21th Annual Student Research and Creative Endeavor Symposium

MARCH 23, 2018

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21st Annual Student Research and Creative Endeavor Symposium

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21st Annual Student Research and Creative Endeavor Symposium
Friday, March 23, 2018
Program
Poster Judging Sessions: 9:00 am – 2:25 pm
Awards Ceremony: 3:30 pm

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- Undergraduate Conference Travel Program
  To be eligible, a student involved in a faculty-mentored research project must have a paper accepted for presentation at a professional conference held in the United States. Successful applicants will receive up to $250 to defray costs.

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Contact Dean Alexis Smith Macklin, macklina@ipfw.edu, Helmke Library for questions about student and faculty mentor permissions and Opus.

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Chen, Chao — Computer Engineering
Chen, Dong — Civil and Mechanical Engineering
Chen, Zesheng — Computer Science
Cuffy, Sheila — Education Studies
Ding, Suining — Visual Communication and Design
Eber, Patricia — Human services
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Gabbard, James — Visual Communication and Design
Gillespie, Robert — Biology
Gruys, Melissa, Dean, Doermer School of Business
Gurevich, Naomi — Communication Sciences & Disorders
Hamash, Kawther — Nursing
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Kingsbury, Bruce — Biology
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Malanson, Jeffrey — History
Matyas Jessica — Psychology
Mikhail, Sally — Physics
Montenegro, Andres — Visual Communication and Design
Nalam, Vamsi — Biology
Nachappa, Punya — Biology
Niazi, Fawad — Civil & Mechanical Engineering
Nunez, Isabel — Educational Studies
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Ohlinger, Donald — Education Studies
Qasim, Mohammad — Chemistry
Reese, Pam — Communication Sciences and Disorders
Ross, Jody — Psychology
Schmidt, Gordon — Organizational Leadership
Stevenson, Steven — Chemistry
Tahmassebi, Daryoush — Chemistry
Truesdell, Cheryl — Helmke Library
Wagner, Sarah — Helmke Library
Wark, Linda — Human Services
Zhang, Yuan — Mathematics
2018 Student Participants (alphabetical) with Poster Numbers

1. Shailesh Raj Acharya
2. Elizabeth Barlow
3. Kayla Bell
4. Janine Bennett
5. Cindy Berger
6. Feroz Ahmed Bhuyan
7. Gabrielle Blust
8. Bre Anne Briskey
9. Cheyenne Carroll
10. Darci Collison
11. Cameron Cook, Aaron Dills, Eric Kim
12. Samuel Cook
13. Jedidiah Davis, Hannah Thompson, Quang Thoai Ho
14. Kowshik Dey
15. Tunir Dey
16. Kaylie Dunn
17. Ashley Eppinger
18. Destin Furnas
19. Michael Hall
20. Connor Hamilton
21. Kaelyn Hatcher
22. Justin Hearl
23. Micha Hetrick
24. Alivia Isch
25. Lindsay Jensen
26. Somer Johnson, Hannah Thompson, Rachel Schelling, Morgan Hardwick, Donovan Rennaker, Kathleen Landrigan
27. Aaron Jones
28. Urvi Joshi
29. Urvi Joshi, Cameron Cook, Aaron Dills, Eric Biazo
30. Christopher LaFontaine, Elizabeth Brown, Luis Nunez, Adam Stucky
31. Giang Le
32. Minh Le
33. Sierra Marsh
34. Sabrina Medert
35. Chelsey Meyer
36. Victoria Miller
37. Skyler Mills
38. John Moeller
40. Tyler Niedermeyer, Colby Kirkwood, Shannon Rahn, Valerie Klar
41. Luis Nunez
42. Luis Nunez, Christopher LaFontaine, Adam Stucky
43. Kairah Pippenger
44. Matthew Place
45. Alison Resac
46. Francisco Rivera
47. Rachel Roberts
48. Heather Rospond
49. Jingru Ruan, Eric Olsen, Donovan Rennaker, Jacob Psimos
50. Kenneth Saillant
51. Molly Schenkel
52. Samantha Schnurr
53. Tianna Schuerman
54. Natali Sheldon
55. Megan Sims
56. Megan Sims
57. Shelby Smiley
58. Joesph Smith, Shahab Shah
59. Stephen Smith
60. Meg Steigerwald
61. Adam Stucky
62. Miriam Greidanus Romaneli, Logan Thacker, Hannah Nissley, Robyn White
63. Ma Thazin
64. Nanthanat Thongoopakam
65. Lauren Tom
66. Emmy Wanjiku
67. Jacqueline Warfield
68. David Watterson Jr.
69. Fyodor Wheeler
70. Jedidiah Davis, Nicholas Yergens
71. Tyler Niedermeyer, Nicholas Yergens, Valerie Valenciano
72. Xiao Yuan
Evaluation of Second generation transgenic soybean plants for resistance against soybean aphids

Shailesh Raj Acharya
Department of Biology

Faculty Sponsor and co-author: Dr. Vamsi Nalam
Department of Biology

The soybean aphid continues to be an important pest in the major soybean growing regions around the country. The current consensus management recommendations that have been developed over more than a decade of research include cultural, genetic, economic and chemical controls. Although these strategies reduce the threat posed by soybean aphids, they do not completely eliminate it as a pest. As a complement to current management practices, we propose utilizing a biotechnological approach to enhance plant immunity. The genetic manipulation of components of the plant’s own defense signaling pathways offers an attractive strategy for boosting plant defenses. Regulatory genes that control the expression of multiple defenses are excellent targets for developing a broad spectrum of pathogens. This approach has several important advantages, including a minimal impact on crop yield for an economically important plant, reduced impact on the environment and the natural enemies of the aphid due to reduced insecticide application. A defense regulatory gene PHYTOALEXIN DEFICINT4 (PAD4) is an excellent candidate for over-expression soybean plants due to its important role in plant defenses against a broad-spectrum of pathogens. Previously, we have developed transgenic soybean plants that over-express the native PAD4 gene under the control of a constitutive promoter. Evaluation of the T0 and T1 plants from five transgenic events indicates that the PAD4 gene is indeed present and expressed in the transgenic plants. Soybean infestation assays indicate that the transgenic plants display enhanced resistance to soybean aphids. Data from the screening of second-generation transgenic plants for response to the soybean aphid indicate that the transgenic plants continue to show enhanced resistance to soybean aphids. Our research demonstrates a central role for PAD4 in plant defense against soybean aphids and that the genetic manipulation of regulatory genes in crop plants can produce a broad spectrum of resistance with a lack of detrimental effects on crop yield and plant traits.

Key words: PAD4, Soybean, Soybean aphid, Host defense, transgenic plant
Cradle for a Demon

Elizabeth Barlow
Department of Visual Communication and Design

Faculty Sponsor: Professor James Gabbard
Department of Visual Communication and Design

Since I was a child, I was fascinated by imaginary worlds. High fantasy, or what is more associated with Tolkien fantasy, is my favorite genre to write and illustrate. Since the beginning of my college career, I have been constructing a fantastical world. My graphic novel, Cradle for a Demon, is a short introduction to a larger fantasy series. My goal is to take standard fantasy tropes and stereotypes, and spin them on their head or take them to the logical conclusion. When writing my story, I did extensive research into typical fantasy races and the real world lore behind them. During the conception phase of my graphic novel, I changed the setting had gotten an overhaul. I chose to set the world in post-Industrial Age versus the standard Middle Ages. Part of my research also included serious themes of mental illness and prejudice to accurately portray these topics to the best of my ability. My concept book showcases more than the sketches and character studies I have done to prep myself for the graphic novel. I several short stories and character and setting studies that explore my world.
Over Our Heads: The Constellations and Their Stories

Kayla Bell
Department of Visual Communication & Design

Faculty Mentor: Professor James Gabbard
Department of Visual Communication & Design

As a child, I remember being outside and wondering how all of these pretty dots appeared in the sky. Growing up, I began to learn how those dots formed images. I taught myself how to find the basics; the big dipper, the little dipper, Orion, and Cassiopeia. While in high school I took an Astronomy course, and fell more in love with the night sky. Those stars that form the images in the sky, they have stories. And the sky has a night of adventures to give us. According to Livescience.com, 20% of Americans confuse Astrology and Astronomy. That’s about 1 in 5 Americans, which really surprised me. So, I have created a book with illustrated constellations that include their mythological stories. The book is aimed towards young adults, creating an engaging way to learn about the constellations and their stories. Books on astronomy are usually boring, with outdated illustrations and language. I retold the stories in a way that is better understood, in a language used in today’s society; this way people can become more engaged and inspired to continue learning more. This is not to be confused as a guide to locating the stars and constellations but more so learning the history and mythological stories behind those stars in our sky through imagery, illustrations, and of course stories. The sky has so much entertainment to offer us, yet so many people have no idea of the stories that encompass the constellations. I believe that young adults who become excited about these stories might then be motivated to learn more about astronomy and the scientific wonders of our universe.
Expression of genes associated with sunscreen biosynthesis in the cyanobacterium *Nostoc punctiforme*

Janine Bennett  
Department of Biology  

Faculty Sponsor and co-author: Dr. Tanya Soule  
Department of Biology  

Cyanobacteria are photosynthesizing organisms that live in environments open to solar ultraviolet radiation. In order to survive in these environments, some cyanobacteria produce sunscreen pigments that convey the ability to tolerate harmful solar energy. The indole-alkaloid scytonemin is a sunscreen pigment that is widely produced among cyanobacteria. This sunscreen pigment intercepts photons before they can harm cellular machinery and DNA. The specific aim of this project is to determine if genes associated with scytonemin biosynthesis are expressed in response to environmental conditions. The genomic region associated with scytonemin biosynthesis is composed of a two-component regulatory system located immediately upstream from a 18-gene cluster that is cooperatively expressed in response to UVA as a metabolic network dedicated to scytonemin biosynthesis. To assess scytonemin response, cells were acclimated and grown under white light for one week and then subjected to the following environmental stresses for two days: UVA, UVB, high light, and oxidative stress. The presence of scytonemin was determined by absorbance measurement of acetone extraction. To determine transcript abundance, cDNA was measured using qPCR using primers targeting scytonemin biosynthetic genes, *scyA*, *trpB*, and Npun_F5233 and compared to control transcript levels for cells under white light only. Of the environmental conditions tested, scytonemin genes were upregulated, but scytonemin was induced and detected only in the UVA and UVB environmental conditions.
Evidence-Based Practices For Students with Autism Spectrum Disorder in General Education

Cindy Berger
Department of Educational Studies

Faculty Sponsor: Dr. Jane Leatherman
Department of Professional Studies

Autism Spectrum Disorder (ASD) is becoming more prevalent in our society. The Center for Disease Control (CDC) estimates that 1 in 68 children are diagnosed with autism. Schools are seeing more students identified with ASD enrolled in the general education setting. This has become a challenge for teachers who are not prepared to differentiate instruction for a student with ASD in the least restrictive environment (LRE) of the general education classroom.

