to break down the unsustainable practices of industrial agriculture. The gallery topics range from the history of agricultural practice to examples of hydroponic crop production and sun study spaces. Furthermore, the museum embodies the sustainable topics through the photovoltaic roof structure that also serves to collect rainwater.

Julia Davis

Quality of Life Parameters for Three Medically Complex Infants in the Neonatal Intensive Care Unit

Mentor(s): Deanna Hanson-Abromeit

Quality of life (QOL) is an outcome measure commonly used in medical settings. While the definition of QOL is fluid, it is commonly a multidimensional, subjective, and context-based evaluation of a person's wellbeing. The purpose of this study is to operationally define the constructs of QOL for infants and evaluate the QOL of three medically complex hospitalized infants receiving music therapy across four weeks of NICU hospitalization. This study is part of a larger music intervention study. The first phase of this study operationally defined QOL constructs for infants, established criteria for coding QOL in infants, and created a measurement tool for coding data. In the second phase, a subset of the existing data set of videos of three medically complex infants in the NICU receiving Music-Based Developmental Stimulation (MBDS) will be analyzed to determine QOL within the context of the music intervention across four weeks of hospitalization. Nonparametric statistics (e.g., Chi Square) will be used to analyze changes in QOL scores to determine if MBDS influences the infants' QOL. Dissemination of this study will influence the clinical practice of NICU professionals (e.g., music therapists, nurses) working with medically complex infants and provide a tool which can assess the QOL parameters of hospitalized medically complex infants. The data collection tool developed as part of this study also has the potential to impact other populations that cannot be assessed through self-report, such as people with significant intellectual disabilities or language delays.

Benjamin Deatherage

Allosteric Inhibition of Glycogen Phosphorylase B by D- (+)-Galactose

Mentor(s): Roberto De Guzman

The enzyme glycogen phosphorylase plays an important role in energy metabolism in the cell, catalyzing the cleavage of glycogen into glucose-1-phosphate. The allosteric regulation of glycogen phosphorylase, achieved through phosphorylation of the enzyme, has been suggested as a possible treatment for many medical conditions, including type 2 diabetes mellitus¹. Unfortunately, not much is known about the allosteric regulation of glycogen phosphorylase b by epimers of glucose such as D- (+)-galactose. To determine the regulatory possibilities of D- (+) – galactose on glycogen phosphorylase b, an assay of D- (+)- galactose and varying concentrations of glucose-1-phosphate was performed, using molybdate and the inorganic phosphate produced by the reaction to yield a colored product. The absorbance of this product was measured to show changes in reaction progress with varying concentrations of D- (+)-galactose and substrate. Absorbance comparisons of the different concentrations show increased concentrations of D- (+)-galactose resulted in decreased absorbances, indicating that the reactions with more galactose yielded less inorganic phosphate. As the increased concentration of the effector galactose slows the reaction, glycogen phosphorylase b is indeed inhibited by D- (+)-galactose. This result is significant as it shows D- (+) - galactose should be further studied as an inhibitor of glycogen phosphorylase b.

Saron Demeke

Does information about learning strategies change students' motivation?

Mentor(s): Marsha McCartney

Achievement goal theory addresses the goal setting behaviors of students and seeks to understand how different types of goal orientations affect performance and other motivational outcomes. The theory is defined by two types of achievement goal orientations, or mindsets: mastery and performance goals. Mastery goals describe students who are motivated by an internal desire to master the task and develop competence. Performance-oriented students are more normatively motivated than mastery students and want to outcompete peers. Previous research found that mastery goals correlated significantly with positive outcomes, including higher grades, increased interest, and improved use of cognitive and metacognitive strategies. Most studies have used self-report questionnaires to investigate how goal orientations relate to performance outcomes without employing any interventional practices to see whether students' goal orientations could be changed. The current study expanded upon past research by administering achievement goal (AGQ-R) and motivational strategies (MSLQ) questionnaires before and after a series of five mini-lectures and activities that informed students about common learning strategies: goal-setting, active reading, distributed practice, in-class strategies, and metacognitive strategies. This study investigates whether the mini-lectures predict students' goal orientations and motivational outcomes. The AGQ-R and MSLQ were administered one week before the lectures begin, immediately after the conclusion of the lectures, and once more near the end of the semester. The participants (N=75) are undergraduate students at a large Midwestern university.

Joseph Denning

Drop the base: Omission MMN sensitivity to morphological status, predictability, and their interaction

Mentor(s): Robert Fiorentino

Using electroencephalography (EEG), the dynamics of processing in the brain can be recorded. The mismatch negativity (MMN), is particularly useful with respect to sound processing in the brain. In the MMN paradigm, a stimulus (the standard) is presented many times followed by a rare stimulus (the deviant) presented only once. In the past, researchers have consistently demonstrated that the MMN is sensitive to basic sound differences (i.e., the MMN is robust when the standard and deviant are different speech sounds, such as ba and da). It is, however, a matter of current debate whether the MMN is sensitive to higher level language properties. Previous research has also suggested that the MMN may be sensitive to predictability, but it is unknown what components of speech can be used to predict. Uniting these two lines of research, we plan to test whether the MMN is sensitive to morphemes and whether these morphemes are used to predict.

Dylan Dennis

The Museum of Sustainable Urbanism

Mentor(s): Kapila Silva

The definition of what it means to develop a sustainable urban setting is important in how we live as humans in regard to the preservation of the earth and quality of life. Within urban settings that have not been developed in a thoughtful way, there is often a few important things that have been neglected in relation to thinking about the pedestrian and the types of experiences that are essential to urban life. Urban spaces should be dense, have a variety of mixed-use spaces, compact and walkable, well-connected, quality architecture and urban design, and multiple ways of transportation that does not harm the environment. The Museum of Sustainable Urbanism seeks to be a great example of developing the urban ecosystem in a thoughtful way. The site selected for the museum is the unused space over a highway in Dallas, TX, to make a statement on sustainable urbanism in mitigating problems of highway designs in terms of maintaining high building density, maximum use of land, and reducing air and noise pollution. The journey through the museum starts on the first floor that acts as an extension of the park across the street. The whole ground floor is devoted to catering to the public and giving people something to participate in through the café and a series of three atrium spaces used as public display cases. As one moves through the museum, they come to gallery floors that revolve around the same atria that now house a set of vertical stacked garden spaces to give the public a strong connection to nature in the vastly urban environment. Moving to the top two floors of the building, the same atria are used as a classroom, a conference room as well as a garden space for the administrative staff to experience nature. The focus of the museum is the atrium spaces that serve several different functions as you move throughout the building. They aim to be mixed-use, dense, and connected to nature in order to drive home the point of developing urban environments in a thoughtful, sustainable manner, thinking about the pedestrian in a deeper way. The whole building is supported by a steel diagrid exoskeleton structure.

Hannah DePriest

Development of a Process Measure to Evaluate a Music Intervention for Infants with Neonatal Abstinence Syndrome

Mentor(s): Deanna Hanson-Abromeit

Background: Neonatal abstinence syndrome (NAS) occurs in newborns exposed to drugs in utero and is of concern. Primary treatment is pharmacological, but non-pharmacological interventions are also desired. There are no known non-pharmacological music interventions specifically targeting NAS symptoms in the neonate. Additionally, no measurement tool exists to evaluate effectiveness of a music intervention in relationship to NAS symptoms. Process measures evaluate characteristics of the intervention that may or may not be related to the outcome, contributing important information for the development of a measurement tool. The purpose of this study is to develop a process measurement tool to evaluate aspects of a music intervention designed to decrease symptoms of NAS in hospitalized infants for use in future research.

Method: Stage 1 is the development of the documentation tool based on review of the existing literature, Finnegan Scoring Tool (standard assessment for NAS) and Goal Attainment Scale (GAS) to evaluate infant complexity and withdrawal symptoms. Stage 2 will field test the tool and assess content validity using a panel of neonatal experts.

Outcomes: This tool captures dosages of morphine or phenobarbital, infant cry behaviors, other NAS symptoms and music intervention components. Monitoring the relationship of intervention characteristics simultaneously with the infants' symptoms and behavioral responses will contribute to a deeper understanding of the aspects of music intervention related and unrelated to the outcome and function to support music intervention development.

Deanna Diaz

Utilizing Fluorescent Soluble Antigen Arrays for B Cell Detection

Mentor(s): Cory Berkland

Autoimmune diseases affect a large population and can alter quality of life significantly. A biomaterial which immunologically mimics the brain has the unique potential to selectively capture and amplify immune cells that are otherwise too discrete to detect in the blood of multiple sclerosis (MS) patients. By culturing immune cells with this biomaterial, T and B cells that are specific to MS are amplified. MHC (major histocompatibility complex)-tetramers can be used to identify antigen-specific T cells. However, identifying antigen-specific B cells has proven to be difficult and costly. Here, we repurpose soluble antigen arrays (SAGAs) by harnessing their ability to target autoreactive B cells via fluorescent labeling. SAGA was synthesized by conjugating ten model autoantigen epitopes (PLP139-151) and a single FITC fluorophore to a 16 kD hyaluronic acid backbone using click chemistry. Various SAGA concentrations were titrated into mouse splenocytes to evaluate the optimal specificity for flow cytometry. Other optimization experiments were performed to determine storage conditions and titration methods. Results show that SAGA is an effective labeling method for antigen-specific B cells for flow cytometry in murine populations. For short term storage, SAGAs are most stable at -20 C. SAGAs are a more cost effective and promising research tool for analyzing antigen-specific B cells.

Phuong Dinh

Will Methylglyoxal have any bacterial resistance as Ampicillin and Streptomycin?

Mentor(s): Randall Logan & Jack Trembl

Antibiotic resistance is an increasing crisis and many antibiotic drugs fail to fight infectious diseases. Honey has been used as food, sweetener, and medicinal purposes in ancient time. Today, honey is considered as an alternative treatment to replace antibiotics in treating wound infection. Honey has a high osmolarity and saturated sugar solution that can inhibit the growth of microorganisms. Methylglyoxal (MG) found in Manuka honey has known for its antimicrobial properties and is a potential compound to combat against the bacterial resistance. When glucose is available, MG is made to living cells in the human body, animals, and plants. MG can also be found in all kinds of honey with a small concentration. Manuka honey is well known for its antimicrobial properties and have the amount of 38 mg to 725 mg/kg MG. This research is designed to test the sensitivity of the bacteria at different concentrations of MG. Kirby-Bauer method is applied to observe the sensitivity of bacteria and to study whether MG has bacterial resistance. The microbial cell viability assay is designed to measure the viability of bacterial cells after being exposed to MG. The compound is then tested with Hela cells for toxicity. Tetracycline and Amoxicillin are also used in the drug test for comparing the potent between the antibiotics and the Manuka honey's compound, MG. Through the cell viability test, it is confirmed that the MG has the anti-bacterial effects.

James Dooley

Track Recommendations and their Impact on Immigrant Students in Germany

Mentor(s): Ari Linden

My research paper deals with the primary school system in Germany and examines whether the stratification that occurs at the transition from elementary school to secondary unfairly disadvantages students who come from immigrant backgrounds. Students entering one of the four secondary schools rely heavily on the recommendations from their primary school teachers, which are binding and determine their academic future, with options to switch schools after entering being very limited. These track recommendations have far reaching consequences for students, as it is very unlikely for a student to enter university if they do not go to Gymnasium, the highest school track. Research has suggested that students who are first-generation immigrants suffer from the language barrier, lower socio-economic backgrounds, lower expectations for school performance from both teachers and parents, discrimination from teachers, and, finally, mental trauma in the case of refugees. These factors result in much lower rates among immigrant students who receive track recommendations to Gymnasium relative to their German-born counterparts, which, in turn, limits their ability to attend a university, enter the professional or managerial work force, and earn a high salary. My research/presentation argues that more efforts need to be made to integrate these students by offering extra German language sessions and by giving students who show promise but underperform in class more opportunities to enter Gymnasium as well as more opportunities to switch school tracks for those showing potential. If no efforts are made to offer more opportunities to these students they will continue to struggle, and the gap between German students and immigrant students will continue to widen. This issue is especially urgent given the exceptionally high number of immigrants who have entered the German system since the refugee crisis began in 2015.

Connor Dougan

PERIOD, Period: Student Analysis of the Effectiveness of The University of Kansas's and PERIOD's Free Menstrual Products on Campus

Mentor(s): Ivery Goldstein

The research project examines the student perspective of providing free menstrual products on campus and evaluates the effectiveness of the PERIOD program partnership, a non-profit 501(c)(3) with a mission to instate menstrual care as a basic right and to end period poverty across the United States. Although PERIOD seeks to provide free menstrual products in restrooms, as well as avenues for future funding, a cost is still associated with providing menstrual products. With more than 28,000 enrolled students at The University of Kansas (KU), the price tag of providing menstrual products to students, staff, faculty, and guests, is likely a staggering number, especially when compared to announced university budget cuts. The research seeks to provide qualitative and quantitative analysis to continue the program at KU while providing survey data and structure that can be used to replicate the project at differing US institutions to understand campus culture surrounding menstruation. As limited research on the effectiveness of providing free menstrual products has been done within the US, specifically in the Midwest and Kansas, the pilot research data aids to help in the implementation of similar programs across the US. As KU, specifically Student Affairs, students aligned with former student senate coalition Rise KU, and Watkins Health Services, are fully funding a pilot program with PERIOD for the Spring 2019 semester, continued evaluation the effectiveness, as well as possible continuation and or expansion, of the program will continue at the administrative level as the semester ends.

Abigail Driggers & Emily Doffing

The Relationship Between Negative Affect and Predicted Utilization of High Intensity Interval Training

Mentor(s): Stephen Ilardi

An efficacious, low cost treatment for major depressive disorder (MDD) is regular engagement in physical activity. One reported predictor for future utilization of an exercise regimen is change in negative affect (NA) following engagement in the activity. This study examined the relationship between changes in NA in response to a relatively new modality of exercise, high intensity interval training (HIIT), and the desire to continue utilizing this exercise in the future. A sample of undergraduates (N =29) with elevated depression symptomatology (Beck Depression Inventory II >10) were recruited from introductory psychology courses. Participants were administered the Positive Affect and Negative Affect Scale before and after engaging in a 16-minute HIIT protocol. The HIIT protocol consisted of 8 x 1 minute periods of high intensity exercise interspersed with 1-minute periods of rest. Change in negative affect (negative affect score after exercise minus negative affect score before exercise) was significantly correlated to predicted number of days the participant stated they would engage in this HIIT protocol, $r(27) = -.38, p = .04$. These results suggest that the greater the increase in negative affect an individual experiences from a HIIT protocol, the fewer days they predict they will utilize this exercise modality. This provides the possibility that interventions which attenuate NA changes (e.g. mindfulness meditation) can potentially increase HIIT utilization in individuals with elevated depression symptomatology.

Niko Drosos

Effects of Aspirin on Glycogen Phosphorylase Kinetics

Mentor(s): Robert De Guzman

Glycogen phosphorylase is the enzyme responsible for the catabolism of glycogen into monomeric glucose 1-phosphate units. To catabolize glycogen at rates required by the organism, glycogen phosphorylase is highly regulated via phosphorylation and allosteric regulation. Glycogen phosphorylase activity is known to be promoted or inhibited by a variety of molecules. However, the effects of aspirin on glycogen phosphorylase have not been well studied. To elucidate the effects of aspirin on glycogen phosphorylase activity, a spectroscopic method was used to analyze the glycogen phosphorylase-catalyzed reaction in the direction of glycogen synthesis. Varying concentrations (0-400mM) of the ligand glucose 1-phosphate (G-1-P) were used, and inorganic phosphate (Pi) formation was measured and used to determine reaction velocity. Michaelis-Menten curves and key values of the curves were generated to compare enzyme activity at different aspirin concentrations.

Ryan DSilva

Glycogen Phosphorylase b Function in the Presence of Galactose Inhibition

Mentor(s): Roberto De Guzman

In the eukaryotic cell, glycogen phosphorylase b (GPb) catalyzes the release of glucose, in the form of glucose-1-phosphate from glycogen. As will most enzymatic reactions there are many forms of regulation in both the eukaryotic cell and in vitro examples. In this examination, we are investigating the effects of adenosine monophosphate and galactose on the functionality of GPb. To see the effects of adenosine monophosphate and galactose varying concentrations of each inhibitor was allowed to react with varying concentrations of glucose-1-phosphate with a color dye that changes with inorganic phosphate concentration. From these experiments, Michaelis Menten graphs were created and showed inhibition similar to other Michaelis Menten inhibitors. The significance of this data is a deeper understanding of the glycogen phosphorylase b enzyme and it's type of regulation by structure of the regulators.

Marissa Duckett

Microbiology and Mineralogy: Investigation of the relationship between microbiome and surrounding sediment

Mentor(s): Jennifer Roberts & Bryan Rodriguez-Colon

This project is an exploratory study in geomicrobiology, focusing on genetic and physiologic diversity in microbial mats obtained from the abandoned salterns in southwestern Puerto Rico. These mats are associated with mineralization processes, such as the formation of aragonite and calcite, that can lead to preservation of microbial features used by geologists to interpret ancient life and paleoenvironments. First, mats were divided into four, visibly different layers, extracted, and the community composition of each layer was characterized using by amplifying 16S and 18S gene regions and finally performing Illumina targeted gene sequencing on the amplicons. In parallel, the layers were grown in type-specific media to specific for aerobic and anaerobic physiologic types to discern metabolic diversity. These data will be compared with geochemical data of the aqueous phase to elucidate metabolic processes that are active in the saltern. This work will be expanded in the future to include additional analyses of sample locations within this saltern as well as adjacent salterns that exhibit different mat morphology. The results of this study could be used to further elucidate carbonate mineralization and fossilization processes, climate change, and the spread of infectious disease.

Jennifer Duepner & Sunayna Pillay

Relationship between Self-Reported Attractiveness and Sexual Partner Preference

Mentor(s): Gillath

According to evolutionary psychology, indexes of health and reproductive potential such as symmetry and hygiene help people select their mates. A previous study in our lab showed that even brief exposure to such signs affected attractiveness ratings. Thus, symmetric and hygienic targets had higher attractiveness ratings than targets that were non-symmetric or non-hygienic. Surprisingly, race of the target also affected the ratings. In the current study, we will further examine the role played by race of target and race of rater. We will also examine the associations between self-reported attractiveness, attachment style, and life history indexes and potential partner's attractiveness. To do that, we will collect a large data set consisting of both black and white participants. We predict that participants will be attracted to other's who are similar to them on their attraction (i.e., highly attractive participants will be attracted to highly attractive targets). We also predict that attachment insecurity, and mainly avoidance will be attracted to more targets regardless of their attractiveness reflecting preference for short-term sexual strategies. Likewise, people who develop in stable surroundings will be less selective in their mate choices (i.e., rate more targets as attractive). Finally, we predict that race of the rater will affect attractiveness ratings, such that white participants will be more selective in general, and exhibit harsher ratings of black targets.

Tyler Duggan

Sustainability of Human Rights Museum

Mentor(s): Kapila Silva

As the world becomes more and more globalized, people are waking up to social justice issues that impact the lives of people all around the globe. In a seemingly more divisive political climate than ever, many have felt their rights have been encroached upon. The purpose of this Museum of the Sustainability of Human Rights is to make visible the effects our actions have on people in the world we all inhabit. Due to differing cultural, religious, or belief systems, many groups of people have been unfairly targeted and discriminated against. This project hopes to make these injustices felt and acknowledged as a means of uniting people together. Located in the Dallas Arts District, the museum's sculptural form suggest movement, tension and direction. The pyramidal mass of the body of the museum and the structural tension arch in front of it point in opposing directions, leaving the viewer to interpret the two opposing directions that the museum is reaching towards. It allegorically showcases the tension felt between opposing forces as they struggle to gain traction and validity in the world. The forms point into the voids of the city, representing a pull towards openness and freedom. To access the museum, one must ascend a flight of stairs or elevator to reach a suspended bridge that leads into the entrance of the museum. Entering above ground gives people a sense of empowerment, leaving them impartial as they begin their experience into the museum. As one enters the museum, they encounter a vertical void that stretches up the entire height of the museum. As visitors move through the different gallery spaces, they must cross this void that represents oppression, confinement and powerlessness. Finally, after making their way through the exhibits, visitors reach the final gallery. Designed to look like a sacred space with dramatic natural light, the final gallery breaks the cold harshness of the previous galleries, overlooking the city of Dallas in an attempt to make hope visible.

Luan Duong

Allosteric inhibition in the activity of Glycogen phosphorylase b by Dextrose

Mentor(s): Roberto De Guzman

Glycogen phosphorylase is responsible for glycogen breakdown in animals. In skeletal muscle and liver cells, it catalyzes the release of glucose from glycogen as glucose-1-phosphate using inorganic phosphate as co-reactant. The enzyme exists in two interconvertible forms and the shift is highly regulated by allosteric effect along with hormonal changes in the body and it. The goal of this project is to study the activity of glycogen phosphorylase b (the less active form predominant in resting muscle) and the down regulating effect of dextrose (D-glucose) on the enzyme. Several kinetic assays were run at different concentrations of dextrose and readings were collected using spectrophotometry. The results show maximum inhibition at 10mM and partial inhibition at 2 and 4mM of inhibitor. A couple more assays were run at wider concentration range to confirm the result and fluorescence spectroscopy was also performed to help with understanding the structure of glycogen phosphorylase. It was concluded that dextrose slows down glycogen breakdown by signaling an abundance of blood glucose, in turn increases the rate of glycogen synthesis.

Robert Edberg-Oostdik

Museum of Sustainable Social Media Interactions, Dallas, TX

Mentor(s): Kapila Silva

With the advent of the internet and online social fora for discourse comes a change in many of core contrivances that society has relied on to operate effectively. Face-to-face conversation, prompt reciprocity in speak, and valuing privacy have faded into uncivil discourse, online harassment, and fake news. A permanent catalog of everything that is said and uploaded to the internet can never be taken back. The social media is designed to generate revenue for tech companies from people's social life and create systems that reward certain behavior online. Most people do not pay attention to these adverse effects; especially today's youth whom are the largest consumers of this kind of media. This is not to say that only way to fix any emerging issues is to get rid of the internet platforms, but instead to rethink how they are used and operate. Architecture can help to refine culture in the same way that art does by creating experiences that exemplify a belief system. This museum design project is about rethinking online social interactions by positioning people in a place that causes them to think about how they use these tools. The spiral shape of the museum indicates movement inward, which leads visitors gradually over a continuous descending ramp to the center – 'the bubble'- a space that induces an introspective moment which causes the user to consider their own online conduct. Along the way to this center is a series of galleries meant to inform people about issues with social media such as misinformation, forced use, antisocial behavior, and privacy concerns. This is done by creating tight spaces which put people in a closer proximity, use of lights and multimedia projections to continuously remind people of the presence of social media. The journey through the entire building unconsciously leads people into a position that feels inescapable and forces them into spaces. This journey in the museum emulates how social media becomes the main means of communication and forces people to use it.

Grant Elias

Allosteric Effects of AMP and Dextrose on Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Found in nearly all animals, glycogen phosphorylase is an essential enzyme for the utilization of glycogen as an energy source. The important metabolic role of glycogen phosphorylase is reflected in its complex regulatory mechanisms. Phosphorylation by phosphorylase kinase converts the less active form (glycogen phosphorylase b, GPb) to the more active form (glycogen phosphorylase a, GPa). However, GPb can still catalyze glycogenolysis under favorable conditions, and it is also subject to several forms of allosteric regulation. This study aimed to identify the optimal temperature for GPb activity and to categorize its catalytic response to two known allosteric effectors: AMP and dextrose (D-glucose). This was achieved by analyzing the reverse reaction of GPb, in which glucose 1-phosphate (G1P) is converted to glycogen and inorganic phosphate (Pi). Stopping each reaction with a reagent containing molybdate allowed for spectrophotometric analysis of each sample; Pi and molybdate react to form a blue-colored complex. This assay could then test the effects of thermal inactivation, AMP, and dextrose on GPb activity. The optimal temperature for GPb was found to be near 40°C. The K_m and V_{max} of GPb remained mostly unchanged in the presence of AMP, indicating the range of [AMP] tested was insufficient to induce activation. Interestingly, dextrose demonstrated an activating effect on GPb, despite glucose's known role as an allosteric inhibitor of GPa in hepatocytes. These findings warrant further study into the allosteric regulation of glycogen phosphorylase and glucose metabolism in general.

Samantha Ellis

Interactions of Stress Level, Sleep Quality, and Alcohol Intake in University Students

Mentor(s): Nancy Hamilton

Stress Levels, Sleep Quality, and Alcohol Intake are correlated (Kenney, Lac, LaBrie, Hummer, & Pham, 2013). The purpose of this study is to explore the day to day correlations among sleep quality, alcohol intake, and stress levels in the collegiate population. These variables are measured using clinical interviews as well as both pre- and post-sleep surveys for seven days. Information collected includes; perceived stress, alcohol consumption, perceived intoxication/impairment, amount of sleep, perceived sleep quality, stressful events during week of participation, and dream/nightmare description. Understanding the relationships among these three factors, alcohol intake, stress level, and sleep quality, may help to better inform university students about the relationship between their health behaviors as well as inspire further research. Future research could expand through the creation of recommendations and interventions to affect change in students and adults.

Rachel Elting

Identifying W-Linked DNA Sequence Reads in the Butterfly, *Heliconius melpomene*

Mentor(s): James R. Walters

Sex chromosomes are distinct from the other chromosomes within a genome. In female heterogametic species, males have two Z-chromosomes, while females have a Z- and a W-chromosome. This unequal distribution of sex chromosomes means that selective pressures may cause female-specific genes to evolve on the W-chromosome.

Discovering W-linked genes is crucial if we wish to study the genetic components of sex-specific behavior and morphology. However, generating a reference genomic assembly for the W-chromosome with standard “short-read” sequencing technology has long proven difficult due to the repetitiveness of its DNA content. The recent advent of “long-read” sequencing provides great promise for overcoming these challenges. A useful first step in assembling the W-chromosome is to isolate the DNA sequences that originate from it. We aim to discover female-specific long-read sequences in the butterfly, *Heliconius melpomene*, that can be used to assemble its W-chromosome. This is accomplished by separately aligning many short-read DNA sequences from males and females to each female long-read DNA sequence. The ratio of successfully aligned male and female short-read sequences is called the Chromosome Quotient (CQ). This value predicts if the long sequence originated from the W-chromosome ($CQ \ll 1$), the Z-chromosome ($CQ = 2$), or elsewhere within the genome. Results show that the chromosome quotient method has great promise in identifying W-specific sequences in *H. melpomene*. Identification of these sequence reads is a significant step towards the future goal of assembling its W-chromosome.

Kate Englander

Glycogen Phosphorylase b Inhibition by Glucosamine

Mentor(s): Roberto De Guzman

Glucosamine is a natural compound found in the human body in the form of cartilage. Glucosamine is used pharmaceutically for pain management of inflammation caused by loss of cartilage due to osteoarthritis. Glucosamine is also an allosteric inhibitor of glycogen phosphorylase b, which releases glucose and inorganic phosphate in response to the energy needs of the cell.

