



OLD DOMINION UNIVERSITY

GRADUATE SCHOOL

GRADUATE RESEARCH ACHIEVEMENT DAY 2019



THURSDAY,
MARCH 28, 2019
12:00 P.M. - 2:00 P.M.
NORTH MALL



March 28, 2019

Dear Colleagues,

Welcome to the 2019 Annual Graduate Research Achievement Day! I am delighted that the Graduate School is once again hosting this event, which honors and celebrates the excellent research of our graduate students.

Graduate education is being recognized increasingly in the Commonwealth, across the nation, and around the world as a vital means of addressing many of society's complex challenges. Our graduate students, with the assistance of their advisors and other faculty, bring their interests, creativity, and hard work to bear on complex questions within and across a broad spectrum of disciplines. The high level of work that they produce underscores the quality of graduate education here at Old Dominion University.

Today, you will have the opportunity to see our graduate students' posters, which deal with a wide range of research topics both within and across disciplines. I hope you enjoy your interactions with our graduate students. They contribute significantly to the teaching, research, and service mission of Old Dominion University, and I have no doubt you will be hearing more about them in the years to come.

Again, welcome and thank you for attending.

Sincerely,

Augustine Agho, Ph.D.

Provost and Vice President for Academic Affairs



March 28, 2019

Dear Colleagues:

Welcome to the 2019 Graduate Research Achievement Day (GRAD) sponsored by the Old Dominion University Graduate School!

Today's event brings together ninety of the University's best and brightest graduate students to share their research-in-progress. The numerous topics covered by our students' posters address many of the world's most significant social, economic, and technological challenges, while offering an excellent view into current multi- and inter-disciplinary scholarship. As such, GRAD demonstrates the high quality of the University's master's and doctoral programs.

I commend all of today's participants for taking the time to prepare their posters, as well as their faculty advisors for their expert mentoring. You will enjoy interacting with these outstanding students. The problems they are researching today will lead to solutions tomorrow.

Again, welcome and thank you for attending GRAD 2019!

Sincerely,

A handwritten signature in black ink, appearing to read "R. Wojtowicz".

Robert Wojtowicz, Ph.D.

Dean of the Graduate School

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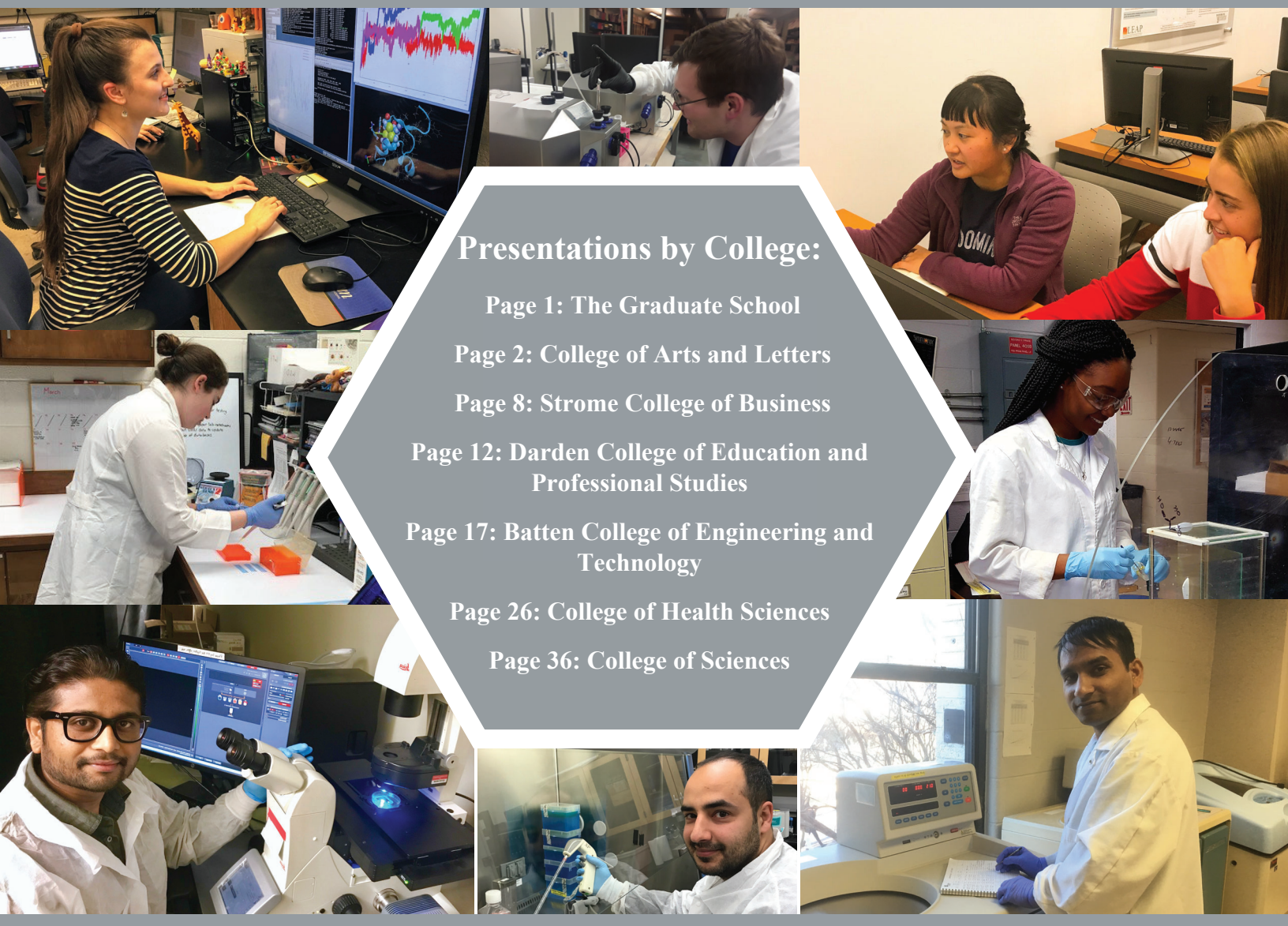
Old Dominion University is an equal opportunity, affirmative action institution. Minorities, women, veterans, and individuals with disabilities are strongly encouraged to apply.



OLD DOMINION UNIVERSITY

GRADUATE SCHOOL

GRADUATE RESEARCH ACHIEVEMENT DAY



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COLLEGE COLOR KEY

THE GRADUATE SCHOOL

GOLD



COLLEGE OF ARTS & LETTERS

RED



STROME COLLEGE OF BUSINESS

GREEN



DARDEN COLLEGE OF EDUCATION & PROFESSIONAL STUDIES

PURPLE



BATTEN COLLEGE OF ENGINEERING & TECHNOLOGY

BLUE



COLLEGE OF HEALTH SCIENCES

GREY



COLLEGE OF SCIENCES

ORANGE



Participants' name badges are color coded for the colleges they represent.



Title of Presentation: Role of Avian Hosts in Spread and Maintenance of *Borrelia* Spp. and *Rickettsia* Spp. in *Ixodes* Spp. Collected off Birds in Southeastern Virginia

Presenter: Alexandra Cumbie

Co-authors: Erin Heller, Anna Phan, Zach Bement, Eric Walters, Holly Gaff, and Wayne Hynes

Program: Ph.D. Biomedical Sciences

Abstract: The role that birds play in the maintenance and the movement of ticks and tick-borne pathogens is an important area of research. The home ranges of resident bird species, and the migratory nature of others, can influence vector-borne disease ecology in a region. Of particular interest is the interaction of birds, both resident and migratory, with *Ixodes* spp. which are the primary vector species of *Borrelia burgdorferi*, the causative agent of Lyme disease. This genus has also been associated with the detection of other tick-borne pathogens, including *Rickettsia rickettsii*. In this study, *Ixodes* spp. were removed from birds captured at various locations in southeastern Virginia. All ticks were pulverized, and their DNA extracted and tested for *Borrelia* spp. and *Rickettsia* spp. The results from this study reveal the prevalence of *Borrelia burgdorferi* sensu stricto in *Ixodes* spp. collected off of resident bird species as well as the discovery of *R. parkeri* and *Candidatus R. mendelii* in *Ixodes brunneus* collected off of resident bird species.



Title of Presentation: Choice of Refugees: Economy or Polity?

Presenter: Bora Aslan

Co-authors: Beder Dine Elkhoul and Nasir Uddin

Program: Ph.D. International Studies

Abstract: The direction of the refugee flow in Europe through the “European Refugee Crisis” is an important source of discussion because of its pattern since some countries are receiving extraordinarily high volumes of refugees while some others having more asylum applications. To understand the dynamics of the flow we asked the following research question: “Is the GDP per capita or the level of polity a better predictor for asylum seekers’ choice of some of the European Union countries.” Our hypothesis was “the polity level is a better predictor for asylum seekers’ country choice.” For this project, we used data for numbers of refugees and asylum seekers according to their arrival countries from “United Nations High Commissioners for Refugees” web site, GDP per capita data from “International Monetary Fund” website “and statistics on the democracy level of the countries from “The Economist Journal.” The data we used were primarily obtained from quantitative evidence analysis processes. We evaluated the data through linear regression analysis to explain whether the correlation between asylum application and GDP per capita is higher than the correlation between asylum application and polity level of the related country. Our findings indicate that the refugee flow cannot be easily labeled as “economic migration.” The first country where the refugees arrived or the one which gets the highest volume does not always receive more asylum applications than the others. The refugees keep on moving towards different countries even after they got the basic protection they desired, however, it is not always towards a more prosperous country but also to a country with a higher level of democracy.

Title of Presentation: Adversities in Interracial Relationships

Presenter: Nadja Bangoura

Program: M.A. Lifespan & Digital Communication

Abstract: Within my research I highlight the different adversities interracial couples tend to go through on a day to day basis, or over time within their relationship. From those adversities I analyze how those couples mentioned were able to be resilient despite external challenges that their relationship faced. By breaking down the normal social construct which determines the ways in which people tend to view certain outlooks, this concept is defined by themes and the way in which things have always been. By determining the way in which people think, it is grasped why people are still against mixed race couples. Through the study that was conducted, 25 interracial couples were interviewed to get their take on any external challenges that they may have faced while being together. While many couples face daily challenges within their own relationships, some interracial couples face many different factors that may either strengthen or hinder their relationships. Through the conducted study and those questions, along with first-hand accounts from these couples it was determined the type of trials they went through and continue to go through on a daily basis. It is also highlighted the importance of resiliency and through positive communication indicators, and resiliency practices those contributions within mixed-race couples significantly improved the relationship. The study concludes with conversational pieces and other studies of scholarly work in similar topic fields. Furthermore, as this topic of interest continues to be at the spear head of engagement; going forward I would want to analyze how the normal social construct is a leading and predominate factor in negative feelings or representation of mixed-race couples.



Title of Presentation: Encouragement Communication with Prisoners and Their Support System

Presenter: Kara Bohrer

Program: M.A. Lifespan & Digital Communication

Abstract: The prison system in the United States house the most number of prisoners in the world. Due to the war on drugs, mandatory minimum prison sentences have accelerated the number of incarcerated citizens over the last 30 years. For research purposes, this paper will focus on those in the prison system. The clear majority of those incarcerated will be released back to their community once their sentence is completed. The reentry to society is a crucial step to becoming a productive member of the community once again. Most formerly incarcerated individuals have issues with reentry and depend on a support system. However, communication with a support system during incarceration is beneficial to rehabilitation and improving the self-perception of the prisoner. The importance of relationships with any individual, formerly incarcerated or not, is a fundamental human need as social beings. This paper will discuss the importance and impact of encouragement through communication and giving between prisoners and their support system during incarceration. The notion is that humans are given forms of encouragement through acts of communication. Encouragement, for this paper, will be defined as a form of positive social support. Communication through meanings of encouragement and giving by way of letters, packages, money, time, support, and affection can have an instrumental impact on prisoner's overall well-being and positive self-perception. Therefore, gaining insight on encouragement and giving positive communication with prisoners then contrasting to those without can be instrumental to prisoner success with rehabilitation. Participants will be given a Likert Scale survey asking a range of questions from frequency of communication, rate of how participants view their self-perception, and overall level of support system satisfaction. The proposed hypothesis is, prisoners with a support system who actively communicate encouragement to them will have an increased positive self-perception and well-being.