The purpose of this phenomenological study, using a mixed-methods survey, is to explore licensed teachers’ awareness of academic and behavior evidence-based practice (EBP) and if they are implemented in their classroom for students with ASD. Nineteen teachers from a suburban elementary school in northern Indiana participated in an anonymous and voluntary Google Forms survey. The initial results showed that most had experienced a student with ASD in their classroom and more than half are using at least one or two academic or behavioral EBP strategies. Preliminary results indicate that teachers do use behavioral and academic strategies in their classrooms. The 66% of teachers want to learn behavior de-escalation techniques and 55% of teachers want to learn academic prompting strategies. The majority of participants did feel like professional development would be helpful to enhance their classroom strategies.
Finite Difference Time Domain Simulation of Transmission Lines

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Department of Engineering

Faculty Sponsor and co-author: Dr. Abdullah Eroglu
Department of Electrical and Computer Engineering

Finite Difference Time Domain Simulations (FDTD) is one of the most effective computational methods for solving electromagnetic problems. It applies the method of finite difference for solving differential equations to Maxwell’s equations. It divides space of application into small fractions which are designated as cells. Then, Maxwell equations are applied at each point in time for each cell. This application enables one to simulate electromagnetic waves propagating in a numerical space. In this work, the finite difference time domain method is applied to develop planar devices for transmission lines. One of the common examples of these planar microstrip devices is directional couplers. The FDTD is developed and applied to design one-line and two-line conventional directional couplers. The results are then compared with Method of Moments (MoM)-based commercial electromagnetic simulators. It is shown that there is close agreement between the results of the proposed method and MoM based commercial software Sonnet. The method such as the one proposed in this paper can be used design any planar devices with accuracy.
Friend Request Rejected: How Social Media Use Affects Interpersonal Communication

Gabrielle Blust
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Faculty Sponsor: Dr. Kim Lloyd
Department of Sociology

Social media use has changed the way we view advertisements, the way businesses operate, and the way we interact with our families and friends. In this study, I hypothesize that there is an inverse relationship between the amount of time IPFW students spend on social media and the amount of time they spend interacting with friends face to face. Additionally, I hypothesize that this relationship will be stronger for students who are in committed intimate relationships, such as marriage, than for students not in relationships. To test these hypotheses, I gather data from approximately 800 undergraduate IPFW students during the spring semester of 2018. Descriptive and multivariate analyses reveal that these two hypotheses are statistically significant predictors of the dwindling interpersonal face-to-face interactions between friends. For example, findings show that students who use social media have fewer face-to-face interactions with friends during the week; they have even fewer face-to-face interactions with friends when they are in romantic relationships.
The Central Intelligence Agency (CIA) involved itself in multiple operations that aimed to contain or prevent the spread of Communism during the twentieth century. The purpose of this project was to examine Operation PBSUCCESS, the CIA’s coup d’etat against Jacobo Arbenz, the democratically elected president in Guatemala in the 1950s. Using declassified documents from the CIA library, as well as scholarly secondary sources on the contemporary situation in Guatemala and on the CIA’s involvement, this project sought to understand how the CIA had determined that Communism infiltrated Guatemala. After careful analyses, I concluded that the CIA misinterpreted their gathered intelligence reports due to confirmation bias, an unconscious process where information is erroneously examined and interpreted to fit with one’s presumptions. The contemporary fear of Communism obscured the CIA’s ability to objectively evaluate Guatemala; the CIA believed there were significantly larger numbers of Communists in the government and voting population than there in fact were. Furthermore, this confirmation bias affected the CIA’s analysis on collaboration between the Soviet Union and Guatemala and on Guatemalan policies. The project concludes that Operation PBSUCCESS can be characterized as a failed intelligence operation due to the misinformation produced from confirmation bias. This conclusion is significant as it is a revisionist interpretation on this operation and how successful it actually was. This is important as it demonstrates the need to be skeptical, even when results turn out favorably.
How do you make your everyday cup of coffee even better? With Wicked Mugs. Wicked Mugs is a coffee mug company with hand crafted and painted coffee mugs. Wicked Mugs has its own unique style that is edgy and original. Although, each mug is different from the rest with its own unique illustration on the front, as well as a matching coaster. Our company targets 18-30 year olds as well as men and women. We strive for uniqueness, creativity and wickedness with our products. The inspiration behind this company comes from personal hobby. I collect coffee mugs and I have always wanted to express my own style of mugs. How I approached this style was doing research in popular trends that teens and young adults have adopted. I looked at reports and research done by the National Coffee Association on what age group drinks coffee the most as well and that is how I targeted my demographics. Coffee shops are becoming very popular hang out areas or teens and young adults so I designed my display to resemble an urban coffee shop. In the past I have never seen a style such as the one I have created and that is what makes my mugs stand out from competitors. Wicked Mugs gives me the opportunity to show my passion for graphic design and marketing, and also my personal hobby of painting and crafting coffee mugs.
Factors that Influence Students’ Views on Human-Induced Climate Change

Darci Collison
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Faculty Sponsor: Dr. Kim Lloyd
Department of Sociology

This research focuses on the factors that influence students’ views on anthropogenic, or human-induced, climate change. In this study, I hypothesize that the source that the primarily source that students receive their news will impact their views toward climate change. Based upon previous literature and the study of media influence over society, as well as the polarization between various news networks and online news sources, it can be argued that those who receive information primarily via conservative sources will be more likely to deny or minimize climate change. My second hypothesis poses that students’ religious affiliation will influence beliefs regarding climate change. Previous research suggests that many religions, such as Evangelical Christians, deny the anthropogenic influence over nature and attribute natural phenomena to God’s will, while other Religions, such as Buddhism, embody a connection with the earth thus garnering further recognition of climate change and its human origins. To test these two hypotheses, I gather data from 718 IPFW undergraduate students during the spring semester of 2018. Descriptive and multivariate analyses were conducted to determine if a relationship exists between the variables. The results suggest that the primary media outlets from which news is received have an impact on students’ views regarding climate change. Findings reveal that students who acquire news from liberal-leaning networks have a higher level of belief in climate change. In the contrast, those that receive news via conservative sources are more skeptical of human-induced climate change. Results also indicate that religious affiliation is less of a predictor of views on human-induced climate change, yet still is a significant predictor. The results of this study support the findings of previous research, which show that both media and religion are significant predictors of people’s perceptions of human impact on the environment.
In developing countries, it can be difficult for people to obtain clean water at an affordable price. For example, there are currently about 700 million people without access to clean water among the 1.033 billion people in Sub-Saharan Africa. Moreover, more than 100 million people live in areas with poor water quality in India. To allow more people access to clean water, one possible solution is to use a solar powered pumping system to provide clean water underground. One challenge to such a solution is to design a low-price, easy-to-use kiosk system. In this senior capstone project, a virtual kiosk system is developed based on the technologies of the Internet of Things (IoT), a network of sensors or devices connected to the Internet. Specifically, this virtual kiosk system is Web-based so that users are able to employ their smartphone, tablet, or computer to request, pay for and obtain clean drinking water from the pumping system through the Internet. The IoT framework that powers the system senses the flow data in real-time. Moreover, the system can control the pump through a simple user interface in a remote browser. For the administration of the pumping system, a dashboard is implemented to monitor and make changes to the system. As part of a senior engineering capstone project, a working virtual water kiosk system has been realized based on IoT technology. Such a system can potentially provide clean drinking water to people in developing countries at an affordable price and have a significant positive impact to their lives.
Investigating Students’ Common Sense Ideas of Coulomb's Law

Samuel Cook
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Department of Physics

Previous physics education research has demonstrated that students have many common sense ideas about the behavior of the physical world derived from their childhood experiences. This previous research has also demonstrated that these common sense ideas strongly affect what students can learn. This project works to uncover the common sense understanding of electrical forces between two charges that students bring to entry-level physics courses. Its main focus is to answer these questions: do students think that other objects affect the Coulomb force two charges exert on each other and, if so, what are their conceptions, or common sense ideas, about what alters the effect? The Coulomb force between two charged particles depends on the product of the two charges divided by the distance between them squared ($F = k \frac{q_1 q_2}{d^2}$). Although this is a straightforward principle, many college students taking entry-level physics courses think that these interactions are much more complicated. We designed a series of questions to investigate the students’ common sense ideas. These questions probe what the students are thinking by having them contrast a base scenario of two charges at a fixed distance away from each other with a series of scenarios having another charge, insulator, or conductor present. Students are also asked to explain how this new element changes the force between the two original charges, if at all. According to Coulomb’s law, the force between the charges at a fixed distance should not change from their interaction in the base case; however, student responses suggest otherwise. Students often believe that new elements alter what was true in the original scenario, proposing mechanisms such as insulators absorbing forces or conductors amplifying forces. Discovering how students think about the interactions between charged particles and whether such ideas change with different student cohorts will allow educators to better counteract these common sense ideas. Knowing the ideas students are entering with will allow instructors to construct materials and activities that will enable students to gain a deeper and more thorough understanding of the course material and how the natural world actually behaves.
How Big of a Problem Is Cyberbullying on College Campuses?

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Dr. Michele Drouin  
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Dr. Kimberly O'Connor  
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In this study, we attempted to provide a snapshot of cyber-abuse behaviors among students at a single, mid-sized commuter university in the United States. The goal of this study was to provide helpful information that could be used to guide universities when creating cyber-civility policies using information that is currently lacking in higher education. We examined recent university cases and relevant laws related to cyberbullying and revenge porn, surveyed student characteristics that were associated with this type of victimization, and made suggestions for language universities should consider when drafting their cyber-abuse policies. Finally, we addressed the role of the university in protecting potential victims, training students on policies and reporting procedures, and intervening in incidents related to these types of cyber-abuse.
Energy harvesting is the process by which energy is derived from external sources (e.g., solar power, thermal energy, wind energy, salinity gradients, and kinetic energy, captured, and stored for small, wireless autonomous devices. The design, simulation and implementation of a radio frequency direct current (RF-DC) rectifier for use in an RF Energy Harvester is presented here. The radio frequency energy harvesting (RFEH) system developed in this paper scavenges energy from electromagnetic waves present in ambient sources to generate usable DC power for use in everyday low voltage systems. Unlike traditional power sources, which are typically voltage sources, the RF ambient energy harvester does not provide constant voltage or constant current but rather constant power. When harvesting energy from ambient energy sources, it is not a feasible technique to analyze current and voltage of each energy source. In the proposed design, the RF-DC conversion system is modified to passively amplify the available voltage for rectification by developing a resonator with a high quality factor. Passive amplification and rectification is implemented using a combination of clamper and peak detector circuit.
Super-Capacitors for Hybrid Storage Applications

Tunir Dey
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Faculty Sponsor: Dr. Abdullah Eroglu
Department of Electrical and Computer Engineering

A hybrid energy storage system configuration, novel to the author's knowledge, was introduced. Interleaving the super capacitor between the ESD and DC-link capacitor, the super capacitor now directly handles all power demands, transient or steady state, and the ESD functions to maintain the super capacitor charge. Differentiation regarding the nature of the power demand is eliminated, thus reducing the system’s control complexity. Due to the voltage-energy storage relationship characterizing any capacitor, the application of the Adaptive Sliding-Mode DC-DC control design successfully addresses voltage permutations to ensure the required output voltage. Bi-directional power flow, important to the continuous hybrid energy storage system operation, is fulfilled by this scheme as well. In addition, the proactive design streamlines implementation, provided suitable response thresholds are initially available. Finally, continuous successful operation is fulfilled with supplemental protection controls, ensuring component life. The operation results were attained through simulation with Matlab's Simulink and the Simulink Power Systems toolkits. Such results are valid as the physical elements are defined by the fundamental component operation characteristic formulas. By following the design procedure summary, this system is applicable to any adequately defined situation.
Bee Here Now: Pollination, Food for a Nation

Kaylie Dunn
Visual Communication and Design

Faculty Sponsor: Professor James Gabbard
Department of Visual Communication and Design

If you were to ask the general public their feelings about bees, most would say that they are terrifying, or maybe that they are allergic to them. The truth about bees is terrifying, but not because of their stinger. The bee population is rapidly dwindling. Bees are responsible for pollinating 30 percent of the world's crops and 90 percent our wild plants. Without bees, we would have to start self-pollinating, or we wouldn't have any food. Maybe your argument would be that you are mostly a carnivore? All of the meat that you eat, cows, chickens, etc. rely on those plants as well. The dwindling bee population goes further still. The rapid loss of bees is also effecting the plant life, which effects the animals, which also effects the planet as a whole. Plants are responsible for filtering most of the air on the planet. The build-up of CO2 is causing global warming. It is all one big cycle that we, as humans can help. My thesis is to bring awareness to the general public about the bees. I want to educate them on the mannerisms of bees, how they don't want to cause harm, how important they are to us and the planet, and what EVERYONE can do to help. I have done this through the power of graphic design and photography. I am trying to portray the seriousness of the dwindling bee population while still trying to celebrate the bees that are alive and celebrate what they do. I have written a book, built a display, and made multiple take-aways to help aid in my purpose. I can't completely stop the bees from dying, we all have to do that together. I hope to encourage people with my display and my information to help as much as they can. Many people have no idea it's even a problem, many people hate bees are scared of them and with my display I hope to change that.
Pillar, Elevating Women