It is unknown at which concentrations glucosamine's inhibition is maximal, which may affect concentrations that should be included in drugs. To study this, kinetics assays were run using different concentrations of glucosamine. From the Michaelis Menten plots, it was determined that at 2 mM and 4 mM concentrations, inhibition by glucosamine is at the maximal amount. The V_{max} was not changed significantly, however the K_m was, indicating that glucosamine is a competitive inhibitor of glycogen phosphorylase b. These results are important because they show that at concentrations of 2 mM and 4 mM in medication, glucosamine may inhibit glycogen phosphorylase b to a point where the body will not be able to release enough glucose to provide adequate energy.

William Ervin

Inhibitory Effects of Nicotinic Acid on Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman & Alex Bowman

Regulation of blood glucose concentration is essential for the maintenance of steady state equilibrium in cells. Glucose can be driven through glycolysis or stored as glycogen for future energy usage. A key component in the breakdown of glycogen, and the enzyme of study of this experiment, is glycogen phosphorylase. Glycogen phosphorylase occurs in a and b forms, the latter of which is dephosphorylated and less active. Enzyme kinetic assays were performed to test the effects of varying concentrations of nicotinic acid (vitamin B3) on glycogen phosphorylase b and the overall rate of inorganic phosphate accumulation. A kinetic assay containing varying concentrations of a known positive effector, AMP, were run with glycogen phosphorylase b to determine a Michaelis-Menten relationship. The nicotinic acid assays were run and analyzed through a Michaelis-Menten relationship to measure V_{max} and K_m values. The addition of nicotinic acid was found to increase K_m values and have no change on the overall V_{max} . Given this data, it was determined that nicotinic acid displayed negative effector qualities similar to that of a competitive inhibitor of glycogen phosphorylase b. This experiment allowed for further understanding of the effects of nicotinic acid on glycogen chains and the accumulation of inorganic phosphate. Although a correlation was determined, further investigation of inhibitory effects would need to be continued to confirm the results.

Mason Fawcett

Effects of D (+) Galactose on Glycogen Phosphorylase B Activity

Mentor(s): Roberto De Guzman

Glycogen phosphorylase is the enzyme responsible for the breakdown of glycogen to form glucose 1-phosphate. The enzyme exists in an active form (a) when phosphorylated and an inactive form (b) when dephosphorylated. Glycogen phosphorylase b catalyzes the reverse reaction of the active enzyme form, taking glucose 1-phosphate and converting it to glycogen and this was the reaction that was studied in this assay. Glycogen phosphorylase b has several known activators and inhibitors however the effects of the monosaccharide D (+) Galactose on glycogen phosphorylase b have not yet been studied. To study the possible effects, enzymatic activity was measured through kinetics assays using varying concentrations of effector. The effects of D (+) Galactose on the K_m and V_{max} for the reaction were used to determine whether the effector was an activator or an inhibitor of the enzyme. These results offer insight into the possible effects of other monosaccharides on the kinetics of glycogen phosphorylase b.

Matthew Fawcett

Germany's Path to Marriage Equality: From East to West to the European Union

Mentor(s): Ari Linden

On June 30th, 2017, Angela Merkel, German Chancellor and leader of the Christian Democratic Union (CDU) and Christian Social Union (CSU), allowed for a vote of conscience, which resulted in the legalization of same-sex marriage in Germany. This was a controversial moment, because historically the CDU/CSU had been against same-sex marriage, serving as one of the biggest obstacles impeding the movement for legalization. This historic result came 23 years after the decriminalization of homosexuality in a unified Germany. My research traces the path that eventually led to marriage equality. It first argues that the reunification of Germany and the more relaxed laws from East Germany with regard to homosexuality influenced the attitudes in West Germany, which put pressure on the CDU/CSU to allow for a vote on same-sex marriage. It then argues—building on recent trends in scholarship—that changes in the European Union, starting with the Maastricht Treaty (1992), ultimately paved the way for this result, because not only was there pressure from within Germany; there was also pressure on the world stage. My paper thus explores how laws concerning homosexuality differed in East and West Germany, and how those laws influenced legislation in post-reunification Germany. It also closely examines how policy changes within the European Union applied pressure on the CDU/CSU to finally allow for a vote on same-sex marriage.

Abria Fisher, Kena Flood & Sarah Morrill

The Developmental Function of Music for Adolescence ages 13-18 years

Mentor(s): Deanna Hanson-Abromeit & Katie Martin

Research about typical developmental expectations is abundant. Literature on music development is available for children, but is limited in its scope across the lifespan. Music therapy students preparing for a career in the delivery of music interventions must be equipped with a strong foundation in developmental capabilities of music with people and how music is integrated with other developmental domains (e.g. motor, cognitive, emotional). There are currently no known comprehensive resources that combine typical developmental expectations across the lifespan with music development expectations. Thus, the purpose of this research project is to develop a theoretical framework for how music functions to support development for adolescence.

We will use developmental milestones, neurologic foundations and uses of music for people who are adolescents. This information will be organized by music characteristics (e.g. rhythm, melody, dynamics) to provide a rationale for how music elements relate to typical development. This information will then be applied to pre-composed music appropriate for the different age ranges and we will assess how well pre-composed music represents the theoretical rationale we identify.

This project is part of a course-based research experience in MEMT 250 Human Development and Music Learning Across the Lifespan. The project is partially supported by a Graduate Research Consultant from the Center for Undergraduate Research.

Taylor Flinn

Caffeine's effect on Glycogen Phosphorylase

Mentor(s): Roberto De Guzman

Glycogen phosphorylase is a dimer that contains two identical subunits and catalyzes the hydrolysis reaction of glycogen to glucose-1-phosphate and shortens a glycogen molecule. One of the essential parts of glycogen phosphorylase is that it uses the cofactor pyridoxal phosphate. Caffeine is used to awaken and keep people alert and can be found in a wide variety of drinks and food such as coffee, pop, and chocolate, and is consumed by many daily. The problem being addressed was whether caffeine was an activator or an inhibitor on glycogen phosphorylase. It was found that caffeine was an inhibitor of glycogen phosphorylase by a series of assays. It is important to keep studying caffeine on glycogen phosphorylase to better understand caffeine's overall effect on the body.

Belinda Flores

Looking Over the Peer: an Analysis of Peer Support in Sexual Violence

Mentor(s): Ivery Goldstein

When it comes to sexual assault, reporting can be done informally and formally. Informal support includes telling a friend or family member about your experience. Formal reporting would include going to a professional about the issue. In this research I am examining the different mental reasoning that one may have concerning why they would seek out one over form of support over the other, as well as if there are any mental effects on how the survivor receives this help. As research has taken place over the differences of informal and formal support, I am focusing on the KU campus in order to be able to specify it more. I will also be adding to the conversation by applying a Women, Gender, and Sexuality Studies lens by considering what role gender might play in this as well as thinking about how formal and informal support can be combined such as in the use of support groups. I use the information that has already taken place on informal vs. formal support to form interview questions to students and faculty at KU. I conducted these interviews myself in an open interview format to gain additional insight from the interviewees that would then add to my research. The research I have collected will then be combined with what has already been researched so that I am able to influence the approach that is made with forming support systems and resources to students who have experienced sexual assault.

Max Fowler

Tumblr TERF War: Transforming Transfeminist Discourse in Online Spaces

Mentor(s): Ivery Goldstein

Feminist researchers have recently sought to understand and contextualize the effects of shifting of feminist discourse into online spaces, acknowledging the potential of these spaces in community building and knowledge sharing. Along with the emergence of numerous feminist online communities has come the identification of a new label for radical feminists who reject trans-inclusive ideologies. TERF, or Trans-Exclusionary Radical Feminist, has become a commonly used description in online feminist discourse within the last ten years. Taking into account the long history of ideological conflict between transfeminists and trans-exclusionary feminists, the focus of my research is understanding the ways in which the nature of this conflict has changed as a result of the increasing prevalence of online feminist spaces. As little work has yet acknowledged the ground-level process of identity and community building within such spaces, my focus is on the ways in which online and blogging formats value shared knowledge and group understandings and definitions created within the community. Specifically, engaging with trans-exclusive or TERF communities online is vital in understanding how to combat trans-exclusive ideologies in online feminist spaces. By participating in ground-level discourse about feminist trans-exclusion with TERF individuals and communities on Tumblr, I examine the methods of knowledge-sharing available to online feminist communities and the ways in which engaging with online discourse shifts trans-exclusionary attitudes and ideologies.

Deva Freeman

The Pink Dollar: Capitalism and LGBTQ Identity

Mentor(s): Ivery Goldstein

The LGBTQ community has a long history within the United States, and tracing how the narratives switched from negative in larger society to being used to market different products can help explain how the rise of the “pink dollar” occurs. The “pink dollar”, or the combined spending power of the LGBTQ community in the United States has seen tremendous growth in the last twenty years, as many scholars have identified. The expansion and growth of capitalism in the United States can also be seen in changing narratives of queerness and how LGBTQ relationships and interpersonal ideas of queerness are pathologized. LGBTQ Studies largely focus on the importance of representation, but feigned LGBTQ representation for the profit of a product or company has implicitly negative connotations that are rarely discussed. A qualitative analysis of existing research and media analysis of both past and modern queer-coded advertisements provides an explanation of how sexuality and gender identity have been commodified and a modern understanding of the implications found within the intersection of capitalism and gay identity.

Collin Freking

A faster method to detect earthquakes in Sumner County, Kansas

Mentor(s): George Tsoflias & Alex Nolte

Many studies have shown a recent influx of earthquakes occurring in Southern Kansas in relation to wastewater injections in the subsurface, often a byproduct of hydrocarbon reservoir development. In order to study the relationship between injection of fluids and the occurrence of seismic events in Southern Kansas, seismic stations were installed in Sumner County in 2015. Earthquake data recorded continuously over the last four years needs to be analyzed in order to identify individual events and determine their location and magnitude. The process of manually analyzing the data is time consuming and susceptible to user biases. Here, we test the efficiency and accuracy of a MatLab computer program developed to automate the identification of seismic events within massive quantities (>1 GB/day) of data. The computer program recently implemented compares the long term and short term averages of wave amplitudes to identify a change in amplitude, related to an earthquake. We test various picking parameters to determine the effectiveness of altering variables such as the duration of long and short term averages or the threshold of detection to produce accurate earthquake identification. We test the code using data from Sumner County, KS during January of 2019. The computer program initially produced accurate earthquake recognition at a more efficient rate than manual data analysis.

Alexander Fulk

Numerical Study of Disease Epidemic Models with Diffusion

Mentor(s): Huang Weizhang & Estela Gavosto

The mathematical modeling of the spread of disease, more generally known as disease epidemiology, has been developed and studied over the last century. To better understand the existing models, we have included a new computational aspect that will hopefully lead to a more useful model, numerical simulations using the finite element method for the partial differential equations model. We have integrated basic SIR epidemiological equations both with and without spatial diffusion in one and two dimensions. We have been successful in generating several 1D and 2D examples. Our current aim for the project is to develop and study population density models that can then be adapted to several different diseases. We are planning to implement more complicated versions of the basic SIR epidemiological equation to account for things like avoidance of sick individuals or loss of immunity to a disease. Further study of our model, as well as others, will lead to a more effective, realistic model.

Alondra Garcia-Arevalo

Kinetic assay of glycogen phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen phosphorylase b causes phosphate cleavage releasing glucose and inorganic phosphate. The Enzyme is studied as a model protein as it is regulated by phosphorylation and allosteric effects, many small molecule effectors can inhibit or activate the critical metabolic enzyme. The inhibitory effects of Nicotinic acid on Glycogen phosphorylase b were examined by a kinetics assay to find maximal and partial inhibition. The levels of inorganic phosphate were used to study the activity of glycogen phosphorylase b. The level of inorganic phosphate could be monitored from the absorbance of the mixture at 600nm because with molybdate ions in the stop reagent the solution produces a blue colored product. The assay found lower phosphate concentrations when the concentration of Nicotinic acid increased. Nicotinic acid is also known as vitamin B3 and niacin. It can be obtained by a variety of foods, it can treat high blood cholesterol and a deficiency can result in anemia. The enzyme glycogen phosphorylase b is inactive but can be converted to active state a. Glycogen phosphorylase b is used to meet energy needs.

Chris Gearon Gearon, Britney Werth, Alyssa Jenkins, Andrew Farnell & Joey Burnell
Prairie Moon School House Energy Conservation Project

Mentor(s): Kelly Kindscher

For our environmental capstone project, we are collaborating with Prairie Moon Waldorf School to help devise a plan to increase energy efficiencies at one of their school sites. Because the school being assessed has been recently added as a second campus, many of the appliances acquired are secondhand and outdated making energy waste a concern especially for such an environmentally-connected school. Having inefficient appliances is not only more costly to the environment and their budget; it also impedes their ability to live more holistically and practice what they preach. In order to formulate the most beneficial and feasible plan, we are conducting an energy audit of the schoolhouse and applying for grants for future funding and replacement of appliances. We will collect data by reviewing previous monthly bills from last year and by using tools such as Kill-A-Watt sensors and HOBO data loggers to get an accurate estimate on energy usage. Using the data, the most energy costly or inefficient appliances will be selected for replacement and the grant money will then be used to purchase newer, efficient appliances. Being able to replace these appliances would not only reduce energy waste but create a classroom that is more environmentally-friendly and more aligned with the Waldorf school values. It would also connect the community of Lawrence by reaching out to local businesses for funding or projects. The finished project will provide confidence to Prairie Moon knowing they are exercising earth care and serving as an example for future aspiring classrooms.

Christopher Gebhardt

Molecular Target Validation of Active Fragments for RNA-Binding Protein Musashi-2

Mentor(s): Lan Lan

RNA binding proteins are essential regulators of mRNA translation and stability. The RNA binding protein Musashi-2, is known to be upregulated in many cancers, including leukemia, glioblastomas, colorectal, lung, and pancreatic cancers. The upregulation of MSI2 allows cancer cells to acquire a more aggressive cancer phenotype and induce drug resistance by interceding mRNA stability and the translation of target proteins in oncogenic pathways. Several fragments have been screened to assess the activity of binding to MSI2; disrupting MSI2-RNA binding can lead to the translation of specific genes that are critical for inhibiting cancer cell growth and proliferation. Currently, validation of these active fragments is being determined to see 1. whether these active fragments bind properly to MSI2 and 2. what biological consequences occur from this binding. Our hypothesis states that these active fragments who disrupt MSI2-RNA binding will block MSI2 function, leading to the translation of target genes that are essential for the reduction of cancer cell survival.

Anna Goddard

Effects of Selection on Partial Clonality on Phenotypic Evolution and Evolutionary Lag

Mentor(s): Maria Orive

Evolutionary lag is defined as the difference between a population's mean phenotype and the optimal phenotype in the current environment. Previous work has shown that the effects of clonal reproduction on the change in mean phenotype under a change in environment can be split into parts that are either phenotype dependent or genotype dependent. Many ecologically important species, including invasive species, show partial clonality, or life cycles that include both sexual and asexual (clonal) reproduction. It is unknown how shifting the relative rates of investment into clonal vs. sexual reproduction in a life history that includes both will affect phenotypic evolution and evolutionary lag in a changing environment. To investigate this open question, a model is developed where the absolute amount of reproduction is constant while the relative rates of sexual and clonal reproduction can vary. Initial results indicate that, under the assumption that the amount of clonal reproduction increases linearly with the phenotypic trait value, the relative amount of clonal reproduction at equilibrium will be higher under selection than in its absence. This is true even though selection has no direct effect on fitness, since here fitness depends on the sum of clonal and sexual reproduction, which is fixed.

Mason Goeckner

The Increase in Prevalence of HIV/AIDS in Relation to Commercial Sex Work and the Rwanda Genocide

Mentor(s): Sandra Gray

Before the Rwanda genocide Rwanda faced an epidemic of HIV/AIDS and hit its peak during the Rwandan genocide. While the genocide was executed by placing Hutu's against Tutsi leading to the killing of many Tutsi at the hands of Hutu. These attacks created a refugee crisis with Tutsi fleeing the violence in Rwanda eventually this created refugee camps where commercial sex work was prevalent. In addition, after the genocide women in Rwanda outnumbered men with women did not have the right to own land which led women to commercial sex work to support themselves and their families. These practices of commercial sex work increased HIV/AIDS in Rwanda with this specifically impacting women who worked as commercial sex workers. Therefore, the genocide influenced the increase of commercial sex work and in turn the increase of HIV/AIDS in Rwanda. This research will be done by doing a literature review of commercial sex work in refugee camps during and after the genocide and commercial sex work in Rwanda after the genocide, especially in major cities and the prevalence of HIV/AIDS in these scenarios. While also reviewing literature on disruption and its impact on refugee camps and commercial sex work in relation to HIV/AIDS in Rwanda and similar scenarios. This project will be done over the course of the semester and presented at the undergraduate research symposium and is being completed in the ANTH 391/400 course.

Lindsey Gollwitzer

Ambivalent Sexism and the #MeToo Movement: How Outgroup Threat Affects Ideologies

Mentor(s): Mark J. Landau

In recent years, the #MeToo movement has raised awareness of sexual misconduct, women's rights, and the distribution of power in society. Unfortunately, the movement has been met with suspicion and resistance, which obstructs social change and increases political polarization. The purpose of the current research is to examine the roots of men's occasional hostility toward the movement. I draw on Social Identity Theory's insight that people generally react negatively to perceived threats to their ingroup. In the case of #MeToo, men may feel as though their group's value is under attack. Building on Ambivalent Sexism Theory, I hypothesized that men would react to this group-based threat with two forms of retaliatory sexism. One, called hostile sexism, entails viewing women and women's rights efforts as stripping men of their societal status. A second form is benevolent sexism, which entails reducing women to certain qualities, such as emotional warmth, that confine them to narrow social roles. In an ongoing study testing this hypothesis, I randomly assign male participants to read about one of two portrayals of the men charged by the #MeToo movement for sexual misconduct. One portrayal depicts these men as demographically similar to themselves ("men like me"), thereby triggering a sense of ingroup threat. The other portrayal depicts the accused men as prominent public figures and celebrities who form a remote outgroup. Afterward, participants complete well-validated measures of hostile and benevolent sexism. I predict that the ingroup-threatening portrayal will increase both hostile and benevolent sexism. Data collection is ongoing.

Brandy Gomez

"No Damn Flag" What Vietnam-Era Flag Desecration Cases Mean Today

Mentor(s): Genelle Belmas

Between 1967 and 1975, American courts heard more than 80 cases of flag desecration that ran the gamut from burning the flag to wearing it as clothing to using it in art displays. Given the renewed interest from the U.S. president and NFL athletes in using the flag for political purposes, the potential for a flag protection amendment to the Constitution seems more possible than it has in decades. What could courts and legislatures sympathetic to renewed calls to protect the flag garner from these Vietnam-era cases to bolster public support for a constitutional amendment?

Amen Hailemariam

The effect of D (+) Glucosamine on Glycogen Phosphorylase B

Mentor(s): Roberto De Guzman

Abstract:

Maintaining blood glucose homeostasis is one of the most important factors to keep the normal functioning of human body. Among many ways that blood glucose can be regulated, one way of keeping the homeostasis of blood glucose is enzymatic method. Blood Glucose can be kept at dynamic steady state by breaking down of glycogen into glucose or converting glucose back to glycogen. An Enzyme called Glycogen phosphorylase has been a target of several scientific researches as it is important for the breakdown of glycogen. Glycogen phosphorylase has two state, one is called R state, active state which is also called Glycogen phosphorylase a; and the other one is T state which is also called Glycogen phosphorylase b. Glycogen phosphorylase can be regulated by a number of effectors to help stabilize blood glucose. Recent studies show that D (+) Glucosamine is an inhibitor to Glycogen phosphorylase b (Oikonomakos NG). Glucosamine is used as a medication to treat a disease like arthritis and cartilage. We tested the effect of D (+) Glucosamine on Glycogen phosphorylase b. In this experiment D (+) glucosamine was used as an effector in enzyme kinetic assay experiment and proven that it inhibits the activity of T state of Glycogen phosphorylase.

Brennen Hall

Dallas Museum of Sustainability

Mentor(s): Kapila Silva

Sustainable design is considered as the next evolution of architecture; but is not it a coincidence that at one point in history we were already practicing sustainable design unconsciously? In this project of 'Dallas Museum of Sustainable Dwelling', I intended to draw attention and inform patrons about past, present, and future efforts of sustainability while also acting as an experience to hopefully introduce a new perspective on living sustainably. To make an architectural statement on 'living sustainably', the museum is placed over a highway to use the wasted space above it, to extend the public space of nearby Klyde Warren Park, and to enhance the city's plans for a 'sculptural art walk' along Pearl Street. The site's position over the highway posed the dual challenge of devising an innovative structural design and spatial programming for the complex function of a museum. In response to these structural requirements, a four-corner 'tree structure' was designed to exponentially disperse load paths horizontally and vertically until being transferred to the ground on the sides of the highway. This allows the building to be suspended from above, rather than being supported from below. It also introduced an open-air space beneath the building, which accentuates the suspended expression of the building volume and affords a covered public space as an extension of the park. This structural design automatically formed and replicated a specific spatial module within the structure, which then guided the programming of various spaces and galleries of the museum. The clusters of modules together created a timeline throughout the history of sustainable building design, which then delineated a line of orientation and visual transitions along the journey through the museum, connected by bridges, stairs, and escalators. The modules were clad with a translucent, energy-efficient polycarbonate skin to generate a glowing 'lantern-like' effect.

David Halliwell

Shifts in Tone: The Effects of the First World War on Classical Music

Mentor(s): Andrew Denning

This paper explores how the First World War affected the lives and compositions of three of the best-known composers who fought in the conflict, English composer Ralph Vaughan Williams, French composer Maurice Ravel, and Austrian composer Arnold Schoenberg. The war affected the lives and compositions of these three composers in significant, enduring, and diverging ways. The sharp differences in their compositional reactions to the war are primarily due to previous compositional style and differences in wartime experiences such as extent of military service and traumatic events that paralleled the war. Despite unique differences, there is a positive correlation between the breaking down and editing of tonality and the way in which composers reflected on the war. More broadly, the war also led to compositions that were characteristically darker, more somber, and dedicated to the injured and deceased.

Jacob Hammil

Additive Manufacturing Challenges for Complex Granular Structures

Mentor(s): Anil Misra

The rise in Additive Manufacturing (AM) techniques and an improved ability to print complex structures has made a way for building granular microstructures that are tailored to certain purposes or metamaterials. 3D printers have advanced enough to produce sheets in which grains are linked by means of rods of suitable length, thickness, and shape, so as to produce the desired local micro-interaction potential. These techniques have been proven to be a real-world approach to test how a structure will behave on a continuum model. The objective of this presentation is to explain the CAD and fabrication of 3D printing of specific granular microstructures that have unique grain-interactions that endow the grain-interactions particular behavior. The presentation will describe the challenges associated with CAD modeling of such microstructures and their realization through AM. Specifying the connections and the structural shapes of the connections, patterning, design the frame of the microstructure such that the realized granular material can be properly tested under well specified loading conditions. As well as the size of the overall structure in relationship to the maximum size and resolution of the AM device, and the Fused Deposition Modeling vs. PolyJet materials used in the AM devices.

Alhamzah Hamzah

The Effect of D(+)-maltose on Glycogen Phosphorylase b activity

Mentor(s): Roberto De Guzman

Glycogen phosphorylase b is an inactive enzyme that involves in the glycogen metabolism. The active form of this enzyme is known as glycogen phosphorylase a and is used to breakdown glycogen into glucose-1-phosphate and release energy. While glycogen phosphorylase b is different from glycogen phosphorylase a because it is not capable to breakdown glycogen. Its structure contains dimer of two identical subunits. It does not contain a phosphate group which makes it different from glycogen phosphorylase a. Glycogen phosphorylase b is used to study which effectors influence this enzyme which effects the glycogen metabolism. Glycogen phosphorylase b is commonly found in the liver where glucose gets stored as glycogen. This experiment was done on glycogen phosphorylase b to analyze its activity toward d(+)-maltose. These reactions used to measure the concentration of inorganic phosphate by measuring the absorbance. The experiment was done by using d(+)-maltose as an allosteric effector to test the change in the curve of Michalis-Menten. The changes in the curve were the response to the changing in the concentration of d(+)-maltose. D(+)-maltose was used at different concentrations to find out if d(+)-maltose act as an inhibitor or activator. After analyzing the data that were collected, the concentration of inorganic phosphate increases by increasing the time with the presence of glycogen phosphorylase b, d(+)-maltose acts as an inhibitor.

Asif Haque, Jackson Leibach, Mackenzie Knox, Colton Rusnak, Pamela Sounnarath & Miranda Watson

Energy Efficiency at the KU Edwards Campus

Mentor(s): Kelly Kindscher

In order to be more sustainable and cost-effective, the University of Kansas Edwards Campus recently retrofitted LED lights into its main parking lot and installed energy-efficient boilers into one of its buildings. Administrators would like to add more sustainability measures, such as LED retrofits and new boilers to the remaining buildings on campus, as well as externally-fitted shades to lower heating and cooling costs. By implementing these sustainability measures, KU Edwards Campus would save money by reducing its energy use, thus exploiting fewer natural resources. However, the lack of initial funding restricts them from accomplishing these goals. Obtaining the funds to initiate these projects is a top priority, as the projects cannot begin unless initial funding is available for them. These projects can be accomplished by collecting data and analyzing the costs and benefits of them in comparison to how things are now, thus proving that these projects would save money and energy in the short- and long-term. The implications of accomplishing these goals are incremental monthly energy savings on utility and dollar savings on energy costs. The initial funding to begin both projects can be obtained by collecting data to show that the incremental monthly dollar savings on energy costs can be allocated to a Revolving Door Loan Fund, thus giving the campus access to loans and grants. Obtaining the initial funding to begin these projects is a precedent for future related activities, which would be stepping stones toward further sustainable progression.

Asif Haque

Organizations conducting community-driven food-related research in the Douglas County area

Mentor(s): Dietrich Earnhart

I have created a KU-accessible database with the purpose to connect individuals in the local community who are interested in food-related research with researchers at the University of Kansas. My study focuses on the research interests and goals of organizations interested in community-driven food-related research projects. This research will help us gain a better understanding of who in the KU community can help these organizational researchers with their food-related research interests, projects and goals. This research study strives to help organizations over time with their food-related projects and goals by serving as a networking platform between KU researchers and these organizational researchers.

Anna Harder

A Predictive Model for Determining Epigenetic Transmission of Trauma, Applied to Rwanda Genocide

Mentor(s): Sandra Gray

Traumatic events, such as genocide, can have life-long physical, emotional, and mental effects on survivors. However, the effects of trauma do not stop at the survivor. Recent research has emerged exploring how genocide can impact the mental and emotional health of the offspring of traumatic event survivors. This transmission of trauma is classified under the scientific theory of epigenetics – the study of the physical modifications of an organism’s genome expression and function instead of alterations in the genetic code itself. Extensive research on individuals diagnosed with Post-Traumatic Stress Disorder has demonstrated that traumatic events cause modifications in the victim’s gene expression which can be inherited by subsequent generations. This inheritance can impact the health of the offspring in numerous ways. The purpose of this research project is to use previous research studies on the epigenetic effects of traumatic effects, such as the Holocaust, to develop a predictive protocol that can be applied to the offspring of the 1994 Rwanda Genocide survivors in hopes to predict possible genetic predispositions related to the body’s stress response. By investigating the epigenetic consequences of the Rwanda genocide, this research project will further support the claims that consequences of genocide extend generations beyond survivors.