Title of Presentation: Examining Searching Practices: How Do College Students Search for Mental Health/Aid Online?

Presenter: Claudia Garcia Mendoza

Program: M.A. Lifespan & Digital Communication

Abstract: The arrival to college is for many students the moment they become independent, having to take their own decisions, including those related with their physical and mental health. In a technology orientated society, Internet has become a common source of information that can help in the decision making process. Given its immediacy and anonymity, health has become one of the main searching topics on Internet. This research proposal is intended to understand how young adults search for mental health information and/or help on the Internet. This study suggests a quantitative and qualitative method. Given the fact that this study inquires in private and intimate practices, quantitative information will be collected from online surveys, these same participants will be asked if they are willing to provide more information about their habits in a focus group. The results from this research will be helpful to identify risky practices, as well as to support future counseling plans. According to Penn State Annual Report in 2016, from 2015 to 2016 there was an increase of 30% in counseling services in colleges, the most common mental issues reported by students were anxiety and depression.



Title of Presentation: Why America is Angry

Presenter: Alex Hamed

Program: Ph.D. International Studies

Abstract: Over the last three decades, the US underwent a transformation in which the social gap and inequality had widened beyond the gilded age of the 1920s. The decline of public good combined with the loss in bargaining power that brought justice and induced a cycle of higher living standard dissipated. The American people lost their ability to believe in their political economy, the “story” and its narrative is no longer acceptable by most Americans. This paper explores the factors that impacted the American unrest and sets some policy recommendations to correct the political discourse. Income inequality must be addressed to soften the negative impact of globalization; it is not only about wages and jobs but is also about the civic inequality, not only on the effects of the purchasing power but the un-commonality between American citizens. Only by restoring, the shared citizenship in public places through common spaces, then the sense of national identity could be restored in democratic citizenship.

Title of Presentation: Human Trafficking and the Muted Groups Theory

Presenter: Amy Matzke-Fawcett

Program: M.A. Lifespan & Digital Communication

Abstract: “Human trafficking,” defined as, “a commercial . . . act . . . the result of force, threats of force, fraud, coercion or any combination of such means” (President’s Interagency Task Force, 2016, p. 2) is a problem in the United States and internationally. Human trafficking, defined by the same task force, is a crime that includes sex trafficking, child sex trafficking, and labor trafficking which consists of bonded labor, debt bondage, domestic servitude, forced child labor, and in some cases, the recruitment or use of child soldiers. Although it is important to raise societal awareness of this crime, it is my contention news outlets, social media and popular media have resulted in a distorted societal understanding about human trafficking as something happening “out there” and positions members of society as passive bystanders (Bellenger, 2016; Latane & Darley, 1969). My research seeks to re-orient the national discussion about human trafficking from a lifespan communication perspective by asking, “How can society best communicate with the trafficked (victims) so as to help those whose voices have been silenced?” Using the lens of Muted Group Theory (Ardener, 1975), those who are trafficked demonstrate that going forward a primary focus of inquiry and advocacy should be on communication between societal advocacy groups that specifically focus on the prevention of human trafficking and those who are trafficked. In general, my research attempts to unpack historical communication problems about human trafficking and sheds light on the communication between advocates and formerly trafficked people as a critical part in its prevention.

Title of Presentation: #HowIWillChange: A Failure to Listen to #MeToo

Presenter: Elizabeth “Casey” Moore

Program: M.A. Lifespan & Digital Communication

Abstract: On October 15, 2017, the #MeToo social media movement began on Twitter and quickly went viral. Women around the world shared their stories of sexual abuse and harassment in an effort to reveal the endemic nature of the problem. In response, the #HowIWillChange hashtag encouraged men to pledge how they would behave differently. As an ally movement, however, #HowIWillChange failed. Successful male allyship of feminist movements begins with empathic listening. Most of the Twitter users who represented themselves as male and tweeted affirmatively to #HowIWillChange did not display empathic listening. The very construct of the hashtag—men having a separate conversation to solve a societal problem that oppresses women—was telling. This paper argues that pro-#HowIWillChange responders did not demonstrate effective allyship due to powerful inhibiting forces, including Twitter’s platform affordances, the intersection of patriarchy and neoliberalism, and the social construction of masculinity—all of which precluded empathic posts. Instead, they responded with pledges to control their personal behavior and monitor that of other men, an approach that elided the systemic nature of the problem. If #MeToo is to reach its full potential to stimulate lasting structural changes in society, its followers might glean lessons from the #HowIWillChange experience in order to engage more effective male allyship going forward.



Title of Presentation: The Messy Nuclear Landscape: Using Fuzzy Cognitive Mapping to Explore a Feasible Scenario for Global Nuclear Disarmament

Presenter: Ryan Nixon

Program: Ph.D. International Studies

Abstract: Nuclear weapons are seemingly permanent fixtures in international relations. Although nuclear abolitionists and actors within the Nonproliferation Treaty (NPT) and the International Atomic Energy Agency (IAEA) have taken steps towards eliminating nuclear weapons, longstanding realist logic suggests nuclear disarmament is nonviable. On the other hand, some realists have suggested global nuclear disarmament is feasible, given certain international instabilities are stabilized and special care is taken during diplomatic negotiations. This presents an opportunity to test this prediction using fuzzy cognitive mapping, a computational modeling technique that identifies problems, stakeholders, and stakeholders' components in order to determine scenarios that solve complex disputes in a collectively beneficial way. This study identifies two problems regarding nuclear disarmament. First, following realist logic, nuclear weapon states resist giving up nuclear weapons, despite agreements to disarm. Second, states have interest in maintaining certain levels of secrecy, while the IAEA has interest in safeguarding nuclear materials. Synthesis between these problems requires that solving one does not make the other worse. Therefore, this study tests various scenarios and finds that, given present-day international instabilities are stabilized, nuclear disarmament is feasible if three conditions are met: First, a global disarmament agreement must not unreasonably affect states' sovereign rights outside of the agreement. Second, states outlying the NPT must be brought into the negotiations. Finally, present states with nuclear arsenals adopt the IAEA's Comprehensive Safeguards Agreement with the Additional Protocol as a measure of good faith. A final factor suggests states' rights to the technology inevitably means states should have an ability to re-proliferate in the event of future international instability that threatens global security. Once these steps are taken and technological rights guaranteed, this model suggests global nuclear disarmament is possible.

Title of Presentation: Generational Perspectives on the Benefits of Connecting and Listening to Nature

Presenter: Jessica O'Neill

Program: M.A. Lifespan & Digital Communication

Abstract: This paper details a mixed methodology research project concerning the perspectives of emerging adults and older adults on the benefits of connecting and listening to nature. It was hypothesized emerging adults would not find connecting to nature as important as the older adults would and therefore would have a less positive relationship with nature. In this limited study, field experiments were done with a group of four 16-20 years old emerging adults using activities taken from Joseph Cornell's book *Sharing Nature; Nature Awareness Activities for All Ages*. These participants as well as two older adults 50-85 years old were interviewed with their answers being compared. Autoethnography was used to reflect on these findings throughout the study. The results found that most of the emerging adults as well as the older adults found nature to be important and recognized they have a relationship with it in some capacity. The emerging adult's responses compared to those of the older adults were less detailed however, leading me to conclude the richness of the two age group's relationships with nature differed. However, the results of the study are limited, primarily by sample size of participants. Further research would be beneficial to the topic in order to obtain a larger and more diverse group of participants, in both age demographics. Doing so would also allow for greater quantity and quality of findings that could be analyzed. Implications of future research on the topic could enhance our understanding of how nature affects humans, how that has changed over time and ultimately the implications of this on communication.



Title of Presentation: Emerging Adults, Alcohol & the College Experience

Presenter: Adam Pyecha

Program: M.A. Lifespan & Digital Communication

Abstract: The following literature review and research proposal involves a communication pedagogy approach about the ideals and experiences of consuming alcohol by college students (Beck and Socha, 2014). Participants in this study will be undergraduate college students from Old Dominion University (ODU) in Norfolk, Virginia and will be supervised by an elected board of Health Communication experts. Professors and adjunct instructors will make up the board of Health Communication experts who will develop and oversee a three-course curriculum with 6-credits upon completion, which will be mandatory for all incoming freshman and graduating seniors. The program will be referred to as the Emerging Adult, Attitude and Alcohol Communication (AAC) studies. Upon ODU acceptance, freshman will take the 1-credit Introduction to AAC during the first semester and the 2-credit History of AAC in the second. Finally, seniors will take the 3-credit Responsibility and Recovery AAC as core coursework, required for the completion of a bachelor's level degree. Along with the experimental curriculum, qualitative data will be gathered and organized through narrative-interview surveys (see Appendix) by ODU graduate level students seeking advanced degrees in the fields of Communication, Psychology, and Higher Education. An initial timeframe for study is set to begin in the fall of 2020, in which case monthly progress reports will be assessed by the board up through the summer of 2021. If the board deems the program to predict future success, as well as meeting eligible academic, community, student, faculty, and financial conditions, then the proposal would benefit from a longitudinal approach, meaning 8 to 12 years of research (Beck, 2018).

Title of Presentation: The Culture of Commodifying Breast Cancer Illness

Presenter: Priscilla L. Roman

Program: M.A. Lifespan & Digital Communication

Abstract: This paper reveals the relationship between the Susan G. Komen Breast Cancer Foundation (SGKBCF), Inc. (2018) and the persistent commodification of breast cancer patients and their co-survivor's: sensitive narratives, community volunteering, charitable donation opportunities, and the feminine opacity ideology that's apparent throughout the breast cancer journey. The SGKBCF and its invisible interminable sponsors, strategically combine emotional survivor communication narratives across multicultural and multigenerational populations. The SGKBCF then entices consumers and retailers to specifically engage with unlimited data tracking e-commerce links, and are tied to the foundation's various social media platforms. Subject matter experts, scholarly research, and a case study disclosed within the text, will analyze and uncover the patterns connecting the iconic breast cancer foundation with actively supporting neoliberal political-economic maneuvers. These maneuvers infinitely regenerate the commodification succession cycle of patients diagnosed with breast cancer. The participants involve: women between the ages of 18-36, that have ever been diagnosed with breast cancer and that currently live in the U.S.A. The methods involve: an anonymous 7-point Likert Scale and the Constant Comparative Method. This method will be utilized for the data analysis portion in order to classify patterns, themes, and demographics recorded within the data. The results will indicate that the SGKBCF Inc. (2018) manipulates breast cancer illness, the symbolic meaning tied to the signature pink ribbon (especially during the months October and May) and instills false consciousness's onto consumers engaging on the foundations social media platforms. Future research: ethnography, sample participant population applied globally, applying the Social Stigma theory and integrating the Communication Adaptability Scale to the research study.