Ashley Eppinger
Department of Visual Communication & Design

Faculty Sponsor: Professor James Gabbard
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As of 2015, women in the United States are paid only 80% of what men are paid. This is called the gender pay gap, because it calculates the difference in the median earnings of men and women. The data used to calculate earnings comes from three separate sources: the U.S. Census Bureau, the U.S. Department of Education, and the U.S. Bureau of Labor Statistics. However, it is important to note that the gender pay gap is often worse in the Midwest Region of the United States. Indiana, for example, exhibits a larger pay gap of 24% (women are paid about 76% of what men are paid). The gender pay gap impacts all women, regardless of demographic, in an abundance of respects. The most notable adverse effect, however, is poverty. Studies show that the gender pay gap contributes directly to women’s poverty levels and if the gap could be closed, women’s poverty levels in the United States could be cut in half. While the gap is narrowing, it is narrowing too slowly. At the current rate, women will not receive equal pay until as early as 2059 or as late as 2152. In order to combat the gender pay gap issue, and close the gap sooner, women need professional support systems in place. This is what my organization, Pillar, would provide. Pillar is a professional, membership-based organization which serves to support women working in creative industries, living in the tristate area of Indiana, Michigan and Ohio. Support systems include a private, online forum to connect them with women in their same fields, as well as networking events, salary negotiation and interviewing strategy workshops, resume and personal brand building guidance, meetup groups with other members, and access to speak from prominent members of their field. By arming women with knowledge, resources and strategies, they can be their own successful advocates for closing the gender pay gap.
Aquaculture-reared fish experience many stressors not found in their normal habitat. The accumulation of these stressors can have numerous negative impacts on the health of these fish. Nutraceuticals such as isoflavones have shown to be effective in modulating stress and improving health. In this study, Nile tilapia (Oreochromis niloticus) were randomly distributed into four groups, each with two replicates: 1) non-stressed group fed commercial feed (negative control), 2) stressed group fed commercial feed (positive control), 3) stressed group fed puerarin-supplemented commercial feed, and 4) stressed group fed genistein-supplemented commercial feed. Primary, secondary, and tertiary biomarkers for stress were measured at 0, 24, and 72 hours for acute stress and at 1, 3, 5, and 7 weeks for chronic stress. Puerarin and genistein, when supplemented with commercial feed, appear to be effective in modulating primary, secondary, and tertiary stress responses in aquaculture-reared Nile tilapia.
Decomposition Rate Survey Throughout Indiana Dunes National Lakeshore

Michael Hall
Department of Biology

Faculty Sponsor: Dr. Jordan Marshall
Department of Biology

Decomposition plays an integral role in the cycling of organic and inorganic nutrients. The purpose of this study is to compare microbial communities related to rates of decomposition. To establish this possible link, leaf litter from a single location was collected and nine carbon fiber bags were filled with the leaf litter. Three sites in northwest Indiana were identified for this experiment, one control site (which was the origin of the leaf litter) and two experimental sites that differed in environmental characteristics. An initial mass was measured for each bag. From the original leaf litter collection, a microbial sample was collected and a sample of the leaf litter was collected for drying to determine the initial dry mass. The experimental bags were checked biweekly over three months. During each visit, the mass of each bag, soil moisture, soil pH, tree species diversity and richness, and canopy density were measured. During the final visit, a final microbial sample was collected for each bag and analyzed for any changes in microbial species or population densities. DNA was extracted from the microbes and amplified using PCR. Once final PCR products were obtained, the samples were mixed to determine a representative sample of each experimental site; four mixed samples were then sequenced at the University of Chicago via high throughput sequencing. Soil moisture was lower at one of the experimental sites compared to the litter source site. Also, soil pH was lower at the litter originating site compared to the two experimental sites. Canopy cover and leaf mass different between sites. Additionally, wet leaf mass was positively related to soil moisture, which would explain mass increases mid-season. Further analysis is needed to fully understand the relationships between decomposition and microbial communities at these sites.
The effects of oregano (Origanum vulgare) leaf extracts on tumor cell growth and immune response

Connor Hamilton
Department of Biology

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Dr. Daryoush Tahmassebi
Department of Chemistry

The use of herbal remedies for the treatment of cancers has been increasing recently. Melanoma is the most dangerous type of skin cancer. The primary aim of this study is to examine the anti-tumor effect of *Origanum vulgare* against B16 murine melanoma cells. The secondary aim is to observe the potential proliferative effect of *O. vulgare* on C57/BL6 spleen cells. The essential oil from the dried *O. vulgare* leaves was extracted via hydrodistillation. Previous studies have referenced different active compounds in the leaf extract of *O. vulgare*. For this particular study, a carvacrol solution was utilized to serve as a control solution in reference to the leaf extract of *O. vulgare*. Moreover, this helped standardize the effectiveness of the essential oil itself. Specific dilutions of the leaf extract were able to decrease melanoma cell counts as well as increase spleen cell counts. In conclusion, this study demonstrates that the essential oil of the *O. vulgare* plant has the potential to serve as an effective component for inducing melanoma cell growth inhibition as well as spleen cell proliferation.
A Case Study of Child Development: An Individualized Approach to Lesson Planning

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Faculty Sponsor: Dr. Julia Smith
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This poster will highlight work that I did for honors credit in Child Development during the fall 2017 semester under the supervision of Dr. Julia Smith. The primary focus will be to show how in-depth observations of one child (name changed to Ava) in the elementary school setting can lead to individual planning in the classroom. I have chosen to focus primarily on social emotional, cognitive, and language development that occurred in Ava over the past two months of observation for my coursework and honors credit. These observations took place within timed increments in a natural setting in which I documented the child’s behavior and development in each domain. I used information from my observations to implement teaching strategies that will build her current development capabilities while scaffolding new knowledge and skills for the child. Each lesson plan has been tailored to the needs of Ava to individualize her learning based on the observations. During my fifteen weeks of observation at an East Allen County District School, I have also used research and theories of child development to inform and strengthen my teaching practice and working with the child. My knowledge of Ava’s educational progress has given me great confidence that she will benefit from the individualization and that these three uniquely tailored lesson plans can be used to further work with the child’s developmental strengths in a positive direction.

The social emotional lesson plan holds a primary focus of improving Ava’s social and emotional understandings of others. These understandings include concepts of empathy, self-efficacy, and self-control of English and Language Arts Indiana State standards. Using my observations as my tool, I will use this lesson plan as a tool to help Ava overcome and identify emotions within conversational topics inside the classroom and during group activities. A cognitive lesson plan was designed to aid in Ava’s understanding of number sense, currency, and measurement of numbers. This lesson plan was also created for Ava to acquire cognitive strategies, self-regulation, and study skills that happen within her child development. A language development lesson plan was also used to serve a phonological and syntactic developmental purpose to build Ava’s fluency of text. The language lesson plan also was also focused on partnering child development theory and English and Language Arts Indiana State Standards related to sentence structure and comprehension of phonological awareness inside selected texts. My primary focus for this research project was Ava’s social and emotional development. Using the social-emotional developmental lesson plan, I wish to use my observations to help her reach her goal of self-control, self-efficacy, and empathy development. This would be accomplished using this lesson plan and standards of the text to grow her understandings of labeling emotions and tailoring awareness of other people’s feelings. I hope that using this poster I can represent and show my knowledge of Ava’s social, emotional, and cognitive child development through in-depth observation inquiries.
Nick

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Animation, across the extensive variety of forms in which it may be manifested, is storytelling in motion. The interfaces with which we engage animations span an equally robust array in their form. I intend to explore the relationship between these elements of narrative value and user interface as they fuse together. Rather than audience members, users will assume the role of active participants within the narrative. The meaning and shape of the story will be subject to the subject, as the user will be tasked with resolving ethical dilemma. These decisions bear varying impact on the expansion of the story. This story takes place in a fantasy setting from the perspective of an adventurous youth. A dark and mysterious force threatens their home and they are thrust into a journey to find a fabled hero to be their savior. Along the way a series strange characters and conflicts will arise. How they will be overcome will depend on the user. This animation will take the form of an interactive cinematic. The story will unfold before the user as a series of cinematic cut-scenes. Intermittently as conflicts in the narrative arise the user will be engaged using mouse and keyboard to participate in their resolution. No task will have only one manner of completion. The effects of each decision sometimes known by the user and at other times unknown allowing for the user to rely on their own desires and ethical perspectives in order to engage the narrative and become a part of it. I intend to tell this story and observe the effects that allowing user input to have upon it. My ultimate goal is to explore the meaning in user interface. It is one thing to watch a story unfold, but quite another to experience it as part of the story itself. Here a decision impacts the meaning within a structured narrative, but it also the effects that the mechanical implementation of making that decision may have on it as well.
Understanding the Relationship between GPA and Alcohol Consumption

Micha Hetrick
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Faculty Sponsor: Dr. Kim Lloyd
Department of Sociology

In this study, I hypothesize that IPFW students who reported consuming alcohol an average of four or more days per week would have lower grade point averages (GPA) than those students who reported consuming alcohol less than four times a week. Data was collected from 411 IPFW students during the spring semester of 2018. Descriptive and Multivariate analyses indicate that there is a negative correlation between number of days per week students consumed alcohol and GPA. Students who reported drinking every day of the week had the lowest GPAs, while students who reported little to no alcohol consumption each week obtained higher GPAs. Further analysis also indicated that students who reported consuming alcohol on a daily basis reported feeling higher levels of stress concerning their coursework, higher numbers of classes retaken, and were often third or fourth year students. These results support the findings of previous research in that frequent alcohol consumption leads to a decrease in performance in both a classroom and workplace setting.
Along with my faculty mentor, Luke Rodesiler, I worked hard to learn about the opportunities to write for audiences beyond the teacher that secondary-level students receive, as documented in *English Journal* over the past 25 years. State standards assert that secondary-level students should be able to effectively address different audiences for a variety of purposes, and scholars have consistently emphasized the value of teachers facilitating such writing events. Therefore, we wondered what opportunities for secondary-level students to write for audiences beyond the teacher have been documented in *English Journal*, the premiere journal for secondary English teachers, from 1993-2017. Through our review of those 25 years of scholarship on writing in secondary-level classrooms, our goal was to see how and why teachers provide opportunities for students to write for authentic audiences.
Historical trauma plays a critical role in the development of a culture. In my poster, I explore the role religious rituals play in psychological healing through a case study of the traumatic past of the Shawnee tribe in Oklahoma. I discuss the repercussions of unresolved grief and trauma, the role of the Shawnee religion in responding to trauma, and the healing potential of religious dance practices. Inspired by my experience of living on the Eastern Shawnee Reservation in Wyandotte, OK, for three months, my poster draws on ethnographic data and empirical research. I ask: How do rituals practiced by the Shawnee Tribe restore cultural identity and heal psychological injuries caused by a traumatic past? Carl G. Jung views religion as an adaptive reaction to difficult feelings, particularly when developing and understanding individual identity within society. Jung’s work, *On the Psychology of the Trickster Figure*, examines American Indian mythology as a means of coping with and personifying internal dissonance or the rejected self (Jung 1890: 195). Unresolved trauma diminishes one’s sense of integration within the body and alters the physiology and functioning of the emotional response system within the brain (Rebekka Dieterich-Hartwell 2017: 39). Rebekka Dieterich-Hartwell investigates modern psychological models of interoception and Dance Movement Therapy (DMT). Dance Movement Therapy is a modality used by psychologists in a clinical setting to heal, reprocess, and reintegrate one’s sense of interoception (Dieterich-Hartwell 2017:39). Available research suggests that dance, drumming, and music regulate the overactive emotional alarm system that is characteristic of post-traumatic stress disorder (PTSD) (Dieterich-Hartwell 2017: 39). Interoception is the awareness of one’s moment to moment sensate and emotional experience and plays a key role in rewiring the neural pathways that are forged during trauma (Dieterich-Hartwell 2017: 38). The Shawnee live with the memory of previous traumatic events, specifically cultural genocide through violent removals and forced assimilation (Talbot 2006: 11). Shawnee dances incorporate singing, rhythm, and coordinated movements (Jackson 2017: 241) and the dance ritual’s sensory richness fosters a safe environment in which tribal members can vocalize, move, and commune in harmony. In the poster, I draw on extensive ethnographic data to argue the Shawnee religious dances promote psychological healing of trauma by embodying key components of DMT and thereby fostering interoception.