Kim Harms

Legislative Rhetoric and Consumer Privacy: A Content Analysis of Lawmaker's Statements After The 2017 Equifax Data Breach

Mentor(s): Sarah Deer

The 2017 Equifax data breach exposed personal, sensitive information from millions of consumers. In recent months, federal lawmakers have heightened interest in reviewing consumer privacy laws. By analyzing statements from lawmakers found in news articles, this research project examines how lawmakers want to address the problem: by focusing on the consumers or focusing on the reporting agencies. Through various coding methods, the research identifies how lawmakers talk about legislation benefiting consumers and legislation benefiting reporting agencies. The project seeks to evaluate the accuracy of the information provided regarding consumer privacy after the data breach.

Molly Hatesohl

Exiled Artists in American Ballet: Chagall and Massine's Aleko, 1942

Mentor(s): James Moreno & John Pultz

Due to the violent conflict that enraptured Europe during World War II, many artists found themselves exiled from their homes and sought refuge in America. Much of the work created during this volatile time period can be understood as a reaction to this deracination; the ballet *Aleko*, conceived through a partnership between choreographer Leonide Massine and artist Marc Chagall is no exception. Based on the poem "The Gypsies" by Alexander Pushkin, the ballet has functioned as a retelling of a canonical piece of Russian literature. By examining the historical circumstances that shaped Chagall and Massine's cultural identity, the research reveals the specifically Russian influence expressed in the ballet's production. In investigating the expressive effect of the artists' aesthetic choices, the essay seeks to explain how Chagall and Massine reinterpreted Pushkin's original diasporic narrative in order to relate their own experience of displacement as a result of World War II. Through the analysis of *Aleko's* nightmare in Scene IV, an element absent from the original text of "The Gypsies," the essay compares Pushkin's poem of expatriation to the artists' allegorical retelling of their mid-century exile. The essay establishes *Aleko* as an embrace of Russian style and subject matter, and therefore, as a celebration of the artists' nationality during a time in which global conflict jeopardized the relationship between culture and identity.

Wade Heger, Claire Byers, Christopher Gough, Elena Khoury, Allison Rozell & Abigail Samuelson

Sustainability Metrics for KU

Mentor(s): Kelley Kindscher

The University of Kansas' Center for Sustainability is committed to promoting a culture of sustainability and empowering students, faculty, and staff to make environmentally beneficial decisions. The Center for Sustainability recently decided to abandon the Sustainability Tracking Assessment and Rating System (STARS) program because the program proved to be costly and was unsuccessful in communicating sustainability metrics and programs to the campus community. Currently, sustainability metrics are not easily accessible or effectively communicated to students. These metrics are becoming increasingly important for making environmentally conscious campus initiatives and inspiring individual change in the face of climate change and environmental degradation. The problem of inaccessibility to data can be solved by publishing the information in campus wide materials such as newspapers, posters, and informational bulletins. In order to ensure students and faculty have access to information they value in publications they interact with, they will be surveyed and have the option to give feedback on their preferences. While these surveys could become skewed, they are overall beneficial to recognizing how individuals interact with information. These responses will guide the efforts of the Center for Sustainability on what information to share and where to publish it in order to ensure students and staff have easy access to data they value.

Olivia Hollman

A Mythos of Belonging: The Curse of Tutankhamen in the British Empire (1922-1932)

Mentor(s): Andrew Denning & Erik Scott

The “curse of Tutankhamen” gripped the British public since the opening of the tomb of the 18th dynasty Egyptian ruler, King Tutankhamen, in 1922. Following the mysterious circumstances of Lord Carnarvon’s death, the dig’s financier, as well as the deaths of at least ten other men connected to the archaeological dig, the curse of Tutankhamen gained infamy in British newspapers.

Like those British readers, I am captivated by the mystery surrounding a supposed ancient curse. I study what made the British receptive to the curse and what the curse tells us about the British Empire. My research argues that the curse of Tutankhamen is a product of British Egyptomania, explaining their cultural susceptibility to specifically Egyptian curses. But the curse was larger than this; it was a means through which the British coped with their changing empire after World War I. Based on research conducted in London and Oxford this past summer and close examination of newspapers and handwritten accounts by those at the archaeological dig between 1920 to 1940, I am examining how the curse reveals previously unseen aspects of British culture. Unlike previous historians who studied the curse, I do not engage with the curse’s veracity but deal only with the curse’s significance. I have discovered that the curse of Tutankhamen is primarily a British invention fused with Egyptian influences, rather than an Egyptian curse adopted by the British. The curse is beyond myth; it is a means of engaging with identity and belonging in a global empire.

Nabil Hossain

Allosteric Regulation of Glycogen Phosphorylase b with Imidazole Inhibits Rate of Product Conversion

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase b(GPb) is a catalytic enzyme that facilitates the conversion of glycogen polymer to glucose 1-phosphate monomer in muscle and liver. This is an essential process, for it releases energy that is stored as glucose in glycogen to be metabolized for cellular processes. GPb functions by cleaving the α (1- \rightarrow 4) glycogen linkage to release a terminal glucose 1-phosphate molecule which can be subsequently subject to glycolysis. To accommodate the needs of the cell, GPb is allosterically regulated by metabolites such that the enzyme optimally functions when glucose levels in the cell are low. Specifically, AMP has been previously identified as an activator whereas ATP and Glucose 6-phosphate have been identified as inhibitors. This raises the question of the influence of other biological constituents and function as effectors for GPb. To test this, we conducted kinetic assay of the enzyme in the presence of imidazole, a biological agent with strong buffer activity. Reactivity was measured in absorbance of the reaction mixture which is directly related to the amount of inorganic phosphate in solution. Examination of the rate of product formation under imidazole levels of 0mM, 2 mM, 4 mM, and 10 mM revealed delayed reactivity with increasing concentrations of imidazole. As the concentration of imidazole increased, the rate of catalysis gradually decreased with catalysis only occurring at high substrate concentration in the presence of 10mM of imidazole. This hindrance to the rate of reaction suggests that imidazole is a negative effector of GPb.

Logan Hotz

The Economic Impact of Environmental Regulatory Changes in a Converting Economy

Mentor(s): Dietrich Earnhart

The Porter Hypothesis proposes well-designed environmental regulation can actually stimulate the productive and financial growth of a firm, contrary to pure market-based economic theory. This project investigates this claim in the context of a country changing its economic framework, from a command-and-control communist basis, to a more capitalistic one, using data from a survey administered by the Harvard Institute for International Development.

Sarah Hunter, Anna St. Pierre & Tessa Worner

The Developmental Function of Music for Children Ages Nine to Twelve

Mentor(s): Deanna Hanson-Abromeit

Research about typical developmental expectations is abundant. Literature on music development is available for children, but is limited in its scope across the lifespan. Music therapy students preparing for a career in the delivery of music interventions must be equipped with a strong foundation in developmental capabilities of music with people and how music is integrated with other developmental domains (e.g. motor, cognitive, emotional). There are currently no known comprehensive resources that combine typical developmental expectations across the lifespan with music development expectations. Thus, the purpose of this research project is to develop a theoretical framework for how music functions to support development for children ages nine to twelve.

We will use developmental milestones, neurologic foundations and uses of music for people who are ages nine to twelve. This information will be organized by music characteristics (e.g. rhythm, melody, dynamics) to provide a rationale for how music elements relate to typical development. This information will then be applied to pre-composed music appropriate for the different age ranges and we will assess how well pre-composed music represents the theoretical rationale we identify.

This project is part of a course-based research experience in MEMT 250 Human Development and Music Learning Across the Lifespan. The project is partially supported by a Graduate Research Consultant from the Center for Undergraduate Research.

Miaomiao Huo

From Overseas to Overwhelmed: A study on Chinese international students' educational and living experiences at The University of Kansas

Mentor(s): Brian Lagotte & Felix Meschke

As China loosened up immigration policies, Chinese international students became the main population to enroll in US colleges. This research explores Chinese international students' academic performance and post-college career choices in relation to level of assimilation at The University of Kansas (KU). The paper targets KU specifically because few research exists on the topic. Intergroup Contact Theory explains the role of contact in promoting social acceptance, a necessary factor in studying students' assimilation process. The project unfolds through regression and thematic coding of YouTube videos, interview scripts, and surveys. These primary data triangulate the project in addition to enrollment data from International Student Services (ISS) and Applied English Center (AEC) at KU. The evidence may suggest insufficient resources at KU to help with proper assimilation and a positive relationship between assimilation and academic performance and post-college career path. The research offers data on Chinese international student experience at KU to suggest policy reformation and resolve current inefficiencies.

Lauren Hutchinson

Syrian Refugee Education Crisis in Lebanon

Mentor(s): Brian Lagotte

As the struggle for access to education for Syrian refugee children continues to challenge Lebanese officials, international organizations offer both practical and opportunistic solutions. The research will address how international organizations' policies have been implemented in Lebanon since 2011 to increase access to education for adolescent aged Syrian refugees. Previous international researchers have pointed to not only the continued need for international intervention in Lebanon's Syrian refugee crisis but also at the effectiveness of current international education initiatives. According to International Relations Theory, international interventions can establish socioeconomic equality in Lebanon and promote an environment of peaceful coexistence for both host and refugee populations. Using analytical comparisons of varying intervention methods used by international organizations to increase access to education, the research can pinpoint which programs were successful and why by finding correlations between intervention methods and an increase in access to education. The research strives to increase awareness of the education crisis facing Syrian refugees in Lebanon as well as provide an in-depth analysis of the effectiveness of existing solutions. An increase in access to education for Syrian refugees empowers future Syrian generations with the tools necessary to reclaim and rebuilt Syria.

Nikita Imafidon

Gay, Interrupted: Examining Queer Women and Female Hysteria in the Last 30 Years of Film

Mentor(s): Ivery Goldstein

This paper examines how the historical link of hysteria with women has contributed to the representation of queer women as mentally unstable in films and television from the 1990s to 2018. Starting in the 1990s, media started to portray more queer women characters in films, but these characters often exhibit stereotypical signs of mental illness and/or murderous tendencies. In this paper, I connect the societal beliefs about women's emotional nature with the distinct lack of mental clarity for queer women characters throughout film by using historical background on hysteria and female deviance. In addition, starting with hit film *Basic Instinct*, my primary research uses content analysis of *Basic Instinct* (1992), *Girl, Interrupted* (1999), *Pretty Persuasion* (2005), *Black Swan* (2010), and *Killing Eve* (2018) to argue that the negative queer women's representation in films and television is not solely due to homophobia, but also due to patriarchal ideas of womanhood. This paper challenges the argument that queer women's media representation has solely been the result of the constructs of the "man-hating" lesbian or gender invert, instead focusing on how queer women are discriminated against in the media due the "crazy woman" stereotype. Furthermore, by including examples that reach into the present, I conclude that media surrounding queer women characters has not progressed to mainly positive imagery. In continually crafting this narrative of women's queerness, popular media perpetuates the stereotype regarding queer women that their sexuality is solely a function of mental illness.

Matthew Jaeschke

Bimodal Self Assembled Supramolecular Nanoprobes

Mentor(s): Candan Tamerler

Controlled interactions at the biological-material interfaces have a vast amount of engineering and clinical applications that may lead to novel imaging, diagnostic, and therapeutic systems. Traditionally proteins have been attached to the biomaterials mostly by chemisorption through creating irreversible bonds or physisorption by inducing non-specific interactions. These approaches however are extremely limited due to the inability to control the orientation of the proteins.¹ Supramolecular approaches building upon non-covalent interactions at the intersections of biology, materials, and medicine have advanced in the last decades. Our group has been exploring peptide based supramolecular assembly over a variety of biomaterials. These peptides are selected by combinatorial biology methods for their affinity to solid materials such as metals, ceramics and minerals.^{2,3,4} Once they are incorporated into larger proteins, the selective self assembly properties of the peptide tags provide an orientation control for the proteins. Recently, our group explored combining multiple sensing and imaging modalities using metallic nanoparticles. Gold nanoparticles are among the common nanoparticles systems utilized in biomedical applications, ranging from targeted delivery of drugs to bioimaging and the monitoring of cells and tissues. By using gold-binding (AuBP) peptides conjugated to fluorescent proteins (GFP and DsRed) we combined fluorescent imaging with metallic nanoparticles plasmonic responses. We further optimized the biomodal nanoprobes over a range of fusion protein and nanoparticles concentrations for GFP_AuBP and DsRed_AuBP. These studies will provide the optimal amount of AuBP peptides that can create controlled and modular biological-material interfaces for directed delivery methods.

Margo Johnson

The environmental consequence of peacetime Colombia

Mentor(s): Dietrich Earnhart

Colombia is an ecologically rich country that boasts the eighth most forest cover in the world. At a total land area of 111 million hectares, around half of this is composed of forest cover home to a number of keystone species. During the decades of the 52-year long civil conflict between the Colombian government and the Revolutionary Armed Forces of Colombia (FARC), a left-wing rebel group, much of the land was damaged in conflict. However, what is more significant is the 44 percent increase in deforestation in the year following the peace accords that were signed in 2016. While incorporating jungle regions, FARC enforced regulated economic activity in order to preserve forest cover that would create protection from government sponsored air raids. Yet as FARC has demobilized and moved out of the jungle, the Colombian government has failed to establish control of the land, and environmentally destructive illegal economic activity, including logging, mining, and cattle ranching, has taken its place. This leads to the question of how absent effective protection from the government, economic activity driven by absence of FARC will affect deforestation in Colombia. This study presents evidence on the correlation between the absence of FARC and the destruction of forestland, as well providing a comparative analysis of the rate of deforestation in Colombia during the presence and absence of rebel groups. Findings indicate that while violence has subsided in the country since the establishment of the peace accords, consequently, the environmental state of Colombia is at risk.

Nicole Johnson

Baton Twirling into the Fourth Dimension

Mentor(s): Estela Gavosto

This interdisciplinary project in mathematics, baton twirling, and graphics aims to display a creative side of mathematics. The end product is a video and set of images that visually convey the idea of series convergence and limits of partial sums. The images and video are accessible to those both with and without a strong knowledge of complex analysis.

Considering the infinite sum of z^n ($f(z) = 1 + z + z^2 + \dots$), which converges to the function $f(z) = 1/(1-z)$ when $|z| < 1$, there are many ways we can visualize the convergence. This project explores convergence graphically. Since complex functions exist in four dimensions, projections into 3-D were used to better visualize the surfaces. By graphing the partial sums of each projection with increasing n , the convergence to $1/(1-z)$ becomes extremely clear. In addition, by projecting 4-D objects into 3-D, we get a better idea of the properties of the original 4-D shape.

The baton is extremely successful in tracing out the surfaces produced by viewing the partial sums as their 3-D “shadows”. Long exposure images were taken with lights on the end of the baton to capture the sweeping motion that mimics the edges of the surfaces. These images are extremely similar to the surfaces generated by the partial sums, illustrating the success of the project. Communicating mathematics using photos and video as more relevant media, and incorporating baton twirling, allows more communities to interact with these complex ideas.

Grant Johnson

Species Delimitation of the Snake genus *Ahaetulla* in Southeast Asia

Mentor(s): Rafe Brown & Jeff Weinell

The snake genus *Ahaetulla* contains eight identified species and four subspecies that have overlapping morphological characters and habits. *Ahaetulla* inhabits regions from Eastern India to the Philippine islands. Despite its large range, the evolution through space and time (phylogeographic history) of this species hasn't been investigated. I believe that *Ahaetulla* currently contains cryptic species, or species that have not yet been identified because they are of similar morphology, behavior, and ranges. I have tested this by sequencing DNA from a mitochondrial gene (Cytochrome B) and a nuclear gene (CMOS) in individuals from across the genus range and analyzed the data to estimate phylogenetic relationships among geographically distinct populations. This data will be used to infer ancestral geographic ranges and to determine how the species first colonized the Philippine archipelago. This phylogenetic data combined with morphological data will allow me to support or reject previously reported differences between the four traditionally recognized subspecies, and to assess if two of the subspecies (*A. p. prasina* and *A. p. preocularis*) should be recognized as distinct species.

Anna Jones

Woman Seeking Woman: The Implication of Kansas City, Missouri's Failed Lesbian-only Neighborhood for LGBTQIA Settlements

Mentor(s): Ivery Goldstein

In the early 1990s, lesbian activists from Kansas City, Missouri sought to create a neighborhood that was occupied exclusively by lesbians. This neighborhood, known as Woman Town, did not come to fruition in the official manner that activists had hoped. Although there is a small amount of information about Woman Town in archival sources, there is not a significant amount of in-depth history about the project. My research gives a more cohesive history of Woman Town, which was compiled from oral interviews with people who had knowledge of the project. Additionally, my project is an examination of the reasons why Woman Town failed to form and the ways in which future LGBTQIA activists can learn from Woman Town. I determined these reasons from both archival sources and oral interviews. Through my interviews, it has become clear that a queer settlement seems to informally exist in modern times at the location of where Woman Town was planned to be. I believe that future LGBTQIA activists can utilize information about the planning of Woman Town to determine how to best avoid some of the obstacles that prevented the settlement from happening, whether they be related to infrastructure, resources or intrapersonal relationships. My interviews revealed that a variety of obstacles were perceived to have prevented Woman Town from existing, including the conflicted dynamic between the activists planning the settlement among a variety of scattered reasons.

Sarah Kahm

Foster Care Independent Living in Film

Mentor(s): Matthew Jacobson & Nicole Hodges Persley

Independent feature film narrative script investigating the difficulties of the independent living process for an “aging-out” foster youth. Using interviews with foster youth, social work staff with the Department of Children and Families, and recent news articles, this study provides a nuanced analysis of the struggle for independence discerning socioeconomic adversity and reflecting the inequalities of a foster youth’s experience in the high school to college transition period. The protagonist characterizes the personal and social effects of foster care independent living.

Amanda Karas

Employing Achievement Goal Perspective Theory to Examine the Impact of Coaching Climate on the Prevalence of Disordered Eating and Body Dissatisfaction within Collegiate Athletics

Mentor(s): Mary Fry

Collegiate athletes often experience pressure from coaches and teammates to both perform at a high level and present an ideal physique for their sport. This pressure can lead some athletes to engage in disordered eating behaviors and to experience high levels of body dissatisfaction (Thompson & Sherman, 1993). Research employing achievement goal perspective theory has revealed that when athletes perceive a caring and task-involving climate, they report greater motivational and health responses, whereas, athletes' perceptions of an ego-involving climate have been associated with negative motivational and health responses (Fry & Moore, 2019). Being in an ego-involved climate can increase athletes' levels of negative motivational and health responses (Fry & Moore, 2019). Being in an ego-involved climate can increase athletes' levels of negative eating behaviors and body dissatisfaction.

Kira Karry

Sex Positive Feminism: Intersectionality and Women of Color

Mentor(s): Ivery Goldstein

My research addresses the reasons why women of color's experiences of sexuality are not well represented in the sex positivity movement in the United States compared to those of white women's. This is exemplified in the unique experiences women of color have with sexual objectification, sexual trauma, and sex based oppression. My research examines the current shortcomings with the rhetoric of the feminist sex positivity movement that continues to present women's sexuality as a monolith. The sex positivity movement broadly refers to women as a collective when in reality each woman has a unique experience especially as it pertains to sexuality. Women of color as a group are particularly unique in this sense. This is explored through an extended literature review analyzing the academic understanding of the feminist sex positivity movement and the sexual experience of women of color through their socialization in the United States. The findings of this article reflect the lack of intersectionality concerning the rhetoric within the feminist sex positive movement, the lack of addressing women of color's experiences of sexualization and how this impacts their representation in the movement, and the limitations of referring to women as a monolithic group within the sex positivity movement. This research fills the gap in feminist research that does not adequately address sexuality as a unique experience for women of color. My research calls attention to the current lack in the intersectional approach to sex positivity and seeks to involve women of color's diverse experiences in this area.

Mattea Keister

Hyperactive Antiforeign Genome Response

Mentor(s): Lisa Timmons

Advances in genetic engineering technology have fostered a drastic increase in the number of experiments involving genome manipulation. Using model organisms, such as *C. elegans*, we can easily see the consequences of adding foreign DNA to the genome. It has long been observed that in transgenic experiments, introduced DNA is expressed well in somatic tissues of *C. elegans*, but often fails to express in the germ line. This is indicative of a more robust set of anti-foreign genome responses in the germ line compared to those in the somatic cells. In our lab, we repeatedly observed silencing of single-copy transgenes in somatic tissue, a phenomenon that has not been previously reported. Silencing of our GFP transgene in somatic cells was observed in over 20 independently derived *C. elegans* lines when the transgene was integrated into the genome using MosSCI methodology, but not when using CRISPR. Although these two integration methods are different, we utilized the same DNA sequence, which was inserted into the same location in the genome. The difference between these techniques is that MosSCI utilizes genetically engineered strains of *C. elegans* containing a sequence of foreign DNA that is fixed to the genome which is replaced by the injected DNA. The goal of this project is to understand why our GFP transgenes are being silenced in somatic cells, by determining if the silencing signal originates from the DNA sequences that are introduced, from sequences within the endogenous locus that was targeted for integration, or from environmental signals.

Ido Kenigsztein

MOST - Museum of Sustainable Transportation

Mentor(s): Kapila Silva

This hypothetical design project is in the Art District of Dallas, Texas. Situated directly above the Woodall Rodgers Freeway, the chosen site provided the perfect opportunity to highlight the issues and opportunities for sustainable transportation in the surrounding area.

The museum consisted of four galleries that explore the history and future of transportation. Each gallery is located within the greater 'route', which ascends gradually and provides dramatic views over the freeway as well as over Klyde Warren Park/Pearl Street. This gallery route is designed to juxtapose these views with the stories told in the galleries: visitors see the problem with modern transportation with the view of the freeway; highlighting the opportunity for sustainable transportation with the view overlooking the greeneries of Klyde Warren Park and the Art District. Finally, a programmatic core was added to cut through the gallery route to highlight its gradual ascension, and to fulfill the project's remaining programmatic requirements.

As a museum of sustainability, the building itself needed to include sustainable features. This is incorporated through the double-layered facade of insulated glass and fiberglass-coated PTFE fabric, to control the sunlight allowed into the galleries. Additionally, the pitched roof both allows for rain water collection as well as air circulation, as the conditioned air enters from the floor, which then rises to the vents at the top of the roof pitch as it warms. Lastly, a 'water-wall' feature was added, where chilled water runs down wires in the central atrium, effectively cooling and dehumidifying the space naturally.

Kirsten Kent

Allosteric effects of adenosine 5'-monophosphate and D(+)-maltose on Glycogen Phosphorylase B

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase B (GPb) is a critical enzyme required for the release of glucose from glycogen in the form of glucose-1-phosphate for energy metabolism inside the cell. Effector molecules regulate GPb activity through allosteric regulation mechanisms of inhibition and activation by acting as ligands that can increase or decrease enzymatic activity. The effect of D(+)-maltose, adenosine 5'-monophosphate (AMP), and a combination of the two substrates on Glycogen Phosphorylase B is unknown. To study the effect of AMP concentration and D(+)-maltose concentration on Glycogen phosphorylase, kinetics assays were performed at varying concentrations of the substrates in order to demonstrate the changes in the Michalis-Menten curve based on the varying concentrations of substrates. With the Michalis-Menten curve data, it has been determined that the increase of AMP concentration results in a larger K_m and smaller V_{max} . The increase in D(+)-maltose results in a smaller K_m and smaller V_{max} . This indicates that there is allosteric inhibition of Glycogen Phosphorylase B that occurs in the presence of AMP and D(+)- in cellular metabolism.

Nila Khan

Trichome Density Responses to Elevated Carbon Dioxide across Arabidopsis Genotypes

Mentor(s): Joy Ward & James Fischer

Trichomes are small, hair-like structures located on the surfaces of leaves and other plant organs. They have many important functions such as secretion of defensive chemicals, reflection of damaging light, drought resistance, energy balance, etc. The crucial roles trichomes play in proper plant functioning makes it critical that we understand the mechanisms behind how they respond to different environmental conditions. Current atmospheric levels of carbon dioxide reside at approximately 400 ppm (parts per million) and are estimated to continue rising as a consequence of further industrialization. In this experiment, six different lines of the model plant *Arabidopsis thaliana* were grown at current (400 ppm) and elevated (800 ppm) carbon dioxide levels. Four of the lines are separate genotypes originating from various geographical locations (Ws, La-0, Est, Kon) whereas two of the lines were selectively bred for in the Ward lab based on their responses to elevated carbon dioxide (SG and CG). Trichome patterning and densities were measured and compared among each of the lines using computer software developed in the lab. Differences observed within and among lines will be used for future research in elucidating underlying genetic mechanisms.

Manahil Khan

Kinetics Assay of Glycogen Phosphorylase b and Allosteric Regulation of D(+)-Glucosamine Effector

Mentor(s): Roberto De Guzman & Priyanka Goyal

Inside muscle cells, energy is continuously metabolized by the enzyme-catalyzed reaction involving the enzyme glycogen phosphorylase b (GPb) and the substrate glucose-1-phosphate (G-1-P). GPb in the cell exists mostly in the less active T state, but when energy is needed, it can be activated when bound to adenosine 5'-monophosphate (AMP), stabilizing the R state, which catalyzes a phosphorolysis reaction yielding G-1-P. While it's known that GPb is regulated by many effectors that work to increase or decrease its enzymatic activities, the exact effects of specific allosteric effectors can still be studied. The regulatory impact of one of these effectors, D(+)-glucosamine was tested here for inhibitory effects. To investigate the down-regulation of GPb activities, several kinetics assays were run in sets and analyzed in comparison to an inorganic phosphate standard. Reaction mixture sets tested increasing amounts of substrate concentration, increasing amounts of AMP, and increasing amounts of the D(+)-glucosamine effector. Using kinetics assays, enzyme titration, and mass spectrometry, it was found that the concentration of inorganic phosphate showed an increasing trend as the rate of the reaction proceeded with increasing amounts of the effector. The significance of these results indicates that the metabolization of G-1-P in cells is up-regulated by the effector protein D(+)-glucosamine in the presence of AMP and the GPb enzyme.

Margaret Kilday

Understanding PTSD occurrence in perpetrators of the Rwandan genocide

Mentor(s): Sandra Gray

This project will compare the prevalence of mental health disorder among Rwandan survivors and perpetrators of the 1994 genocide, specifically, the occurrence of post-traumatic stress disorder (PTSD). In 1994, following years of violence against the Tutsi people, an interim Hutu government launched a genocide with the intent of killing all Tutsi people in the country. Over half of the country's population was killed or displaced by the conflict. While there are many health impacts faced by the surviving Rwandan population, this project will analyze mental health outcomes of victims, those targeted by the genocide, and perpetrators, those who carried out the genocide. Because it is more difficult to find data on the mental health of perpetrators than it is to find data on genocide victims, I will use existing studies of the prevalence of PTSD among these groups as well as documented accounts from perpetrators to conduct a combination of literature review and meta-analysis. I expect to find prevalence of PTSD among both groups because of their exposure to violence during the conflict, though I do expect more prevalence of the disorder among genocide victims. This study has implications for treating mental health in post-conflict zones; medical professionals can determine what populations are at greatest risk for PTSD. This project is being carried out and presented as part of ANTH 391/400, which focuses on health impacts of the Rwandan genocide 25 years later.

Soyeon Kim

Modeling the Impact of Movement on Methicillin-Resistant Staphylococcus aureus

Mentor(s): Folashade Augusto

A deterministic model for methicillin-resistant staphylococcus aureus (MRSA) among injection drug users is developed and presented. The model incorporates transmission of the bacterial among non-injection drug users and injection drug users (IDUs) who are both low-and high-risk users, and their movement between large metro, suburban and rural areas.