Title of Presentation: Parent-Managed Social Media Profiles for Their Children

Presenter: Rae Smith

Program: M.A. Lifespan & Digital Communication

Abstract: This proposed study aims to examine the phenomena of parents who preemptively create and manage social media accounts for their young children who are not yet able to use or manage these accounts themselves. According to a nationwide survey conducted by Gerber.com of more than 1,000 moms with kids under two, “close to 40 percent of moms aged 18 to 34 created social media accounts for their baby before the child’s first birthday, and another 7 percent made one before their child’s second birthday” (Dubin, 2016). The reasons and motivations cited by parents may vary, from wanting to create a personal identity separate from their children, to wanting to reserve a social media handle for their child’s name (Shea, 2016). This proposal examines the communicative, cultural, and social contexts that may lead parents to this decision, while acknowledging the benefits and risks associated with families’ use of social media. It reviews literature on the management of children’s online identities, parental control, children’s privacy rights and public autonomy, and permission issues. Utilizing the communication privacy management theory, it considers possible tensions that may arise between parents and children as an intergenerational dynamic when disclosing personal information online. It then proposes a longitudinal study to determine the long-term effects on the parent-child relationship, and especially on the children who will have grown up with a public online accounting of their life from a very young age. As social media’s aptitude as a culture-shifting communication tool continues to expand, so does its potential for intergenerational impact on parents and their children. As its use becomes more common among all stages of the lifespan, it will become vital to policy makers and web developers to understand the long-term impact of these early-aged accounts.

Title: When Appropriation Becomes a Tool of Colonization and Forced Assimilation

Presenter: David Tortolini

Program: M.A. Humanities

Abstract: For a culture, subculture, or ethnic group to survive they naturally need to maintain their cultural identity and power. These groups run the risk of losing their power and identity once they become a noticeable population. The reason this happens is that once the hetero-patriarchal power groups notice these minority groups they become the newest target of colonization. Once a group loses its power its members are forced to assimilate to their oppressor and become “a cultural cog in the machine”. The term which I am going to apply towards this power base struggle and fight is Gramsci’s term of cultural hegemony. You have various methods in which you see the hegemonic process happen. The most damaging and contemporary measure in which you see this happen is through means of appropriation. A modern method in which you see this happen is through media. Using Saussure’s idea of language and Helene Shugart definition of appropriation as part of the methodological framework in how media recodes and re-writes various cultures and identities. This presentation will explore how children’s movies are used as methods of appropriation and diminish a cultures power and identity. Once a culture and sub-culture are appropriated, you cannot undue the appropriation.



Title of Presentation: A Path Analysis of the Mediating Role of Flood Risk Perceptions

Presenter: Donta Council

Program: Ph.D. Public Administration & Policy

Abstract: This purpose of this research is to examine the multiple relationships that explain household adaptive behaviors, and if (and how) risk perceptions play a mediating role in these relationships. Given the shift in transferring risks from flood risk governance structures to households, there is a renewed interest in promoting private adaptive behavior amongst households that are vulnerable to flood impacts. While the literature purports the claim that flood risk perceptions rarely account for the variance explained in statistically modeling for household adaptive behaviors, this study will analyze an integrated conceptual framework that explores the mediating role of risk perceptions. The population for this quantitative study is individual households in Portsmouth, Virginia. The integrated conceptual framework considers the assumptions of Protection Motivation Theory and the Psychometric Paradigm. The conceptual framework will be analyzed using a several structural equation models to test the hypothesized causal effects of various relationships, and mediated effects of risk perception in explaining household adaptive behaviors. Findings from this study will contribute to practitioners' understanding of the role of risk perception in flood risk management to better transfer risk to households and promote adaptive behavior. This study also builds on the theoretical knowledge of how risk perceptions explain adaptive behaviors in flood contexts.

Title of Presentation: What Level of Organizational Prestige is Associated with the Strongest Financial Performance

Presenter: Veronika Ermilina

Program: Ph.D. Business Administration - Strategic Management

Abstract: Many studies have been conducted on organizational prestige. The vast majority of these studies emphasize the benefits associated with organizational prestige, especially superior financial performance. But, there are some studies highlighting disadvantages associated with organizational prestige and even suggesting that there could be advantages being a non-prestigious organization. In this study we argue that there is a cost associated with organizational prestige. Such cost is often omitted in the prestige literature. Specifically, we propose that in the presence of industry prestige saturation (i.e., number of prestigious organizations in the industry), organizational prestige-financial performance relationship may vary. That is, when industry prestige saturation is high (i.e., there are many prestigious organizations in the industry), we propose highly prestigious organizations will encounter lower relative financial performance while non-prestigious organizations will enjoy higher relative financial performance. On the contrary, when industry prestige saturation is low (i.e., there are a few prestigious organizations in the industry), we propose highly prestigious firms will enjoy higher relative financial performance while non-prestigious organizations will encounter lower relative financial performance.



Title of Presentation: Alleviating Emergency Department Congestion: Early Information Access and The Perspective of Information Processing Theory

Presenter: Anjee Gorkhali

Co-authors: Ling Li

Program: Ph.D. Business Administration - Information Technology & Supply Chain Management

Abstract: Alleviating Emergency Department (ED) congestion results in shorter hospital stay which not only reduces the cost of medical procedure but also increase the hospital performance. Length of patient stay is used to determine the hospital performance. Organization Information Processing (OIPT) Theory is used to explain the impact of information access and availability on the information processing need and ability of a hospital. Technical devices such as RFID that works as “Auto Identification tags” is suggested to increase the information availability as well as the information processing capability of the hospitals. On the other hand institutional factors such as employee behavior towards the new technology is studied to analyze the impact of human factors in the implementation of these technical devices in the ED procedures. However, other factors such as employee trainings, management structure and management policies moderate the relationship between information availability and the processing capability of a hospital ED.

Title of Presentation: Uncovering Effective Practices for Improving Public-Private Partnerships in Member Countries of the World Bank Group.

Presenter: Kouliga Koala

Program: Ph.D. Public Administration & Policy

Abstract: Public-private partnerships (PPPs) emerged as a cross-sectorial mechanism of potentialities and opportunities for governments to initiate or speed up the development of infrastructure. The World Bank Group (WBG) provides assistance to member countries to finance infrastructure projects. However, the introduction of new guidelines on PPPs procurement poses some challenges. To meet the requirements, countries have to restructure their governance system or create new units and regulations. The requirements are in place for effectiveness and efficiency throughout the entire PPP project process from project preparation to project deactivation. The literature on PPPs posits that failure or success of PPPs depends on the effectiveness of governance factors and therefore, more advanced economies perform better than less advanced ones. However, there is gap in the literature in that it focuses on general factors while at the same time omitting the stages of PPP procurements and the sub-categories. Using data from the Procuring Infrastructure Public- Private Partnerships Report 2018, the Private Participation in Infrastructure (PPI) database, and the Worldwide Governance Indicators (WGI) database, the research ran a multivariate regression. The researcher found that focusing on PPP procurement stages and sub-categories better informs governments and practitioners in both developing and developed economies of the specific elements for better performance.



Title of Presentation: An Enemy Within - Intra-Country Consumer Animosity

Presenter: Olga Moseley

Program: Ph.D. Business Administration - Marketing

Abstract: Animosity is an important factor in understanding consumers' product preference and buying decisions. In its broad form, it refers to the impact of negative feelings caused by military, economic, religious and political tensions on product attitudes, judgements, and choice. Consumer animosity was originally proposed as an international marketing concept; however, it has been recently extended to help explain consumer behavior in an intra-country context (Shimp et al. 2004; Hinck 2004; Shoham et al. 2006; Little et al. 2014). In the current literature intra- country animosity is largely viewed as an extension of international animosity and little theoretical support is provided for consumer animosity within one country (Shimp et al. 2004). The purpose of this research is threefold. First, drawing on the social identity theory (Tajfel 1969, 1970, 1981; Hornsey 2008) this paper seeks to offer the theoretical backing for intra-country consumer animosity as a distinct concept that has several significant differences compared to its inter-country counterpart. Second, by bridging the gap between consumer animosity theory of international marketing, anti-consumption literature in consumer research, and relevant in-group/out-group psychological research, this paper provides a more holistic view of consumer animosity. Finally, this paper opens a lucrative area for future research to help further establish and refine the concept of intra-country consumer animosity.

Title of Presentation: A Comparative Study of the Prevalence of Jungle Justice in Developing and Developed Countries: A case study of Nigeria and USA

Presenter: Taiwo Oguntuyo

Co-author: Oge Agim

Program: Ph.D. Public Administration & Policy

Abstract: The research presents a comparative case study of the prevalence of Jungle Justice (also known as vigilante justice) in developing and developed countries, using Nigeria and the United States of America as a comparative case study. In many countries in West Africa, and highly prevalent in Nigeria, jungle justice is categorized as a major social vice that militates against national growth and development. The act of a group of people (usually a mob) taking laws into their own hands by beating an alleged criminal to the point of death (or even to death) without following due process; this arbitrary method of counter-aggression sums up the core of jungle justice. This dehumanizing and degrading act requires urgent intervention because it not only negates the maintenance of societal law and order, but abuses the notion of right to free and fair trial, and largely infringes upon the fundamental human rights of the accused perpetrators. Interestingly, in the United States, a new form of jungle justice has emerged, which will be our basis for comparison. This form of vigilante justice (anti-pedophile activism) comprises of the false representation of young victims by the activist group (known as "catfishing" in modern terms) with the main goal of drawing the accused perpetrator out to a place the group can carry out jungle justice. It comes in the form of video recording the accused, parading the individual on social media, taunting, mocking and in some cases, beating them up. These acts, albeit heroic in nature, have implications for the 14th amendment to the US Constitution which promises equal protection under the law. Using theories and concepts of public justice, this study relates the impacts and implications of jungle justice to the principles of democracy, due process and the rule of law.



Title of Presentation: Close but No Cigar: The Joint Impact of Goal Type and Goal Completion Magnitude on Consumer' Post-Goal Behaviors

Presenter: Junzhou Zhang

Co-authors: Yuping Liu-Thompkins

Program: Ph.D. Business Administration - Marketing

Abstract: Goal pursuit represents an important psychological mechanism under loyalty programs. Although academic research on loyalty programs has examined the extent to which consumers succeed or fail in reward-goal pursuit, insufficient attention has been paid to the consequences of such successes or failures. Addressing this gap, this paper draws upon research on goal pursuit and counterfactual thinking to examine the effect of goal completion magnitude on individuals' effort toward achieving subsequent goals, and how maintenance versus attainment goal types moderate this relationship. Analyses of flight activities from 5,719 members of a major airline's frequent flyer program reveal that (1) individuals who failed (vs. succeeded) at achieving an attainment goal will put more (vs. less) effort into subsequent goal pursuit than individuals who failed (vs. succeeded) at fulfilling a maintenance goal; (2) goal achievement magnitude has a linear effect on future goal pursuit effort under a maintenance goal, such that the more one completed his/her previous goal, the more effort he/she will invest in the subsequent goal cycle; and (3) under an attainment goal, goal achievement magnitude has a reverse U-shaped effect, such that substantial goal achievement in the previous goal cycle creates a surprising hampering effect (i.e., close-but-no-cigar effect) on subsequent goal pursuit. Instead, moderate achievement of the previous goal leads to the most effort invested in subsequent goal pursuit. These results and the proposed underlying processes are further explored in two lab experiments.



Title of Presentation: Using Repeated Reading and Previewing Vocabulary Interventions with Elementary- Aged Struggling Readers to Improve Fluency and Comprehension

Presenter: Khaled Alotaibi

Program: Ph.D. Education - Special Education

Abstract: Students with learning disabilities encounter challenges while reading. Finding effective strategies to improve their reading fluency and comprehension is essential for their success. Though there are numerous approaches for improving the reading skills of students with learning disabilities, the use of repeated reading interventions is one of the most effective.