Jung, Carl. (1890). *On the Psychology of the Trickster Figure*.
Without visual cues, navigation in an unfamiliar environment is guided by self-movement cues, and research with mice suggests that these cues are processed by the vestibular system (sense of balance; Blankenship, Cherep, Donaldson, Brockman, Trainer, Yoder, & Wallace, 2017). In humans, men appear more likely than women to use self-movement cues to maintain orientation in an environment with ambiguous visual cues (Kelly, McNamara, Bodenheimer, Carr, & Rieser, 2009). The purpose of our research was to examine differences between men’s and women’s exploratory behavior in a virtual environment without distinctive visual landmarks. We designed our virtual environment to be analogous to the one used in the previous study with mice. In the current study, introductory psychology students experienced a foggy virtual forest for 8 minutes using a virtual reality headset (HTC Vive). They could physically walk and teleport through the environment. Participants were not given any special task or any instructions on what to do in the forest. We found that men explored more meticulously, especially early on, and at a quicker rate than women. These findings may indicate that men were more engaged than women in mentally mapping the environment. Men were also more likely to report feeling oriented in the virtual environment. This study extends previous findings showing that men tend to have a more accurate sense of direction than women (Lawton, 2010). In addition, we will compare the exploratory behavior we observed in women and men to the behavior observed by Blankenship et al. in mice with and without vestibular dysfunction.
Anti-Proliferation of Melanoma Cells and Immune Stimulation by the Cyanobacterial Indole-Alkaloid Scytonemin

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Scytonemin is an indole-alkaloid pigment synthesized by many strains of cyanobacteria. Scytonemin biosynthesis is induced under long wavelength UVA stress and functions as a sunscreen pigment for cyanobacteria as self-protection from the harmful effects of UVA radiation. Furthermore, scytonemin has been shown to have anti-inflammatory and anti-proliferative properties. It has been used in past research as an inhibitor of Plk1 to decrease proliferation in myeloma cells. Plk1 not only plays a role in cell proliferation, but also promotes the G2-M transition in the cell cycle. Therefore, research should be conducted into the effects of scytonemin on other cancer cells. As such, the objectives of this research are to evaluate the effect of scytonemin on melanoma tumor cell growth and spleen cell proliferation, the latter of which indicates an enhanced immune response. Scytonemin was extracted from the cyanobacterium *Nostoc punctiforme* following UVA stress. The crude pigment extracts were then purified into three fractions using HPLC: pure scytonemin, other pigments (chlorophyll and carotenoids), and vial wash. Melanoma and spleen cells were treated with 10 to 50µM of each fraction against untreated control cells using tritiated thymidine uptake assays on a scintillation counter. Preliminary results suggest that 20 to 50µM of both the purified scytonemin and vial wash fractions containing scytonemin displayed enhanced anti-proliferation properties against melanoma cells, while only 50µM of the other pigment fraction had a significant reduction compared to the controls. Spleen cell proliferation assay results were more variable and will need to be repeated for statistical analysis. To our knowledge, this is the first study to test the effect of scytonemin on melanoma cells. Future research will use live mice to observe the effect of scytonemin on melanoma cells in vivo.
Space Exploration Using the Internet of Things

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The Internet of Things (IoT) concept has found wide applications in many areas such as healthcare, smart homes and buildings, smart cities, retail, energy, manufacturing, mobility and transportation, and logistics. However, IoT technologies have not yet been applied to space research.

The overall goal of this project is to develop and implement a test-bed where we can experiment on applications of the IoT framework and technologies to research on space exploration. Specifically, an IoT prototype is implemented to facilitate the procedure of sensing, processing, and responding to useful data from remote planets. This prototype in the test-bed is built using Raspberry Pi microcontrollers, a pi-camera, and a moving robot. The movement of the robot can be controlled remotely through a web framework; that is, a user is able to send movement commands to the robot through a web browser. Meanwhile, the real-time video from the pi-camera is shown inside the browser. Such a prototype simulates space exploration by using sensors to detect useful data (e.g., visual terrain information) and control the movements of robots on the planet (e.g., Mars) in the test-bed.

This research also helps us better understand the limitations of IoT technologies in space exploration. The limitations include, but are not limited to, camera quality, live-stream speed, and the processing speed of the Raspberry Pi controller.

The contribution of this research is a basic prototype of an IoT-based system with off-the-shelf components for space exploration. Overall, this project provides a better understanding of space research.
Building an Affordable Smart Home Based on the Internet of Things

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The Internet of Things (IoT) is made up of multiple Internet-connected devices with sensors. Its true value lies in the data that interconnected items share. The IoT may, for instance, lead to improved highways, more efficient hospitals, and changes in how goods are shipped. The IoT has also added a new term to the lexicon: “business intelligence.” For example, when the sensor in a smart water resource management system detects that the water levels in a tank are too low, the system will call you and allow you to remotely refill the tank from a reservoir. Other IoT projects include controlling home electronics from the office, locating empty spaces in parking lots, checking carbon monoxide levels, and monitoring crops. IoT technology may find wide applications in many areas, such as healthcare, smart homes and buildings, smart cities, retail, energy, manufacturing, mobility and transportation, and logistics.

The goal of this research is to investigate, design, and implement an affordable smart home based on IoT technology. Smart homes can make life easier and keep homes more secure. However, many smart home systems currently on the market are expensive and require a company’s specific devices. In this research, an affordable smart-home system is built by using low price microcontrollers and devices already in many homes. Specifically, the smart home is designed based on a web system that allows a user to remotely view the status of lights, blinds, and fans at home and monitor a security camera from a web browser. A Raspberry Pi microcontroller is applied to host a website and interact with all the previously mentioned devices. Our system also allows a user to send commands to control their devices remotely, such as turn off the lights, speed up the fan, or take a photo or video from the security camera.

The main contribution of this research is to build a basic, affordable smart home system that, with a few modifications, can be used in many residences, based on the technologies of the IoT. It also serves as a starting point for a more advanced system that controls more devices and provides more security alerts.
Community Engagement Research on the Impact of a Veteran Transitional Housing Program

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This research aims to investigate the impact of a transitional housing program for homeless veterans in Fort Wayne, Indiana, and examine how effectively the program provides services to clients and helps staff members accomplish their duties. The Fort Wayne Transitional Housing Program for Veterans (indicated VTH below) has provided services and shelter for homeless veterans since its launch in 2014. The program has three primary programmatic goals: to offer homeless veterans hope, restore their dignity, and transform their lives. The program director hopes to maintain a good quality of service for homeless veterans and develop the impact of the program by serving individuals in need in the Fort Wayne area. In coordination with the VTH director and staff, the preliminary study was conducted in summer 2017. For this study, we asked three research questions: 1. What are characteristics of clients and what types of service do they need for independent living?, 2. What are patterns of norms, values, behaviors, and interactions learned and shared by staff members?, and 3. How do staff’s performance and perception influence the quality of services delivered to clients? To investigate these questions, a secondary data analysis and participant observations were employed. To investigate the first research question, we conducted a secondary data analysis of the data collected by VTH from 2014 to 2017. This analysis allowed us to identify characteristics of VTH clients and types of service they need. To explore the second and third research questions, we collected qualitative data via participant observations during August and December 2017. During observations, we learned staff’s norms, behaviors, and experiences related to the VTH program. We wrote journal entries for each visit at the end of day and gathered field notes. Staff’s daily duties and activities varied, depending on their positions. Because each of them plays a specific/different role, staff often performed their duties on their own. Our field research revealed some strengths and challenges. Based on the results, we made four recommendations for further improvement of the VTH program. Through this study, we have established positive relationships with our research partners. On the one hand, it will provide an opportunity for us to understand people in the local community. On the other hand, the VTH program as our research partners has enhanced its ability to ensure the community priorities and address its own issues and needs. We have found that our mutual collaborations and efforts have been beneficial. This research contributes to the development of our knowledge about homeless veterans and find effective ways of helping them integrating them back to the society.

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Once, humans thought that the moon’s movement was simple and elegant—a perfect circle. Then during the 17th century, Johannes Kepler published his stunning observation that the motion of the moon, as well as the planets, were in fact best described by ellipses—still elegant, but a tad more complicated to analyze. Isaac Newton later published his theory of gravity that strongly supported this observation, as Newton himself demonstrated that if the motion of the Moon were indeed governed by his theory, then it would follow the path of an ellipse. However, the mystery surrounding the motion of the Moon does not stop there. It turns out that the ellipse the moon follows is not stationary, but is observed to rotate slowly, but noticeably over time. This observation perplexed Newton greatly as he tried to reconcile his theory with reality. All was not lost, however, because in his derivation of an elliptical orbit, Newton only accounted for the attraction of the main body (the Earth) on the Moon. He tried to account for the attraction of other entities, especially the Sun, to see whether these other forces could "perturb" the Moon’s ellipse over time and cause it to gradually rotate. Newton failed, however, because what he was attempting is what mathematicians now call a three-body problem, which does not have a closed-formed, exact solution. Newton attempted some approximations, and his result fell short.

Now, with the advent of modern computers, this task becomes significantly easier. In this research, we introduce an approximation method using Taylor series expansion to solve the differential equations posed in an n-body problem and utilize the program Matlab to carry out the numerical approximation. We will use this procedure to find solutions to certain configurations of the three-body problem, most notably the Earth -- Moon -- Sun system, in an attempt to explain the observed motion of the Moon. As we shall see, the Earth – Moon – Sun system actually has a much simpler and more elegant solution than we would otherwise expect a general three-body problem to have. We also extend the scope of our study to other planets. Specifically, we carried out a simulation on the entire solar system and were able to accurately model another phenomenon that also greatly perplexed astronomers in the past: the perihelion precession of Mercury.
The Genetic Contribution of Small-Mouthed Salamanders to a Unisexual
Salamander’s Genome

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The Ambystoma Unisexual (unisexual mole salamander) is an all-female salamander species
that reproduces asexually. Their existence and persistence has been a conundrum for biologists,
since the advantages of the unisexual reproduction must be weighed against the expected
fitness advantages (i.e., genetic variation) that are generally characteristic of sexual
reproduction. Kleptogenesis is a reproductive mode that has been proposed for this species of
Ambystoma. Particularly, unisexual Ambystoma can attract and mate with bisexual males. After
acquiring sperm from a bisexual male, unisexual Ambystoma’s eggs will pass through one of
the following scenarios. First, the egg might be stimulated to develop without incorporating the
sperm. Second, the egg might incorporate the sperm and one (or two) of the egg’s set of
chromosome is replaced by the sperm’s. Finally, the egg could incorporate the sperm and add
one of the sperm’s sets of chromosome into its genome, elevating its ploidy level. Due to these
various scenarios, the unisexual Ambystoma is diverse in genomic pattern. The genome
variation for a particular unisexual individual is labeled according to the initials of the species of
the sperm donors contributing to its genome. For example, a unisexual that has one genome
from A. laterale (L), one from A. jeffersonianum (J), and two from A. texanum (T) will be labeled
as LTTJ. A population consisting of unisexual Ambystoma and A. texanum (small-mouthed
salamander) is found at the Eagle Marsh Natural Preserve, Allen County. The genomic pattern
in the population suggests that Ambystoma texanum had, at one point in its history, contributed
its genome to the unisexual’s gene pool, elevating LJ to LTJ, and sometime later on, contributed
again, elevating LTJ to LTTJ. However, it is unknown whether A. texanum is still mating with
and contributing genetic information to the unisexual Ambystoma’s (both LTJ and LTTJ) gene
pool or not. The goal of this research is to answer that question. Specifically, we are trying to
find out if A. texanum is still actively replacing existing T genome in the unisexuals or the
contributions that led to ploidy elevation or ploidy alternation in the unisexual are the only genetic
contributions in its history. If the latter occurred, then the subsequent asexual reproduction
in unisexual Ambystoma must have given rise to other unisexual that are identical
to their parents in the population. I hypothesize that A. texanum is no longer contributing to the
unisexual population’s gene pool and, thus, has only genetically contributed to the population
twice in its history.

To test this hypothesis, I will collect A. texanum samples during the next few springs. I will then
use microsatellite Atex74, which is unique to A. texanum and is also found in unisexual
Ambystoma (both LTTJ and LTJ). ATEX74 will undergo the PCR process and electrophoresis for
allelic similarities to determine the relationship between A. texanum and unisexual Ambystoma
located at Eagle Marsh.
Political Party Influence on Students' Perceptions of Racist Public Speech

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Previous research has shown that ethnic politics are being increasingly used in order to gain political power. Some of that ethnic politics works to encourage fear that some people may have on difference races. Previous research has shown that ‘fear politics’ does slightly help Republicans when it comes to political gains. In this study, I test two hypotheses regarding students' perception of the acceptance of racist public speech based on the identity of the president's political party. Specifically, I hypothesize that students of color are more likely to believe that a president's political party membership (Republican or Democrat) has an influence on the acceptance rate of racist public speech than white students. I also hypothesize that a student's parental educational attainment will increase the student’s perceptions of the president's political party influence on the acceptance rate of racist speech. To test these hypotheses, I gather data from approximately 800 IPFW undergraduate students during the spring semester of 2018. I anticipate that these analyses will correlate with that past research and indicate that both race and parental educational attainment are important factors in students' perceptions of the increasing acceptance of racist speech in America since the election of a Republican President in November 2016.
In the 1950's, approximately 10% of Americans were considered obese. Today, according to the CDC, 38% of Americans are considered obese and 70% of Americans are considered overweight. Obesity rates are at an all-time high, and diets intended to help those rates don't just don't. For this reason, I created a food education system called Back To Basics: Because Diets Don't Work. I believe there is a lack of understanding in our society's view of food and nutrition. People go on fad-diets all the time, but when they stop follow the strict guidelines, they stop losing weight or start gaining it back. People need to understand how we gain weight and what different foods do to our bodies so they can be armed with accurate information when they shop at the grocery or eat out in restaurants. After all of my research, I've come to 3 initial conclusions on problems America faces: overconsumption, malnutrition, and nutritional longevity. I've created a book that takes the three problems and digs in deep to explain how each work in our lives. Each section then has an 'application' feature, so readers can apply what they've learned to their lives in attempts to better themselves.