The model parameters are fitted using disease prevalence data from 2008-2013 obtained for non-IDUs from the Agency for Healthcare and Research and Quality (AHRQ). Sensitivity analysis was implemented to determine the parameters with the greatest impact on the total number of infected individuals; the transmission probability and recovery rates for the subgroup were found to have the highest impact on the number of infected individuals. Furthermore, the sensitivity of the parameters in the different areas was the same when the areas are disconnected. When they are connected, the parameters in large-metro areas were more sensitive, and the rural areas were least sensitive.

Our result shows that to effectively control the disease across the large metro, suburban and rural areas, it is best to focus on controlling both behavior and disease in the large metro area as this have a trickledown effect to the other places. Controlling behavior and disease at the same time in all the areas will lead to the elimination of the disease.

Emily Kimball

More Bite than Bark: Ancient Dogs as Evidence for Birnirk—Thule Connections in Northwest Alaska

Mentor(s): Lauren Norman

Dogs have always been closely tied to human life in the Arctic, as they are integral to day-to-day functions such as hunting and transportation. Dogs have been so important to humans, in fact, that similarities in the dogs utilized by two different human populations are one piece of evidence for a connection between groups. While it is speculated that Birnirk people are ancestors of Thule Inuit, more concrete evidence is needed to confirm this; one way to do this is to identify similarities in dog size and use. However, only one faunal study and no DNA analyses have been done on Birnirk dogs. By measuring Birnirk dog remains and approximating their weight, size comparison with Thule and contemporary Inuit dogs can be used to support the link between Birnirk and Thule people. I used measurements of mandibles of Birnirk dogs from Cape Espenberg, Alaska to calculate the body mass of the dogs. I found that Birnirk dogs are about the same size as contemporary Inuit dogs, but larger than Siberian dogs and smaller than southern Native American dogs. Similarities in size between Birnirk and Thule dogs support the hypothesis that Thule Inuit are descendants of the Birnirk people.

Brandon Kinn

NMR relaxation as a method of exploring porous networks in gelatin methacryloyl

Mentor(s): Alan Allgeier

Nuclear magnetic resonance (NMR) has a wide range of technological uses, from medical imaging to identifying unknown compounds. Many chemists use NMR data in the frequency domain but time domain methods can be useful in characterizing surface chemistry, surface area and porosity of colloids, soft porous, and hard porous materials wetted with solvents. Time-domain NMR data were evaluated for characterizing the porous network of a soft porous polymer, Gelatin Methacryloyl (GelMA), which is a widely used biocompatible hydrogel in biomedical engineering applications. Using a benchtop low-field NMR, three weight loadings of the hydrogel were analyzed yielding average spin-spin relaxation time constants (T_2) of 597, 1172, and 1598 ms at 20°C for 14, 7, and 3.5 wt% GelMA. These average relaxation times correlated with the expected trend in porosity but do not require freeze-drying and subsequent microscopy or liquid mercury intrusion analysis. Additionally they can be completed in minutes instead of the many hours required by other methods. Time- domain NMR offers a convenient option for characterizing porosity in Gelatin Methacryloyl. Ongoing work seeks to elucidate a calibration curve quantitatively correlating T_2 and pore size distribution.

Forest Kinsey

A Measurement of Comedic Abstraction

Mentor(s): Margaret Jamieson

Even though comedy and humor are enjoyed by nearly all of humanity, these concepts are still not completely understood. Humor has long been considered immeasurable, due to its subjective nature. This makes it difficult to analyze comedy without bias. I propose that it may be possible to apply an objective measurement for certain critical aspects of comedy, such as the relative level of comedic abstraction in creative works. A type of abstraction, Absolute Abstraction, and comedy have been referred to as one and the same, as their use in entertainment, literature, and other arts exhibit interrelated characteristics and purposes. Importantly, both are primarily used to address difficult subjects from a detached perspective, allowing easier discussion and new perspectives. Absolute Abstraction is composed of three progressively ordered components, which are near parallels to the principles of comedic subversion, suggesting that comedy's principles can similarly ranked. As comedy and abstraction are immensely similar, it is logical to apply a scale of abstractive complexity to comedy, allowing measurement of one critical facet of comedy and humor. A hierarchal scale of comedic abstraction is presented with explanatory detail. This proposed scale is a step toward achieving a comprehensive measurement of comedy, which will allow a nonbiased approach to comedic studies.

Charlie Kircher

Allosteric regulation of D(+) maltose on Glycogen phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen phosphorylase (GP) catalyzes the reversible reaction of glycogen to glucose-1-phosphate primarily in the mammalian muscle, brain, and liver. Present in two interconvertible forms (GP_a and GP_b), phosphorylase activity is suppressed and stimulated through complex allosteric and hormonal regulation. When blood glucose is low, phosphorylase is allosterically activated to yield sufficient glucose. When elevated, phosphorylase activity is suppressed. Although some GP allosteric effectors are commonly known, the highly-regulated enzyme is likely subject to many alternative effectors. Ranging from simple disaccharides to capsaicin, potential effectors are a common subject of interest. Initially, we analyzed the effect of AMP on GP_b activity for the reverse reaction (G-1-P to glycogen and Pi). Similarly, the effect of potential effector D(+) maltose on GP_b was assessed after assaying for inorganic phosphate formation. Pi concentration was calculated for both effectors after determining degree of precipitation with molybdate reagent using spectrophotometry. Effects were analyzed through Michaelis-Menten kinetics. AMP was found to inhibit the reverse reaction, while increasing maltose concentration stimulated Pi formation. Given the extreme significance of glycogen/glucose regulation in the mammalian body, understanding the role of potential effectors is essential for both fundamental understanding and identification of potential drug targets.

Henry Kircher

Kinetics Assays of Glycogen Phosphorylase B

Mentor(s): Roberto De Guzman

Glycogen phosphorylase b is the enzyme that catalyzes the breakdown of glycogen into glucose. More specifically, it catalyzes a phosphorolysis reaction that yields glucose 1-phosphate from glycogen and inorganic phosphate, the fate of which is determined by particular metabolic conditions in the cell. This enzyme allows us to break apart glycogen storage, converting it into glucose molecules which can be used to synthesize ATP and other energy-carrying molecules. Thus, the lack of a functional gene for glycogen phosphorylase could result in substantial negative effects for an individual. Glycogen phosphorylase catalyzes a reversible reaction. Because glucose 1-phosphate is continuously used up and at a low concentration in vivo, we looked at the reverse reaction in order to not drastically alter the enzyme properties. I performed a number of different assays at varying concentrations of substrate to analyze the kinetic properties of the enzyme at varying concentrations of AMP and followed with analysis of the impact of imidazole on the enzyme's kinetic properties. Imidazole is involved in molecules such as certain amino acids, pharmaceutical drugs, and salts. Knowing the kinetics of glycogen phosphorylase and the response of the enzyme to various effectors will allow us to further study the enzymatic response to certain compounds consumed by humans.

Elise Klaske

The Great Italian Educator: Maria Montessori and American Nativism in the 1910s

Mentor(s): Jonathan Hagel

The Montessori Method arrived in the United States in 1910, at a time when progressivism and reform were at the front of the American mind, but somehow this method of education that advocated for individualized instruction and freedom within the classroom did not become widely used. This project seeks to explain that missed connection by examining the cross-section between American nativism, progressivism and alternative education. A popular historical theory holds that nativist sentiments in America prevented the Montessori Method from taking hold, due to its founder's Italian heritage and Catholic faith. However, this study finds that due to Montessori's curriculum vitae and personal convictions, her heritage and faith did not pose any serious obstacles to American consumers. Montessori's media advocates pushed an image of her as a scientist, feminist, and advocate for freedom that appealed to the public and showcased the Montessori Method as compatible with essential American values. This research helps elaborate on the relationship between the media and alternative education, and show that the culture of celebrity was as prevalent in the early 20th Century as it is today.

Emily Kramm

Allosteric inhibition of Glycogen Phosphorylase b by D(+)mannose

Mentor(s): Roberto De Guzman

Glycogen phosphorylase is a key enzyme responsible for the regulation of glycogen degradation, a process that liberates glucose as Glucose-1-phosphate. D(+)mannose is an inhibitor of glycogen phosphorylase b and can be measured by looking at the rate of conversion of glucose-1-phosphate to glycogen and inorganic phosphate. The relationship between absorbance and concentration of inorganic phosphate was used to analyze inhibition by D(+)mannose and inhibition by AMP. A standard curve of absorbance against concentration of inorganic phosphate was used to determine a slope of $0.3078 \div 0.02197$. Quantifying the concentration of inorganic phosphate and introducing increasing amounts of D(+)mannose showed allosteric inhibition by glycogen phosphorylase b. A kinetic assay of the inhibitor D(+)mannose showed the K_m decreasing as the level of AMP increased, indicating that AMP is an inhibitor while the decreasing K_m due to D(+)mannose shows that it is an inhibitor of glycogen phosphorylase b.

Malorie Kuker, Carly Graefe & Cameron Wilson

The Developmental Function of Music for Aging Adults 66 and Above

Mentor(s): Katie Martin

Research about typical developmental expectations is abundant. Literature on music development is available for children, but is limited in its scope across the lifespan. Music therapy students preparing for a career in the delivery of music interventions must be equipped with a strong foundation in developmental capabilities of music with people and how music is integrated with other developmental domains (e.g. motor, cognitive, emotional). There are currently no known comprehensive resources that combine typical developmental expectations across the lifespan with music development expectations. Thus, the purpose of this research project is to develop a theoretical framework for how music functions to support development for adults age 66 and above.

We will use developmental milestones, neurologic foundations and uses of music for people who are 66 and above. This information will be organized by music characteristics (e.g. rhythm, melody, dynamics) to provide a rationale for how music elements relate to typical development. This information will then be applied to pre-composed music appropriate for the different age ranges and we will assess how well pre-composed music represents the theoretical rationale we identify.

This project is part of a course-based research experience in MEMT 250 Human Development and Music Learning Across the Lifespan. The project is partially supported by a Graduate Research Consultant from the Center for Undergraduate Research.

Natasha LaGrega

Expression of Human Tau Mutants Leads to Synaptic Loss in *Caenorhabditis Elegans*

Mentor(s): Brian D. Ackley & Molly E. Birrer

In Alzheimer's disease, FTDP-17, and many other neurodegenerative diseases, tau aggregation and mutations of human tau are often seen and linked to a decline in neuronal function. However, the association of tau aggregation to decline in neuronal function is not well understood, due to the fact that it is difficult to examine tau in the human brain. To further explore this, we have put the longest isoform of human tau (htau40) as well as a mutation of htau40 that causes polymerization in vitro into multiple transgenic *C. elegans* lines to better understand how the formation of the tau aggregates may lead to toxicity and a decrease in neuronal function. Our results indicate that mutations in tau lead to a decrease in synapses in the dorsal nerve cord of *C. elegans* as they age. The decrease in synapses corresponds to a shorter average life span and a decrease in movement mimicking the phenotypic effects of neurodegenerative diseases. Our results indicate that our system is a valuable tool to further explore the form and function of htau40 and htau40 mutants.

Zoe Lai

Allosteric Inhibition of Glycogen Phosphorylase b by Nicotinamide

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase b (GPb) is an important enzyme catalyzing the degradation of glycogen to form glucose during muscle contraction. The activity of GPb is carefully regulated to suit various cellular states. GPb is usually inactivated in muscle to store glycogen for times of exercise. GPb is activated when adenosine monophosphate (AMP) binds to it at its allosteric site. There are many different small molecule effectors that can up or down-regulate the enzymatic activity of GPb through allosteric mechanisms. Nicotinamide in nicotinamide adenosine dinucleotide (NADH) is one of them. NADH inhibits GPb by binding to the same allosteric site on GPb as AMP, which prevents the activation of GPb by AMP. Although the mechanism and kinetics for NADH inhibition of GPb are fully studied, there is a lack of study on the mechanism and kinetics for nicotinamide inhibition of GPb. To study the kinetics for nicotinamide inhibition of GPb, the allosteric effects of nicotinamide were tested by looking for changes in Michaelis-Menten curves in response to changes in nicotinamide concentration. The V_{max} and K_m at each nicotinamide concentration were also examined. By using these kinetic assays we showed the maximum and partial inhibition of GPb by nicotinamide. To better study the mechanism of inhibition of GPb by nicotinamide, the structure of nicotinamide and GPb was analyzed and studied through a molecular visualization system, PyMOL. Given the kinetics and structural study of nicotinamide inhibition of GPb, the mechanism of nicotinamide inhibition of GPb can be better understood.

Tyler Lamport

The Effect of D (+) – Mannose as an Allosteric Inhibitor of Glycogen Phosphorylase B

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase B (GPb) is an enzyme necessary for energy production in all multicellular animals, including humans. It is important to understand its mechanism of glycolytic cleavage to be used in gluconeogenesis as this process is necessary for metabolic processes to continue even when an organism is under the stress of fasting. Although there are a multitude of activators and inhibitors for this enzyme to be regulated, the allosteric inhibition by hexose sugars seems to be one that is easily understood and able to be studied. Through various metabolic assays, the kinetics of GPb were measured by running the glycogenolysis reaction in reverse and measuring the production of Inorganic Phosphate by the means of a colored indicator, molybdate ions, which produce an absorbance which will indicate how effectively our enzyme catalyze the reverse reaction. The hexose sugar of D(+)-Mannose has the same chemical structure of glucose and is able to be catalyzed for oxidation in glycolysis. With this in mind, it was hypothesized that the Mannose would be an inhibitor of GPb in the same way that its constitutional isomer, glucose, inhibits GPb; which as V_{max} and K_m values indicate, was indeed the case. This research concludes that hexose sugars, such as D (+)-Mannose, inhibit Glycogen Phosphorylase B and provide reason to believe that other hexose sugars would do the same.

John League

Allosteric regulation of Nicotinamide on Glycogen Phosphorylase b

Mentor(s): Guzman

Glycogen Phosphorylase is an enzyme that breaks up glycogen into glucose that can be used in the citric acid cycle. This enzyme is very important in the energy regulation of the cell being activated at the wrong times could cause the cell to waste energy. Many activators and inhibitors have been discovered for this enzyme one of the inhibitors is Nicotinamide. Nicotinamide, NADH, is an important molecule in cells for redox and oxidation reactions. It is especially important in carrying electrons from the citric cycle to the electron transport chain. This may be because NADH is abundant when the citric acid cycle is operating. This would be a sign that there is glucose being used by the cell and large concentrations of NADH could signal that no more glucose is needed. This lab was conducted to determine the impact on V_{max} and the K_m of the enzyme. Assays were run with the intention to find out the standard curve to find concentration from absorbance at a specific temperature and concentration. Kinetic assays then begun with varying concentrations of substrate, Glucose-1-Phosphate, and with varying amounts of inhibitor and nicotinamide. The significance of this is that glycogen phosphorylase can be inhibited by molecules that are made in the presence of the citric acid cycle operating.

Daniel Lee

Person, Party, and Politics: Analyzing the Meanings of "Left" and "Right" in European Contexts

Mentor(s): Brian Lagotte

Amidst the rise to power of populist parties in Europe, political scientists are reconsidering the traditional meanings of left and right in European politics, with some going as far as to suggest other axes to compensate for, or replace, the left-right schema. This project delves into just what "left" and "right" mean for European voters by analyzing responses from the European Social Survey. By utilizing voters' self-identification, partisan choices, and political opinions, this project looks to see what ideological divides define each country's left and right. With the Theory of Basic Human Values as a foundation, this project created models based on suggested political spectra and scales to look not only at the political choices of voters but also at the underlying values of those choices. The project evaluated the model fits of the spectra in each country, and the spectra's correlations with voters' personal values, political opinions, and party affiliation along the amorphous left-right schema. The two hypotheses of the project are (a) the open-closed spectrum would most precisely and accurately connect the values of populist voters and parties, and (b) the voting blocs for the prominent left-center and right-center parties will identify broadly across the other axes and values. The discoveries of this project provide a voter-oriented basis (rather than a uniquely policy or a priori basis) to develop a political spectrum to reflect contemporary political circumstances, namely with the rise of populism.

Trevor Lies

The Effect of an Abstract Construal on Perceptions of a School Shooting Scenario

Mentor(s): Monica Biernat

This research examines whether engaging in abstract versus concrete thinking influences perceptions of a school shooting scenario. Combining insights from Attribution Theory and Construal Level Theory, we examine whether participants could be influenced to think of a situation in a more comprehensive manner that would make situational factors more salient, and dispositional factors less so (Heider, 1958; Trope & Liberman, 2010). In an experiment (N = 183), participants were randomly assigned an abstract or concrete condition. Those in the abstract condition were asked to recall a broader category of words, while those in the concrete condition were asked to recall examples of words from a broader category (Fujita, 2006). Both groups then read a vignette about a school shooting, and give their thoughts on responsibility, severity, and policy endorsement, amongst other variables. Participants primed with an abstract (vs. concrete) construal reported less internal responsibility, lower severity, and higher overall positivity toward the shooter. Our main hypothesis was supported because participants who were primed with an abstract construal tended to give fewer internal attributions to the school shooter. This pattern was particularly strong among ethnic minority participants. Ethnic minority participants in the abstract condition gave fewer internal attributions to the shooter's actions, possibly due to the fact that most of the minority participants in this sample were Asian, and sensitivity to context is consistent with interdependent cultures (Markus & Kitayama, 1991). Construal level did not influence White participant's perceptions of the shooter.

Brian Locascio

Music & Harm – A preventative model for premature infants in the NICU

Mentor(s): Deanna Hanson-Abromeit

Healthcare practices have extended the lives of premature infants. Music interventions have contributed to premature infants improved physiological outcomes (e.g. oxygen saturation, sleep, weight gain, and regulation of heart rate). Music therapy utilizes elements of music to instigate change towards a desired goal by a certified board music therapist; however, there is limited research related to music interventions and the potential for harm. The purpose of this study is to identify the theoretical risk factors of music interventions with potential for harm to premature infants in the NICU, and to conduct a secondary analysis of previously reviewed research to evaluate the strength of the relationship for these risk factors.

The research questions are: 1.) What are the risk factors associated with the potential for harm in music interventions for premature infants in the NICU? 2.) What is the strength of the relationship of the identified risk factors for potential harm between premature infants and the characteristics of reported music interventions (e.g. receptive music listening). 3.) What risk factors for harm should be considered and monitored in future music intervention studies to minimize the potential for harm in premature infants.

Specifically, data for this study will examine studies using receptive music listening as an intervention strategy with premature infants. To date, recorded music articles (n=28) have been identified. These articles will form the data to assess the potential relationship for risk factors of harm for premature infants receiving recorded music interventions in the NICU.

Ernesto Lopez

The Museum of the Sustainability of Waste

Mentor(s): Professor Kapila Dharmasena Silva

The phrase 'sustainability of waste' is a paradox; waste is inherently unsustainable. However, waste is a product of human consumption as we must consume to survive. It is inevitable. As a species we must continue to adapt to the constraints of limited resources and push for sustainable methods when it comes to our waste. The design of this museum project, located in the Arts District in the heart of downtown Dallas, TX, was developed through an investigation into our current methods of waste management as well as into the use of sustainable building materials and technologies. The museum is intended to represent the post-consumption life of a product through material and architectural choices. Waste product start in one place, eventually make their way to a plant to be crushed, categorized, and decomposed or recycled. The journey through the museum starts on the first floor where you visibly can see a trash collection, creating a sense of an awakening to the consequences of consumption. As you make your way up to the main exhibit, light filters down from the sustainable canopy, filled with recycled plastic bottles, symbolizing the awakening of repurposement. From there, the galleries are categorized and oriented through a matrix of order. Visitors then can learn of the many sustainable waste management methods being used throughout the world, thus having an awakening to responsible consumption. As visitors leave, they must pass the trash collection one last time as a reminder that they - the consumers - now have the knowledge to make what is inherently unsustainable into something sustainable.

Justin Lorenz & Tate Bestwick

Optimization of Hybrid Energy Grid

Mentor(s): Kyle Camarda

The current transition in energy production from traditional networks that run solely on fossil fuels to sustainable systems has created a challenge in terms of infrastructure design. The new goal is to enhance the use of renewable sources, while always meeting local energy demands with the objectives of minimizing both cost and environmental impact. Our initial problem considers the operation of a wind and solar energy network, while optimizing costs and limiting the energy borrowed from a traditionally-fueled grid. This includes minimizing the release and storage of carbon dioxide into the atmosphere due to the traditional grid system. This problem was formulated using data from a real network of wind and solar generating plants in New South Wales, Australia. The problem was formulated as a mixed-integer linear program, and was solved using the branch-and-bound solver CPLEX, within the General Algebraic Modeling System. The optimal solutions for different scenarios help to guide operators, since they can better understand the trade-offs between costs and carbon emissions. Another useful result was that the optimal operating policy allows for the network to operate almost independently, limiting the amount of energy needed from the fossil fuel-based grid. Next, the efficiency of a new renewable energy grid was tested based on a model created by Abdullah et. al (2015). This model combines the two most common forms of renewable energy, solar and wind, and was optimized against both the cost and the CO₂ emission rate. The results allow a comparison between different network configurations and scenarios.

Nick Lowe

Changes of IpaC secondary structure in micelles by Circular Dichroism spectroscopy

Mentor(s): Roberto De Guzman & Amritangshu Chakravarty

Shigella and Salmonella are examples of Gram-negative pathogenic bacteria. These bacteria utilize the Type III Secretion System (T3SS) to inject and infect eukaryotic cells with virulence factors. The T3SS is made up of a base, extracellular needle, tip and translocon. These components comprise the needle apparatus of the T3SS. Translocons can be categorized by molecular weights: major and minor translocons. IpaC is the minor translocon of the Shigella. We have used Circular Dichroism spectroscopy to show that IpaC and its N-terminal and C-terminal domains take on conformational changes when inserted into DPC, LMPG, and SDS micelles. The results will help to better understand the role of IpaC and T3SS in pathogenesis of Shigella.

Brianna Marsh

Decoding the Neural Substrates of Intent to Speak

Mentor(s): Jonathan Brumberg

In this study we used an electroencephalogram (EEG) based brain-computer interface (BCI) to decode intent to speak and complexity of intended word from healthy participants using a brain wave called the contingent negative variation (CNV). The CNV is a brain wave that is elicited in anticipation of a motor command like speaking (indicating intent to speak), and may be further implicated in inhibition of competing alternatives during cognitive planning. We defined 9 levels of complexity via 3 levels of increasing syllable structure by 3 levels of word frequency in American English. Healthy participants first saw the stimulus word presented in red or green to instruct them to speak (green) or not speak (red) the word aloud at the next cue when the word turns white. Each word appeared throughout the experiment in both a “speak” and “don’t speak” condition in randomized order. An artificial neural network (ANN) will be trained on this data to then decode, or predict, when participants had intent to speak and what level of word complexity the stimulus had from brain activity alone. Thus far, we have found that the CNV presence is indicative of intent to speak, but the ANN may be needed to decode finer aspects of the signal to determine word complexity. When applied to existing BCI’s for communication, we hope this will speed up the process of communication by separating decoding of speech intention from speech content.

Brandon Martin, Brian Schath, Kaitlyn Foster, Hannah Bohacek, Mary Stites, Hattie Hobart & Kathryn Pamperin

Food Access and Transportation in Kansas City

Mentor(s): Mark Jakubauskas

Stable access to affordable and healthy food is essential for quality of life, but proves to be an issue for many Americans. In Kansas City, socioeconomic inequities and limited access to personal vehicles present many families with food insecurity issues. This limited access to food results in negative health outcomes for the community.

Transportation has been named the top impediment to peoples' ability to reach food, and the Kansas City Healthy Kids' Fare Food Shopping initiative works to improve transportation through more effective, more equitable communication as well as general bus route infrastructure improvement. The primary objective of this program is to inform policy that will assist Kansas City families in accessing healthy and affordable food. This project aims to support the Fare Food Shopping initiative through a literature review of food access and food desert issues, and through an outreach effort to food retailers in the Kansas City area.

Brandon Martin, Shane Hefner, Rain Bruce & Patrick Kennedy
California Wildfires and an expanding Wildland-Urban Interface

Mentor(s): David Rahn

California has a long history of wildfires. Recent events indicate that the impact of wildfires on the people and economy could be increasing and might be linked to several factors including changes to land use and climate. With California's continued urban expansion and a likely increase in climate-related stresses such as drought, there is likely a greater risk of loss of life and property in the coming years. The amount of potential risk an area experiences will be assessed by considering Wildland-Urban Interface (WUI). The WUI is a land use classification that identifies areas where urban development intersects with wild landscapes. These areas are at particular risk for fire due to their proximity to large amounts of vegetative fuel for wildfires. Using a geographic information system (GIS) analysis, we first diagnose how much land is currently at a high risk for fire. To investigate the most likely scenarios associated with an increase of fire risk, we use urban growth projections to help determine how the risk of fire will change in the future. This analysis will be based on fire-related data from the State of California and supplemental information from California Natural Resources Agency. In addition to WUI, fire vulnerability will be assessed throughout the state according to CalFire hazard criteria including topography, vegetation cover, and rainfall. This analysis of urban and non-urban fire risk will yield a greater understanding of the present and future danger fire presents to the citizens of California.

Lani Martin

Cognitive Decline in Elderly Adults With and Without Hearing Loss

Mentor(s): Cynthia Hunter

To examine the relation between age-related hearing loss and cognitive decline we compared working memory task performance of young normal hearing participants, elderly normal hearing participants, and elderly impaired hearing participants. There is convincing evidence for four different directional hypotheses that support either a causal relationship between hearing loss and cognitive decline or a third factor producing both conditions. At this time the evidence for no single hypothesis is sufficient to fully explain the link. Participants were scored on a working memory task that included sentence judgment and digit recall components. Pure tone audiometry measures were also collected for each participant. Accuracy and reaction time in the working memory task were significantly different among the three hearing levels: young normal hearing, elderly normal hearing, elderly impaired hearing. Results are discussed in terms of support for the four proposed hypotheses for the link between age-related hearing loss and cognitive decline.

Stephanie Matthews

The Kinetic Effects of Theophylline on Glycogen Phosphorylase B

Mentor(s): DeGuzman

Glycogen Phosphorylase catalyzes the release of glucose 1-phosphate from the body's glycogen stores. When activated, the subsequent release of glucose into the blood replenishes the organs with the energetic molecules required for proper function. The conversion of glycogen phosphorylase between its active (glycogen phosphorylase a) and inactive (glycogen phosphorylase b) forms in response to external cues, while maintaining an adequate catalytic rate, allows for the proper regulation of blood glucose levels. Synthesizing pharmaceutical drugs which do not alter glycogen phosphorylase's activity remains a task for biochemists and pharmacologists alike. Theophylline, a drug used to treat various pulmonary diseases, may adjust glycogen phosphorylase's kinetic activity, causing the side effects associated with the drug. In order to test theophylline's effect on glycogen phosphorylase activity, spectrophotometry was used to detect the amount of inorganic phosphate produced by the enzyme, which becomes blue in color after interacting with the stopping reagent. Glycogen phosphorylase was assayed with various concentrations of the substrate glucose 1-phosphate to determine a standard curve, and was then assayed with the addition four increasing concentrations of the effector in the same fashion. The absorption increased as the amount of theophylline added to the solution increased, indicating the production of a larger amount of inorganic phosphate ions as the concentration of the added theophylline increased. This indicates theophylline to be an inhibitor of glycogen phosphorylase activity. These findings indicate that alternative drugs which do not alter glycogen phosphorylase activity may be preferred for the treatment of chronic pulmonary disorders.