Title of Presentation: Tangible and Financial Satisfaction among Full-Time Faculty and Adjunct Faculty

Presenter: Courtney Jane Belmonte

Co-authors: Shanda Jenkins and Laura Soulsby

Program: Ph.D. Education - Higher Education

Abstract: The current study examines faculty data from the National Science Foundation's 2015 National Survey of College Graduates on 4,311 full-time and part-time faculty. Little research exists investigating job satisfaction of adjunct faculty in higher education. Overall job satisfaction was divided into two scales: intangible (i.e., opportunities for advancement, intellectual challenge, degree of independence, job location, level of responsibility, and contribution to society) and financial satisfaction (i.e., job salary, job benefits, and job security). Researchers found significantly different results with full-time faculty reporting higher levels of satisfaction when compared to part-time faculty. Limitations and implications for future research are discussed.



Title of Presentation: Self-regulated Learning Strategies vs Evidence-based Study Strategies

Presenter: Wanda Brooks

Co-authors: Linda Bol

Program: Ph.D. Education - Educational Psychology & Program Evaluation

Abstract: There is a growing concern about students entering college only to drop out or change majors after a semester or more of study. There are multiple reasons for this including personal reasons that may have nothing to do with academics, of course, but sometimes students switch to different majors because they feel that their original choice is too difficult after not doing well in the required introductory courses. Training in self-regulated learning (SRL) strategies may enable students to gain the skills necessary (e.g., making goals, planning, organization) to succeed in gateway courses that have a minimum grade requirement. These behaviors allow students to be active contributors to their learning, and to have control over achieving their goals. SRL also requires that a learner have some kind of control over how they learn, what kinds of methods to use, or even their environment, otherwise, the student may still learn, but the outcomes are determined by external factors. Self-regulation skills can be taught and utilized in different contexts. Once a learner develops the skills of SRL they can choose to put them to use in those contexts. **Treatment: Students will be assigned to one of two groups, receiving either “Evidence based study strategies” or “Metacognitive strategies”. Following receipt of video and pdf, students will be asked to upload a brief assignment related to the strategy presented. Students will be asked to complete a brief survey following the final assignment. Questions asked: Do students rate the utility-value of SRL strategies higher than Study strategies? Do students rate the effectiveness of SRL strategies higher than Study strategies? Do students rate the effort-cost of SRL strategies lower than Study strategies?

Title of Presentation: Relationship between Measures of Anxiety and Change in Resting Metabolic Rate

Presenter: Alex Ehler

Co-authors: J.L. Wynne and P.B. Wilson

Program: Ph.D. Education – Human Movement Sciences – Applied Kinesiology

Abstract: PURPOSE: To investigate the relationship between measures of anxiety and outcomes from two resting metabolic rate (RMR) tests. METHODS: A total of 33 subjects (11 men, 22 women; 34.1 ± 11.5 years) completed two RMR tests within one month. Variables from the tests included RMR (kcal), oxygen consumption (VO₂ in mL/min) and heart rate (HR in bpm). During the first visit, the State-Trait Inventory for Cognitive and Somatic Anxiety was used to assess state (STICSA-Moment) and trait (STICSA-General) anxiety and the Anxiety Sensitivity Index-3 (ASI-3) to evaluate anxiety sensitivity. STICSA-Moment was administered again during the second visit. RMR Variables and STICSA-Moment were compared between visits and Spearman’s rank correlation coefficients assessed relationships between outcomes. RESULTS: There was a significant difference in STICSA-Moment scores ($t = 2.45, p = .020, \Delta\text{STICSA-Moment} = -1.4, 95\% \text{ CI} = -2.7, -.3$) and VO₂ ($t = 3.50, p = .001, \Delta\text{VO}_2 = -9.6 \text{ mL/min}, 95\% \text{ CI} = -15, -4$) between visits but not for HR ($t = 0.99, p = .331, \Delta\text{HR} = -1.1 \text{ bpm}, 95\% \text{ CI} = -3.1, 1.1$) or RMR ($t = 1.45, p = .157, \Delta\text{RMR} = -23 \text{ kcal}, 95\% \text{ CI} = -56, 9$). Significant, moderate correlations were observed between change in STICSA-Moment scores and change in RMR ($\rho = .482, p = .004$) and VO₂ ($\rho = .460, p = .007$), as well as a weak relationship with change in HR that trended towards significance ($\rho = .325, p = .065$). Correlations between RMR variables and outcomes from STICSA-General and ASI-3 were insignificant. CONCLUSION: Although the changes were small in magnitude, practitioners and researchers should be aware that RMR and state anxiety may decline after an initial test. Future research should further explore the relationship between state anxiety and RMR results.



Title of Presentation: The Impact of Continuous Versus Intermittent Physical Activity on Vascular Function While Sitting

Presented by: Benjamin Lieu

Co-authors: Leryn Reynolds

Program: M.S. Exercise Science

Abstract: Previous studies demonstrate prolonged sitting impairs blood vessel function. However, these studies also demonstrate breaking up sitting time by exercise maintains endothelial function. No one has examined whether a continuous bout of exercise prior to sitting is as effective as breaks in sitting on maintaining endothelial function. **PURPOSE:** This study examined whether continuous versus intermittent bouts of exercise are more effective at maintaining vascular health while sitting. **METHODS:** 5 males (age: 36 ± 18 , BMI: 22 ± 5) and 1 female participated in three randomized 3-hour sitting trials where popliteal endothelial function was measured via Doppler ultrasound every hour. In the sedentary trial (SED), subjects sat for 3 continuous hours with their leg in a 90° bend. In the continuous exercise trial (CON), the subjects walked for 30-minutes at 2-mph on a treadmill before sitting for 3-hours. During the intermittent exercise trial (INT), subjects sat for 3 hours similar to the SED condition; however, every 30-minutes they walked at 2-mph for 5-minutes. Flow-mediated dilation (FMD) was performed at baseline, 1-hr, 2-hr, and 3-hr in each trial. **RESULTS:** Percent change in FMD was unaltered between groups or across each trial ($p > 0.05$). **CONCLUSIONS:** These preliminary data suggest that endothelial function is unaltered across the groups. This is an ongoing study and we are actively recruiting more individuals to increase the power of this study due to our low sample size.

Title of Presentation: You See What I See? Eye-Tracking Visual Attention During Social Stories in Adolescents with ASD

Presenter: Victor A. Lugo

Co-authors: Anne Michalek, Chung-Hao Chen, and Jonna Bobzien

Program: M.S. Speech Language Pathology

Abstract: Personalized video stories are possible interventions used to facilitate an understanding of social situations for adolescents with autism spectrum disorder (ASD). This feasibility study explores the visual attention of adolescents with and without ASD when watching personalized, video social stories and the relationship of visual attention patterns to the comprehension of social story content. Six adolescents with and without a diagnosis of ASD viewed a personalized, video social story containing digital images of themselves during a routine dental appointment. Eye gaze metrics were collected to measure visual attention and a knowledge assessment was administered to determine social story comprehension. Results indicated that eye tracking technology is a viable measure of differences in visual attention during dynamic social stories for adolescents with and without ASD. Visual attention varied as a function of visual image type and diagnosis. However, visual attention was not related to social story comprehension and retention.



Title of Presentation: The Impact of Blood Flow Restrictive Exercise on Endothelial Function

Presenter: Hannah Twiddy

Co-authors: Leryn J. Reynolds and Robbie Pittman

Program: Ph.D. Education – Human Movement Sciences – Health & Sport Pedagogy

Abstract: Blood flow restriction training (BFRT) is the occlusion of blood flow during resistance exercise to elicit enhanced skeletal muscle hypertrophy while lifting lower weights compared to standard resistance training. Research has shown BFR with low intensity resistance training to elicit similar results in skeletal muscle hypertrophy when compared to higher intensity resistance exercise. Although BFR demonstrates similar levels of skeletal muscle hypertrophy, no research has examined the effects of BFR exercise on brachial artery endothelial function which has been demonstrated to be closely linked to coronary artery endothelial function and thus predisposition to developing atherosclerosis. Due to the effect on endothelial function, this type of training modality may not be suitable for individuals with cardiovascular disease (CVD) or those at a greater risk for developing CVD. The purpose of this study is to examine the effects of blood flow restriction training on endothelial function. Subjects were 9 healthy males, 23.9 ± 1.2 years, 27.7 ± 1.2 kg/m² who regularly participate in resistance training exercises at least 2 times per week. Subjects performed 3 sets of bicep curls at 30% of their 1 repetition maximum to failure with a blood pressure cuff at 80% arterial occlusion pressure. Endothelial function was assessed by flow mediated dilation performed before, immediately after, and one hour post BFR. These data indicate BFR exercise does not alter endothelial function in healthy males. Given that studies have demonstrated that an acute bout of traditional resistance training increases flow mediated dilation, BFR may be impairing the ability of exercise to improve endothelial function. Future studies will be aimed at examining plasma markers of vascular dysregulation, such as endothelin-1 and vascular cell adhesion molecule in response to BFR to determine potential mechanisms for the blunted flow mediated dilation.



Title of Presentation: The Effect of Body Mass on Physical Performance in Naval Special Warfare Operators

Presenter: Dallas Wood

Co-authors: David P. Swain

Program: Ph.D. Education - Human Movement Sciences - Applied Kinesiology

Abstract: US Naval Special Operations Forces have performed some of the US Military's most rigorous missions. The Human Performance Program (HPP) developed a physical performance testing battery to assess and monitor physical performance. Testing bias relative to body mass has been noted in past literature, including military physical fitness tests. Purpose: This retrospective study looked to determine if there is body mass bias in the HPP performance assessment and if an optimum body mass for each performance test could be determined. Methods: Data from 333 subjects (age: 28.4 ± 5.0 yr; height: 178.4 ± 6.2 cm; mass: 86.0 ± 9.2 kg) were analyzed to compare body mass to performance on the eight performance tests: standing long jump, Pro-Agility test, weighted pull-up, body weight bench press, 1-RM deadlift, 274-m shuttle run, 4.83-km run, and 800-m swim. Linear regression analysis was used to analyze the relationship of body mass to performance; a 2nd degree polynomial was utilized to determine best-fit curves for each of the physical performance tests; ANOVA was utilized to examine differences in performance between body mass groups. Results: Significantly better performance for lighter subjects was found in the Pro-Agility test, weighted pull-up, body weight bench press, 274-m shuttle run, and 4.83-km run. Heavier subjects performed better in the 1-RM deadlift. Second-degree polynomial regression revealed optimum body mass for the Pro-Agility test, 274-m shuttle run, and 4.83-km run to be somewhat heavier than the lowest body mass. Conclusion: These findings could help professionals better assess and train operators of varying body size. The views and opinions expressed are the authors' and do not reflect those of Naval Special Warfare Command, the US Navy or the Department of Defense.



Title of Presentation: Biochemical Methane Potential of the Liquid Phase from Hydrothermal Carbonization of Municipal Solid Waste

Presenter: Kameron Adams

Co-authors: Sandeep Kumar and Ben Stuart

Program: Ph.D. Engineering - Civil & Environmental Engineering

Abstract: We have a problem, in 2015, the EPA reported that Americans generated over 254 million tons of trash; 57% (landfilled), 16% (incinerated), and 27% (recycled/composted). MSW landfills are the third largest source of human related methane emissions which have 23 times more greenhouse gas trapping potential than CO₂. Improvements in terms of waste management and energy production can be solved by integrating MSW processing with hydrothermal carbonization (HTC) and anaerobic digestion (AD) to reduce waste to landfills and maximize the organic carbon and resource recovery. A mixture of known composition (paper, plastic, metal, glass, food) representing waste that typically goes to the landfill has been created for testing under the proposed process. The purpose of this particular study was to 1) investigate carbonization experiments at varying temperatures (250, 280, 310 °C) and times (10 min, 1 h, 6 h) 2) evaluate liquid phase and biochar properties 3) perform AD bench scale bottle test on liquid phase to generate experimental data on biogas yields to understand biodegradability. Mass balance shows that 22-48% of carbon remained in the solid phase, 33-45% in the liquid phase and 15-44% in the gas phase. The condition of 280°C at 10 min yielded the highest TOC of 8.0 g/L with biogas yields of 222 g biogas/g TOC. Liquid phase will be tested for biochemical methane potential as the next series of analysis based off biogas yields from anaerobic digestion.