Overconsumption deals with a lack of portion control in the United States, and teaches about portion control, how calories work, and psychological factors that exist in the brain that promote overconsumption without us realizing it. The application in this section is a food journal to initiate a shock factor in users who don't realize how much food they are consuming.

Malnutrition exists in our society because people don't know what they should be fueling their body with. We are a fast food based, pre packaged, boxed food society. This section teaches about macronutrients like carbohydrates, protein, and fats. It also details micronutrients like vitamins and minerals that are important in our diets, as well. The application feature in this book is a detailed explanation on how to read a nutrition label and what to watch for in an ingredient list. Everyone has a need for nutritional longevity. This section focuses on what certain food groups do to your body and that by switching up specific groups you could get a better night's sleep, stop getting headaches, etc. The application in this section is a list of simple ingredient switches people can follow in recipes, restaurants, and snack choices.
Marriage and Divorce: Undergraduate Students’ Desire to Marry while Earning a College Degree

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The purpose of this research study is to explore students’ desire to marry while earning a college degree. I hypothesize that women will be less likely than men to wish to marry while earning a bachelor’s degree. I also hypothesize that undergraduate students who experienced a parental divorce will be more likely to desire postponing marriage until after they finish their college education. Data was collected from a sample of 678 undergraduate IPFW students during the spring of 2018. Descriptive and Multivariate analyses indicate that women are less desirous of marriage prior to college completion than are their male counterparts. Analyses also indicate that undergraduate students that come from divorced families are more likely to desire postponing marriage until after they finish college compared to students who were raised in intact family households. These results support findings of previous research that indicates a strong relationship between gender and marriage plans – with women and those raised in divorced households being more likely to wish to postpone marriage and until after completing their college education when compared to men and those raised in intact families. Marriage and divorce plays a role in many people’s lives in today’s society, and it is common for people to gain a college education. Therefore, it is important to gain more insight on students gaining a college education and their marital desires.
Chemicals found in mass-produced body sprays, deodorants, and lotions can cause allergic reactions and can contain cancerous properties. These chemicals can be avoided through natural ingredients including essential oils. The objective of this idea is to design a line of packaging for ingredients, entitled Elements, that can be used in conjunction to create natural products that are virtually free of allergens. Each kit includes the base ingredients to make the product, essential oils to fragrance it, and an empty container to store the final product. Glass jars are used for a majority of ingredient storage to promote recycling. There are 9 total kits, with three flavors, including Lavender Chamomile, Lemon Frankincense, and Eucalyptus Spearmint, along with three different product outcomes. These outcomes are body spray, lotion, and deodorant. The brand colors and design are specifically chosen to appeal to those of all sex and age. The importance is that those with allergies can obtain a product that is appealing to them and that works.

The inspiration for Elements comes from my husband’s fragrance sensitivities and my desire to know what I use on my body. Both natural and artificial ingredients can cause allergies. Many popular perfumes, colognes and body sprays typically contain a dozen or more potentially hazardous synthetic chemicals, some of which are derived from petroleum. In my research, I’ve found that eleven percent of people had a reaction when patch-tested with a standard mix of fragrances used in cosmetics and grooming products. Sixteen percent of the population now reports sensitivity to environmental triggers such as strong odors, and five percent of those people report the symptoms are severe enough that they are made physically ill. Elements enables consumers to look at a product and know that they can avoid their allergen. Another option is to avoid an ingredient in an Elements’ packaged kit. Each kit is fragranced differently, so irritating essential oils can be substituted or completely avoided. Many articles I came in contact with stressed that contact allergies are mostly inflamed because of fragrance. In research about which fragrances to use, and likewise which to avoid, I found an article that laid out that compositae plants, or flowers, and colophonium, or pine and sap, fragrances contained a risk of allergy. I attempted to avoid these scents as much as possible but still diversify each kit with complementary fragrance. I envisioned each element of the created catalog and marketing material as if it were a part of a fully-functioning multi-level company. In doing so, I highly recommend users initiating a self-administered patch test to be completely aware of possible allergens in the product. In the future Elements could include finding sustainably sourced packaging and ingredients, and a recycling incentive. These aspects are also included in the material to express my wish for the complete concept of Elements.
Electro-Hydrodynamic Thrust

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Since the 1920s when it was misinterpreted as an anti-gravity effect, physicists have been interested in the strange effect of thrust being produced as a result of high voltage running across asymmetric capacitors. While there is still some debate over the exact mechanism for this thrust, the commonly accepted explanation is that the strong, dense electric field around the smaller end of the capacitor causes ionization in the surrounding atmosphere, creating charged ions. This action gives the air an electric charge and those created ions transfer momentum by colliding with the rest of the air, pushing it downward, and creating thrust. This phenomenon is called electro-hydrodynamic thrust, or EHD thrust. It can be used to model the interactions between the ionization of the air and the electric field created by the device itself. This phenomenon can be modeled as a flow of ions, much like a charge through a wire, to partially describe the electric field’s role in the creation of thrust. That flow can then be used to map the interactions between the cloud of moving ions and their collisions with the un-ionized air particles to get an idea of how the thrust is being generated. Previous research has shown that this system may be capable of producing thrust on the order of 100N kW⁻¹, but the density, or the distribution over the measurable area, of that thrust is so low that it cannot lift things heavier than a couple of grams without a strong power supply and a massive capacitor. For this reason, most demonstrations of this effect come from hobbyists using light aluminum foil and thin wires to lift a very light frame, commonly called an ion lifter. However, more important applications have been demonstrated by NASA’s Glenn Research Center for use in rockets that send satellites into deep space. In these cases, fluids other than air are used to create thrust for the rocket. This research uses the basic form of an ion lifter and focuses on three major ideas of understanding, analyzing, and visualizing the EHD effect: mathematical modeling, geometric analysis, and flow visualization. The goals were: 1) come up with a working mathematical model for the ion lifter thrust; 2) design a way to accurately measure the output thrust of the device using a cantilever beam and lasers; and 3) visualize the distinction between the ion flow and the un-ionized air flow during the testing. By accomplishing all these objectives, a better picture of EHD can be derived for the system.
The Effects of Tariffs on Economic Growth

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Over the last few decades global trade has been increasing. As global trade has increased, the effort to lower trade barriers around the world has continued. The World Trade Organization, and those countries that hold to free trade policies, continues to encourage all countries to utilize low trade barriers to increase trade. Tariffs are one trade barrier that is commonly scrutinized and sought out to be lowered or removed to generate increased trade. However, the benefits of free trade policies are starting to be questioned and protectionist policies are being put forward. Those countries putting forward protectionist policies believe that free trade policies will decrease their economic growth. Tariffs are used to protect domestic businesses from foreign trade and are a popular policy to use since they tend to be easy to enact and easy to measure the effect on economic growth. A great deal of economic research demonstrates that tariffs have negative effects on GDP growth, but other research argues that tariffs can have a positive effect on GDP growth, specifically for less developed countries. For this study, data were collected from 89 countries during the period of 2010-2014. The countries were then classified as rich or poor based on the definition from the World Bank. A multiple regression analysis was used to discover the effects that tariffs have on GDP growth. Ultimately, it showed that tariffs have no effect on the GDP growth of rich countries, although tariffs have a positive effect on GDP growth for poor countries.
Problematic Phone Use, Depression, and Technology Interference Among Mothers

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In this study, we examined problematic mobile phone use, depression, and technology interference among 223 mothers of children aged one to five, who were recruited from Amazon’s mTurk. As an extension of previous work on the topic, we also examined the time mothers reported spending in each of the parenting domains. Most mothers (76.7%-100%) reported that they engaged in the measured parenting activities with their children, and many (41.9%-71.8%) reported that technology interfered with those activities. Maternal depression was positively related to time spent with children during mealtime and joint technology use (e.g., television viewing), and it was also related to technology interference in playtime and in doing chores with the child. Meanwhile, problematic phone use was positively related to time spent with children during meals, but it was significantly and positively related to technology interference in 9 of 11 parenting domains (e.g., playtime, mealtime, and playtime excursions). Finally, problematic mobile phone use was a mediator in the relationship between maternal depression and technology interference in parenting. These results highlight the importance of screening for maternal problematic mobile phone use alongside traditional maternal depression screens to circumvent the potential negative issues (e.g., children’s negative, provocative behaviors and less sensitive parenting) that may result from technology interference in parenting.
How Reliable are Self-Reports of Partner Violence?

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The validity of self-reports of intimate partner violence (IPV) has been questioned by researchers for at least the last 30 years (e.g., Arias & Beach, 1987). Similar concerns exist regarding self-reports of non-physical forms of relationship aggression, such as psychological or verbal abuse (Bell & Naugle, 2007; Follingstad & Rogers, 2013). Although the use of data from both partners in a relationship may seem like a solution, within-couple agreement often is relatively low (Caetano, Schafer, Field, & Nelson, 2002). Several strategies have been devised to compensate for suspected self-reporting biases. For example, some researchers have administered self-report scales of social desirability for use as covariates (see Sugarman & Hotaling, 1997). Others have made adjustments to raw data to reflect suspected underreporting by multiplying men’s and women’s self-report IPV scores by particular, gender-specific “correction factors” (Heyman & Schlee, 1987; O’Leary & Williams, 2006). In addition to researchers’ concerns about the validity of these self-report data, the issue of IPV underreporting has other important, practical implications. For example, funding for batterer interventions and victims’ services is based, at least in part, on prevalence estimates, which may be impacted by such reporting biases. The goal of the present study was to compare self-reported experiences of IPV perpetration and victimization under two conditions, as described below. Participants were students in introductory psychology classes at IPFW who participated in research as one option to fulfill a course requirement. At Time 1 (T1), participants completed a Qualtrics survey outside of the lab (e.g., on their home computers). At Time 2 (T2), participants completed a subset of the original measures in the lab under what is commonly referred to as a “bogus pipeline” (BPL) condition, in which participants are connected to devices described by research personnel as having the ability to detect truthfulness and deception in participant responses. However, the “pipeline” here is artificial; the equipment does not have the detection capabilities as described. This paradigm has been used to motivate truthful responding related to a variety of socially undesirable topics, including substance use behaviors, cognitive distortions related to child molestation, and racist attitudes (Aguinis, Pierce, & Quigley, 1995; Gannon, 2012; Sigall & Page, 1971). In the present study, participants’ T1 responses on the Revised Conflict Tactics Scale (CTS2; Straus et al., 1996), the most widely-used measure of IPV perpetration and victimization in the U.S., was compared to their responses on this same measure at T2, under the BPL condition, to assess for evidence of systematic reporting biases. Participant confidentiality was protected by keeping researchers blind to survey content. Participants also completed measures of social desirability, personality, and attitudes towards IPV. From among 554 participants, only 5% disbelieved the researcher could distinguish honest/dishonest responding. These participants were excluded from analyses, as were those in non-violent relationships. Paired t-tests comparing participants’ scores on each CTS subscale (physical, psychological, and sexual aggression) at T1 and T2 suggested little systematic under- or over-reporting for either gender indicating that self-reports of IPV may be more reliable than previously thought. Correlates of biased responding will be examined.
Suicide Prevention: The Effect Exposure Has on Student Opinion

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Suicide prevention has become an important topic among university populations. According to the American College Health Association (ACHA), suicide is considered the second highest leading cause of death among students in higher education. In this study I hypothesize that the more exposure students have to suicide prevention material, the less negative stigma they will associate with suicide. I also hypothesize that students who have been personally affected by suicide will be more likely to view seeking help for mental health issues in a positive way. To test these hypotheses, I gather data from roughly 800 undergraduate students enrolled at Indiana University-Purdue University Fort Wayne during the spring semester of 2018. Descriptive and multivariate analyses will be analyzed during February 2018. I anticipate that these analyses will indicate that students who experience greater exposure to suicide prevention on campus will associate less negative stigma with suicide. I also anticipate that students who have been personally affected by suicide will be more likely to view seeking help for mental health issues in a positive way. If these are my results, then they will support the findings of previous research which documents that both experiences with suicide and greater suicide awareness ease the negative stigma associated with the taking of one’s life.
Going Green: A Popular Epidemiological Method to Community-Engagement Research

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A steel recycling plant that is operating in a residential neighborhood has been non-compliant with a 2009 agreed upon order. Enforcement of that order at all levels of governance – local, state, and federal – has been slow. What little remediation that has occurred has failed to address its impact on the immediate residential neighborhood. Collaborating with Blackford County Concerned Citizens, undergraduate students at IPFW have helped residents to voice their concerns about how it is impacting them. This collaboration has involved testing soil and air for pollutants, communicating and educating the residents about the results of the tests and its possible impact on public health, motivating residents to communicate their concerns to city and state officials, and attending public meetings to press local government to respond. This is the first known application of this popular epidemiology method in the country. IPFW students are presenting plans that could serve as realistic proposals for redevelopment of the brownfield that would be left behind following the relocation of the steel recycling plant to an appropriate industrial park. Grants are available for redeveloping brownfields for the purposes of urban horticulture. Early development of redevelopment plans in anticipation of possible relocation of the steel recycling plant is in accordance with best practices according to EPA region five recommendations. Students will be presenting evidence of a groundwater pollution plume from the steel recycling plant that is migrating toward the city water supply. The groundwater results suggest failure to relocate the steel recycling plant would put the entire city water supply at risk.
The Relationship between Students Plans After Graduation and Academic Performance