Kate Mays

He Said, She Said: examining opportunities for gender bias intervention in selecting expert sources for reporting

Mentor(s): Ivery Goldstein

This project examines possible opportunities for gender bias intervention to journalism students at the University of Kansas in regards to expert source selection. Currently, there is no required curriculum in the journalism school that teaches students about acknowledging and overcoming biases. I examined prior research that shows that men are used as expert sources significantly more than women. Using a gendered lens, I did a content analysis of several journalism syllabi to look for references of biases or expert source selection as well as conducted focus groups and interviewed journalism students about how they choose expert sources and professors about if and how they teach students about biases. Because of my findings, I argue that there should be increased discussion surrounding gender biases in reporting in the School of Journalism.

Colin McCue

Kinetics Assay of Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen phosphorylase b catalyzes the release of glucose-1-phosphate from glycogen within the cell. Glycogen phosphorylase activity is up or down regulated within the cell based on its energy needs. This is done through a variety of allosteric effectors that act on glycogen phosphorylase b. The unknown of this experiment was the effect of theophylline on glycogen phosphorylase b activity. To determine the effects of theophylline, a kinetics assay was run. The results of the kinetics assay showed that increased concentrations of theophylline resulted in less enzyme activity. This indicates that Theophylline acts as an inhibitor to glycogen phosphorylase b.

Alexis McGhee-Dinvaut

Race Impacts On Mental Illness Stigmatization

Mentor(s): Nyla Branscombe

Mental illness is a topic that while people have become more educated on is still widely stigmatized. Because of the heavy stigmatization, it has led to negative perceptions of those with illness and treatment. The hope is that “ less stigma would lead to greater openness about seeking out treatment or staying in treatment” (Schomerus 2012). This study will focus on how race affects how a person perceives mental illness. Data will be gathered about one's level of stigmatization, along with other sociodemographic factors. After data collection, analysis will be done to see if there is a correlation between one's identified race and how they view mental illness. Ultimately, the goal is to see if higher levels of stigmatization would lead to a higher prevalence of mental illness. If specified groups can be identified, that could lead to possible interventions and overall improved mental health.

Meghan McNamee

The Phoenix Rising from the Ashes?: The Reconstructed Dresdner Frauenkirche and the Fantasy of Healing in Post-Unification Germany

Mentor(s): Ari Linden

The bombing of Dresden in 1945 left both physical and emotional scars on the German city, one of which was embodied in the rubble of the Frauenkirche (Church of our Lady), which stood in the city center from 1945 until its reconstruction from 1994 to 2005. The ruins of the church became a symbol of destruction, loss, and suffering experienced during the war; its reconstruction came to symbolize national healing and unification. While the reconstruction project was incredibly popular among the citizens of Dresden and funded largely through private donations, it has also been criticized by academics and scholars internationally for its symbolic attempt to erase or reverse the past and for its emphasis on German victimhood and suffering. My presentation builds upon this research by considering both the Frauenkirche's function and status as a memorial within the context of German Erinnerungskultur ("Culture of Remembrance") as well as the ways in which the reconstruction actually works against remembrance by creating a false narrative of healing and the erasure of the past. My paper analyzes, finally, the contributions of both the German and international media to this narrative through their idealized and fantastical portrayal of the church as a "Phoenix rising" or "Jewel in the Crown of Europe," while largely ignoring its controversial status as a symbol of German suffering among the recent rise of Neo-Nazis and right-wing extremists in the former East Germany.

Kathleen Meeds

The Israel-Palestine Conflict in German and American Media

Mentor(s): Andrea Meyertholen

In this project, we will compare how the three most popular German and American online news sources report events concerning the Israel-Palestine conflict. While some sources tend to publish articles that support American or German political relationships, others do not.

This project explores how elements, such as word choice, point-of-view and use of photography can help frame these events. This project also looks into how often different news sources publish articles concerning Israel and or Palestine, and what types of events they tend to focus on.

The goal of this project is to better understand the trends of news that Germans and Americans are highly likely to see. We will also explore how the media may be influenced by cultural and legal aspects, and how those differ between countries.

Henna Mehta

Inhibition of Glycogen Phosphorylase B by Imidazole

Mentor(s): Roberto De Guzman

Imidazole is a polar, ionizable, and aromatic compound that is often used in pharmaceutical research and is an inhibitor of glycogen phosphorylase b. Derivatives of this compound is used for anti- cancer, anti-diabetic, anti-depressant, anti-inflammatory, and anti-viral activity. It can be useful for diseases like diabetes mellitus, stroke, depression, and hypertension. Inhibition of glycogen phosphorylase can cause provide treatments for diabetes and other cardiovascular diseases. Glycogen phosphorylase b is an inactive form of phosphorylase. When one finishes exercising, AMP levels are elevated and phosphorylase B is activated. So looking at the effect of imidazole activity in different concentrations of AMP, we can see how future medicines containing imidazole can have an effect on the gluconeogenesis process in the cell during minimal or strenuous exercises. In this research paper, the inhibition of glycogen phosphorylase b by imidazole was looked at four different AMP concentrations. The highest concentration of AMP at 10 mM was seen to be the most effected by the inhibition and had the lowest velocity of the four concentrations. That being said, the one with no AMP had the highest velocity and was not as effected by the inhibition of imidazole as the other ones.

Henna Mehta

Wear and Tear of Bees Mandibles

Mentor(s): Victor H. Gonzalez Betancourt

It is no secret of how important bees are to the ecosystem. It is a passion of many to understand and learn the workings of this magnificent insect. In this project we will be looking closely at how the mandible of bees get worn down as their life span goes on. It will be seen how the razors of the bees get worn down first instead of the actual teeth. Electron microscopy and softwares are used to determine the surface area of these razors to see how much each ridge has degraded and where it starts. We have taken the female bees and also measured the body size and wing span to compare and observe the correlation between the two.

Camila Andrea Mican Rondon

Systems of Oppression or Emancipation? Understanding the Colombian Education System Through Critical Education

Mentor(s): Brian Lagotte

The Colombian Peace Treaty of 2016 invited close reflection regarding the efficacy of pedagogical practices (PP) and educational curriculum (EC) in creating political and socioeconomic equity in the country. The present research examines the effect of socioeconomic status on perceptions of adults in Bogotá regarding the nation's EC and pedagogy. Previous research looked at the relationship between EC and the elite's oppression of lower classes, as well as pedagogy's effect on the sociopolitical development of a country. The research will use Critical Education Theory, hence assuming EC and pedagogy maintain the socioeconomic privilege of higher classes in society while preventing the social mobility of lower classes by intentionally excluding the teaching of critical thinking. This project unfolds through content analysis of interviews. Moreover, the research triangulates data with thematically coded surveys. Most likely, socioeconomic status affects the perception of education, the research will unveil how. The project will urge educative institutions to rethink the present curriculum and pedagogy by providing data about the inefficiencies of EC and pedagogy in promoting equitable social, political, and economic development in the country.

Sofia Mildrum Chana

Discrepancies between teacher-and child- reports on proactive and reactive aggression: Does prosocial behavior matter?

Mentor(s): Paula Fite

Previous research has demonstrated that children and teachers may differ on their reports regarding the functions of childhood aggression (i.e., proactive and reactive aggression). Further research is needed to understand how reporters' discrepancies may be moderated by other variables (e.g., teacher-perceived prosocial behavior) within-time, as well as how these variables may change over time. The current project will examine the discrepancies between teachers' and children's reports of proactive and reactive aggression as well as how teacher-reported prosocial behavior moderates reporters' discrepancies of aggression. Previously collected data will be used for the project to examine an elementary school population at two time points (i.e., fall and spring semester within the same academic year). This study will also analyze whether discrepancy scores change over time. Self-reported measures of proactive and reactive aggression, as well as teacher-reported measures regarding their students' proactive aggression, reactive aggression, and prosocial behavior will be analyzed. This project postulates that prosocial behavior is an influential factor that may explain the discrepancies between teachers' and children's reports of aggression. Specifically, prosocial behavior is expected to be negatively associated with teacher-reports of reactive and proactive aggression, such that the moderated effect of prosocial behavior will likely reduce the discrepancies between child- and teacher-reported aggression.

Sidney Miller, Elliott Renft & James Jeong

Freshman Habits and the Myth of the 'Freshman 15'

Mentor(s): Victor Gonzalez

Obesity is on the rise, and there is a common myth that incoming Freshmen gain 15 pounds after their first year, known as the 'Freshman 15.' However, there are many factors that contribute to this increase in weight, and therefore, we will examine the different ways they gain weight. We examined the Sophomores at the University of Kansas in Human Anatomy class by asking several questions via SurveyMonkey. The responses from students were categorized and information was incorporated into a graph that explored trends and habits. Then, the results were compared to the self-reported weight gains to examine whether or not these habits correlated with increased weight.

Susannah Mitchell

Click Me Baby, One More Time: An Intersectional Feminist Analysis of the "Sugar Baby" Phenomenon

Mentor(s): Ivery Goldstein

The terms "sugar baby" and "sugar daddy" have entered the cultural lexicon in the last couple of decades as indicators and labels of people participating in a specific kind of sex work known as "sugaring." "Sugaring" involves an extended (usually sexual) relationship between the "baby" and "daddy" in exchange for money, gifts, or favors that the sugar baby receives. This essay seeks to examine the sugar baby phenomenon through the lens of intersectional feminism and to discover commonly-held identities among sugar babies. Through data collection and analysis of previous literature (concerning sex work) and sugar dating websites, as well as interviews with three self-proclaimed "sugar babies," the research discovers the methods used by sugar babies to find and connect with sugar daddies as well as the similarities in identity between sugar babies. Sugar babies tend to find their sugar daddies through the use of websites intended for the purpose of connecting daddies and babies in the pursuit of forming an arrangement. Often, these relationships continue offline via text messaging or a messaging application, with meetings often occurring at hotels or either of the participants' homes. The research finds that the "typical" sugar baby can be described as such: young, white, female, in college. This research intends to understand what the typical sugar baby looks like and experiences, including the process involved in finding a sugar daddy and maintaining the sugar relationship. These discoveries add to previous literature by specifically utilizing Intersectional Feminist Theory (IFT) and examining an under-researched topic.

Joshua Mitchell

Allosteric Mechanism Evaluation of Glycogen Storage through Inorganic Phosphate Regulation by Dextrose with Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Dextrose (D-Glucose) is used to combat many medical issues such as malnutrition and is known to cause high blood sugar. Dextrose is also taken as a supplement to increase the amount of glycogen stored in the muscle, but the mechanism by which dextrose effects the glycogen catalysis pathway as an allosteric effector is unknown. There is pre-existing evidence showing that dextrose is easily able to directly increase blood glucose levels and that glucose acts as an inhibitor to the glycogen catalysis pathway by assisting in the conversion of phosphorylase a to b from two allosteric sites. In this experiment, a correlation between glycogen phosphorylase b and dextrose is established. To demonstrate this correlation, the standard curve of inorganic phosphate was evaluated with the phospho-molybdate complex for the extinction coefficient. Using a time-controlled stop and reading of the reaction, with the addition of dextrose at different concentrations, the nature of the effector was evaluated. With spectroscopy and rate-controlled reactions, dextrose was shown to be an inhibitor similar to other monomers to the glycogen catalysis pathway. Understanding how introducing dextrose can lead to glycogen storage by inhibiting glycogen catalysis, shows how dextrose can be used for muscle recovery after taxing exercise and how it could be used in combination with other molecules in studies for greater regulation of glycogen storage.

Corey Monley

Online Gaming Focus Groups

Mentor(s): Bruce Liese

As of 2018, 66% of individuals in the United States aged 13 years or older regularly play video games, with overall video game play increasing by 8% since 2013. Most individuals that play video games face no adverse consequences. However, some individuals do experience problems of psychological, neurobiological, and/or social functioning. Internet Gaming Disorder (IGD) is a recent conceptualization of problematic video game play reported in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) under Section III: Conditions for Further Study. The criteria for IGD resemble criteria for Substance Use Disorder and Gambling Disorder. In a recent polling at a meeting of the San Diego Psychology Association, one third of psychologists stated that their clients had expressed concern about excessive video game use pertaining to themselves or family members.

The purpose of the present study is to elicit attitudes of gaming and gaming behavior while examining attachment related behaviors and beliefs within and between three groups: collegiate aged frequent gamers and infrequent gamers, and non-gaming adults over 40. This study will employ self-report surveys and focus groups for data collection. I am hypothesizing that frequent gamers will exhibit a higher prevalence of insecure attachment related beliefs and behaviors when compared to occasional gamers and non-gaming adults, which will be reflected in self-report surveys. This relationship between attachment behaviors and gaming behaviors found via statistical analysis of self-report surveys will be further explained through thematic analysis of focus group transcripts.

Hollie Mullin

Differences in Experiencing the Speech-to-Song Illusion as a Function of Age

Mentor(s): Micheal Vitevitch

Illusions occur when our senses incorrectly perceive what is in our environment (Castro, Mendoza, Tampke, & Vitevitch, 2018). Although many people have experienced visual illusions, illusions affect many of our other senses as well. The Speech-to-Song Illusion is an auditory illusion that occurs when a spoken phrase is repeated. After several repetitions, some listeners report that the phrase seems to be sung, rather than spoken. Node Structure Theory (NST), a model of language processing, was recently investigated as the cognitive mechanism that underlies the Speech-to-Song Illusion (Castro et al., 2018). NST accounts for a variety of language- and memory-related phenomena, including increased experiences of the tip of the tongue phenomenon (where you know a word, but can't bring it to mind) in older adults. Based on the age-related change in the tip of the tongue phenomenon, we predict that older adults are less likely to experience the Speech-to-Song Illusion than younger adults. This project will examine how older and younger adults experience the Speech-to-Song Illusion by collecting data through Amazon Mechanical Turk (Amazon MTurk). This project will tell us more about the Speech-to-Song Illusion and help us better understand speech and music perception.

Mariaelena Nabors

Sucrose and Diphenhydramine as effectors of Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen phosphorylase b catalyzes the breakdown of glycogen to glucose 1-phosphate (G1P) in situations where the homeostasis of blood glucose needs to be maintained, for example between meals. After this initial breakdown G1P is converted to glucose 6-phosphate where it is free to enter glycolysis and generate ATP. Glycogen phosphorylase b is regulated by many molecules within the cell. However, identification of all glycogen phosphorylase b effectors is still incomplete. Mutations within the glycogen storage pathway can lead to numerous diseases like glycogen storage disease V, McArdle disease, which creates an inability to break down glycogen altering the function of muscle cells.¹ The allosteric effects of Sucrose and Diphenhydramine on glycogen phosphorylase b were tested by performing kinetic assays with changes in effector and substrate concentration. Using comparisons between the V_{max} and K_m values of assays performed with the effector and assays performed without, I was able to determine Sucrose acts as an activator and Diphenhydramine acts as an inhibitor toward glycogen phosphorylase b. Given the key role mutations within glycogen metabolism have on widespread diseases like McArdle disease, this discovery could lead to the development of new therapies for it and other diseases caused by mutations in the regulatory molecules of glycogen synthesis and degradation.

Tyler Nguyen

Biosensors, Biocatalysts, and Beyond: Putrescine Oxidase Immobilization on Gold Nanostructures via Peptide Tags

Mentor(s): Cindy Berrie

Redox enzymes, which transfer electrons, are promising components for advanced electronic devices. Electrical current from redox reactions between enzymes and reactants could generate signals for biosensors in disease diagnostics, and power environmentally-friendly catalysis and fuel cells. To make these devices, it is necessary to control enzyme shape, orientation, and placement at surfaces. In this presentation, we will discuss the results of binding a redox enzyme, putrescine oxidase (PutOx), to a variety of different surfaces, including self-assembled monolayers (SAMs) and metal surfaces. The selective binding of this model protein to metal nanostructures, through a genetically-engineered peptide tag, allows control over the orientation of the protein at the surface. The control has been demonstrated through atomic force microscopy (AFM) experiments to monitor the shape and density of the protein (with and without the engineered tag) on the surface. This control of position and orientation is critical in biosensors for disease diagnosis and must be optimized if nanoscale sensing elements are to be achieved for point-of care, lab-on-a-chip diagnostics. In this work, we explore the use of hydrophilic SAMs as the background resist layers, due to the reduced denaturation and binding of protein observed on these surfaces. We also explore procedures for the formation of hydrophilic silane-based SAMs with terminal hydroxyl and carboxylate groups. These silane SAMs should provide a robust resist layer that allows selective, controlled binding of PutOx on the patterned metal nanostructures.

Thomas Nowatzke

Post Traumatic Stress and Secondary Traumatic Stress on Aid Workers

Mentor(s): Prof. Sandra Gray

The purpose of this research is to examine the impact on Post Traumatic Stress Disorder (PTSD) and Secondary Traumatic Stress (STS) or known as Vicarious trauma, experienced by Aid and Health workers in Rwanda during the Genocide. Humanitarian aid workers deal in conditions that would cause major psychological impacts and leave victims of the event. While it is important to recognize the Rwandans themselves and their own experiences, it is equally important to see the effects that the genocide had on those that weren't directly targeted in the killing. Being able to connect the symptoms of mental health from both victim and aid worker. What I hypothesis is that ultimately aid workers themselves become victims and in turn would become survivors of the Rwandan Genocide.

The Major areas of study will focus on PTSD and STS as nonclinical employees or volunteers that are exposed to physical or psychological trauma both in direct or indirect forms. As in the case of Rwanda, there are several cases in where Aid Workers were given the choice of who is to be spared or kill, or worse forced into the crime itself. These symptoms would eventually manifest after the event. As a large number of aid workers during and after the genocide would be diagnosed with depression and even committed suicide.

Hayley Nugent

Anti-Immigrant Rhetoric by the United States Government Upholds Colorism: The Impacts on Interpersonal Relationships and Mental Health of Latino Immigrants

Mentor(s): Ivery Goldstein

This project examines the current implications of colorism, or the devaluing of dark skin, on Latino immigrants during the resurgence of white nativism by the current United States administration. The upholding of color hierarchies are deeply embedded into our society, and are further perpetuated by the media and our current government. Through analyzing Donald Trump's anti-immigrant rhetoric, patterns are found that equate immigrants to being criminals or dangerous. This way of thinking associates having a darker skin tone with having negative qualities. Bringing the academic disciplines of Spanish and Women Gender Sexuality Studies together, this research focuses on the effects of colorism specifically in relation to dating culture, gender norms, and mental health. Research has shown that for Latinos, their perceived skin tone affects their preferences of skin color for dating partners, due to internalized colorist messages about the implications of each skin shade. These racial self-classifications also impact the mental health of deeper skin tone identifying Latinos who statistically face higher levels of depression, due to discrimination. By interviewing Latino immigrants from Costa Rica and Mexico, my research uncovers the powerful influence that racial stratification has over Latino immigrants in the United States. The goal of this research is to raise awareness of these effects and encourage accurate representation of marginalized groups by our government and media. By challenging the rise of white supremacy, a more inclusive and respectful environment that supports diplomacy between cultures for all living in the United States can be created.

Michelle Oboro

Stigma and Attitudes Surrounding the Intersection of African American Women, Domestic Violence, and Substance Abuse

Mentor(s): Carl Lejuez

The evidence revealing American women face problems of co-occurring partner violence and substance abuse is extensive, but there is a gap in the knowledge on women's varied experiences with both issues. Our primary focus in this study will be to examine the effects of victim ethnicity and mental health status on women's attitudes towards a scenario involving domestic violence as well as the correlation between women's ethnicity and attitudes to the same scenario. We aim to improve the understanding on attitudes and stigma surrounding this specific community of underrepresented battered women. More sympathy is expected from Black American women, than White American women, towards an African American female abuse victim in this study.

Erick Oduniyi

Computational Stories Pt 2: Elementary Studies in Systems Architecture

Mentor(s): Folashade B. Augusto & Jonathan Brumberg

Birthered out of physics, computing, and sociology, network science provides tools for representing the structure and information propagation in biological, cognitive, computational and digital, and sociocultural systems. Principally, studying these complex systems through such network proxies afford researchers and complex systems scientist conceptual tractability, a suite of domain motivated network analysis tools, and ultimately the ability to make conjectures about the system's underlying architecture and evolutionary trajectory. As proof, an initial overview of network representations (architectures) in nature (i.e., food webs, language) and network constructions devised and mediated by humans (i.e., internet, social media) are given. Then, network foundations and basics are outlined. Finally, the showcasing of network science being used in three interdisciplinary undergraduate research projects: modeling child-language acquisition, forecasting measles outbreaks through Twitter sentiments, emotion extraction in stories through sentiment analysis and physiological sensing, and their respective preliminary results and insights are given.

Autumn Olsen

Dallas Museum of Sustainable Forests

Mentor(s): Kapila Silva

As our built environment has become more urban, society has neglected and harmed the natural environment. The result is a severe instability in ecosystems, particularly forests. The trees that make up forests are inherently sustainable because they live and support life around them. However, there is much more to forests than just the trees; they are a complete ecosystem with life forms and energy cycles. The sustainability of forests is the inspiration for this museum located in the urban environment of Dallas, TX. While being a sustainable example itself, the focus of this project was to educate about the issue of deforestation, how forests are sustainable, and what can be done to improve the sustainability of cities via urban forests. The footprint of the building is limited, allowing the rest of the site to be given back to the city as a green space. The gallery spaces and the supporting spaces are separated into two forms. The galleries are stacked together to form a tall vertical gallery volume that represents a natural form and orients toward the green area of the site with projecting display areas and balconies. The supporting spaces contrast this with an urban form along the city streets. This opposition is further expressed through the natural and synthetic material choices assigned to those forms. A central atrium space allows light to come in and begins the journey through the ascending galleries. This design enabled the building to become a 'vertical forest' as an example of how tall city buildings could incorporate nature.

Bryn O'Meara

Canonical Wnt signaling guides motor neuron axon growth in *Caenorhabditis elegans*

Mentor(s): Brian Ackley

Nervous system development requires specific molecular signals to guide axons to their correct targets. Motor neurons extend axons that innervate specific muscles for proper function. Our understanding of the mechanisms that guide motor neuron axon growth is incomplete. We study GABAergic D-type motor neurons in *Caenorhabditis elegans* (*C. elegans*) to better understand the signals that instruct axons where to stop growing.

The canonical Wnt signaling pathway regulates multiple aspects of neuronal development. Loss of function in Wnt ligands results in GABAergic axons that extend beyond their normal termination point, suggesting this signal normally induces axon termination. However, there are 19 total GABAergic neurons, and identifying which neuron is failing to terminate has been complicated by the lack of individual cell markers. We have recently developed a VD13 selective marker (termed *lhIs97*), that has enabled us to examine the role of Wnt signaling on VD13 development.

Intriguingly, we've found that, in addition to affecting morphology, mutations in some Wnt signaling genes result in altered specification of VD13, which we see as a loss of *lhIs97* expression. In canonical signaling, Wnt ligands bind to Frizzled receptors, which activate Disheveled proteins, ultimately allowing the transcription factor β -catenin to enter the nucleus. We examined the effect of two Wnt ligands (*egl-20* and *lin-44*) and two Disheveled proteins (*mig-5* and *dsh-1*) on *lhIs97* expression. Here we will report the effects of Wnt signaling mutations on VD13 specification and morphology, and update on the results of a genetic screen for other factors involved in VD13 development.

Emily O'Meara & Mara Schlichting

Comparison of Early vs Late Spring Pollen Composition in *Colletes inaequalis*

Mentor(s): Deborah Smith

Colletes inaequalis is one of 2,500 described species found in the monophyletic family Colletidae. They are solitary ground nesting bees prevalent throughout North America. Female *C. inaequalis* spend the majority of their time and resources constructing a nest and collecting nectar and pollen as provisions for their offspring. *C. inaequalis* is a polylectic species and is known to forage for early blooming trees such as *Acer rubrum* (red maple). In our study, we plan to collect pollen samples from female *C. inaequalis* from two different locations on campus during the early and late foraging season of this bee. Our goal is to determine the pollen composition present on the bees to see which plants are being visited in early versus late spring. The question we hope to answer is how foraging habits, namely pollen source, changes over the course of the foraging season. Every three days, foraging bees will be collected to obtain data from. Pollen will be collected by chilling the captured bee until it reaches an unconscious state. We will scrape the pollen from its legs and abdomen and then stain it using vital dye-glycerol mixture. Stained pollen from females will be compared to references from prestained pollen of the plant life surrounding nest aggregations and also against literature. Composition of pollen found on the bees will be plotted in order to see if there is a change as spring progresses.

Alexis Paige

Optimization of the Electrophoretic Separation of Nitrated and Non-Nitrated Species

Mentor(s): Sue Lunte & Kelci Schilly

Research has suggested that neurodegenerative disease may be a severe consequence of nitrosative stress accumulated in the human brain. One example of such nitrosative stress is the production of 3-nitrotyrosine resulting from peroxynitrite reacting with tyrosine residues of mitochondrial proteins in the brain; an excess of 3-nitrotyrosine has been observed in the brains of neurodegenerative disease patients. The overall goal of this project is to develop a practical and efficient method to detect nitrated species and distinguish them from non-nitrated species in blood samples in hopes of being able to provide an earlier diagnosis to neurodegenerative disease. Microchip electrophoresis (ME) is capable of separating multiple analytes prior to either oxidative or reductive electrochemical detection (EC). Because nitrated and non-nitrated species have different electrochemical properties, a dual-electrode detection method may be used to distinguish them. In this project, the electrode material, electrode substrate, and buffer composition were altered to optimize the experimental conditions based on the analytes of interest. Cyclic voltammetry was utilized prior to microchip electrophoresis to find the optimal oxidation and reduction potentials for these analytes. Tyrosine and 3-nitrotyrosine are the primary analytes in this study, although other easily-oxidizable and/or -reducible analytes may also be used for the evaluation of these electrophoretic methods. Through this project thus far, a greater understanding has been reached as to the optimal conditions needed for the reproducible separation and detection of tyrosine and 3-nitrotyrosine using ME-EC, which will aid in detecting these species in biological systems.

Samiyah Para-Cremer

Working Together: A Comparison of Midwestern Human Trafficking Task Forces Perceptions on Collaboration

Mentor(s): Shannon Portillo

In the past two decades, human trafficking, loosely defined as transportation, recruitment, or detainment of persons, with the “purpose of exploitation” has drawn international attention (Baker, 2006, p. 172). As the United States joined the world in combatting human trafficking with the passage of the Trafficking Victims Protection Act (TVPA) in 2000, states have followed suit with their own anti-trafficking legislation (Brennan, 2010). On a microlevel, these efforts have resulted in the formation of anti-trafficking taskforces in cities and counties across the country. These taskforces intend to represent the collaboration of different professional sectors, each with different skill sets, objectives, and targets of influence. Recognizing these actors’ diverse motivations and backgrounds, this comparative project aims to ask: How do the individuals comprising human trafficking task forces view collaboration? If different, what implications do their divergent perceptions of collaboration have on the three pillars of public administration: efficiency, effectiveness, and equity?