Title of Presentation: Characterization of Dynamic and Quasistatic Compressive Mechanical Properties Of Ice-Templated Alumina-Epoxy Composites

Presenter: Sashanka Akurati

Co-authors: Nicole Tennant and Dipankar Ghosh

Program: Ph.D. Engineering - Mechanical Engineering

Abstract: In recent years, bioinspired ceramic-polymer composites with multilayered architecture have drawn significant attention because of the possible synergy of strength and damage-tolerance. Polymer infiltration of ice-templated ceramics has emerged as a promising and versatile technique to develop this class of novel composites, which can be utilized for several structural applications including in high-strain rate environments. In spite of the growing interests, there is limited understanding of compressive mechanical response of ice-templating based multilayered ceramic-polymer bulk composites and investigation on their dynamic behavior is almost non-existent. Moreover, for this class of materials there is a need to understand the orientation-dependence of properties. In this study, our goal is to understand the effects of composition (ceramic to polymer ratio) and morphology of the ceramic scaffolds on the macroscopic response of the composites. Moreover, these composites will be subjected to uniaxial compressive loading in quasistatic ($\sim 10^{-3}$ s⁻¹) and dynamic ($\sim 10^3$ s⁻¹) regimes. A split-Hopkinson pressure bar (SHPB) will be utilized to investigate the dynamic response of the composites. Fragments of the composite specimens were analyzed using scanning electron microscopy to study the fracture characteristics.



Title of Presentation: Automated Analysis of Mixed Sample Raman Spectra Using Feedforward Neural Networks and One-Vs-All Decomposition.

Presenter: Alexander Atkinson

Co-authors: M.N. Abedin (NASA LaRC) and H.E. Elsayed-Ali (ODU ECE)

Program: M.S. Engineering - Electrical & Computer Engineering

Abstract: Interest in use of Raman spectrometers in many fields of analytical science has increased due its ability to nondestructively provide information about molecular structures and component materials of a mixed sample. Advancements in Raman spectrometer hardware has allowed for compact instruments to have deployment capabilities directly on interplanetary missions, flexible usage conditions requiring no sample collection/preparation, and no need for daylight radiation shielding. As the amount of science which can be collected from a Raman spectrometer in a given amount of time increases, a bottleneck will be created in data analysis which leaves a need for a faster method of spectral data classification. In this study, a framework to allow for fast automated analysis of mixed sample Raman spectral data is proposed and an implementation of this framework is tested. Analysis of mixed sample Raman spectra was achieved by implementing a model which decomposes an N-class multi-label problem into “N” single class detection problems. The model (consisting of multiple neural networks) was trained with pure sample data and was tasked with analyzing both real and theoretical mixed sample Raman data. Performance of the model is judged by its ability to detect component materials in real mixed sample data at the same level that it is able to in ideal mixed sample data (consisting of linear combinations of training data). The model’s structure, training and testing methodologies, and results will be presented.

Title of Presentation: Uniaxial Compressive Response of Ice-Templated Ceramics with Directional Porosity: Effects of Porosity, Morphology and Strain Rate

Presenter: Mahesh Banda

Co-authors: Dipankar Ghosh, James E. John, and Diego A. Terrones

Program: Ph.D. Engineering - Mechanical Engineering

Abstract: Due to high specific strength and energy absorption capacity, ice-templated ceramics with directional porosity are promising materials for nuclear warheads, armor systems, anti-mining, and impact protection. In these applications, materials are often subjected to mechanical forces within loading durations of tens of microseconds. Therefore, mechanical response of ice-templated ceramics measured in quasistatic regime may not truly represent their dynamic (high-strain rate) mechanical behavior. In this presentation, we will discuss our work on understanding the uniaxial compressive response of ice-templated sintered ceramics both in the quasistatic and dynamic regimes of strain rates. We utilized ice-templated alumina as a model system and employed a split-Hopkinson pressure bar (SHPB) to measure the uniaxial dynamic compressive response. In the processed ice-templated ceramics, porosity, lamellar bridge density, microstructural morphology and other length-scale features were modified through the systematic variations of the intrinsic (solids loading of suspension, particle size and morphology) and extrinsic (freezing front velocity) variables. This study will help to decipher the effects of porosity, pore morphology and length-scale features on the compressive mechanical response of ice-templated ceramics at two widely different strain rate regimes.



Title of Presentation: Analyzing Influential Factors in Capacitive-Coupled Wireless Power Transfer

Presenter: Yashwanth Bezawada

Program: Ph.D. Engineering - Electrical & Computer Engineering

Abstract: Wireless power transfer (WPT) is an emerging technology and trending topic in the field of research and commercial area, it provides convenience for electrical users to charge devices by means of avoiding power cables. It has proven to be applicable from low power: mobile devices, to high power: Electric Vehicles (EV), and many other applications for battery charging. During the past, most of research focused on inductive-wireless power transfer. But, recently, capacitive-wireless power transfer (C-WPT) has proven to be efficient over inductive-wireless power transfer for near-field transmission. Capacitive-Wireless power transfer uses electric field to transfer power from transmitter to receiver by means of capacitive plates. In this work, we analyzed the resonant points of a Switch-Inductor-Inductor-Diode (SLLD) circuit. The SLLD circuit has a relatively-simple topology with only one switching device, which makes it obtaining a potential of high efficiency and easy to identify the impact of each component on system performance. The SLLD circuit is applicable for both low power and high power applications. According to the resonant points, the circuit parameters were specified to obtain the controllability of MPPT. The influential factors were analyzed and verified by experimental tests.

Title of Presentation: Z-Source Circuit Breaker for DC-Network Protection

Presenter: Sagar Bhatta

College: Batten College of Engineering and Technology

Program: Ph.D. Engineering - Electrical & Computer Engineering

Abstract: Direct current (DC)-nature distributed energy resources like solar and fuel cells are emerging in electric power systems as a part of DC microgrids/nanogrids, MVDC and HVDC transmission and distribution networks. DC microgrids, which is considered as coupling points of many renewable energy resources and distributed generators in modern power systems, cannot be widely applied until appropriate solutions of fault current limitation and interruption are proposed. But limitation of fault current in DC network is an essential challenge that needs careful attention. Due to the lack of a zero-crossing point in DC unlike alternative current (AC), most of commercial AC circuit breakers cannot be applied into DC power systems directly. A couple of Z-Source circuit breaker (ZCB) topologies have been introduced with capabilities of bi-directional power flow and automatic/controllable turnoff. In this work, the power loss analyses of three bi-directional ZCB topologies during normal steady-state operation have been performed. From our study, the Z-Source breaker with least losses has been considered and its power loss distribution which is a major consideration in breaker selection, along with its configurable tripping time is evaluated. By performing comparative study, we found that the inter-cross connected bi-directional ZCB has the minimum loss during steady-state operation. The relationship between steady-state power loss and configurable tripping time is determined by specifying the parameters of ZCB. It is found that the increase in configured tripping time would decrease the efficiency of ZCB relatively. From theoretical analysis and laboratory tests, it has been verified that when the tripping time is configured to be equal or less than 0.1 ms, the ZCB can operate at a high efficiency (say $> 98\%$), which makes it a good candidate for DC protection



Title of Presentation: Radio Link Design for CubeSat-to-Ground Station Communications Using an Experimental License

Presenter: Anthony G. Cappiello

Co-authors: Dimitrie C. Popescu, Jason S. Harris, and Otilia Popescu

Program: M.S. Engineering - Electrical & Computer Engineering

Abstract: CubeSats have attracted increased interest from the academic community in recent years due to their relative low cost and rapid development cycle. As is the case with all autonomous spacecraft, CubeSats rely on radio communications with ground stations to receive commands for performing scientific missions, and to transmit telemetry and measurement data back to Earth for processing. This paper discusses the radio link design for the Old Dominion University (ODU) CubeSat communication system that is scheduled to be launched in 2019 as part of the Virginia CubeSat Constellation (VCC) project. The presentation includes an overview of the system and the RF link budget analysis, along with salient design aspects including impedance matching for the CubeSat radio, a custom interface for the ground station radio, and an outline of the link layer protocol used.

Title of Presentation: Microsecond Kinetics of Ion Transport and Membrane Interface Binding Before, During, and After Lipid Electropore Formation

Presenter: Federica Castellani

Co-authors: Esin B. Sözer, and P. Thomas Vernier

Program: Ph.D. Engineering - Biomedical Engineering

Abstract: Molecular dynamics simulations of lipid membranes reveal the nanoscale evolution of biophysical systems, including complex processes that are not observable with conventional experimental methods. Among these processes, electroporation, also called electropermeabilization, is used in medicine and biology to introduce drugs, nucleic acids, and other normally impermeant material into cells. It is known that the application of strong transmembrane electric fields causes the formation of bilayer-spanning water bridges and conductive lipid pores, and that material otherwise not able to go through the cell membrane can enter or exit the cell through these breaches of the membrane barrier. Knowledge about how specific ions and molecules are transported through electropermeabilized membranes, however, is very limited. Our simulations focus on the dynamics of ion-membrane interactions during electroporation. We describe the previously unexplored microsecond kinetics of ion binding to phospholipid bilayers and transport through lipid electropores in double bilayer systems containing K^+ , Ca^{2+} , and Cl^- . A double bilayer system allows us to simulate the different ion concentrations inside and outside the cell and to study their dynamics before, during and after the pulse. In particular, the intracellular distribution of Ca^{2+} is a key component in the operation of numerous regulatory and signaling pathways. Little is known about the evolution of the three-dimensional $[Ca^{2+}]$ profile during the nanoseconds and microseconds after a porating electric pulse. Does Ca^{2+} diffuse freely into the cytoplasm or is it bound quickly to the intracellular interface of the lipid bilayer? Molecular simulations allow us to explore this nanoscale world in search of answers to these questions.



Title of Presentation: Application of Biodegradable and Recyclable Chelating Agent for Ash Removal from Algae

Presenter: George Daramola

Co-authors: Sandeep Kumar

Program: M.E. Engineering - Environmental Engineering

Abstract: Ash is inherent in most biomass feedstock, and the origin for common constituents in biomass ash include silicates, glass and other inorganic phase which are responsible for equipment failure and operating difficulties in thermochemical energy conversion facilities. The purpose of this research is to investigate the recycling of chelating agent used for the removal of ash from biomass. In recent year's ethylenediamine-tetraacetic acid (EDTA) has been studied extensively to remove ash from biomass. EDTA is non-biodegradable, which is not environmentally friendly. Hence a biodegradable acid, nitrilotriacetic acid (NTA) was investigated for the removal of ash from algae. The treated and recovered sample from NTA was further treated by citric acid and acetic acid consecutively. Weighed out algae sample was soaked in a measured NTA treatment for 2 h at 60 °C, the sample was then dried, and the same process was repeated for the citric acid treatment on the algae sample. Ash analyses was carried out on the algae sample that was recovered after each treatment. In this study, it was observed that NTA had the most impact on the algae for its ash removal. The study also focused on recycling the NTA by using Na_2S with $\text{Ca}(\text{OH})_2$ to precipitate the metals extracted from the algae sample with the NTA solution. A measured amount of $\text{Ca}(\text{OH})_2$ was added to the recovered portion of the NTA, after which Na_2S was added, gently stirred and allowed to settle overnight. The top and clearer portion of the solution was extracted and re-used to treat the algae sample, while the bottom part of the settled metals was stored for further comprehensive analyses and study.