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Students’ academic performance has been known to be a product of socio-economic, psychological and environmental factors. It is important to understand the factors that affect students’ academic performance in order to gain insight on how academic institutions can help students be more successful. The purpose of the current research is to empirically examine the influence of IPFW students’ plans they have for after graduation on their GPA. In this study I hypothesize that students who plan on going to graduate school after graduation will have a higher GPA than students who plan on going straight into their career after graduation, or are not sure of their plans. I also hypothesize that the longer students know what their plans are for after graduation, the higher their GPA will be. Data is gathered from 800 undergraduate IPFW students during the spring semester of 2018. Multivariate regression analyses will be completed by February 16, 2018. I anticipate that these analyses will reveal that there is a significant relationship between students’ plans for after graduation and their current GPA. I also anticipate that these analyses will show a significant relationship between the length of time students know what their plans are for after graduation and their current GPA.
Astronomical Spectroscopy

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The research presented here analyzes the ongoing design, construction, and testing of an astronomical spectrograph. The spectrograph is used with an IOptron Solar 60 telescope due to its low-cost and availability. The detector used with the spectrograph is the webcam that comes with this telescope. The current results indicate that an indoor spectrograph built with this telescope and webcam can resolve the two sodium D-lines, which are less than half a nanometer apart. The next steps are to finalize the spectrograph design in an indoor setting and then construct the final astronomical spectrograph using 3D printed parts. To test and calibrate the spectrograph, the spectra of the sun and Vega will be measured since they are known to a high accuracy level.
Millennials as a Loveless Generation

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We algorithmically find dates on tinder. We skip friendship and head straight to sex. We ghost each other because we can't give or take rejection. We fight and break up over text. We cheat over text. We have full blown relationships over text. We decide flowers are too expensive so Netflix and chill is courting enough. We've invented a dating limbo where questioning infidelity is considered clingy. We called it “talking”. We crave the drama and the chase of intimacy, yet we're so afraid to provide it. We hide ourselves. We kiss for likes. We lock our phones. We block. We creep. We pry. We are the loveless generation.

This body of work explores the element of digital communication as it pertains to our “Loveless” generation. Moments that should be shared in person like a first “I love you” or a breakup can now be carried out over phone lines, allowing people to bypass the repercussions of mistreating someone. To communicate this message, I asked my Instagram followers to submit text messages they received from a lover or ex-lover that they felt would not have been said in person. Upon posting a call out, I received hundreds of texts that were mean, hurtful, controlling, and even absurd. I am combining my own photographs with these real text messages that people from the millennial generation have received. This collection of work showcases the disconnect that comes with an emotional connection shared via technology.
Microstrip Antenna Design for Energy Harvesting

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With the rapid growth of wireless systems and corresponding low-power integrated electronic circuits, researchers have been studying the practicability of powering these systems and circuits by harvesting ambient electromagnetic (EM) energy. The design of microstrip antennas have been the most rapidly developing research field in the last thirty years. Currently, these antennas are applied in mobile radio systems, integrated antennas, satellite navigation receivers, satellite communications, and direct-broadcast radio and television. The considerable interest in microstrip antennas is due to their advantages compared to conventional microwave antennas. Microstrip antennas are lightweight, low volume, conformable, and easy to fabricate. In this paper, a dual-band microstrip patch antenna is designed to radiate at 900 MHz and 1.8 GHz. Two rectangular microstrip patch antennas were designed for the two frequencies of interest. A dual-band octagonal microstrip patch antenna is designed using the dimensions of two rectangular microstrip antennas with a novel technique. The antenna consists of two dielectric substrate layers that are stacked together. On the first layer, the octagonal patch is placed. The second layer has a proximity coupling feed with ground plane on the bottom layer. The antenna can be used to harvest the energy from Wi-Fi and other widely spread mobile networks. The dual-band antenna has good bandwidth, gain and radiation characteristics at the frequencies of interest. It has also a small form factor in comparison to conventional microstrip patch antennas. The simulated and measured results show good agreement.
Building Brand Loyalty with Mobile Applications

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In today’s competitive marketplace, it is crucial for companies to focus on keeping their existing customers since acquiring new customers costs much more than retaining ones. An increasing usage of mobile loyalty programs has been witnessed in the past recent years to increase customer retention and to deter the customers from switching to their competitors. However, measuring the effectiveness of these programs has not been systematically substantiated. This study will fill voids in the literature by investigating the effects of mobile loyalty applications (apps) on customers’ purchase and retention in a coffee industry where many consumers prefer to customize coffee to their tastes. Mobile loyalty apps are programs implemented on one’s smartphone that can be purchased or are free of charge. In a coffee industry, the loyalty app is convenient and saves time by allowing the purchase of customized coffee directly from the mobile application. The Starbucks app, for example, was installed in late October 2013 and was bringing in 11 percent of Sales volume by mid-2014, according to the Howard Schultz, CEO of Starbucks at the time the application was launched. Then in July of 2017, it had doubled to 22 percent of all US Sales. The Dunkin Donuts app was launched at the end of January 2014. This study intends to survey customers using mobile applications of coffee companies such as Starbucks and Dunkin Donuts to ascertain the reasons behind the coffee purchases they make. Both companies allow customers to make online purchases and have a card on file which brings them more revenue. Dunkin Donuts upgraded their app to help customers earn more drinks in 2016 on the eve of the update of Starbucks app which shows their competition. Also, Dunkin Donuts has used their appreciation of the donut to lure customers to adapt a taste for their coffee products. This study explores different driving factors of effective mobile loyalty apps in increasing customer loyalty. We will investigate the role of online purchasing methods, ease of use of the apps, time to get a free item on the app, types of promotion, location, and the level of customization of the coffee. Demographic variables such as income level, gender, and ages will also be collected. Theoretical and practical implications of this study will be discussed.
Bliss Soap Company

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If you have paid attention to the news or social media lately, you’ll have seen that more and more people are turning to healthier more conscious products, mainly health food, but it doesn’t stop there. Using soap is an everyday thing and what soap is made out of should also be a top priority. Did you know that your skin absorbs an average of 64% of what is put on it? Through this project, I want to inform consumers of the dangerous chemicals used in soap making and also provide a product that is honest about the ingredients being used and where they are coming from. Being a mother myself I’m always looking for personal care products that are healthier, safer and gentle enough to use on my son’s skin. Too many times I am stuck deciding which product to buy because of the use of scientific terms on the ingredient list. I stand in the isle looking up each term to get a better understanding of what they are and then realize that some of the products that say they are “natural” aren’t as natural as they seem. This led me to create an all-natural soap company that utilizes a limited amount of ingredients with labels that are easy to understand, called Bliss Soap Company. The design of my soap labels help solve the problem of not knowing and understanding ingredients by using common names instead of the scientific term. This will allow the consumer to feel at ease when looking for a natural alternative. I used Illustrator to create vector images of the scents that are contained within each kind of soap. I also used Photoshop to create a unique background for each of the different scents, which allows the consumer to easily spot what they are looking for. I have created a website that allows easy access to purchase my soap while familiarize them with safe ingredients through the use of my blog. Soap should not be complicated or filled with chemicals. Read the ingredients; don’t assume that a product is natural because it’s printed on the label, get to know your soap.
The goal of this study is to create an immersive virtual reality simulator to train new military personnel in troop movement “Battle Drills”. Our program allows trainees to practice troop movement drills simulating 2/3 square kilometer in a space of a small room. This immersive experience is rendered in an HTC VIVE head mounted display (HMD), and a VR treadmill affords users an unbounded walking experience while remaining in place so that they can explore a large digital world. The verisimilitude of the simulation is enhanced by intuitive hand gestures and voice commands. The responsive artificial intelligence of the simulated enemies and allies further affords users an opportunity to go through several different training exercises. Results are discussed in terms of design and development of this simulation in addition to some concerns regarding user experience.
Probiotics in Aquaculture

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Stress presents a significant problem in aquaculture. Stress over time leads to a reduction in immune response and a decrease in the ability to fight against diseases. Current aquaculture techniques, therefore, involve the use of antibiotics and other chemicals to reduce disease and mortality within the crops, which is not good for the fish, their consumers, or the environment. In order to provide solutions to the problems of aquaculture and quality protein to consumers without the use of potentially harmful substances, we are looking into the use of nutraceuticals. For this experiment, we used probiotics in order to decrease stress responses, increase immune responses, increase growth, and increase the nutritional value of tilapia reared in recirculating aquaculture systems. Over a four-week long experiment, we measured Specific Growth Weight (SGR), Absolute Feed Intake (FIABS), Feed Conversion Ratio (FCR), Protein Energy Retention (PER), Protein Production Value (PPV), and Fulton Condition Factor (K) for growth; blood glucose, packed cell volume, and plasma protein for physiology; and spleen-somatic index and macrophage phagocytic capacity for immune response. The results indicate that fish fed probiotic-supplemented commercial feed have better health indices than fish fed sham-supplemented commercial control feed in terms of all physiological and immunological responses.
Recovery Made

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My name is Molly Schenkel, and I would like to present my company, Recovery Made to the IPFW faculty. Throughout the last year spent at IPFW, I have been researching the multiple homeless shelters and halfway homes for women throughout the Fort Wayne and surrounding areas, and have started my own company in teaching these women on how to make and sell jewelry. The process of this undertaking is to go into the houses that I have partnered up with, The Charis House, Place of Grace and Turning Point shelter, and teach a different skill within the process of jewelry making. These skills include learning how to thread, bead and set up 6 key pieces of jewelry throughout different classes. As I work with the women, we share stories and life experiences that have brought us to where we are. All of the jewelry is then collected and sold within local boutiques and shops in the Fort Wayne area, with the money going back to each house of which that piece of jewelry was made. My project is more hands-on and active based research. I have been learning about what it takes to form a business, as well as how women’s creativity can help when experiencing a crisis in their lives. I would love to present and share my experience and findings with you.
WIC Participation Rates

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As a society, it is important that we care for our at risk expectant mothers and children through social programs. It is these individuals who are our future and will foster its success. The Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) has been proven to be one of the most effective government assistance programs in place. It decreases a child’s consumption of sugar and reduces the rate of obesity within infants and children. The research conducted for this study will seek insight into the participation levels of the WIC program in relation to how much a state’s government spends on the program. This study hypothesizes that as the spending on the WIC program declines, there will be a decline in the participation of the program. There were three main surveys from which data was collected: the United States Department of Agriculture (USDA), the Centers for Disease Control and Prevention (CDC), and the Bureau of Economic Analysis (BEA); each covering all fifty states between the years 2011 and 2015. This study ran a multivariable regression and found that for every $1,000 increase in spending per person, WIC participation rates declined by 3.52%. This result suggests that states may have to cut individuals from the program in order to increase their per person spending. This suggests that the issue of the lack of participation within the WIC program lies within the federal government rather than the state government, and that the overall budget for the program, per state, needs to be adjusted.
Perception and Knowledge of Emergency Responders Concerning Augmentative/Alternative Communication (AAC)

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This study is being conducted to evaluate first responders’ knowledge of augmentative/alternative communication (AAC) and how to interact with individuals who use AAC prior to participating in the training and following the training. The objective is as follows: acknowledge the change in knowledge base of subjects, employees, and volunteers as first responders, prior to and following a lecture and hands-on activity about AAC systems. Speech language pathology focuses on the evaluation, diagnosis, and treatment of communication disorders. The term AAC is used to describe communication methods that aid or replace verbal communication. If first responders do not have the skills that allow them to collect accurate information from people who use AAC, these individuals may not get the appropriate assistance they need or may become a victim of crime and of the judicial system. The training of first responders is imperative in creating a safer community for those labeled as “disabled.” Once this project is completed, the training can then be replicated nationally and possibly internationally.