Anjali Pare

Hyperparameter Optimization of the level set 2D layer tracker

Mentor(s): John Paden

CRISIS studies how the melting of ice sheets in Greenland and Antarctica might affect sea-level change. A key parameter for this research is the ice thickness, which can be estimated by calculating the location of the ice surface and subglacial topography beneath the ice in radar sounder imagery. In the past, identification of the surface and bottom of each layer was performed manually and was usually very time-consuming. As a solution to this, our project evaluates and tunes a level set algorithm to automatically track the ice surface and bottom.

The contour is defined as the intersection of the surface with the 2D image. The level-set method takes an initial contour or curve for the layer and builds it into a surface. It evolves the surface that intersects the 2D radar image instead of just evolving the contour. It starts with a best initial guess contour and iterates for a prescribed number of iterations until it accurately aligns with surface and bottom. The algorithm tracks the zero-level set of the surface and the number of iterations necessary using a mathematical function. The main objective of this work is to tune the hyperparameters for this level-set algorithm by optimizing the hyperparameters to produce the best match to the training data. In this work, we parallelize the code, try different initial contours and numbers of iterations to improve the accuracy of detecting the ice bottom and surface as compared to the ground-truth images, and then assess the accuracy with our test dataset.

Nidhi Patel, Naiya Patel & Natalie Danisi

Are Cadavers or Prosections More Effective in Student Retention of Anatomical Structures?

Mentor(s): Victor Gonzalez

The Human Anatomy Observation Laboratory is a requirement for most pre-health students at the University of Kansas. In this lab, pre-health students have the opportunity to learn anatomical structures using cadavers, prosections, and three dimensional models. Though students have the opportunity to learn anatomy holistically, this class is the most dropped class among all pre-health students at the University of Kansas often due to difficulty in learning the large amount of information, resulting in poor test scores. We believe that the low test scores and high drop rate is specifically due to how students learn the anatomical structures in the classroom. Some structures are taught and learned on just the prosection, cadaver, or both. We investigated if learning off the cadaver or prosection will have a better effect on student retention of anatomical structures. To test this, an anatomical structure was tagged on the prosection, and the same structure was tagged on the cadaver during the anatomy lab student's unit 2 exam. Accuracy of the student's answers were measured. The findings may indicate a potential problem in the teaching and learning methods in this lab, leading to a more effective approach of learning anatomy in the future.

Catherine Pham

Investigating the relationship between individual differences and island sensitivity

Mentor(s): Robert Fiorentino

Structures such as *wh*-questions in English have been argued to involve movement of the *wh*-element (e.g., *What did John eat ___?*). 'Islands' are syntactic structures from which this kind of movement is not possible. While it is well-attested that native speakers tend to give low acceptability ratings to sentences that involve movement from within islands, a current debate in the language processing literature focuses on whether this is due to syntactic constraints, as argued by the grammatical view, or whether islands simply present processing bottlenecks, as argued by the resource-limitation view. The current study examines the source of island effects by investigating the relationship between island sensitivity and individual differences in cognitive abilities, as the resource-limitation view predicts a negative relationship between the two whereas the grammatical view does not.

We tested 44 native English speakers on 4 island types (*whether*, *complex NP*, *subject*, and *adjunct* islands) using an acceptability judgment task to quantify island sensitivity and three cognitive tasks to capture individual differences (reading span and counting span tasks to measure working memory, and a number Stroop task to measure attentional control). Preliminary analyses show strong island sensitivity effects across all island types, and also reveal that individual differences in cognitive abilities do not strongly modulate island sensitivity, which runs counter to the resource-limitation view. These results suggest that island effects emerge due to the existence of syntactic constraints and not because of processing difficulties, in line with the grammatical view of islands.

Anthony Pham, Hannah Cavanaugh, Nick Leseberg, Abbie Boyer & Nicole Gentry

KU Food Waste

Mentor(s): Kelly Kindscher

In order to divert more waste away from landfills, the University of Kansas has implemented a composting pilot program on campus. Currently, there are two facilities on campus aimed at collecting food waste and other compostable material. Unfortunately, besides data related to total volume of collected waste, there is no other means of assessing the community's understanding of the program or its success. This is concerning because community participation in composting efforts around campus are key to achieving the university's waste diversion goals. In order to gauge the overall progress of the pilot program, the contents of the composting collection bins were analyzed, and surveys regarding individual familiarity and knowledge of composting were distributed. While the surveys provide a direct assessment of the success of the program, the ratio of compostable to non-compostable waste indicate how well the community understands the composting process. The results of this study are vital for the university's course of action from here on out as they will indicate which aspects of their plan are successful and which will need to be modified.

Hedwick (Heddy) Pierce

Understanding Ideals of Motherhood Amongst Vulnerable Populations: The Implications this has on Community Building and Identity

Mentor(s): Ivery Goldstein

For years we have heard about “mommy wars” and viewed juxtapositions of the welfare queen and the soccer mom. This brought me to the idea of what is the ideal mother? How in our current society do we define what a mother should look like? While there is extensive research on the importance of raising a well-adjusted child, there are many gaps in the research as to what exactly women in vulnerable communities view as the ideal mother. This lapse in research is life threatening to mothers and children. Without adequate communities to build alongside, while facing social stigmas, many mothers embark on this journey alone. We cannot expect children of single or vulnerable moms to have a future outlook any better than their mothers, without community. This unfortunately works to continue oppressing people from vulnerable backgrounds by keeping them trapped in the cycle of poverty, loneliness, and desperation, without an ability to further advance. This is where my research project began; in finding vulnerable communities of women and listening and discovering what they viewed as the ideal picture of motherhood. Through pairing participant observation and semi-structured interviews, I will also look closely at existing literature to further understand these often-underrepresented populations. This research will ultimately help to further inform research on the ideals of motherhood and the role that has in community building and shaping identity through a more inclusive and holistic way.

Catherine Prestoy

All a Part of the Experience: Dating Culture and Masculine Identity of the Male American Study Abroad Student in China

Mentor(s): Ivery Goldstein

My project will analyze the male American study abroad student's self-perception of masculinity in China and how this instigates dating culture with native Chinese women. Past research has engaged with concepts of masculinity and racial dating preference as it relates to situations within America. However, rarely do these studies consider the critical factors of dating culture and masculinity as it relates to studying abroad in unfamiliar cultures. Because of changing and heightened perceptions of masculinity within male American study abroad students in China, this drives the belief that dating culture is a pivotal part of the study abroad experience. The projected results will uncover critical data in racial dating preference, masculinity and power as well as the study abroad experience as it relates to China. I will use two major research strategies: (1) in-depth interviews and (2) survey result data. The conversation around the reasoning for studying abroad fails to recognize the pushing factor of masculinity forcing dating as a component of the cultural experience. This research brings to light the gap of understanding within hegemonic masculinity and the study abroad experience. This research will add needed context in the discussion of race, intercultural dating and hegemonic masculinity.

Skylar Pryor

ACT UP, Political Funerals, and the Call for Humanity

Mentor(s): Sandra Zimdars-Swartz

When the Acquired Immunodeficiency Syndrome (AIDS) crisis struck the United States, governmental, religious and health officials met the epidemic with a level of negligence that was unmatched. For example, the Center for Disease Control did not have an accurate definition of the term AIDS for several years, and the Food and Drug Administration (FDA) failed to provide proper medication for AIDS victims (Forstein). Scholarship has been conducted on the AIDS crisis and the activist organization, AIDS Coalition to Unleash Power (ACT UP), as a means of exploring how the widespread disregard was received and combatted. Many of whom were most heavily affected by the AIDS crisis mobilized and participated in protests. Specifically, the organization ACT UP pushed limits—some believe too far—as a means to obtain the attention and care that was critical to their survival. This included organizing political funerals and other public displays of death and grieving. However, research has not studied how as a result of the neglect that AIDS victims were faced with, activists took to utilizing an array of protest tactics that turned traditional western death rituals upside down and gave space for a myriad of grieving styles. My project will examine how utilizing religious spaces and rituals for political protesting was perceived by the news media and citizens of New York City and Washington DC, in addition to how effective these tactics were in terms of policy change, as well as grieving. The proposed project will examine the implications that political funerals, the Ashes Action compared to the NAMES quilt, and the Stop the Church demonstration had on the people of New York City and Washington DC, specifically as it pertains to religious rituals and the effectiveness of their methods.

Priyanka Radadiya

Inhibitory Effect of Sucrose on Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Control of blood sugar levels in the body are very important in maintaining homeostasis and responding to the energy needs of the body. Glycogenolysis, the breakdown of glycogen into glucose, involves the key protein glycogen phosphorylase b. Thus, this protein is important to study especially for those who have Type I diabetes. Here, the effect of sucrose, which is currently unknown, was examined. In order to do this, multiple kinetic assays on glycogen phosphorylase b were done with varying concentrations of sucrose. The production of inorganic phosphate was measured as a measure of rate of reaction. This was analyzed via Michaelis-Menten graphing and determination of V_{max} and K_m values. It was found that as the concentration of sucrose increased, the V_{max} remained the same but the K_m increased. Thus, sucrose was found to be an inhibitor of glycogen phosphorylase b. This is important because it helps to understand that as high levels of sucrose are ingested, the body can control blood sugar levels by reversing the process of glycogenolysis.

Sophie Raines

How Does Pornography Consumption Alter the Roles of Individuals in Intimate Relationships

Mentor(s): Ivery Goldstein,

This research uses visual sexual stimuli (VSS) to document both positive and negative effects on mental health. Previous research has provided mixed results regarding VSS's impact, whether they are good or bad. This study is making an attempt to place broader theoretical frameworks to explore the value of VSS. The findings are somewhat contradictory in using laboratory findings that usually document positive feelings with erotica exposure, and that self-reports have showed an increase in expanded sexual repertoire. Previous research have identified that the repeated exposure of VSS use leads to an increase in sexually deviant acts and tendencies, having difficulties in intimate relationships and increased acceptance of rape myths. Other studies have documented the effects of pornography on sexual aggression and the discriminative ability of men are classified as "high risk" based on these characteristics. The impact of viewing VSS on intimate relationships is mixed. Reports, public opinion, and research data vary indifferently concerning the presumed positive and negative effects of VSS, which have both resulted in to risk dissolution of the relationship and strengthen the relationship. This particular study is formatted on individual experimentation with VSS and that individual's evaluation of one's self views of their partner and relationship satisfaction. Using excitation transfer as a broader theory, this predicts that co-viewing exciting and sexual films should further increase the positive perceptions of the partner and relationship. Social comparison theory predicts that evaluations of one's relationship and partner will be lower after-viewing erotica than viewing exciting films.

Leonor Ramos-Salamanca

Exposure to Violence, Coping, and the effect on Academic Achievement in Latinx youth

Mentor(s): Omar Gudino

Studies have shown that Latinx youth is at higher risk than their non-Hispanic white peers of being exposed to community violence. Little research has been done when it comes to the coping mechanisms used by the Latinx youth. In this study I will be looking at (a) community violence exposure and academic achievement and (b) coping and academic achievement. What affect does community violence exposure have on one's academic achievement? How does knowing how to cope with the violence one is exposed to affect academic achievement? I hope that this research will contribute to the understanding of how exposure to violence and coping affects academic achievement within the Latinx youth.

Amanda Rebori

The Allosteric Effects of Adenosine 5'-mono Phosphate and Epinephrine on Glycogen Phosphorylase b Kinetics

Mentor(s): Robert De Guzman

Glycogen phosphorylase b catalyzes the removal of glucose from glycogen in the form of glucose-1-phosphate. Its activity is crucial for the energy metabolism of cells and is regulated to meet various cell needs. GPb was purified and the kinetic properties of the enzyme examined to determine the effects of AMP and epinephrine on V_{max} and K_m . To determine kinetic parameters, the amount of inorganic phosphate that formed as a byproduct during the reaction of glucose to glycogen was measured via absorption spectrometry. A standard curve of P_i was created to calculate concentration values from absorbance measurements. The optimal temperature that GPb functions was determined to be 35 degrees C based on a thermal enzyme assay. Based on a thermal titration enzyme assay, GPb was then diluted 12-fold in all assays that examined the kinetic properties of GPb. The V_{max} and K_m of GPb were determined using a nonlinear regression in GraphPad. The allosteric effects of Adenosine 5'-monophosphate and epinephrine on GPb kinetics were examined via enzyme assays. AMP acted as an inhibitor of GPb; V_{max} decreased and K_m increased from the AMP-free kinetic parameters. Epinephrine was found to inhibit GPb activity. In the cell, Epinephrine has been shown to trigger the conversion of GPb to the more active GPa, which breaks down glycogen to yield G1P. This study's results are incongruent with current literature that has shown epinephrine to stimulate the activity of glycogen phosphorylase.

Mitch Reinig

The Impact of Airport Flight Volume and Hub Status on Metropolitan Area Unemployment

Mentor(s): David Slusky

Over the past few decades, the air transportation industry has experienced widespread consolidation due to mergers and acquisitions among leading airlines. While the impact of airline consolidation on consumers has been a hot topic within the industry for years, few efforts have sought to determine how individual airports - and the metropolitan areas they serve - have been affected by these changes. This study analyzes the five major airline mergers or acquisitions of the last 15 years, focusing on airports that lost, gained, or retained hub status as the result of these transactions. Within this context, I utilize a time series analysis to explore how hub status and flight volume impact the annual unemployment rate of the metropolitan area an airport serves.

Fabian Requesnes

Interaction of D(+)-Mannose on Activity of Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen phosphorylase b (Gpb) is an enzyme located in the muscle, liver, and brains of mammals. Its main purpose is to breakdown glycogen, turning it into Glucose 1-Phosphate. The effects of D(+)-Mannose and its interactions with Gpb are relatively unknown, and may be of use to health professionals, particularly in consideration of diets. To study the interactions of D(+)-Mannose and Gpb, protocols were made for the standard activity assays of Gpb, with addition of the activator AMP, and with the addition of D(+)-Mannose. Activity was measured as a value of absorbance after addition of substrate. Initial results show that D(+)-Mannose alters the activity of Gpb. While the assays show that D(+)-Mannose is an activator, the mechanism by which this occurs is not known. Given the importance of Gpb in maintaining blood glucose levels, inhibition and activation of the enzyme could be of use to medical professionals.

Kaitlyn Rohde

Applying a Numeric Definition of Hyper-palatable Foods to the KU Cafeteria Dining Menu

Mentor(s): Tera Fazzino

Introduction: Hyper-palatable foods (HPFs) have been suggested to play a role in the obesity epidemic because they can override homeostatic mechanisms and lead to overeating. Common ingredients in HPFs include certain combinations of fat, simple sugars, complex carbs, and salt. The majority of existing literature on HPFs has used descriptive terms to identify HPFs. There is currently no established numerical definition of HPFs in humans. Therefore, the purpose of this project was to identify a numeric definition of HPFs and apply this definition to the cafeteria dining menu at Mrs. E's Cafeteria, an all-you-can-eat dormitory cafeteria at KU.

Methods: Descriptive definitions of HPF items from existing literature were entered into nutrition software to obtain quantitative nutrition data. Next, the percent of calories from fat, simple sugars, and complex carbohydrates, along with percent weight from salt, was calculated for each food. A data-driven approach was used to determine the common numeric combinations of the ingredients in HPFs. The numeric criteria generated were then applied to KU's cafeteria dining menu covering over 27 days to determine the percentage of foods that met HPF criteria.

Results: HPF items comprised 40% (224/549) of the unique food items offered at the cafeteria. Almost half of HPF items (46%; 104/224) consisted of processed/cooked meats, fish, and meat-based dishes. Desserts (e.g., cakes, pies) accounted for about 10% of HPFs (23/224).

Conclusion: Applying a data-driven definition of HPF to a KU cafeteria dining menu revealed that HPFs constituted a substantial proportion of foods available on the cafeteria menu.

Muriel Roith

Environmental effects of the Rwandan Genocide massacres

Mentor(s): Sandra Gray

Massacres across the globe force us to re-evaluate the effect they demonstrate. Not just on people, but the environment as well. This study inquires what the effects were and if the results of the massacres in Rwanda after the genocide produced beneficial results on the environment. By looking at the Rwandan Genocide, it can serve as a recent example of large-scale slaughter that we can use to assess the environment that many people are living on today. Due to the lack of environmental studies over the Rwandan Genocide, I will be looking at the body decomposition process, mass deaths of animals in limited regions, google earth to observe the environmental changes over time of mass grave sites and Rwandan National parks, and a study that examines soil contamination of mass graves. Contrary to widespread belief, decomposing bodies are not as threatening as we may think and they can actually benefit the environment if they are disposed of in the appropriate way. Infrastructure and population are steadily rising in Rwanda, so it is important to know the environment Rwandans live in and build upon. Another question might ask, could the profound effects on the environment affect the lifelong health of the local people as well? This study is apart of Sandra Gray's Anthropology 391 Rwandan Genocide research class.

Adrian Romero

Sustainability of Algal Biofuels: Selective Fermentation of Algal Biomass and Growth in Aqueous Co-Product

Mentor(s): Sirwan Alimoradi & Belinda Sturm

A major research field in chemical engineering is the sustainable production of renewable energy. Algal based biofuels represent an attractive alternative to replace fossil fuels. One promising technology is the conversion of algal biomass to biocrude-oil using a high-pressure, high-temperature reaction called hydrothermal liquefaction (HTL). However, the byproduct of the reaction called aqueous co-product (ACP) contains a significant portion of non-biodegradable and potentially toxic dissolved organic nitrogen (nbDON). To reduce the formation of nbDON, a pretreatment method can be implemented on the algal feedstock. Selective Fermentation converts the nitrogen present as proteins in algal biomass into ammonia and volatile fatty acids, which is a recoverable energy source. The fermented biosolid undergoes HTL and the aqueous co-product (ACP) can be used as a growth supplement. I will be presenting the effects of fermentation as a pretreatment for HTL reaction to reduce the formation of nbDON. This research makes algal biofuels a more sustainable and cost-effective renewable energy source.

Sarah Rooney

Assessing the Role of Parental Psychological Control in the Relationship Between Alexithymia and Depressive Symptoms in Adolescents in Juvenile Detention

Mentor(s): Paula Fite

Background. Adolescents in juvenile detention are at a higher-than-average risk of developing internalizing problems, such as depression. Parental practices can influence the development of psychological issues in their children especially when their children have traits that increase their risk of developing a psychological disorder.

Objective. The current study investigated whether parental psychological control influences the relationship between alexithymia (the inability to express and identify feelings) and depressive symptoms in adolescents in juvenile detention.

Methods. 111 adolescents (M=15.52 years) from a Midwestern juvenile detention facility (47.7% Caucasian, 71.2% Male) completed an intake survey that included items measuring alexithymia, depressive symptoms and parental psychological control.

Results. A link between alexithymia and depressive symptoms was evident, with higher levels of depressive symptoms associated with higher levels of alexithymia. There was also a link between both variables and parental psychological control, with higher alexithymia or depressive symptoms associated with higher psychological control. However, parental psychological control did not moderate the association between alexithymia and depressive symptoms.

Conclusions. Findings did not support a moderating effect of parental psychological control in this population of juvenile detainees. Associations between these three variables should be investigated further in future research, and other moderating factors should be explored. In addition, the significant first-order effects imply that it could be possible to decrease depressive symptoms by targeting alexithymia for reduction.

Carly Rosey, Yang Yang & Miran Heo

The Developmental Function of Music for 4-8-Month-Olds

Mentor(s): Deanna Hanson-Abromeit & Katie Martin

Research about typical developmental expectations is abundant. Literature on music development is available for children, but is limited in its scope across the lifespan. Music therapy students preparing for a career in the delivery of music interventions must be equipped with a strong foundation in developmental capabilities of music with people and how music is integrated with other developmental domains (e.g. motor, cognitive, emotional). There are currently no known comprehensive resources that combine typical developmental expectations across the lifespan with music development expectations. Thus, the purpose of this research project is to develop a theoretical framework for how music functions to support development for 4-8 month-olds.

We will use developmental milestones, neurologic foundations and uses of music for people who are 4-8 month-olds.

This information will be organized by music characteristics (e.g. rhythm, melody, dynamics) to provide a rationale for how music elements relate to typical development. This information will then be applied to pre-composed music appropriate for the different age ranges and we will assess how well pre-composed music represents the theoretical rationale we identify.

This project is part of a course-based research experience in MEMT 250 Human Development and Music Learning Across the Lifespan. The project is partially supported by a Graduate Research Consultant from the Center for Undergraduate Research.

Macie Rouse

Discourses of Sustainability within Models of Foreign Aid:

Clashes Between Local and Foreign Experiences

Mentor(s): Kathryn Rhine

During the 1980s, structural adjustment programs led to a disinvestment in social service saftenyets in countries experiencing poverty. Tanzania saw a shift from state-based healthcare systems to the increased establishment of international non-governmental organizations (NGO) following the deterioration of governmental healthcare services. This surge in NGOs brought in different types of donor politics as organizations adapted various mechanisms of fundraising towards Western audiences. One model of NGO fundraising is through voluntourism - a form of service in which students pay to volunteer abroad while also engaging in tourist excursions. Other organizations began to utilize more permanent methods, staffing their NGO programming with foreign-born professionals in order in increase donations from international stakeholders.

Comparing personal experiences from my participation in a voluntourism trip to Tanzania with MEDLIFE International, with ethnographic data collected from the site of Mufindi Orphans NGO in Tanzania as a member of KU's "Bridging East Africa's Digital Health Divides" Collaborative Lab, I discuss how these donor politics affect international NGOs' claims of sustainability. These are often defined by the presence of human and physical infrastructure, however ignore community perspectives of sustainability including NGO employment and opportunities for upwards social mobility. I argue that the clashes between global donor notions of sustainability and local notions of sustainability exacerbate power asymmetries between local stakeholders and Western volunteers, donors, and aid workers. As a result, these physically measured structures of sustainability may create more harm for community members by masking the social inequalities being produced by them.

Jaidan Royal

"Monsters"

Short Experimental Fashion Film

Mentor(s): Meg Jamieson & Laura Kirk

Two sisters bicker about the reality of the monster they once feared, but it is not until the closet door is opened that the gravity of the monster is revealed. The film metaphorically explores the beautiful complexity of identity, as denial and shame are transformed into self awareness.

Lauren Ryan

Allosteric regulation of Glycogen Phosphorylase b with effector Proline

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase b (GPb) is a key player in the role of metabolic activity within the cellular networks. Much of our understanding of how the cell processes and produces energy supplied by glucose comes from our extensive study of GPb. The activity of this metabolic pathway is regulated in such a way that it must be able to adapt and transition through a variety of cellular states and demands, however some changes are just too drastic for normal activity rate that results can either be activated more or even inhibited all together. The purpose of this experiment was to test the mechanisms of glycogen phosphorylase b in the presence of an effector Proline. Proline, is a cyclic nonessential amino acid that is a main element of many proteins and found in higher ratios in collagen. The effectors analyzed in this capacity typically regulate GPb activities through allosteric mechanics which can be studied and concluded through structural methods. At varying concentrations of Proline within the assay reaction, the activity level of GPb was measured and analyzed to see if this particular effector was considered an activator or an inhibitor of glycogen phosphorylase b. The data that was collected was derived from the measurement of the solutions absorbance at 600 nanometers from Light Spectrometry for all the varying assay concentrations. Conclusions were drawn from the plotted Michaelis-Menten curves in order to calculate a V_{max} and K_m of each of the assays.

Jo Sabus

Beyond the Surreal: Deren and Anger as Marginalized Filmmakers

Mentor(s): Margaret Jamieson

The works of Maya Deren and Kenneth Anger are some of the most influential and well-known within avant-garde filmmaking. Both of their styles include explorations of subjectivity through editing, unreal causality in their plots, and many other experimental techniques and similarities, Anger himself being famously influenced by Deren. These specific techniques often cause the two filmmakers to be associated with Surrealism due to their aesthetic similarities to other Surrealist works. However, when investigating these artists beyond pure Aestheticism, it becomes harder to label their works as purely surrealist. Broadly, this essay makes a case against pure aesthetic considerations when considering if a piece of work should be associated with a certain style or movement. More specifically, it synthesizes other texts to argue that Deren and Anger did not want to (and perhaps should not) be associated with the Surrealists because the movement itself was not encompassing of their identities as a woman and gay man respectively.

Mel Saldaña Fuentes

Being Brown, Feeling Down: Mental Health Concerns Among Young Adult Latinx Individuals

Mentor(s): Ivery Goldstein

My research looks at how mental health is perceived, talked about, and how mental health care is sought out among young (age 18 - 26) Latinx individuals specifically. Previous research suggests that due to stigmas attached to mental health care, culturally based standards of what is acceptable to disclose outside of family to others, and perceptions of mental health care facilities and practitioners, Furthermore, Latinxs often do not seek out mental health care treatments in clinical settings. Instead, they often find other means to manage their mental health, sometimes through familial support, spiritual rituals, and participation in faith-based organizations. I hypothesize that although research has indicated that stigma and cultural perceptions of mental health are two main deterrents to seeking mental health in clinical settings, another major factor related to mental health is lack of access to these services, and lack of support among friends or extended support groups.

Mel Saldaña Fuentes

«Ni papeles ni que nada»: Women's Motivations to Immigrate to the US from Mexico, and the Barriers that Interfere with Acquiring Citizenship or Residency

Mentor(s): Rachel Denney

Although immigration is often discussed as an overall human rights issue, research surrounding migration into the United States framed as an issue complicated by socioeconomic factors is often left out of focus. As a result many of the complex reasons underlying motivations to immigrate, including gender-based poverty and discrimination, are often not given due consideration. Moreover, the gendered process of gaining legal citizenship based on marital status is typically given priority in these discussions without equal emphasis placed on the advantages and disadvantages of acquiring citizenship as an unmarried woman. My research focuses on the socioeconomic circumstances that motivate Mexican women specifically to immigrate to the United States, as well as the legal policies and measures that complicate their acquisition of legal residency and citizenship.

Sophia Sanchez

Establishing a Viable Animal Model for Social Loss Using Male Prairie Voles

Mentor(s): Adam Smith

Social relationships are a fundamental part of life for humans and many other animals. The loss or disruption of these relationships can therefore have adverse effects on our lives and mental well-being. Prairie voles are a socially monogamous species and are therefore a viable means of modeling social relationships. In this experiment we studied 32 male prairie voles as we paired them, conditioned them, and then induced social loss. Once we paired these animals we did a conditioned place preference (CPP) screening on them in a three-chamber arena to see which chamber they preferred. This preference allowed us to set up their conditioning training so that they would associate their partner to either their preferred or non-preferred side. After their training we did another CPP screening and then we did a partner preference test (PPT) to determine if a bond had been established. After this test, our experimental subjects lost their partners while the control group kept theirs. We did a third CPP screening after loss to determine their preference once more. Then, after a week of loss we ran our subjects through the forced swim test and collected their brains afterward. From our behavior tests we were able to find that our males spent more time in the chamber where they were conditioned with their female partner and that they showed an increase in immobility during the forced swim test, which is indicative of stress.