Title of Presentation: Characterizing Silicone and Polyacrylamide Gel Substrates for Mechanobiology Studies Using a Widefield Fluorescence Microscope

Presenter: Sandeep Dumbali

Co-authors: Venkat Maruthamuthu

Program: Mechanical Engineering, Department of Mechanical and Aerospace Engineering

Abstract: Tissues in the human body are predominantly made of cells and the extracellular matrix (ECM). The elastic modulus (Young's Modulus E) of these tissues varies over many orders of magnitude. Epithelial and other cells in soft tissues adhere to a microenvironment whose stiffness typically falls in the kilopascal range. For example, the elastic modulus of brain is several hundred pascal, whereas that of muscle is more than 10 kilo pascals and that of cartilage is in the range of megapascals. Flexible substrates such as polyacrylamide and silicone gels have proven to be excellent biomimetic substrates for cell culture in vitro. Several methods have been used to measure the stiffness of flexible substrates, including atomic force microscopy, macroscopic deformation of whole samples upon stretching, rheology and indentation using spheres and spherically tipped micro-indentors. While each technique has its own advantages and disadvantages, indentation with a sphere is an especially simple yet fairly accurate method that only requires access to a widefield fluorescence microscope. Recently, confocal microscopy has also been used for an elegant characterization of the indenter method. To characterize the Young's moduli of isotropic linear elastic substrates, we present here a simple method that only employs a widefield fluorescence microscope for the actual stiffness testing. Common availability of this equipment, use of suitable indentors and methods to restrict fluorescent marker beads to the substrate top surface, enables this method potentially widely accessible.



Title of Presentation: Effect of Substrate Stiffness and Formin on Fibrillar Force Generation by Fibroblasts

Presenter: Mohamad Eftekharijoo

Co-authors: Venkat Maruthamuthu

Program: Ph.D. Engineering - Mechanical Engineering

Abstract: Fibroblasts in connective tissues often interact with a fibrillar extra-cellular matrix (ECM) that restricts their shape along one-dimension (1D, along the fiber). At the same time, the fibroblast responds to and affects the mechanical nature of its microenvironment which consists of the inter-woven fibrillary ECM, other matrix components and cells. The determinants of force generation by fibroblasts, which is necessary to understand normal physiology and disease, is however unclear. In order to construct the 1D geometry of fibroblasts, we plated NIH 3T3 fibroblasts on micropatterned 1.5 μm -wide fibronectin lines on polyacrylamide gels with stiffness of 13 or 45 kPa. We used traction force microscopy to quantify the cellular traction force exerted and the associated strain energy stored in the substrate. We found that strain energy or maximum traction stress is not a function of cell length. Even though cell length depends on substrate stiffness, the strain energy and the maximum traction forces exerted were independent of substrate stiffness. Besides, we found that fibroblasts in a 1D morphology have prominent linear actin structures and inhibition of a family of actin nucleators (formin) significantly reduced linear actin level. Importantly, we found that the fibrillar force exerted by fibroblasts also strongly decreased, implicating formin in fibrillar fibroblast force exertion.

Title of Presentation: Design of A Biochar-Based Water Filter for Metal Removal

Presenter: Pushpita Kumkum

Co-authors: Sandeep Kumar

Program: Ph.D. Engineering - Civil & Environmental Engineering

Abstract: Heavy metal contamination is a serious concern that needs to be addressed in order to prevent the severe health effect caused from its exposure through drinking water. Activated carbon is the adsorbent of existing water filters available in the market but it has some limitations in removing metal contaminants such as lead. Literatures report, biochar shows higher adsorption potential in removing lead from drinking water than that of activated carbon due to the presence of oxygen containing functional group. Biochar has lower energy demand, lower global warming potential impact, and retrieve more cost efficiently than activated carbon for metal removal. The current study presents the experiences of designing, testing, and operating a low-cost biochar water filter for removing lead from drinking water. To make a customized filter, three major steps are conceived including (i) making biochar, (ii) granulating biochar, and (iii) packing granulated biochar in a filter casing. Small-scale biochar maker is constructed by using recyclable household materials like food cans. A handcrafted or low-technology method for granulation of biochar powder have been implemented. The product will be developed simulating the process of actual faucet flow rate and mimicing the practical lead contamination condition. The filter will be highly effective (with 99.99% reduction efficiency) in providing protection from lead contamination. The filter is unique since it uses the adsorption potential of biochar and can be made at a nominal cost (< \$1 per unit) from locally available biomass waste and recyclable materials. This will provide significant benefits in water purification technology and metal contamination management not only for the developed world but also to the developing countries with subpar infrastructure.



Title of Presentation: Challenges of Designing Pilot Scale Short Residence Time Hydrothermal Continuous Reactor for Algae Processing

Presenter: Mason Martin

Co-authors: Ashani Samaratunga, Orlando Ayala, and Sandeep Kumar

Program: M.S. Engineering - Environmental Engineering

Abstract: Growing demands for renewable energy and fuels have led to a search for economical and efficient biomass pretreatment methods. We have extensively studied the continuous Flash Hydrolysis (FH) laboratory-scale reactor as an environmentally-benign method for fractionating microalgae components. Several of our recent studies showed promising results for lipid and protein by-product recovery with FH of microalgae at 280°C for 9 s in continuous process. The short residence time of the order of seconds, in a continuous process is crucial for fractionating algae components without their degradation to undesired products. However, heating algae slurry at a desired heating rate of 50 - 100°C under hydrothermal conditions to bring up to the reaction temperature and quenching the products bring several engineering challenges such as dealing with rapid heat transfer and multiphase flow. The current study presents the experiences of designing, testing, and operating one of its kind pilot-scale mobile flash hydrolysis unit for processing microalgae slurry. In order to provide the necessary flowrate as well as building pressures up to 2000 psi, several pumping possibilities were reviewed. For the rapid heating of the algae slurry, two different mechanism were reviewed. They were: mixing of room-temperature concentrated algae slurry with high-pressure clear hot water, and direct heating of the room-temperature diluted algae slurry. For the direct heating, after evaluating different techniques, induction heating was chosen. Both heating mechanisms have their advantages and disadvantages related with their sizing and will be discussed in this study. Regarding the quenching of the products, similar challenges were found. The best option was found to be passing the products in a constantly stirred chill water pool.

Title of Presentation: Data Acquisition, Visualization and Processing of Polarographic Systems for Bioenergetics Studies

Presenter: Lucas Potter

Co-authors: Krusienski D, Kennedy J, and Lai N

Program: Ph.D. Engineering - Biomedical Engineering

Abstract: Bioenergetic functions are routinely evaluated with polarographic systems. Besides polarographic systems with data acquisition, visualization and processing tools, other extant systems without these integrated features are still commonly used- however they require cumbersome operations and calculations to derive respiration rates, respiratory control and ADP/O ratios. Even when the signal is digitized, the system requires filter processing and analysis to determine whether large or unnecessary amounts of data have been recorded. A GUI (graphical user interface) was developed in Matlab to integrate digitization, visualization and processing of bioenergetics data measured with a biological oxygen monitor (YSI 5300) via a Clark electrode. The integrated system allows for calibrating, recording and visualizing the signal in real time- as well as determining respiratory rates, respiratory control, and ADP/O ratios. The GUI uses an algorithm to denoise the data collected during the experimental protocol. The use of this denoising procedure allows for a reduction in the sampling rate without compromising the accuracy in calculating the state 3 and 4 respiratory rates. The state 4 respiration rate relative error was the most sensitive in comparison to the other respiration rates errors to changes of the sampling rate. The relative error of the respiration rates, RCR and ADP/O ratio was lower than 0.5% even at low sampling rates (20Hz). The integrated tools of the GUI allow to a user to: a) overcome the typical limitations related to data processing and storage of polarographic system without a digitized component; b) analyze data in comma separated values (csv) format obtained with other digitized systems.



Title of Presentation: Acid-Assisted Flash Hydrolysis of Scenedesmus Acutus for Recovery of Sugars and Lipids

Presenter: Ashani Samaratunga

Co-authors: Ali Teymouri, Mason Martin, Tao Dong, Nick Nagle, Philip T. Pienkos, and Sandeep Kumar

Program: Ph.D. Engineering - Civil & Environmental Engineering

Abstract: Recovery of sugars from high carbohydrate microalgae species will provide value added products in a biorefinery scenario. Recently, fractionation of microalgae components (proteins, carbohydrates and lipids) has been successfully demonstrated with Flash Hydrolysis (FH), a subcritical water based continuous hydrolysis process. This FH process, typically conducted at 280°C and 10 s residence time in continuous flow reactor, leads to a lipids-rich solids fraction (biofuels intermediate) and a liquid hydrolysate. Earlier, dilute acid hydrolysis has been studied extensively to hydrolyze sugars from microalgae and lignocellulosic biomasses. In this study, dilute acid was incorporated into FH process for the first time to reduce the hydrolysis temperature, pressure, and maximize monomeric sugar recovery from Scenedesmus acutus. The experiments were conducted in the range of 150-200°C with dilute sulfuric acid ($\leq 1\%$), and residence time of 10 s under subcritical water pressure. Monomeric and total (monomeric and oligomeric) sugars, and sugar degradation byproducts in the liquid hydrolysate were quantified. Comprehensive lipid profiles including poly-unsaturated fatty acid (PUFAs) analyses on both microalgae and its biofuels intermediates (BIs) were performed to study the lipid recovery and quality under the acid-assisted FH conditions. Almost complete recovery of monomeric glucose was achieved with FH at 200°C with 1% sulfuric acid. Furthermore, greater than 90% yield of total sugar (monomeric and oligomeric) was achieved with FH at 200°C and 0.5% acid, and at 175°C with 0.5% and 1% acid. Almost all the lipids present in Scenedesmus acutus could be retained in BIs, making it lipids-rich solid with approximately 7 fold increase in lipids content when compared with untreated algae biomass.

Title of Presentation: Design, Simulation and Fabrication of Novel Diagnostic Device for Bunch Characterization and First Uncorrelated Emittance Measurement of Magnetized Electron Beam

Presenter: Mark Stefani

Program: Ph.D. Engineering - Electrical & Computer Engineering

Abstract: The study of magnetized electron beam has become a high priority for its use in ion beam cooling as part of Electron Ion Colliders and the potential of easily forming flat beams for various applications. A new diagnostic is described with the purpose of studying longitudinal and transverse magnetized beam properties. The device is a modification to the classic pepper-pot and was designed for use with a kicker cavity for longitudinal bunch profile measurements of magnetized beams. Used in this novel context this device is capable of measuring the uncorrelated components of transverse emittance in addition to the typical effective emittance.



Title of presentation: Stem Cell Differentiation and Effects of Three-Dimensional Cellular Microenvironment

Presenter: Martina Zamponi

Co-authors: Peter A. Mollica, John A. Reid, Patrick C. Sachs, and Robert D. Bruno.