Each participant’s knowledge base of the subject is evaluated by the use of pre-and-post event surveys. The data collected from each survey is being compiled into an Excel spreadsheet continuously. The impact of the specialized training to emergency first responder workers (police, fire, EMT, dispatch) regarding AAC is being assessed. In order to extrapolate the data, answers are being coded into common categories. From this coding, the pre-and-post survey data will be compared. The success of this training will then be determined. Potential participants are those attending a pre-scheduled training for emergency first responder departments who give permission for their surveys to be used. Participants are given the opportunity to decline participation in the research project. This does not hinder the individual’s training experience. Prior to completing the pre-event survey all individuals in attendance receive a brief overview of the research project. They participate in a lecture with hands-on training specifically designed for first responders. At the completion of the training, attendants are then given the opportunity to complete the post-event survey to evaluate their increased knowledge of AAC. To date, the results for the first 300 participants have been analyzed, with an anticipated final sample size of 1,000. The results collected thus far indicate that when given the training, first responders feel more comfortable communicating with someone who uses AAC. This suggests that the present data supports the objective.

Additionally, an increased awareness of difficulty using AAC was noted post-survey. The respondents noted that the two most important things when interacting with AAC users are having patience and respect towards the AAC user and giving them time to respond. Data is continually being collected to provide further understanding of the benefits of training first responders in this area.
The purpose of this project is to create a space where individuals can intentionally seek an encounter with God, as well as worship, pray, and reflect upon themselves. Often it is hard to find an ideal place where one can relax, focus and meditate upon specific aspects of life. This space is meant for those who seek to encounter a spiritual experience or merely a meditation experience that allows personal growth. Not only must the design address the issues at hand, but it also must address a specific set of requirements. First and foremost, the design had to evoke an atmospheric intervention to create the most ideal environment for the issues that it is pursuing to address.

Research had to be conducted to investigate how to address the intended goals for the experiential nature of the space. The primary function had to allow for an atmospheric experience that aided the purpose of the building. Specific standards such as ADA codes, occupancy levels and circulation had to be addressed in the project. To obtain the necessary information for this design, a questionnaire was developed and given to a handful of people. These people were of all different backgrounds, however they all shared the connection of religion. A series of questions were asked about how each individual seeks to encounter God, as well as how the space influences that experience. Additionally, information in regards to incorporating nature was obtained by visiting sites that possessed unique elements of nature. Observations of the conditions, lighting, colors, sounds, textures and effects on the senses were recorded to discover how to best create a peaceful and meditative atmosphere. According to the results, people experience more of a closeness with spirituality when everything is still, quiet and peaceful. This atmosphere that is created within the space helps reduce distractions so that the person can block out the world and focus on God, and it prepares the mind and relaxes the body so that a successful encounter with God will likely occur. Solitude is a key part in creating an ideal space for these people to connect or encounter God.

Therefore, specific areas in both the garden and the building were added to accommodate one’s desire to be in solitude. Gathering spaces were also added for those that desire to share their experiences with others. Nature, such as water features, ivy, daylight and potted plants were incorporated into the design to assist in creating a quiet peaceful environment. The overall goal of this design is to provide a safe peaceful space that allows individuals to grow, connect, worship, reflect, meditate and pray. In order to achieve this goal, the space was creatively designed to allow separate spaces for those who wish to be in solitude, as well as common spaces that everyone can enjoy. Additionally, elements of nature and intentional sensory design were incorporated into the space. Therefore, a peaceful and serene atmosphere was created to evoke a spiritual connection or experience.
Dust in the Wind or Production Induced Sickness?

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This research presents the results from a one-tailed, t-test of data collected on April 21, 2017 to determine the source of fugitive dust contamination with heavy metals. Moss was used as a surrogate for testing for air pollution. Two hypotheses were tested. Hypothesis one predicts that if Hartford Iron and Metal (H-I&M) is creating a plume of dust contaminated with fugitive dust, then there would be no significant difference between upwind and downwind samples of heavy metal concentrations. Hypothesis two predicts that if the wind is picking up dust and carrying it off site, then downwind concentrations would be significantly higher than upwind concentrations of heavy metals in moss samples. The results from the analyses supported hypothesis one, suggesting that the ongoing operations of H-I&M is generating a cloud of pollution in the air that serves as a direct avenue of toxic contamination to neighborhood residents.

Hypothesis One: There is no significant difference between upwind and downwind samples.
Hypothesis Two: Downwind samples are significantly higher than upwind samples.
Do Work and Kids Negatively Impact Academic Achievement?

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This research examines how children and working outside of college impact students' academic achievement. In this study, I hypothesize that students who work full-time obtain lower GPAs, compared to those who work only part-time or who do not work at all. Secondly, I hypothesize that college students who have children also obtain lower GPAs compared to those who do not have children. Data will be gathered from 632 undergraduate IPFW students during spring 2018. Academic achievement is measured by students' grade point average (GPA). Preliminary descriptive and multivariate analyses indicate that students who work full-time and/or have children have significantly lower GPAs than those who do not. These results regarding IPFW students mirror those of students at other universities across the nation; indicating that working while earning a degree and being a parent can negatively impact students' academic performance while in college.
Evaluating the Benefits of a Chemistry Lab for Home-schooled Teenagers in a University Setting

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The current American Chemical Society (ACS) public policy statement confirms that students who have “well-designed laboratory experiences develop problem-solving and critical thinking skills.” Furthermore, the ACS stresses that a hands-on experience cannot be replaced by theoretical work. According to the National Center for Education Statistics (NCES), the percentage of students in home schooling has been steadily increasing. With this increase in students, there may be a need for outreach programs to fill the void in the hands-on education of these students, specifically in subjects for which it is difficult to create a safe and cost-efficient laboratory experience. Thus far, there has been a relative dearth of research regarding the benefits of a science outreach program targeted to home-school students. A science outreach lab hosted on March 5, 2018 for area home-school students may provide insight into the benefits of such an experience. Does this hands-on laboratory prove to be an effective pedagogical tool in learning chemistry? Does a laboratory in a university setting provide the experience necessary to improve a student’s self-efficacy in data collection, data analysis, and transition to college lab work? Home-school students between the ages of 13 and 17 will be brought to IPFW to participate in a chemistry lab. As part of this voluntary study, these students will be asked to complete a pre-lab and post-lab survey and will also be observed by key personnel. These survey questions will be analyzed using individual comparisons as well as group comparisons of these anonymous surveys. A previous study at Clemson University provided positive results with an increase of self-efficacy. For our study, an increase in sample size as well as the additional analysis of the improved content knowledge resulting from a hands-on lab, should provide more guidance about the implementation and utility of such outreach programs.
Disease management through Collective System Design (CSD) approach

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Using Collective System Design (CSD) methodology, an approach to diabetes early detection and reversal was established for use by doctors and nurses in the Fort Wayne community to teach proper treatment plans and reduce the number of diabetic cases. Applying the CSD methodology starts with the tone of the people to redesign a system. Improvement in tone can be accomplished by re-educating about diabetes, as defined by the System Design Map for Early Detection and Reversal of Diabetes. The tone of the system design map fosters an environment that views human failure as a failure of the system design itself. Thus, continuous improvement, through the Plan-Do-Check-Act (PDCA) cycle, will allow for easier adherence to the required lifestyle changes. This system design map represents a model approach for disease management. Saving millions of lives through a sustainable lifestyle redesign program with the required diet and exercise is the motivation for this paper.
Rainbow Ties: LGBT Discrimination in the Workforce

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Imagine you are at your job. Your coworkers decorate their desks—vacation photos, family photos, pictures of their spouse and their children. These decorations and photographs are fond memories that push them to work through both good and bad days—to keep pushing to work better. Coworkers can talk about their families to each other, allowing them to connect and become a more cohesive team. Now imagine being afraid to set up a picture of your own spouse or your own family for fear of being fired because he or she is of the same sex. In over half the states one can be fired for being LGBT—the reality is that being openly LGBT at work can be a gamble with your career. Fired not for being a bad employee, but for who they are and who they love—something that has no bearing on one’s ability to perform a job. One of these states is our own. While some counties and cities—such as Fort Wayne—may have nondiscrimination ordinances in place, the fact is that the state as a whole does not. Rainbow Ties is an information campaign that brings these challenges to light not to demonize businesses as a whole. This project criticizes businesses that have discriminated and praise ones that are preventing these practices. This information campaign has been created to inform the public about these issues and instruct them as to how they can help. Through the use of software such as Adobe Photoshop, Illustrator, and InDesign, I created my designs—such as posters and a booklet—to show the pervasive lack of nondiscrimination protections for LGBT individuals. While many may understand and be sympathetic to the concept at first glance, they may not understand the scope of the issue. Until we can solve these issues through non-discrimination laws (which I also advocate) businesses will have to take matters into their own hands to prevent and protest discrimination and the general public can research and challenge businesses that allow discrimination. This information campaign and design work will be realized through my skills as a graphic designer and member of the Department of Visual Communication and Design.
Diagnostic Labels and Their Effect on Parent Perspectives of Child Language Disorders

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Recent studies have proposed a new diagnostic label, developmental language disorder (DLD), be used for children who have traditionally been referred to as having specific language impairment. The rationale for using the term DLD is partially based on expert opinions on parent perspectives. This study investigated whether the statements made by experts are representative of parent opinions. An online survey asked parents about a hypothetical situation in which their child has a language impairment. Parents were given a description of the disorder, a label for the disorder, or a combination of the two. Based on the explanation given to them, parents provided their opinions regarding how they would interpret the implications of the child’s language disorder. The results found that receiving a diagnostic label with a description was more useful to parents than receiving only a description or only a label, regardless of what the label was. Parents also felt that knowing whether their child had a disorder was more important than how the disorder differed from other language impairments. These results have the potential to impact the way that speech language pathologists explain a child’s diagnosis to parents.
Firearms in the Farmlands: Indiana Students' Views on Gun Control

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In this study, I examine the relationship between attitudes on gun control, gender, and political party affiliation. I hypothesize that Republican and male students are more likely to support fewer restrictive gun control policies, while Democratic and female students will be more likely to support more restrictive gun control policies. Data are collected from approximately 800 undergraduate IPFW students during the spring semester of 2018. I anticipate that these analyses will indicate that there is a significant relationship between gender and attitudes towards gun control. I also anticipate that students who identify as Republican are more supportive of gun rights than students who identify as Democrats.
Traversing Uncanny Valleys? Young Adults’ Feelings About Chatting with “Bots”

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An increasing number of interactions are being monitored or navigated by bots (computerized applications programmed to perform interactive tasks online). These bots are being used by businesses to interact with customers who are navigating their websites; chatbots are even being piloted for e-therapy. According to Mindshare (2017), more than half of individuals expressed an openness to interacting with bots to connect with a brand; however, they also indicated that it would be uncomfortable if the bot started becoming too personal. This observation aligns with Uncanny Valley Theory, which suggests that when computers are too like people, individuals experience negative emotions like uneasiness and disgust (Howard, 2017).

In this study, we examine individuals’ reactions to chat interactions with other humans or faux “bots” (humans that participants were told were bots) to examine whether labeling an interaction partner as a bot would have a negative effect on participants’ emotional reactions to chats. Participants were undergraduates recruited from introductory psychology classes. Participants were randomly assigned by computer to chat online for 15 minutes with a (1) person, (2) chatbot, or (3) “someone” revealed to be a chatbot post-chat. Our confederates were not aware of the study’s conditions or true purpose. Post-chat, participants complete a positive and negative affect scale and were asked whether they would like to speak to their interaction partner again. All participants were debriefed afterwards. Participants displayed similar positive and negative reactions to conversations to pre-identified humans or bots. However, when told afterwards (rather than before) that they had been chatting with a bot, participants were significantly more hostile and upset. Additionally, participants were significantly less likely to want to chat again with post-identified chatbots than humans or pre-identified chatbots. The uncanny valley appears traversable, provided bots are identified as bots at the onset of interactions.
Fill in the Blank, Brand

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Five of the world’s lowest literacy rates are located in West Africa. Less than 40% of people there can’t read or write, majority of which being women. Most families in the developing world don’t have the financial means to support their children in school. Education is a huge component in improving lives. In order to enhance the future of education in these countries, I created the company Fill in the Blank.