Xavier Scherschligt

Effect of Sucrose on The Kinetics of Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen phosphorylase is a key enzyme that breaks down glycogen into Glucose 1-phosphate, mobilizing it into a usable molecule for the cell. Glycogen phosphorylase exists in two different forms, glycogen phosphorylase a and glycogen phosphorylase b. The two forms are interconvertible and regulated both allosterically and hormonally. Glycogen phosphorylase b is the less active form and is considered to represent the reverse reaction, Glucose 1-phosphate to glycogen and inorganic phosphate (Pi). The kinetic effects of allosteric regulation of Glycogen phosphorylase b (GPb) are not well documented, forcing researchers to dig through related studies to find the effect of a given regulator. GPb has a number of effectors, both positive and negative, but the goal of this research is to clearly outline the effect of Sucrose on GPb. Sucrose is a competitive inhibitor of GPb, so in order to study its effects, four graphs were produced using Michaelis-Menten kinetics to represent the reaction of four different effector concentrations over a range of substrate concentrations. The result was that, as the concentration Sucrose increased, the Michaelis constant (K_m) increased and the V_{max} was unaffected. This research is significant because Sucrose is used commonly as a sweetener in food and soft drinks. Anything so broadly used should be studied meticulously and documented clearly. This is especially relevant to something that has important effects on an extremely fundamental process such as the breaking down and production of glucose, something which in turn largely impacts key metabolic processes that include cycles like glycolysis and gluconeogenesis.

Megan Schulte

Investigating the Gender Difference in Trauma Related Nightmare Experiences

Mentor(s): Nancy Hamilton

Introduction

Recent studies have shown that the prevalence of posttrauma nightmares differs significantly between genders, with females experiencing higher rates of PTNs. The purpose of this study is to examine the relationships between factors influencing trauma nightmares in order to determine whether any of these factors contribute to the gender gap in PTN occurrences.

Methods

Participants (N = 1,498) completed an online survey approved by the associated IRB. The survey included demographic measures (age, gender, & class), the Life Events Checklist (LEC), the PTSD Checklist for the DSM-V (PCL-5), the Adverse Childhood Experiences scale (ACE), and a short questionnaire on PTNs. Hierarchical logistical regressions were used for analyses.

Results

Using a bottom up model building procedure, we first discovered that multiple traumas (B= -3.93, $p < 0.001$), adverse childhood experiences (B = 0.17, $p < 0.01$), and gender (B= -1.05, $p < 0.01$) significantly predicted weekly PTN occurrences. However, when the interaction term of (gender*multiple trauma) was added to the model, only multiple traumas (B = 0.41, $p < 0.001$) and ACE (B= 0.17, $p < 0.01$) significantly predicted weekly PTNs.

Conclusion

Multiple traumas, adverse childhood experiences, and gender all predicted weekly PTN occurrences. However, when the interaction term of gender and multiple traumas was added, gender did not significantly predict weekly PTNs, suggesting the relationship between gender and multiple traumas may play a role in explaining the gender gap. Future studies should further investigate the relationship between gender, multiple traumas, and PTNs.

Claire Schumacher

Born Overnight: Techno Music and the Reunification of Germany

Mentor(s): Ari Linden

Despite its roots in the United States, techno music found its biggest audience in Berlin during the '80s and '90s. This period in Berlin's history was tumultuous, with East Berlin a satellite of the Soviet Union, and West Berlin an island of Western culture. The many years of separation created a cultural divide between the two halves of the German metropolis. Although West Berliners were the primary champions of techno, East Berliners, lacking in other modes of Western popular culture in the Soviet Union, also developed an interest in this music through access to West German radio stations. When the city finally opened up, many East Berliners moved to neighborhoods in former West Berlin, and many West Berlin artists moved into the vacant and rent-free housing in the former East, where techno clubs like Tresor and Berghain were born overnight. Some innovative artists took advantage of the abandoned and destroyed buildings and the absence of police in the newly accessible former East, where they held underground parties and advertised them through radio and word of mouth. These parties were some of the first interactions that former East and West Germans had with each other. My paper demonstrates that while there was disguised animosity, open hostility, and even some altercations between these two previously divided populations, these clubs and parties functioned as a significant site for the former East and West to meet and enjoy music together. Techno clubs and their music were highly instrumental in the process of reconciling a broken city.

Kameron Sharp

Kinetic Activity of Glycogen Phosphorylase b In the Presence of Nicotinamide

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase is a key enzyme in cellular metabolism. Glycogen Phosphorylase b is the less active form of this enzyme, but under certain cellular conditions it still plays a key role in breaking down glycogen into glucose-1-phosphate. The glucose-1-phosphate produced in this process can eventually enter glycolysis, the citric acid cycle, and oxidative phosphorylation thereby powering cellular metabolism. Understanding the cellular regulators that activate or inhibit the action of Glycogen Phosphorylase b is therefore key to understanding cellular metabolism. Nicotinamide is one such regulator has been shown in studies to inhibit the phosphorylating action of Glycogen Phosphorylase b. More research is needed to understand the extent of this inhibition and its significance in cellular metabolic processes. In this study we obtained kinetic assays of Glycogen Phosphorylase b in the presence of nicotinamide by measuring the amount of inorganic phosphate produced as a byproduct of phosphorolysis of glycogen. We show that Nicotinamide significantly lowers the V_{max} of glycogen phosphorylase b indicating it acts in a noncompetitive inhibitory manner as an allosteric regulator.

Zachary Shaw

Kinetic Effects of Lactose and 5'-AMP on Glycogen Phosphorylase B

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase B, the enzyme studied, is one of the main enzymes in the process of glycogenolysis; it functions to break down glycogen stores, primarily in the liver, in response to low blood sugar. The activity of Glycogen Phosphorylase B in the presence of 5'-AMP, a known activator, and Lactose, a hypothesized inhibitor, was unknown. Assays with varying [5'-AMP] and [Lactose] were performed, for 10 minutes, and the absorbance values of inorganic phosphate, a product of the reaction, at 600nm were used to determine the relative activity of Glycogen Phosphorylase B. It was found that increasing [5'-AMP] were correlated with an increase of the enzyme's V_{max} and decrease of the K_m . The largest [5'-AMP] tested was 4mM, which yielded a $+\Delta V_{max}$ of 4.212 and a $-\Delta K_m$ of 105.44mM [Glucose-1-Phosphate], further confirming 5'-AMP is a likely activator of Glycogen Phosphorylase B. It was also found that Lactose is possibly a mixed reversible inhibitor of Glycogen Phosphorylase B as the presence of Lactose was correlated with a decrease in the V_{max} and increase in the K_m of the enzyme. A [Lactose] of 1mM yielded the largest $-\Delta V_{max}$ of 1.537, while a [Lactose] of 2mM yielded the largest $+\Delta K_m$ of 20.678mM [Glucose-1-Phosphate]. All activity data was plotted in Michaelis-Menten curves, along with trials used as standards. The project was insightful into the effect of Lactose on blood sugar regulation, but additional trials would be required in the future to confirm the results further than a possible correlation.

Dania Shoaib

Mcr is required for Drosophila egg elongation

Mentor(s): Rob Ward

Morphogenesis is a conserved developmental process by which cells and tissues obtain unique shape and size. Previous work in the Ward lab has identified Macroglobulin complement-related (Mcr) as a key protein for morphogenesis as well as a key component of the epithelial septate junction (SJ) in the fruit-fly, *Drosophila melanogaster*. The SJ, equivalent to tight junctions in vertebrates, provides a physiological seal between epithelial cells. We find mutations in Mcr are embryonic lethal with functionally disrupted SJs. To understand the role of Mcr in morphogenesis, we are using fruit-fly egg elongation as a model system. *Drosophila* eggs undergo fourteen morphological stages over approximately seven days. During these stages, the egg changes shape from round to oval, a process known as egg elongation. Since Mcr homozygous mutant animals die early in development, we are utilizing the binary GAL4-UAS system. This system allows us to knock-down (KD) the level of Mcr only in the ovary. Through RNAi-mediated knock-down experiments, we find eggs that express Mcr-RNAi failed to elongate properly. In addition, Mcr KD cells break apart late during egg development, which we hypothesize is due to disruptions in the actin cytoskeleton. We are currently conducting live imaging experiments to capture the process through which Mcr KD cells fail to maintain their structure. Taken together, Mcr is required for proper egg development through maintaining cell-cell contact and actin cytoskeleton.

Andrea Silva-Trejo

“The Pence Problem” – A Content Analysis of Newspaper Coverage of Indiana’s HIV Outbreak, 2011-2015

Mentor(s): Sarah E. Deer

An HIV outbreak took place in Indiana during 2011-2015 when the then acting Governor, Mike Pence, overturned the clean needle exchange program. This led to many heroin users sharing dirty needles and transmitting diseases among them, causing an HIV outbreak in Scott County. Mike Pence refused to take action as he didn’t want to allow a clean needle exchange program. He argued that such program would enable and “persuade” heroin users to inject. Other officials demanded action and approved of the needle exchange program, but the Governor wouldn't get on board, influencing many local residents over the situation. This research explores how regional newspapers portrayed this epidemic and how heroin users were stigmatized by government officials and the public at large.

Abigail Simonson, Crystal Hung & Alyssa De La Cruz

The Developmental Function of Music for Toddlers (12-24 months)

Mentor(s): Deanna Hanson-Abromeit

Research about typical developmental expectations is abundant. Literature on music development is available for children, but is limited in its scope across the lifespan. Music therapy students preparing for a career in the delivery of music interventions must be equipped with a strong foundation in developmental capabilities of music with people and how music is integrated with other developmental domains (e.g. motor, cognitive, emotional). There are currently no known comprehensive resources that combine typical developmental expectations across the lifespan with music development expectations. Thus, the purpose of this research project is to develop a theoretical framework for how music functions to support development for toddlers (12-24 months).

We will use developmental milestones, neurologic foundations and uses of music for people who are between 12 and 24 months of age. This information will be organized by music characteristics (e.g. rhythm, melody, dynamics) to provide a rationale for how music elements relate to typical development. This information will then be applied to pre-composed music appropriate for the different age ranges and we will assess how well pre-composed music represents the theoretical rationale we identify.

This project is part of a course-based research experience in MEMT 250 Human Development and Music Learning Across the Lifespan. The project is partially supported by a Graduate Research Consultant from the Center for Undergraduate Research.

Abigail Simonson

Does rap music foster meaningful parent-child interactions? An exploratory study of YouTube videos

Mentor(s): Deanna Hanson-Abromeit & Kara Caine

Background: Infant-directed speech and infant-directed singing are communication methods which grab babies' attention, convey emotional meaning and express communicative sounds early in life. However, there is no information whether rap music, which uses the combination of speech and musical characteristics of rhythm and lyrics, is beneficial in a similar way. The purpose of this exploratory study is to observe infant's and toddler's interactions with their parents during a shared rap music experience.

Methods/Design: A keyword search of YouTube videos found 13 videos that met inclusion criteria. Videos were coded for: focus of infant/toddler attention, episodes of vocalization, body language and affect during the rap music experience.

Discussion: This poster will present our outcomes. To our knowledge, this is the first study analyzing YouTube videos of parent-child interactions when engaged in rap music. Strengths of this study include an emerging understanding of the relevancy of rap music for infant/toddler development and the unique potential of YouTube videos for music intervention research. The inability to randomly sample the population and control the environment limit the generalization of these outcomes. This study contributes to our knowledge of music in parent-child interactions and considers whether the rap genre can be used as a useful intervention modality within music therapy and parenting.

Michael Smith

Disaster Resilience Research

Mentor(s): Elaina Sutley

My project deals with analyzing elevated and manufactured(mobile) housing and how the building code can be improved to limit damages caused by natural disasters. In this specific case, I will be analyzing damage caused by Hurricane Michael to a number of buildings effected in Florida. I have photos of the damages and I will be discussing the different types of damages as well as how often the damages occurred based on the wind speeds of the hurricane.

Melissa Smith

Museum of Climate: Texas

Mentor(s): Kapila Silva

Desertification is a major problem that is affecting Texas and neighboring regions. It is the process by which fertile land becomes barren desert, typically due to climate change, drought, deforestation, or unsustainable agriculture. This became the subject for my 'Museum of Climate: Texas'. Through learning more about the causes and effects of and solutions to desertification, Texans can become more educated and make steps toward bettering the situation. In researching the climates of Texas, I found that there were five major climate regions. These five regions became the five major galleries of my museum. A sixth central gallery of walls protrudes into the five outer galleries and displays information about desertification. These interior walls are designed to be of rammed-earth construction, and the exterior walls are clad with Corten steel panels. These material choices are based on sustainable needs and the visual aesthetics of the museum. The urban context also played a significant role in the design. I used the 30' bays of the Nasher Sculpture Center next door to create a 30' x 30' structural grid for my museum off of which I based the formation of all other spaces. Museum Tower – the high-rise apartments behind my site – posed the issue of a heat island. To solve that issue and create a sustainable museum that fits the climate I used several techniques including a green roof, single-axis tracking solar panels, solar and Low-Emissivity glass, and native plantings. This museum educates its visitors through its displays and didactic learning techniques.

Benjamin Smith

Theophylline's positive allosteric effect on Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Theophylline is a methylxanthine derivative which is a purine base structure form that includes a number of stimulants such as caffeine, Theobromine, and Xanthine. Theophylline has a diverse effect on the human body such as diuretic, bronchial dilation, Smooth muscle relaxant, and cardiac and central nervous system stimulant. Most commonly is used to treat asthma, bronchospasm, and COPD. Theophylline 80 years ago used to be a more commonly prescribed for bronchodilators, although from its long list of complications with other drugs and vast side effects including nausea, abnormal heart beat, diarrhea, insomnia, headaches, dizziness, and even seizure other prescriptions have taken its place. To examine its effect on the enzyme glycogen phosphorylase b a Michaelis Menten curve was made from Theophylline's positive allosteric effect on this enzyme. RESULTS (my Graph Pad was unable to download). From Theophylline's positive allosteric effect on Glycogen Phosphorylase b enhances activation of breaking down glycogen and producing a higher concentration of Glucose to the blood supply to provides its stimulant effect to the human body.

Emily Smith

The Effect of Caffeine and Aloe Vera on Glycogen Phosphorylase

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase is an enzyme that uses inorganic phosphate to break glycogen down into glucose 1-phosphate. This enzyme is known to be allosterically regulated by various molecules. There are some known regulators, such as caffeine, but some are still being investigated. Aloe Vera is suspected to have an antidiabetic role in controlling blood sugar levels. Thus, Aloe Vera may be a direct regulator of glycogen phosphorylase. To test this, assays with an increasing concentration of the effector and glucose 1-phosphate were developed. The rate of the reverse reaction was measured by the formation of inorganic phosphate. Caffeine was used in the same assay to serve as a control. Caffeine was shown to decrease the V_{max} of glycogen phosphorylase, but did not affect the K_m . If Aloe Vera affects the rate of glycogen phosphorylase, then it has potential to be used as a medication for controlling blood sugar.

Eric Splavec

From Lawrence to Dar-es-Salaam; a Reflection on the Research Process

Mentor(s): Katie Rhine

When I joined the University of Kansas's ColLab Field School, in February of 2018, as an Undergraduate Student Research Fellow, I had no experience with "Big R Research". I had done plenty of "Little R Research" by writing research papers and essays for various classes, on diverse subject matter, throughout my academic career, yet in those projects I had used other scholars' research, other scholars' statistics and other scholars' datasets. So, I thought that the "Big R Research" would come naturally to me. I was so confident in my ability to make this transition from a "Little R Researcher" to a "Big R Researcher", that in the Summer of 2018 I wrote an application for travel funds from the Undergraduate Research Center of the University of Kansas, in my application I had said that with their financial support I planned to interview 80 Tanzanians about their level of political activism and their access to healthcare to better explore this relationship. I thought that I had the experience in research, enough knowledge of political science and enough proficiency in Kiswahili to accomplish this ambitious goal that I had set for myself. I quickly found out how overzealous I was and that I would not accomplish that ambitious goal in Tanzania.

Samuel Steuart

Allosteric Effects of AMP and Epinephrine on in vitro Glycogen phosphorylase b Activity

Mentor(s): Roberto De Guzman & Sanjana Sundararajan

Glycogen is a branched glucose polymer stored in the liver and muscle cells that supplies glucose to the blood during fasting and muscle cells during contraction. Glucose units are extended with linear α -1,4 linkages from glycogen's core protein, glycogenin, and from branch points, formed via α -1,6 linkages. Glycogen phosphorylase regulates glycogen degradation and cleaves α -1,4-glycosidic bonds from the nonreducing ends of the glycogen molecule to yield glucose 1-phosphate. Phosphorylase exists in two forms, a and b, that favor equilibrium between an active R state and less active T state, respectively. Glycogen phosphorylase b (GPb) is allosterically regulated in response to various cellular states and demands. Increases in cellular AMP concentration signal energy is needed; therefore, phosphorylase binds AMP and stabilizes the R state. In contrast, the T state is stabilized by ATP and excess glucose 6-phosphate. Kinetic assays of glycogen phosphorylase b (GPb) were performed to study the allosteric effects crucial for regulating energy metabolism in cells. Characterization studies were performed to demonstrate AMP and epinephrine's roles as effectors of GPb. Michaelis-Menten plots were analyzed for epinephrine and AMP assays to certify each as activators by the observed reduction of GPb's K_m value. These results are significant because the properties of AMP and epinephrine may be used in future studies to exploit their enhancement of glycogen breakdown in the muscle and liver for fueling muscle contraction and to research disorders in glycogen breakdown that have adverse effects on energy metabolism and human health.

Grace Stewart-Johnson

Misuse of Indian Penal Code Section 498A: Legal Terrorism or Anti-Woman Backlash?

Mentor(s): Ivery Goldstein

In 1983, section 498A of the Indian Penal Code banned common dowry-related harassment and violence. However, this section has proved controversial with men's rights groups in India, the Indian judiciary, and the Indian public overall. These groups decry the alleged misuse of section 498A, claiming that scores of Indian women are filing false dowry harassment claims to take revenge on their husbands, a practice that has been coined "legal terrorism." Some scholars argue, though, that this misuse is not nearly as common as is being publicized, but good data remains scarce. This paper will compare the controversy surrounding section 498A of the Indian Penal Code to other historical backlashes to attempt to discern whether the controversy is, in fact, an anti-woman backlash, or instead a phenomenon where Indian women are taking advantage of this anti-violence law to seek revenge on their husbands. To accomplish this, I will analyze the materials produced by anti-section 498A groups online, and compare their rhetoric to the types of strategies utilized by those who perpetuated past anti-woman backlashes. If women in India truly are filing false claims, legal action may be necessary to protect victims of false accusations. However, though they lack data to support their claims, some anti-section 498A activists are calling for the repeal of the important anti-violence law, which could leave Indian women more vulnerable to violence. This paper will provide evidence to support that this controversy is an anti-woman backlash, and caution against the hasty repeal of section 498A.

Eleanor Stewart-Jones

Understanding the Reactivity of a Series of MnIV(oxo) complexes

Mentor(s): Tim Jackson

Many essential chemical reactions, such as cellular respiration, occur due to the presence of transition metal catalysts, which lower the energy necessary for the reaction to proceed. The energetic benefits of metal catalysts have made them prevalent in industrial processes. Synthetic model based systems, which are easier to study and alter than their enzyme counterparts, allow us to elucidate how the environment around the metal center tunes its reactivity. An essential part of understanding the reactivity of these metal complexes lies in their thermodynamic driving forces. The enthalpic and entropic contributions to the Gibbs free energy were determined for the oxygen atom transfer reactivity of the $[(\text{Mn}(\text{O})\text{IV}(2\text{pyN}2\text{Q}))_2]^{2+}$, $[\text{Mn}(\text{O})\text{IV}(\text{N}4\text{py})]^{2+}$, $[\text{Mn}(\text{O})\text{IV}(\text{DMMN}4\text{py})]^{2+}$, and $[\text{Mn}(\text{O})\text{IV}(2\text{pyN}2\text{B})]^{2+}$ complexes. These values will give further insight into the observed reactivity trend.

Jonah Stiel

Understanding the role of sterically bulky diimine ligands during electrocatalytic reduction of CO₂ using [Mn(CO)₃] complexes

Mentor(s): James Blakemore

[Mn(CO)₃] complexes bearing a variety of diimine ligands are highly active electrocatalysts for the reduction of carbon dioxide (CO₂), effectively generating feedstocks that can be used as carbon-neutral sources of energy. Progress in synthesizing better catalysts is currently limited due to a lack of mechanistic understanding of how electrocatalysts couple electrons with a substrate to generate product. As discussed in the literature, and what we observe during electrochemical experiments, [Mn(CO)₃] complexes typically display a ligand centered reduction, followed by a metal centered reduction, resulting in the active catalyst, which is capable of binding CO₂ during electrocatalysis. We are working to develop model [Mn(CO)₃] complexes bearing bulky diimine ligands to better understand how steric bulk on the ligand impacts the mechanism of electrocatalysis for this family of complexes. Our recent work has focused on the synthesis and characterization of a series of complexes differing in the steric bulk on the bound diimine ligand to build up a structure-activity relationship for this popular class of catalysts. The synthesis, characterization, and electrochemical properties of these new [Mn(CO)₃] complexes will be discussed.

Lauren Stone

Experiencing Asexuality: A Content Analysis of Forums on the Asexuality Visibility and Education Network

Mentor(s): Ivery Goldstein

Since the 1980's, psychological researchers investigating human sexuality have used the term asexuality to describe individuals who experience little to no sexual attraction. After two decades of limited research focusing specifically on asexuality, researchers have begun to address a number of concerns, including the conceptualization and creation of validated measures of asexuality. Yet, little qualitative research has been done to situate the lived experiences of asexual individuals into the broader scholarly context. By synthesizing scholarly research on asexuality with information gathered from online forums for asexual individuals, this paper will establish a greater understanding of the subjective experience of asexuality. Preliminary readings of forums on the Asexuality Visibility and Education Network (AVEN) suggest that there are numerous aspects of asexuality that have gone largely unexplored by academia, such as intersections of asexuality with other sexual orientations, and challenges in romantic relationships. By focusing on the subjective experiences of asexual individuals in conjunction with scholarly conceptions of asexuality, this project will demonstrate the breadth of topics that are still to be explored by researchers, as well as put the experiences of asexual individuals at the forefront of understanding asexuality.

Silas Sutterby

Police Use of Force in Prime Time: A Content Analysis of Law and Order

Mentor(s): Sarah Deer

Crime genre television programs have entertained society with their ability to solve crime quickly and accurately through action and violence, however no one questions whether these depictions of those in the criminal justice system are accurate. Recent literature on the subject argues that viewers of crime genre television often gain false perceptions of law enforcement and how the policy and procedures of their agencies apply to their actions. This study is a content analysis of the prime time crime show Law and Order: Special Victims Unit and assesses whether the show accurately follows the use of force policy of the agency the program represents-The New York Police Department (NYPD). This research looks at use of force scenarios that would seem to fall under the New York Police Department's use of force policy within each episode of Law and Order: Special Victims Unit through specially selected seasons. These scenarios are then analyzed through the use of force policy of the NYPD and a determination is made on whether or not each scenario follows policy. This research helps understand the messages crime genre television sends to its viewers on the daily operations of law enforcement and if fictional officers on television realistically follow policy and procedure in the course of their duties.

Holly Swearingen

Effects of physical activity on working memory performance

Mentor(s): David Jarmolowicz & Stephanie Stancato

Working memory is essential to daily functions, such as daily tasks related to work and education. The titrating-delay match-to-sample procedure has been used in the assessment of working memory. This procedure requires subjects to correctly match a sample stimulus to a corresponding comparison stimulus with delay increasing between the presentation of the two stimuli. Specifically, the delay between sample offset and comparison onset adjusts as a function of the subject's performance. The steady-state titrated delays, referred to as retention intervals, serve as the primary dependent measure. Working memory was assessed using the titrating-delay match-to-sample procedure prior to, during, and after 30-minutes of access to a running wheel. A marked increase in subjects retention intervals following access to the running wheel was observed. These retention intervals remained high even when access to the running wheel was removed. This suggest that physical activity has long lasting effects on working memory.

Landon Sweeney

Comparison of Disease Impact In Refugee Camps After the Rwandan Genocide.

Mentor(s): Sandra Grey

The purpose of this research is to examine the impact of infectious diseases during and immediately after the Rwandan genocide in refugee camps focusing on with some consideration to chronic long-term diseases. Major areas of focus will include the morbidity, mortality, and the environment of disease which are primarily the refugee camp. Two locations of camps will be the focus of this dissuasion one located in Zaire (now the Democratic Republic of Congo) and another located in Tanzania. Comparisons across multiple sources found much higher than expected rates of disease, especially of *Vibrio cholera* and *Shigella dysenteriae*. Vital parts of treatment for both of these consist of rehydration therapy. A key difference between two of the largest camps was one was significantly more impacted by diarrheal diseases. I hypothesize that this was because of the physical properties of the location including hard volcanic soil leading to a difficulty construction sanitation infrastructure and sourcing water.

Other diseases of note that spread at rapidly during and immediately after include tuberculosis, malaria, meningococcal meningitis, and HIV/AIDS. Some diseases were antibiotic resistant, making the problem of treatment drastically more difficult. The majority of disease were spread via weak hygiene and poor sanitation practices in the wake of the violence; however, a large amount also occurred as a result of sexual violence.

Rachel Yu Ru Tan

Malaysia Boleh? Examining the Factors of the Malaysian Brain Drain

Mentor(s): Brian Lagotte

Brain drain, the exodus of highly skilled citizens from their home countries, remains a persistent problem in Malaysia despite countless initiatives by the Malaysian government to mitigate the issue. While research has established an informative push-pull framework illustrating how undesirable economic, political, and social situations at home and comparatively better conditions abroad propel brain drain in Asia, this study fills a geographic gap in existing literature by examining the decision-making processes of the underexplored Malaysian diaspora. Using the push-pull model derived from Lewin's change theory, I investigate the interaction between negative "push" factors driving citizens out of Malaysia and attractive "pull" factors in host countries enticing Malaysians to remain overseas. I collect survey and interview responses to gauge Malaysian respondents' reasons for migrating, perceptions of their host countries' conditions, and return inclinations. This research finds negative perceptions of the Malaysian education system and a desire for exploration as the primary reasons younger students leave Malaysia, while the diaspora's working population cites frustrations with the pervasive racist and religious sentiments within Malaysian politics, education, and society as a central push factor. Interestingly, findings reveal overseas Malaysians' return inclinations are not tied to their perceptions of conditions in the host country, but with the group's level of confidence in Malaysia's ability to implement the changes they expect to see in the country. By identifying the factors behind the Malaysian brain drain, this research contributes to the development and implementation of effective policies to curb the outflow of human capital from the country.

Yane Tan

Impacts of conversion from open canals to buried pipes on groundwater recharge in the Republican River Basin

Mentor(s): Andrea Brookfield

Understanding water sources and pathways in a drainage basin is important for water management and sustainability. Water in the Republican River Basin is often disputed upon by Kansas, Nebraska, and Colorado, despite a regulatory compact signed by the three states. This research project examines how changing from open irrigation canals to buried pipes affects groundwater recharge in the Republican River Basin by comparing pre- and post-conversion water level data. In this work, water levels in seven monitoring wells within the Republican River Basin are analyzed by observing how water levels fluctuate over time. Water levels in the seven wells from March 1986 to November 1999 were graphed and compared to the water levels in the same wells from December 2017 to June 2018, after the conversion from open canals to buried pipes. All seven wells showed a trend of less fluctuation after the installation of buried pipes, especially in wells closest to the converted canals. When graphing precipitation against recent water level data, groundwater fluctuations were not consistent amongst all wells. In particular, two wells within close proximity to the main canal, but furthest from the other five wells in that area, had significant fluctuations at the same time as precipitation events. It is hypothesized that water levels in the main canal increase during precipitation events, and the groundwater levels in the wells close to the main canal are responding to those changes.