Program: Ph.D. Engineering - Biomedical Engineering

Abstract: The cellular microenvironment has been shown to play a fundamental role in the regulation of cell function, stem cell fate determination, maintenance of cell potency and tissue homeostasis. Our laboratory focuses on the study of the effects of cellular microenvironment in the context of cancer and neurological models, based on the observation that a healthy environment can induce the suppression of tumorigenesis in mouse models. Insights concerning the molecular mechanisms that drive these processes are very limited, partly due to the inability of the current traditional methods of investigation, such as two-dimensional cell cultures and animal models, to accurately represent the human in vivo cellular microenvironment. Three-dimensional cell cultures allow to overcome the structural limitations posed by monolayer cultures, and maintain the ease of experiment design, monitoring and data analysis associated with in vitro procedures. Our laboratory has established systems to overcome some of these limitations and rely on the strengths of three-dimensional culture methods to elucidate mechanisms that govern stem cell differentiation. A customized 3D extrusion-based bioprinter was developed starting from a commercially available model, allowing for precise and controlled injection of cells within three-dimensional substrates. This tool allows for design of highly controlled experiments, in which the effects of cellular microenvironment on stem cell differentiation can be studied at a single-cell resolution. For increased levels of biomimicry, tissue specific substrates are generated from extracted tissue. Collected tissue is subjected to a chemical decellularization process, followed by lyophilization, enzymatic digestion and neutralization, to generate a self-gelling product upon incubation at 37°C. Mammary and brain extracellular matrix-derived substrates have been shown to support the growth of cells of the epithelial and neuronal lineages, respectively. Here, we apply these established systems to study the effects of the environment constituted by the three-dimensional substrates on the differentiation of injected stem cells.



Title of Presentation: Tobacco Smoking Prevalence Among College Students in the Kingdom of Saudi Arabia: Systematic Review and Meta-Analysis

Presenter: Saad A. Alotaibi

Co-authors: Mohammed A. Alsuliman and Praveen Durgampudi

Program: Ph.D. Health Services Research

Abstract: Introduction: During the last two decades, several studies have been published regarding the prevalence of tobacco smoking among college students in the Kingdom of Saudi Arabia (KSA). This systematic review and meta-analysis is intended to determine and to examine the smoking prevalence in Saudi college students from 2010-2018. Methods: PubMed, Science Direct, APA PsycNET, Web of Science, and CINAHL were utilized to search for published articles reporting the smoking prevalence among Saudi college students. After eliminating irrelevant articles, investigators independently assessed the quality of each article, based on Russell and Gregory's guidelines. MetaXL software was used to calculate the pooled prevalence among included studies, using the IVhert model. Heterogeneity among included studies was evaluated, using I² statistic. Sensitivity analyses were conducted between male and female genders. Results: Of the 295 published articles, 29 articles used a cross-sectional design to determine smoking prevalence among Saudi college students. Most of the studies were conducted in Riyadh at health science-related colleges; the rest were performed in different cities and colleges. The meta-analysis showed that the pooled estimate of smoking prevalence among college students in the KSA was 17% (95% CI: 11%-23%). Saudi male students had a prevalence rate of 26% (95% CI: 24%-29%), whereas Saudi female prevalence was 5% (95% CI: 3%-7%). Conclusions: Smoking among Saudi college students was higher than in the majority of regional countries (e.g., Iran). Saudi male students had a higher smoking prevalence than Saudi female college students. Additionally, studies that reported a high prevalence targeted students in specific disciplines. Public health authorities in the KSA should develop a surveillance system that monitors the prevalence of tobacco smoking on campuses. A surveillance system of monitoring tobacco use among Saudi college students could be beneficial in determining the degree of the tobacco problem and in improving current tobacco control programs.

Title of Presentation: Determinants of Glycemic Control among Patients with T2Dm in Saudi Arabia: a Systematic Review and Meta-Analysis of Prevalence

Presenter: Mohammed Alsuliman

Co-authors: Saad A. Alotaibi, Qi Zhang, Robert J. Cramer, Praveen K. Durgampudi.

Program: Ph.D. Health Services Research

Abstract: Aims: Despite the increased prevalence of diabetes in Saudi Arabia, individuals with T2DM had lack management of the blood glucose which contribute to the economy and well-being; therefore, it was deemed important to address the prevalence and evaluate personal, psychological, and behavioral risk factors related to poor glycemic control among T2DM patients in SA. Methods: Meta-analysis of prevalence and systematic review was conducted following PRISMA flowchart, and scrutinized peer-reviewed articles retrieved from Scopus, PubMed, PsycINFO, Web of Science, and CINAHL Plus databases. The included articles were assessed using modified STROBE tool, and random effects model used for the meta-analysis. Results: 19 articles were included of which 3 retrospective cohort, 1 case-control, and 15 cross-sectional. The quality of the studies was 3 high, 7 moderate, and 9 low. The pooled prevalence of uncontrolled T2DM, $\geq 7\%$ (53 mmol/mol), was 77.7% and mean (SD) age was 54.2 (11.1). The most examined factors were age, gender, treatment modality, education, diabetes duration BMI, physical activity and diet. The most studied factors established association with HbA1c were diet, diabetes duration, and treatment modality while the least was age, gender and education. Conclusions: Variation was evident among the studies due to the differences in the methodology. The overall quality of the studies was relatively weak, and the findings had limited generalizability. Further studies are needed to address the psychological and behavioral factors with emphasis on a theoretical foundation. Collaboration between the government and healthcare providers is necessary to effectively lessen the burden of diabetes.



Title of Presentation: Individuals with an ACL Reconstruction Have Altered Neuromotor Function

Presenter: Cortney N. Armitano

Co-authors: Steven Morrison and Daniel M. Russell

Program: Ph.D. Kinesiology & Rehabilitation

Abstract: The anterior cruciate ligament (ACL) is a key structural component in stabilizing the knee joint during purposeful movement. However, damage and subsequent ACL reconstruction does not always often result in a return to normal function. Indeed, wide spread motor problems can emerge as a result of the absence of a natural ACL. For example, individuals with a reconstructed ACL often exhibit increased variability and irregularity coupled with changes in coordination during gait. What has not been assessed to date is whether ACL damage also leads to slowing of responses under postural conditions. The current study was designed to compare differences in reaction time under both seated and postural (i.e. standing) conditions. It was also of interest to examine how ACL reconstructed individuals responded under the more challenging postural task. Fifteen adults with unilateral ACL reconstruction and 15 age-matched healthy controls participated in this study. Baseline assessment of neuromotor function including measures of proprioception, balance, strength, and walking ability were performed. Simple and choice reaction time response were assessed under seated (i.e. control) conditions and during a postural stepping task. The results revealed similarities between both groups with regards to the baseline measures of proprioception, balance, strength, and gait as well as the seated reaction time tasks. However, during the postural stepping task, individuals with ACL reconstruction had significantly slower reaction times compared to the healthy controls. This finding indicates that these persons had a reduced ability to respond quickly under more challenging postural conditions. This finding of slower responses when stepping for the ACL reconstructed adults may be a compensatory response to the previous injury and/or residual symptoms post-ACL reconstruction. Overall, these findings indicate that reconstruction of the ACL ligament impacts neural mechanisms, altering individuals' ability to respond under challenging balance tasks.



Title of Presentation: The Role of Academic Debt and Benefits to the Profession on the Interest of Professional Post-Baccalaureate Athletic Training Students' in a Doctor of Athletic Training Degree

Presenter: Gary Cohen

Co-authors: GW Cohen, R Medina, E Hoffman, S Paladin, S Clines, CE Welch Bacon, LE Eberman, J Cavallario, and BL Van Lunen

Program: Ph.D. Health Services Research

Abstract: Context: The requirement of completing a post-baccalaureate degree for entry into clinical practice will necessitate advanced degree seekers to consider their academic debt (AD) and benefits to the profession. We examined interest in a Doctor of Athletic Training (DAT) degree, concerns regarding AD, and perceptions of benefits to the profession of currently enrolled post-baccalaureate athletic training students. Methods: 15 of 51 programs that met the inclusion criteria comprising 287 students (91 Males, 193 females) in this cross sectional study. Participants completed a 6 theme survey. Questions were asked in select one, open-ended, and 4-point Likert scale formats. The main outcome measures for this part of the survey were interest in a DAT, amount of AD, and perceptions of the impact of a DAT on benefits to the profession. Statistics were calculated using IBM SPSS (Version 24; Armonk, NY). Descriptive statistics were used to calculate percentages and frequencies. Mann-Whitney U tests were used to assess group differences in interest in pursuing the degree ($P < 0.05$). Results: 170 participants were minimally interested in pursuing a DAT, while 115 were moderately or extremely interested. 125 participants reported debt accrual of post-baccalaureate programming to range between \$40,000 and \$80,000, with 63 students accruing over \$80,000. AD did not differ between groups for pursuing a DAT ($P = .906$). Participants agreed that a DAT would increase salary ($n = 202$), lead to job candidacy ($n = 226$) or diverse setting employment ($n = 212$), increase in professional recognition ($n = 240$), increasing awareness, ($n = 228$) increase respect ($n = 229$) and collaboration ($n = 221$) amongst and with healthcare providers and within the public ($n = 210$). Conclusions: Accumulation of AD does not affect interest in pursuing a DAT within post-baccalaureate students. They think that the DAT will be linked to increases in salary and recognition. Future research should examine perceptions of DAT completers and employment, debt accumulation, and debt to earnings ratio.

Title of Presentation: The Provider Perspective: Identifying Barriers to Prescribing Long Acting Injectable to Persons with Mental Illness

Presenter: Kimberly Farley

Co-authors: Kathie S. Zimbardo

Program: D.N.P. Nursing Practice - Advanced Practice

Abstract: Long acting injectable (LAI) antipsychotic medications should be used as a first-line treatment when patients require long-term antipsychotic treatment. However, clinicians often decide not to prescribe these drugs. Psychiatric clinicians are positioned to create and employ change. Therefore, it is important to explore experiences and opinions influencing LAI antipsychotic medication prescribing practices to minimize barriers that impact the receipt of the best and most appropriate medications for persons with mental illnesses. This study will explore the relationship between provider sociodemographic, practice locations, behavior attitudes, industry norms, and clinician prescribing behaviors. A non-experimental cross-sectional design with prospective data collection as an anonymous on-line survey used to collect data. Identification of any correlations between the sociodemographic, contextual factors, behavior attitudes, subjective norms, perceived behavioral control, and prescribing behaviors of clinicians and plans to, or not, increase use of LAI antipsychotic medications in their practice in the following 12 months. LAI antipsychotic medications improve patient adherence to treatment, but clinicians often fail to prescribe these drugs. Providers are central to successful patient outcomes as they control which medications are prescribed. Therefore, it is critical to explore factors that influence clinicians' decisions to prescribe LAI antipsychotic medications, creating a barrier for patient accessibility.



Title of Presentation: Perceptions about Telehealth Aiding in the Transition Process from Pediatric Health Care to Adult Health Care for Children with Medical Complexities.

Presenter: Emily K. Fisher

Program: Ph.D. Health Services Research

Abstract: Continuity of care for children with medical complexity, a subset of youth with special health care needs, transitioning from pediatric health care to adult health care is often a concern for both patients and providers. The American Academy of Pediatrics recently released guidelines stating that 20 years of surveys and studies, both from the state and community levels, continue to reveal that youth with special health care needs and their families do not obtain the support needed to effectively make the transition from pediatric health care to adult health care. (White & Cooley, 2018) With the advancement of technology, could telehealth, specifically synchronous communication, become a viable option to assist in the transition from pediatric health care to adult health care? One study noted that telehealth synchronous communication, when coupled with care coordination, significantly impacted planned visits to a pediatric health care provider versus unplanned visits to a pediatric health care provider for children with medical complexity ages 2-15 years old when compared to the control group. (McKissick, Cady, Looman & Finkelstein, 2017) The goal of this research aims to provide insights into the perceptions and use of telehealth, from a patient's perspective, and how those perceptions frame beliefs about and during the transition process from pediatric health care to adult health care. Results from a pre/post survey will be analyzed after experience with the telehealth invention.