Fill in the Blank is a brand dedicated to giving school supplies to every child in need. Our company sells pencils, notebooks, backpacks, t-shirt, and more. In addition to purchasing our products people can also learn how they are making an impact by reading our blog, located on our website. We want to encourage education by donating 50% of our profits received by supporting nonprofit organizations who provide schooling for children in developing countries. In every child’s life, they deserve a chance to Fill in the Blanks with opportunity.
Improving academic performance is an important concern not only for students but also for members of their families, universities, and communities. Receiving support undoubtedly enhances students' performance. The purpose of this study is to examine the relationship between forms of college students' social support and their level of academic performance. I hypothesize that students who receive high levels of emotional and financial support from their family will out-perform those who do not receive similar levels of support. I also examine the impact of receiving campus support on students' academic performance. Academic performance is measured as students' self-reported GPA. I hypothesize that greater levels of family and campus support will result in high academic performance as measured by current GPA. Preliminary data analysis of 659 undergraduate students during the spring semester of 2018 support these hypotheses. Students receiving greater support out-perform students not receiving support from their family and/or campus.
Exploring the Feasibility of Self-Collected HPV Sampling

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Cervical cancer ranks as the fourth most common cancer in women internationally and the fourteenth most common women’s cancer in the United States. Human Papilloma Virus (HPV) is the leading causative factor for cervical cancer. In America, over 79 million men and women have HPV, with over 14 million new infections occurring yearly. Although nearly every person who is sexually active will test HPV-positive at one point in their life, most HPV infections are easily eradicated by the immune system. In some cases, however, HPV infections persist and cell changes take place that eventually lead to cancer. Papanicolaou (pap) testing has long been a screening method used to ensure early detection of abnormal cervical cells and spur action to prevent cancer development. Recent changes in national screening recommendations promote cytology alone before age 30, followed by HPV testing or cotesting with HPV and cytology after the age of 30. HPV testing has been proven superior to traditional cytology when comparing cost, resources, time, and skill required to interpret cytology slides. With the rise in popularity of HPV testing for cervical cancer screening, self-collected HPV sampling has been explored as an additional option for increasing the number of women screened for cervical cancer. Women have proven competent in self-collected sampling and expressed satisfaction with this method of testing. Conversely, self-collected sampling prompts concerns for patient follow-up needs, provider responsibilities related to results, incomplete well-woman’s exams, and effects on results of sampling vaginal tissue compared to cervical tissue. When compared to provider-gathered Pap testing alone, self-collected HPV testing offers the ability to reach women who lack access to care or do not seek screening due to time, embarrassment, or knowledge deficits. When considering the feasibility of self-collected HPV sampling, the opportunity to improve cervical cancer screening compliance among hard-to-reach populations is promising. However, bypassing the gold standard of cotesting with cytology and HPV, accounting for patient results, and managing patient follow-up care represent the potential drawbacks to promoting self-collected sampling. As HPV self-collected sampling research grows, further implications of this method on decreasing cervical cancer prevalence will be discovered.
The expression of mycosporine-like amino acid (MAA) genes in the cyanobacterial strain *Nostoc punctiforme*

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Mycosporine-like amino acids (MAAs) are a diverse family of colorless and water-soluble natural products that are widespread in many aquatic microbial communities. They are associated with algae, cyanobacteria, and fungi and unified by their ability to absorb ultraviolet radiation (UVR) in both the UV-B (280-315 nm) and UV-A (315-400 nm) ranges. Solar UVR exposure induces deleterious effects in living creatures, such as photoaging and carcinogenesis. In response, many organisms have evolved the ability to use secondary metabolites, such as MAAs, as a form of sunscreen protection. MAA biosynthesis is encoded by a genomic region consisting of four genes in the cyanobacterium *Nostoc punctiforme* ATCC 29133. In this study, *N. punctiforme* was stressed with UV-B radiation in order to assess the accumulation of any specific MAAs and measure the level of transcription of the MAA biosynthetic genes (NpF5597, R5598, R5599, and R5600). UV-B was able to induce production of the MAA shinorine, as determined by absorption at 334 nm. Using quantitative-PCR, it was also found that all four genes were transcribed in response to UV-B. This study is the first to demonstrate the responsiveness of these genes to UV-B stress. Future experiments will assess their response to other conditions such as UV-A, salt stress, and reactive oxygen species.
Tune In; Power of Food

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There is a mantra, “eat your vegetables”. The mantra should also include fruit because both are full of phytochemicals, enzymes, and mineral salts that are life-sustaining. Without the full understanding of food properties and characteristics, it is no wonder people pass by the produce section quickly. The time is now to make friends with these vibrant, nutritious produce because the deliberate intake of wild foods, herbs, spices, fruits, and vegetables will heal and optimize your physical body and well-being.

The project is to educate and encourage people to make friends with whole food and also to help them discover the high impact of these every day foods that are at their fingertips. Fifty vector illustrations have been created and etched (sandblasted) into blue bottles. The blue bottles were chosen because they can be instrumental in enlivening the water by sitting it in the sun. Photos have been taken and manipulated in Photoshop to be used for torso and book. Layout skills have been utilized in creating a book by incorporating all the assets that have been developed. The book has simple recipes of each of the 50 foods that assist the person with integrating the high nutrient dense food into a person’s life.

As a graphic designer, the researched ideas were visually articulated in a colorful, well-illustrated 108-page book and physical display. The book has been created with the top 50 foods that have survived over time. Each food has a 2-page spread in the book with history of each individual food, followed by the vitamins, minerals, and nutrients it is known for. It is also sprinkled with non-mainstream information that can be life changing. To encourage people to make friends with these foods, there is a section that explains how to purchase and to prepare each of the 50 foods. To complete each individual spread, there is a step-by-step recipe.

Drawing all three facets of information together from non-mainstream, scientific, and Oriental Traditions, we can prove that the deliberate intake of wild foods, herbs, spices, fruits, and vegetables will truly heal and optimize your physical body and well-being. At the same time, foods can be enjoyed with flavorful taste with their simplicity of their preparation.
Do People Want our President to Fail?—A Multivariate Approach

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The President has the ability to shape the country’s future and significantly impact the lives of each citizen. Although he needs the help of congress to achieve many things, we still recognize that the President himself can have a major impact on the country. The purpose of this research is to examine whether or not the IPFW students want our Presidents to fail based on their belief that the President is intentionally not doing what is in the best interest of our country. In this context, “to fail” would represent a historically low approval rating coupled by the inability to fulfill major campaign promises. I also examine whether students who hold the opposite political affiliation will be more likely to want the President to fail than those of his own party. To test these hypothesis, data is gathered from approximately 800 undergraduate students using survey questionnaires. Descriptive and multivariate analyses will be completed by February 16, 2018. I predict that these analyses will find that those students who believe the President is doing what he believes is best for the country will also want him to succeed. Similarly, findings may support the hypothesis that those who hold the same political affiliation as the President will be significantly more likely to want the President to succeed.
The Misunderstood Mother: Rangda in the Context of Hinduism and Hindu Gender Roles

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There have been multiple attempts to explain the origin and role of Rangda, a monstrous figure of Balinese myth and performance. Seen in dances as locked in eternal combat with her arch-enemy the Barong and as the Queen of witches, Rangda is often considered the embodiment of evil and fear. However, she is also associated with Durga, one aspect of the Hindu Goddess, Devi, and is seen as a mother figure and wronged widow. Her fearsome, destructive aspects have led her to be misrepresented in scholarship and in her public image. I argue this arises from a misunderstanding of both Hindu religion and gender roles.

Bateson and Mead (1942) describe Rangda’s role in the Barong dance and her maternal archetype, but they say little about her religious significance. Instead, she is almost always called the Witch in their description, emphasizing her evil nature. Belo (1949) connected Rangda to Durga, but did not attempt to reconcile her evil character with the destructive but good figure of Durga. More recent scholarship by Stephen (2001) has found a connection between Rangda and Uma, a loving and creative aspect of Devi that is a counterpart to Durga. Some versions of Rangda’s story, do not identify her as Durga, but depict her as a widow scorned and seeking revenge through the goddess’s power.

I draw on these sources and others to offer a retelling of the Balinese conception of Rangda. I present the findings of my study within the religious context and the gender framework of Hinduism, in particular its Balinese iteration. I argue that the basic interpretation of Rangda as evil is incorrect and based on a faulty interpretation that fails to take into account the religion and gender structures surrounding her. Specifically, Hinduism does not have a strict dichotomy of good and evil. Beings, including deities, will have different aspects in their incarnations. My poster will show that Rangda has four exclusively female roles that form two pairs of related identities: goddess and mother; witch and widow. These are reconciled when viewed through Hinduism’s concepts of gender and womanhood. Rangda is almost always described as some kind of mother, fierce or loving like her goddess counterparts. She is also remembered as a widow, since her name means “widow” in Old Javanese, and her characterization reflects Hindu attitudes toward widowhood. In Bali, widows are associated with witchcraft. These associations must be considered before passing judgment on Rangda, as such consideration will reveal that she is not an evil figure, but a figure of multiple contradictory identities and significances.
Gender Differences in Types and Targets of Aggression

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A more nuanced understanding of gender differences in interpersonal aggression is emerging as research invalidates broad generalizations suggesting that men are uniformly more aggressive than women. In fact, depending on the type (e.g., physical vs. relational) and target of aggression (peer vs. romantic partner), women may be more aggressive than men. Researchers often focus narrowly on one context despite the overlap and presence of similar predictors of peer and partner aggression (e.g., emotion dysregulation, personality dysfunction, low self-control, family-of-origin violence). This narrow focus has resulted in a largely divided literature where findings in one context often fail to adequately inform research and treatment in another.

Participants reported on their direct and indirect aggression toward peers and romantic partners and completed measures of antisocial and borderline personality, low self-control, family-of-origin violence, and general aggressiveness.

In the context of peer relationships, men engaged in more direct aggression (e.g., hitting, yelling) and women in more indirect aggression (e.g., gossiping, ignoring). As for partner-directed aggression, women engaged in significantly more direct and indirect aggression than men. Violence was related to borderline personality traits, low self-control, general aggressiveness, and for women, family-of-origin violence.

Considering the overlap and similar predictors of peer-directed and partner-directed aggression for men and women, the examination of aggression in varying contexts as separate fields of research seems inappropriate and may have contributed to common misconceptions about aggression and gender. Gender differences in aggression depend on the type and target of aggression. Men are more aggressive than women, but only toward certain targets (i.e., peers) and using certain forms of aggression (i.e., direct aggression). These data also suggest a set of key potential prevention and intervention targets that may help reduce interpersonal aggression in a broad set of circumstances. Treatment or prevention programs focused on problems with emotional and behavioral self-control and family-of-origin violence may decrease aggression in both peer and romantic contexts.
Sex Is Fine, but Sexting Is Illegal? Teen Sexting Laws across the United States

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Lawmakers and prosecutors face quandaries when handling teen sexting cases. Not all states have adopted specific sexting legislation, and grey areas in child pornography laws have led to the prosecution of teenagers who willingly self-generate nude images and share them with other teens. Thus, teens in some states (e.g., North Carolina) could face felony charges for the creation, sending, or receiving of nude photos, even if they are exchanged in the context of legally permissible sexual relationships. In cases where teenage sexting appears to be consensual, some prosecutors are choosing to charge teens with less serious offenses, or even to not charge them at all. However, prosecutorial discretion is variable, and ultimately, the state’s specific sexting or child pornography legislation governs maximum penalties.

In this study, we examine sexting legislation across all fifty states, focusing on the penalties and possible defenses teen sexters may use, and discuss the public health risks associated with teenage sexting within the context of psychological research on prevalence rates. We used Lexis-Nexis and Westlaw databases to search criminal statutes related to teenage sexting for all U.S. states and Washington D.C. There are numerous current statutes without colloquial terminology (e.g., sexting) within their legislation; thus, we also searched for phrases such as “transmission/dissemination of intimate images.” In cases where a jurisdiction did not have specific sexting laws, we recorded all of the relevant child pornography statutes. There is considerable variation among U.S. sexting laws, with some jurisdictions relying on archaic child pornography statutes to prosecute teenage sexting cases and others developing new, extensive legislation that addresses various types of online interactions with varying degrees of criminal intent (e.g., sexting, revenge porn, and cyberbullying). Additionally, in jurisdictions where specific teenage sexting legislation has not been adopted, there are often discrepancies between these child pornography statutes, laws related to the age of sexual consent, and typical teenage sexting behavior.

Overall, current legislation has created an environment in which teenagers are unable to determine the legality of their sexting behaviors, leaving them and their futures vulnerable. Due to the inconsistencies in sexting legislation across the U.S., we propose the development of harmonized state or comprehensive national-level legislation to address the online behavior issues of teens. Additionally, creating more uniform legislation nationwide also increases the potential for national campaigns to reduce adolescent sexting altogether.
Modeling Dependence among Stock Prices Using Copulas

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A copula is a function that connects the joint distribution of random variables to their respective marginal distributions. Recently, using copulas to model the joint distribution of random variables has become more attractive due to their many appealing features. For instance, one great advantage is that using a copula permits the modeling of dependence structure of variables independent of their marginal distributions. Applications of copula modeling can be seen almost everywhere, including finance, risk management, engineering, and climate forecasting. In this study, the dependence among the performance of several stocks is investigated using copula models; specifically, elliptical copula models, including Gaussian copula and student t-copula. Time series methods are also used to prepare the data for analysis. After the study, we found that these stocks are highly dependent, and that copula models have captured these dependence very well. By understanding these dependence among the stocks, the investors can take better measures to control the investment risks in the stock market.
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