Mary Kate Tankard

White Nationalism of Yesterday and Today: The nature of Ideological Retro-Activism

Mentor(s): David Heath Copper

White Nationalist movements continue to arise around the world, regardless of varying political and economic trends. While the argument is often made that movements predicated on the advancement of racially motivated ideology, can be attributed to economic stagnation or political trends, many countries in the modern with high levels of economic and political stability, are still seeing the emergence of white supremacist movements. Identity theories may be useful for understanding the ideological predispositions that orient individuals to this specific form of activism. In order to gain a better understanding of White Nationalist movements and their consistency in emerging over time, I intend to study the relationship between identity and activist frameworks, in two movements in the twentieth century, and two in the modern, in the United States. My central argument, being that White nationalist movements should actually not be considered a form of activism, as they are ineffably rooted in sentiments of the past making their action inherently retroactive, and essentially unable to achieve goals, or promote cultural change, and therefore should not be considered a form of activism.

Morgan Thompson

Animal Welfare in the German Constitution

Mentor(s): Ari Linden

In 2002, Article 20a of the German constitution (or Grundgesetz)—which establishes Germany as a social and democratic state—was amended in order to extend the protections of the “natural foundations of life” for future generations to animals as well as people, making animal welfare and protection a state goal. In comparison to other western democratic nations, it is easy to amend the Grundgesetz, especially because such amendments are not subject to a vote by the general population. Indeed, the Grundgesetz has been changed 62 times since its creation after the end of World War II. (The United States constitution has, by contrast, been amended only 17 times since 1791). Germany also became the first country in the European Union to extend such sweeping protections to animals. This amendment was preceded by many years of debate over the moral and ethical status of animals, what our responsibility to them as humans entails, and over the implications of such extended protections to animals for the rights of humans. Because Germany is a welfare state dedicated to preserving the natural foundations of life for future generations, extending these protections to animals serves to make article 20 more comprehensive. Building on previous scholarship, my research/presentation/paper suggests that the natural foundations of life on which the security of future generations depend are impacted by all factors of the environment, human and nonhuman. These additional protections thus strengthen the purpose of article 20a without detracting from its protections for the human population.

Tyler Thornton

Behavioral Economic Intersections of Alcohol and Cannabis Use in Undergraduate Students: Implications for the Reinforcer Pathologies Model of Addiction

Mentor(s): Derek Reed & Gideon Naude

While recreational cannabis use is becoming increasingly prevalent in the United States it has received relatively little attention within behavioral economics. Toward this end, an examination of the behavioral risk factors is timely. The reinforcer pathologies model proposes behavioral addictions are largely a function of two behavioral economic constructs: operant demand and delay discounting. These constructs manifest as behavioral markers of addiction in the form of excessive demand for a reinforcer and strong preference for immediate access and consumption of this reinforcer in spite of suboptimal long-term outcomes. The first aim of the present investigation was to identify the degree to which discounting (money and alcohol) and demand for hypothetical alcohol differ between drinkers who don't use cannabis and co-users (i.e., individuals who use both) in a college sample. As our second aim we examined the relation between discounting (money, alcohol, and cannabis) in co-users as well as demand for hypothetical alcohol and cannabis. Regression analyses suggest co-users have significantly higher demand for alcohol, demonstrate steeper delay discounting of alcoholic drinks, and are at greater risk for alcohol use disorder than individuals who drink yet don't use cannabis. Within the co-using group, cannabis Omax (peak expenditure) was positively associated with alcohol Intensity (drinks consumed when priced at \$0.00) as well as alcohol Omax. Moreover, steeper monetary discounting and greater alcohol Intensity were associated with greater cannabis Intensity. These results integrate well within the reinforcer pathologies model of addiction and add to the literature on co-substance use in the college population.

Madeline Tierney

The Medias Portrayal of High-Profile Women Candidates

Mentor(s): Ivery Goldstein & Emily Vietti

This paper is about how American news media portrays high-profile women candidates compared to their male counterparts, explicitly through media-framing, and gender bias within the media. It focuses on the 2020 Presidential candidates and how the media has started to frame them early on in this election cycle, expanding on previous research that has been done on the media effects on female candidates and their opponents in other high-profile elections. The media most often portrays women candidates through gendered rhetoric, gendered issues, and their physical appearance more than their male counterparts. Through a content analysis of four major online newspapers and their Sunday editions, The New York Times, The Washington Post, USA Today, and The Wallstreet journal, articles specifically pertaining to any 2020 presidential candidate were analyzed and coded. Sunday editions of these newspapers were chosen for their high volume of political analysis. Each article was coded for gendered rhetoric, focusing on terms like “likability” and the mention of family and or personal life; gendered issues, policies that are typically more feminine; and physical appearance, specifically race, gender, and age. The timeline of this analyzation took place over 14 weeks, between the dates of January 6th, 2019 and March 31st, 2019, a time period when the most candidates declared they were running. Results from this analyzation showed that female candidates are more often talked about using gendered rhetoric, focused on more feminine issues and their physical appearance was mentioned more than their male opponents.

Chase Toalson, Clark Bee, Hannah Redford, Montanna Hayes, Dotty Gaumer & Dane DeRee

Carbon Sequestration & the Kansas Land Trust

Mentor(s): Kelly Kindscher & Morgan Okeson

Carbon is one of the foundational elements that exists in abundance on earth, both in living and non-living forms. Due to dramatic increases in land-use changes for both agricultural and commercial/industrial use, much of the carbon that is stored in soils and biomass is being released into the atmosphere, increasing CO₂ levels. An increase in atmospheric CO₂ levels disturbs the earth's natural climate cycles, accelerating the rate of climate change. The Kansas Land Trust preserves land through conservation easements, preventing carbon from entering the atmosphere. This preservation will halt further disruption of the earth's natural biogeochemical cycles, especially the carbon cycle. The cost of preserving land for KLT is \$27 per acre. Research on carbon sequestration and soil chemistry will be analyzed to form a financial relationship with an individual's carbon footprint, describing how much it would cost them to offset it. This figure, in dollars per metric ton of carbon, will be vital in public outreach efforts for KLT's mission. Having a figure that makes the complicated science of climate change more simplistic and easy to understand to the general public will increase awareness of the issue.

Aldin Tollison

Modeling Global Water Scarcity in Google Earth Engine

Mentor(s): Xingong Li

Across the world, water is one of the most important substances to humans due to their various uses for it. However, water is unevenly distributed across the planet and has been so throughout time. Additionally, varying policies across different governments affect how water can be accessed in different areas. This can lead to water scarcity in some regions. While there are multiple methods to measure water scarcity, this study aims to measure water scarcity using the Water Stress Index (WSI) in Google Earth Engine, a high-performance cloud-based geospatial analysis platform. The WSI takes an area's mean annual river runoff and divides it by the area's population and compares those values to defined thresholds. Using runoff data from TerraClimate and population estimates from the United Nations, WSI values were calculated globally using yearly and seasonal runoff averages. Most results appear to be logical as urban and desert areas appear to face more water scarcity, which is expected. However, some areas have illogical results, particularly the Arctic. Additionally, this approach has some limitations as the runoff dataset only considers surface water while groundwater is accessed in many places. In addition, this method only considers the domestic uses of water, not agricultural or industrial uses. These limitations will need to be addressed in future studies.

Aldin Tollison, Ethan Tidwell, Kristy Mo & Raffi Hatutian

Lake Pleasant: An Expanding Lake in a Drying Region

Mentor(s): David Rahn & So-Min Cheong

In Arizona, surface water loss has been a problem for multiple decades, invoking many political and environmental debates over the future of the state's water supply. Despite this, Lake Pleasant behaves differently compared to other water bodies in the state as its surface water has expanded in area, indicating differences in the way water resources are managed in this area. Using the Automated Water Extraction Index (AEWI), surface area was derived from Landsat imagery between 1984 and 2011 through Google Earth Engine, a high-performance cloud-based geospatial analysis platform, to analyze water body area. To explore factors responsible for these changes, possible physical and social factors contributing to these differences were analyzed. The primary physical factors affecting surface water levels are precipitation, potential evapotranspiration, and soil moisture. Water management could also be a driver of surface water differences in the region.. For example, Lake Pleasant is an important reservoir for Colorado River as it's part of the Central Arizona Project. This study contrasts Lake Pleasant and the region as a whole in terms of surface water area.

Jason Tran

Kinetics Assay of Glycogen Phosphorylase b and the Effects of Proline and Rosmarinus officinalis Oil

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase b (GPb) is an enzyme that catalyzes the release of glucose-1-phosphate (G1P) from glycogen. The properties of GPb is determined through several assays that observe the conversion of G1P to glycogen and inorganic phosphate (Pi). Each enzyme assay contains glycogen and G1P to provide glucose for the glycogen. When glucose is accepted by glycogen, an equimolar amount of Pi is released. Each reaction within the assay is stopped at specific intervals with a solution of molybdate ions and sulfuric acid. The molybdate ions complex with the Pi released to form a blue product that can be measured via spectrophotometer. A standard curve of inorganic phosphate is made and used as a baseline to compare the kinetics of other assays with the addition of various effectors. Other properties of GPb are determined such as thermal inactivation and range finding. Adenosine monophosphate (AMP), Proline, and Rosmarinus officinalis oil (rosemary oil) are tested as allosteric effectors of GPb. The focus of my research is to observe the effects of AMP, Proline, and rosemary oil on the kinetics of Gpb.

Maya Van Nuys

The Modern Mission Civilisatrice: Cultural Representations in French History Textbooks

Mentor(s): Brian Lagotte & Andrew Denning

This research project asks what secondary school French history textbooks published between 2014 and 2018 indicate about contemporary French integration strategies. The project contributes to previous literature on the role of education, and particularly textbooks, in promoting national identity by exploring the role of French history textbooks in immigrant integration. Postcolonial theory helps to explain how former colonial governments use cultural representations in education to maintain preferred representations of national culture and to integrate non-native citizens. Three French history textbooks and supplementary interviews with students who attended French secondary schools served as primary sources. Textual analysis with thematic coding of the three textbooks and interview transcripts enabled the detection of patterns in representations of the French nation and immigration in history course content. The French government chooses history textbooks with French cultural representations stressing national unity over discord by promoting the study of objective history over the conflicting historical memories of different social groups. As such, textbooks operate as assimilation tools, attempting to integrate immigrants and non-native ethnic groups into the French state by promoting an overarching and unifying national historical narrative. However, the promotion of national unity in textbooks may serve to alienate immigrants and non-native ethnic groups from French society, as textbooks largely ignore the contradiction between French democratic values and the undemocratic nature of French colonial rule as well as the historical contributions of French colonial subjects, and later immigrants, to the French nation and society.

Derek VanWyck

Fictive Truths

Mentor(s): Elise Kirk

Since its conception the camera has been striving to truthfully recreate the world that lies in front of it. This project will stretch the boundaries of what is considered truthful while still remaining within the confines of photography.

The photographer Jerry Uelsmann said, “all knowledge is self-reflective”. This quote has an impact in the way I view photography.

This is because as a kid some of my fondest memories were going camping with my dad and his friends. I remember sitting next to them around a campfire in amazement as they told story after story which had been passed down through generations. It was these stories that began to shape my knowledge and understanding of the world.

When I first came to KU as a photography major I began to photograph the world in the way that I had come to know and see it. As a double major in the Russian Literature I was introduced to classic Russian fairytales. I began to draw inspiration from these folkloric tales. This became a turning point for me in my photography.

As my work evolved, I began compositing multiple photos in order to create individual narratives. I now saw simple aspects of life such as a field, bedroom, or person as a stage where stories from mythical folklore could come to life.

This project takes the reality we all see around us, and through photography, creates an alternative visual narrative of the stories that people have been telling for hundreds of years.

Bryan Vasquez

Characterizing the role of Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase catalyzes the breakdown of glycogen to glucose-1-phosphate and enters glycolysis. Blood glucose levels are critical in minimizing the effects of hypoglycemia or even diabetes in the liver. In order to gain an understanding of this enzyme, thermal inactivation, enzyme titration, varying AMP concentrations, and allosteric regulation assays were performed in order to examine catalytic activity. Effectors were used in order to see what activated or inhibited catalytic activity. GPb was found to be catalytically active by AMP and showed an example of allosteric regulation. Lactose when introduced into the body is broken down into glucose and galactose and can cause problems if not absorbed by the body and broken down. An effector, Lactose, was used instead of AMP and showed that it inhibited catalytic activity. GPb plays an important part in our body in order to maintain homeostasis and is an enzyme that needs to be studied for common health diseases and to observe the effect of lactose on glycogen phosphorylase b.

Karen Vazquez

Analyzing Manufactured Housing Damage Caused by Hurricane Irma

Mentor(s): Elaina J. Sutley

The goal of this research is to advance the current state of knowledge in damage assessment of mobile homes using new findings from 2017 Hurricane Irma. This effort combined a number of datasets and utilized mixed method approaches. The newly created dataset grouped post-Irma RAPID reconnaissance photographs with Homeland Infrastructure Foundation-Level Data (HIDLD) to identify locations of mobile home parks in Florida. Google Maps imagery were used to identify differences across the mobile home parks, including mobile home layout and number of homes, and assess these differences before and after the disaster after controlling for maximum wind speed gained from Applied Research Associates, Inc. (ARA) predictions. These data were collectively used to characterize multi-hazard (wind, flood and debris impact) damage to mobile homes into physical damage states. These classifications were applied to economic impact and restoration findings from public record data to quantitatively link factors, including physical damage and social vulnerability, shown to impact the rate at which a home recovers. The results reveal homes classified at higher damage states take longer to restore and experience a larger drop in home value. The results also identified the degree to which other socioeconomic factors contributed to an increase or decrease in recovery time. These findings have implications for households living in areas prone to frequent flooding or at risk for hurricanes, and particularly low income households residing in mobile homes in those areas.

Daniel Villarreal Acha

Allosteric Activity of D-Fructose in Glycogen Phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen Phosphorylase b (GPb) is a metabolically important enzyme which regulates glucose secretion from glycogen storage sites in the muscles and liver in many organisms, including humans. Although this enzyme has been studied extensively, there are still noteworthy interactions to study; namely the allosteric activity of D-Fructose. Thermal inactivation and enzyme titrations were performed to optimize further enzyme kinetics testing. Study of the activation of the enzyme was performed using AMP, measuring product formation with spectrometry. D-Fructose was tested in the same manner. Results demonstrate the strong activating capabilities of D-Fructose via the substantial decrease of the K_m value of GPb. This result has implications for the understanding of metabolic triggers which could influence GPb in a hypoglycemic state and sympathetic responses.

Art Vollbrecht

Application of Pyomo Optimization Suite to Solve MILPs in Energy System Optimization Problems

Mentor(s): Kyle Camarda

Modern energy systems must respond to an ever-increasing energy demand, diversify production by implementation of new technologies, and meet the expectations of a global initiative to safeguard the environment. Combining these requirements with the necessity of remaining financially viable creates a non-trivial multi-objective optimization problem, which in the case of this work takes the form of a mixed integer linear program. This work utilizes the Pyomo optimization software package which is implemented in the Python programming environment. Pyomo contains a suite of programs for optimization, and is very flexible, allowing for the optimization of models without data. Pyomo does not support multi-objective optimization directly, and so generation of the Pareto optimal points is obtained using an ϵ -constraint. In this research, we demonstrate the efficacy of this practice on a model created by Fazlollahi et. al., which was selected because it combines six different energy resources, optimized against cost and carbon emission. Results of the ϵ -constraint carried out in this paper are compared to Evolutionary algorithm employed by the author.

Jack Weiner

Broadband Viral Immunotherapy via Antibody Recruiting Molecules

Mentor(s): Mark Farrell & Suresh Kurhade

According to the CDC, over 1.1 million people in the United States are currently HIV-1 positive. HIV-1 has been studied for decades, but due to rapid genetic changes and immune evasiveness, it remains difficult to treat. Viral envelope glycoproteins facilitate interactions with host cells and are essential for infectivity and viral replication, however, targeting neutralizing epitopes on these glycoproteins for therapeutic purposes proves difficult due to the high concentration N-glycans.

High-mannose N-glycans are expressed on HIV-1, influenza, Ebola, Herpes Simplex Virus-1, and many more viruses in such high concentrations that it physically blocks viral peptidic epitopes. Fortunately, these glycans are absent from the glycoproteins of healthy cells, as such they represent a point of differentiation that can potentially targeted for viral inhibition.

The Farrell lab is targeting the high-mannose N-glycan shield with antibody recruiting molecules (ARMs). The ARM is composed of three parts: a target-binding terminal (TBT) that naturally binds to high-mannose N-glycans; an antibody-binding terminal (ABT) that induces an immune response through the recruitment of endogenously produced antibodies; and a non-cleavable linker at an optimal chain-length.

The ARM is designed to seek out the glycans on the viral envelope glycoproteins on infected cells or viral particles, and trigger immune system activation via antibody dependent cell-mediated cytotoxicity (ADCC), complement dependent cytotoxicity (CDC), opsonization, and neutralization.

Kate Weis

Kinetics Assay of Glycogen Phosphorylase B

Mentor(s): Roberto De Guzman

In the body, the breakdown of the glucose storage molecule, glycogen, catalyzed by the enzyme glycogen phosphorylase b, is an important reaction for areas in the body that solely use glucose as fuel, such as the brain. In order to understand what affects the breakdown of glycogen, it is necessary to understand what activates and inhibits the activity of glycogen phosphorylase b. This is difficult to study because the reaction of glycogen being converted to glucose 1-phosphate and inorganic phosphate only occurs in the cell. Therefore, this experiment studies the activity of the enzyme catalyzing the reverse reaction (glucose 1-phosphate converted to glycogen and inorganic phosphate) by carrying out a series of kinetic assays and observing the effects that an allosteric molecule and an inhibiting effector have on the activity of the enzyme. The results of the assays show that the K_m of the enzyme decreases when the level of the allosteric activator, AMP, increases and the K_m increases when the level of the inhibiting effector, caffeine, increases. This indicates that the rate of the breakdown of glycogen increases when the lack of energy (shown by an increase of AMP) increases the activity of the enzyme, while the addition of caffeine slows the enzymatic activity, thereby decreasing the rate of glycogen breakdown. These results comment on the negative impact that the consumption of caffeine has on the brain's process of obtaining fuel, due to its ability to inhibit glycogen from being broken down to glucose for energy for the brain.

Connor Wernimont

An analysis of differential cilia-length in *Tetrahymena thermophila* and temperature-dependent rate of movement

Mentor(s): William L. Dentler, Jr.

External motile cilia are involved in regular movement of certain unicellular organisms, such as in *Tetrahymena thermophila*. It has been hypothesized that *T. thermophila*, grown in cultures at higher temperature points will develop external motile cilia that are longer, and thus will move at faster rates than *T. thermophila* grown at lower temperatures. *T. thermophila* of the strain Cu428 were grown in culture at 22°C and 38°C for approximately 24 hours, and statistical data reflecting rates of movement due to change in environmental temperature of a water bath apparatus was collected. External motile cilia from *T. thermophila* of the same batch were isolated and measured. It was found that as temperature increases between defined temperature points of 22°C and 38°C, while positively increasing, the average rate of movement of *T. thermophila* increases. It was also found that *T. thermophila* cultured at higher temperatures develop longer external motile cilia than those cultured at lower temperatures.

Alicia Whitson

The September Siblings: A Case Study in Student Activist Methods and Results

Mentor(s): Ivery Golstein

My research examines student activism at the University of Kansas by studying the September Siblings, a coalition of activists at KU who formed in the fall of 2014 to protest rape culture and the university's handling of sexual assault. The group of activists made 10 demands and sat in on Strong Hall until the administrative staff agreed to hear their demands. They also started a hashtag #AGreatPlacetoBeUnsafe to raise awareness about the sexual assault problem on campus and to warn incoming freshman about the problems. Some of the demands resulted in change being made at an administrative level.

This mixed method project fills a gap in KU history through archival research, analysis of social media posts, and interviews and seeks to understand the movement using social movement theory. Social movement theory is concerned with what motivates people to mobilize and how activism affects society. This project also uses reflexivity to understand the September Siblings movement, as I was an incoming freshman at the University of Kansas in 2014. I use these lenses to understand why students got involved in the September Siblings movement, find out what their methods were, and understand what change they had on the University of Kansas campus.

Riley Winter, Alisa Childress, Olivia Childress, Reece Knapic, Amy Glattly, Rachel Heitmann & Jared Schmalstieg

Perennial Gardening at Prairie Moon Waldorf School

Mentor(s): Kelly Kindscher

This plan and proposal for an herb and pollinator garden at Prairie Moon Waldorf School demonstrates the value of implementing gardening experience into education and presents the ways that working with plants positively affects a child's education. In order to incorporate a gardening curriculum into everyday practice, Prairie Moon needs a low-maintenance garden. Establishing a perennial/herb garden will allow students to observe plants and pollinators in their natural habitat. Students may also use the garden as a resource for cooking herbs, native dye plants, and medicinal plants. This project will involve coordinating who will build and maintain the garden and collaborating with teachers to build a curriculum. Through careful planning and coordination with Prairie Moon staff, this project will create an authentic, nature-centered learning experience for the students at Prairie Moon Waldorf School.

Zach Wood

Synthesis and characterization of organic molecules for potential applications in nanoelectronics

Mentor(s): Mikhail Barybin

Chemists often use the isocyanide junction unit, $-N\equiv C$, to link organic molecular fragments to transition metal atoms and ions. These molecules attached to a metal center are called ligands. The ligands featuring an isocyanide group have important applications in modern catalysis, materials science, drug discovery, and diagnostic medicine. For example, the cationic radioactive compound $[^{99m}\text{Tc}(\text{CNR})_6]^+$ (R = methoxyisobutyl) is an active ingredient in Cardiolite[®] (a myocardial perfusion imaging agent administered as a part of the “stress test” procedure) and in Miraluma[®] (a breast cancer imaging agent). Professor Barybin’s research group at KU employs isocyanides as “alligator clips” to connect conducting organic molecules to electron-rich metal atoms and surfaces to form novel platforms for applications in organic electronics. This presentation will focus on my work that has provided important quantitative insight into tuning electronic characteristics of isocyanide-containing molecular wires, which may facilitate rational design of new organometallic materials relevant to applications in molecular electronics.

Kevin Xie

Effect of D-fructose inhibitor on the kinetics of Glycogen phosphorylase-B

Mentor(s): Roberto De Guzman

Glycogen phosphatase-b is a protein that is used as catalyzes the hydrolysis of a glycogen molecule to generate glucose-1-phosphate. In the breakdown of glycogen molecules by glycogen phosphatase-b is considered to be the rate determining step. Glycogen phosphorylase-b is usually inactive and can be converted to its A form of a phosphoryl group is attached to Ser14. The rate of the reaction in which an inhibitor is introduced which in this case is D-fructose was studied. The result shows that the relationship of organic pi concentration and the substrate stock solution is linear. The 2mM concentration for the D-fructose inhibitor had the highest final inorganic phosphate concentration at .465 M while the 6mM had the lowest at .3839 M. This is important because this effector can be seen being an inhibitor which causes the inorganic phosphate to have a higher concentration because the glucose-1-phosphate is being converted into glycogen and inorganic phosphate. This shows that d-fructose prevents the conversion of glycogen to glucose-1-phosphate as can be seen with the increase concentration of inorganic phosphate. These results were obtained using spectrophotometry and calculating the concentration of inorganic phosphate from the absorbance.

Whitney Young

Audacity

Mentor(s): Elise Kirk

"Audacity" is a conceptual photo series that documents women of the local Kansas City music community at concerts, shows, performances, and events. The photographs are then turned into raw data and edited in the music editing program Audacity, only using words and effects that could be construed as pejorative to women. The result is an abstracted photograph held within a specific space. The glitch is meant to be read as both the veil of these injustices but also meant to be the catalyst in which these issues are to be made aware of.

Aneka Zarger, Jakob Moberly & Tabitha Bassett

The Developmental Function of Music for Adults Ages 29-45

Mentor(s): Deanna Hanson-Abromeit & Katie Martin

Research about typical developmental expectations is abundant. Literature on music development is available for children, but is limited in its scope across the lifespan. Music therapy students preparing for a career in the delivery of music interventions must be equipped with a strong foundation in developmental capabilities of music with people and how music is integrated with other developmental domains (e.g. motor, cognitive, emotional). There are currently no known comprehensive resources that combine typical developmental expectations across the lifespan with music development expectations. Thus, the purpose of this research project is to develop a theoretical framework for how music functions to support development for adults ages 29-45.

We will use developmental milestones, neurologic foundations and uses of music for people who are adults ages 29-45. This information will be organized by music characteristics (e.g. rhythm, melody, dynamics) to provide a rationale for how music elements relate to typical development. This information will then be applied to pre-composed music appropriate for the different age ranges and we will assess how well pre-composed music represents the theoretical rationale we identify.

This project is part of a course-based research experience in MEMT 250 Human Development and Music Learning Across the Lifespan. The project is partially supported by a Graduate Research Consultant from the Center for Undergraduate Research.

Cong Zhao

The effects of sucrose for Glycogen phosphorylase b

Mentor(s): Roberto De Guzman

Glycogen phosphorylase b(GPb) plays an important role in cellular energy metabolism. The activity GPb must be carefully regulated to respond to various cellular states and needs. In fact, GPb is a well-studied enzyme known to have many small molecular effectors that up-regulate or down-regulate its enzyme activity. These effectors typically regulate GPb activity through allosteric mechanisms, which have been investigated using enzymatic and structural methods. In this experiment, we did study the allosteric regulation of GPb by selecting effector which is sucrose. We chose 0AMP, 2AMP, 4AMP, and 10AMP to do the measurement. The glycogen phosphorylase b(GPb) of the kinetics of enzymatic reactions were investigated, and the allosteric effect of adenosine 5' adenosine monophosphate(AMP) was measured by the Michalis-Menten curve. Moreover, V_{max} and K_m for each amperage concentration also be checked. The graph showed that the V_{max} at the 10AMP. When AMP was increasing, then the maximum velocity was also increasing. Therefore, according to the result, sucrose increased the activity of the enzyme and it's activator.

Katie Zimmerman

A Computational Study of the Amino Terminal Copper and Nickel Antimicrobial Metallopeptide Motif

Mentor(s): Candan Tamerler

Resistance to modern antibiotic treatments is a broadly shared concern. A possible solution is the use of antimicrobial peptides (AMPs) that naturally execute biological performances to eliminate microbial infection. Antimicrobial peptides have the potential for improved integration of bio-compatible implants in the body through preventing bacterial infections. Our group has been exploring delivering antimicrobial peptides to the implantation site to prevent infections.

Certain antimicrobial peptides operate with metal ions by adapting structural changes upon metal binding, sequestration and redox chemistry. In this study, we explore antimicrobial metallopeptides as antimicrobial agents to utilize them onto the implantation site. The amino terminal copper and nickel (ATCUN) motif is a sequence trait found in several AMPs that utilize metal ions for antimicrobial activity activation. We designed our computational study to mine ATCUN amino acid sequences from the AMP databases to determine traits that infer the combination of metal ion binding with antimicrobial activity. The ATCUN motif sequences will be used to dictate relevant sequence characteristics using Modified Learning from Example Module version 2 (MLEM2), an algorithm to select commonly observed attributes. Determining separable definitions of active ATCUN sequences will allow for improved AMP design to deliver a solution to antibiotic resistance.