Title of Presentation: Utilization of YouTube Videos to Grow Nurse Leader Competencies

Presenter: Smita Glosson

Co-authors: Adrienne Hartgerink

Program: Doctor of Nursing Practice- Nurse Executive

Abstract: Purpose: The purpose of this study is to determine the impact of viewing selected inspirational leadership youtube videos on leadership competency and leader self-efficacy of nurse leaders, by evaluating the difference pre and post intervention. The long-term goal is to provide leadership and succession planning programs and alternative teaching modality to support nurse leader development. Significance: To provide another method to utilize in developing and enhancing future nurse leader competencies. Background: Nurse leaders have responsibility for large spans of control, driving quality metrics, improving financial performance, and operational efficiency. By 2020, it is predicted that 50% of nurse leaders will be leaving the workforce. The Institute of Medicine, Future of Nursing, report recommends increasing the number of nurse leaders through development and effective succession planning for nurse leaders. Historically, many leaders enter their roles with little education or experience on leadership competencies required to do their job. Often nurse leaders are acclimated to their job functions through on the job training focusing on clinical skills and less emphasis on developing leadership expertise. Only 21% of US Hospitals have structured succession plans, leaving no formalized development plan to grow an internal pipeline of nurse leaders. Methods: The study used a pre-experimental one group pre-test/post-test design. The sample consisted of nursing leaders in a large comprehensive health network. Comparison of pre-test and post-test survey scores were conducted to analyze group differences before and after intervention. Correlations were assessed between leadership competency, self-efficacy, and tenure of the nurse leaders. Nurse leaders completed the pre-test surveys on ACHE Healthcare Executive Competency Assessment tool and Leader Efficacy Questionnaire. The study group participated in the intervention by watching two short videos followed by post-test survey. Results: Study findings showed an overall improvement after intervention in post survey scores in nurse leader competency and self-efficacy scores. The results that technology such as social media, and Youtube can be used to strengthen leadership competency development as an alternative training modality. Implications: Use of video as a media for education was influential in creating inspiration and excitement of nurse leaders to improve their leadership competency. Feedback from nurse leaders, sparked executive level conversations to develop succession plans, and an executive nurse leadership academy at the study site.



Title of Presentation: Program Evaluation of a Home Visiting Program: Perspective of Home Visitors

Presenter: Kaitlin Gudger

Co-authors: Diana Cartagena

Program: D.N.P. Nursing Practice - Advanced Practice

Abstract: Purpose: A program evaluation to determine if home visitors at Child Development Resources (CDR) are comfortable and have adequate knowledge and resources to provide sufficient support to families, and what home visitors view as facilitators and barriers to providing these resources Research Questions/Hypothesis: (1)Do home visitors believe they have adequate knowledge and resources to provide sufficient support to families? (2)What are the home visitors' perceived barriers to carryout goals of the home-visiting program? (3)What are the perceptions, attitudes, and/or beliefs of the home visitors related to the benefits of home-visiting programs? (4) Do home visitors believe the addition of technology to home visits would improve patient outcomes? Significance: This study will provide CDR with information that will aim to improve their home-visiting program to provide better education and support to low-socioeconomic and high-risk families. Because low-socioeconomic families are more at risk for adverse health effects, this program is essential to health promotion and improvement of the families in this community. Methods: This research study is a program evaluation of the home-visiting program at CDR using a descriptive design. The study will be conducted using a convenience sample of approximately 30 home visitor participants. A demographics survey, CDR home-visiting program survey, and a breastfeeding knowledge tool are being collected and analyzed. Findings: The results from this study showed home-visitors would benefit from added education regarding breastfeeding, maternal-infant bonding, and more. There was not an overwhelming response to employee's preference as to whether they perceived implementing technology into visits would be beneficial; the majority of employees were neutral on the matter. Discussion: There is little research to currently understand how home visitors perceive program information they are providing to families. The information gathered from this study can be used to improve home-visiting programs, which will create better health outcomes for mothers and children.



Title of Presentation: Individuals with Plantar Heel Pain Demonstrate Altered Foot Posture, Plantar Fascia Thickness, and Plantar Cutaneous Sensation

Presenter: Kathleen Hogan

Co-authors: Matthew Hoch

Program: Ph.D. Kinesiology & Rehabilitation

Abstract: Plantar heel pain (PHP) is a common injury in physically active individuals that decreases the ability to participate in physical activity and quality of life. The symptoms of plantar fasciitis are well known, however, there has been inconsistent evidence to explain the multifaceted etiology of this condition. The purpose of the study was to compare foot posture, plantar sensation, plantar fascia thickness and abductor hallucis morphology in individuals with and without PHP. Sixteen individuals with PHP and sixteen matched healthy participants volunteered to participate. Foot posture, plantar sensation, plantar fascia thickness, and abductor hallucis cross-sectional area (CSA) were evaluated in each participant. Foot posture was assessed with the Foot Posture Index-6 (FPI-6). Plantar fascia thickness and abductor hallucis CSA were measured utilizing diagnostic ultrasound. Abductor hallucis CSA was measured while participants performed a short foot exercise. Plantar fascia thickness was measured at three sites from the medial calcaneal tubercle to the second toe. Plantar foot sensation was assessed using Semmes-Weinstein Monofilaments. Sensation thresholds were tested at two aspects on the plantar aspect of the foot. Between group differences were evaluated using independent t-tests for all outcome measures ($\alpha \leq 0.05$). Individuals with PHP exhibited a more pronated foot posture (PHP=6.7±3.4; healthy=3.0±3.6, $p=0.01$) and displayed greater plantar fascia thickness at the proximal insertion (PHP=0.32±0.09cm; healthy=0.25±0.04cm, $p=0.02$) compared to healthy controls. Plantar sensation thresholds were higher in the PHP group compared to healthy controls at the head of the first metatarsal (PHP=3.85±0.72; healthy=3.22±0.39, $p=0.01$) and medial longitudinal arch (PHP=3.91±0.42; healthy=3.62±0.38, $p=0.04$). There was no difference in abductor hallucis CSA between groups (PHP=2.15±0.53; healthy=1.99±0.57, $p=0.41$). Individuals with PHP exhibited a more pronated foot posture, thicker plantar fascia, and diminished plantar tactile sensation. Cumulatively, these findings provide evidence that PHP is associated with both mechanical and sensorimotor deficits in the foot.



Title of Presentation: Oral Health Education and Promotion Activities in Early Head Start

Presenter: Ahlam Joufi

Co-authors: Denise Claiborne

Program: Ph.D. Health Services Research

Abstract: Early childhood caries (ECC), is a preventable chronic condition that continues to be a public health concern for stakeholders. Early head start (EHS) program, which consists of low-income children aged 0-3 years is one platform that can be used to promote oral health education and promotion activities. However, evaluation of EHS programs application of oral health activities is inadequate. Purpose: To utilize a systematic review design to evaluate oral health education and promotion activities applied in EHS programs for staff, children, and caregivers in the U.S. Methods: Relevant databases such as CINAHL and PubMed were searched using key words to include: oral health, education, promotion, activities, early head start, and early childhood caries. Inclusion criteria for studies were quantitative studies related to oral health education and promotion activities in Early Head Start programs for staff, children and caregivers in the U.S. from 2000 to 2018. Studies were assessed for eligibility using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram (PRISMA). Eligible studies were evaluated independently by two researchers using Effective Public Health Practice Project's quality assessment tool for quantitative studies. The tool evaluates selection bias, research design, intervention integrity, and data analyses of each article. Results: The initial search yielded 363 total articles screened for eligibility. Following the screenings, 5 articles met the inclusion criteria. Of the 5 articles, one was ranked strong, three were moderate, and one was classified as weak. Outcome measures were combined and classified into four categories: oral health knowledge, oral health education, oral health promotion, and oral health activities. Conclusions: From the studies reviewed, oral health education was promoted and incorporated within the Early Head Start programs. However, only five studies were identified that focused on caregivers and parents of children enrolled in EHS programs.

Title of Presentation: Using Social Media to Recruit Millennial - Aged Survivors of Pediatric Cancer for a Mixed-Methods Study

Presenter: Kristen Mantlo

Co-authors: Richardean Benjamin

Program: Ph.D. Health Services Research

Abstract: Background: It's estimated that there are 328,652 adult childhood cancer survivors in the United States (Maeda, 2009; Mariotto et al., 2009). The majority of Millennial-aged survivors are at risk for developing complications related to their treatment known as late effects; most are not participating in recommended screening protocols to identify them (Schultz et al., 2010). Social media provides a viable recruitment tool for this difficult to reach population since a majority (85%) of Millennials report using at least one form of social media (Jiang, J., 2018). Methodology: Targeted distribution of an online survey was implemented. Members of the Association of Pediatric Oncology Social Workers (APOSW), post invitations to the survey in the private, closed, and secret social media groups they moderated. In addition, an extensive search was conducted for social media accounts, groups, and pages assisting Millennial survivors. Of the 61 groups and organizations identified, 48 groups and pages distributed the survey. For 18 months the announcement was posted monthly or every other month depending on group activity level. Posts were also shared across platforms. Results: A total of 146 individuals clicked on the survey link, and 90 surveys were completed. Of the completed surveys, 11 were excluded. While the total number of responses was lower than the targeted sample size of 179 the overall response rates for both the online portion (n= 43,54%) and the phone interview (n=23,53%) were higher than the accepted 30% response. Conclusion: A growing body of research suggests social media is a viable recruitment method for study participants. While enrollment levels were low completion rates were higher than most for both portions of the study. Various components of the changing social media landscape should be considered in future studies, such as funding posts, increased distribution frequency, and an incentive for each participant.



Title of Presentation: The Impact of Chewing on Neuromotor Function in Children

Presenter: Jessica Prebor

Co-authors: Brittany Samulski and Steven Morrison

Program: Ph.D. Kinesiology & Rehabilitation

Abstract: Reaction time is a common measure used to assess the speed of cognitive processing in individuals of all ages. Typically the latency for simple reaction time changes with age with children exhibiting slower simple reaction times compared to adults. Chewing gum is a common behavior which many people perform on a daily basis. Evidence suggests that this activity has benefits on attention and memory in children and adults. However, any definitive benefits of chewing for reaction time remain unclear. The current study was designed to examine the effect of chewing at different speeds on simple reaction time in a cohort of typically developing children (n=16, aged 10-17 years). Individuals completed a simple reaction time task under the following conditions: 1) no chewing (control), 2) slow chewing (1 Hz), 3) fast chewing (2.2 Hz), and 4) preferred chewing. A repeated measures, mixed generalized linear model was used to assess differences in reaction time across the four conditions. Results revealed that all chewing conditions led to a significant increase in reaction time values compared to the no-chew (control) condition. Conversely, the reaction time values during the slow and fast chewing conditions were slower than the preferred chewing condition. While these results indicate that chewing gum can have a negative effect on reaction times, systematically instructing children to increase or decrease their chewing rate from their preferred frequency amplified this interference. One possibility is that chewing requires more attention which may result in decreased cognitive resources allocated for the reaction time task. Completing a concurrent oral motor task during a simple reaction time degrades performance.

Title of Presentation: Chewing Speed Does not Follow Typical Patterns of Motor Slowing with Age

Presenter: Brittany Samulski

Co-authors: Jessica Prebor, Cortney Armitano, and Steven Morrison

Program: Ph.D. Kinesiology & Rehabilitation

Abstract: Aging adults experience gradual structural changes in nerve and muscle tissues that impair their ability to exploit speed as an effective movement strategy. The aim of the study was to examine whether chewing rates demonstrate a level of age-related neuromotor decline similar to other motor tasks. Fifteen young (20-40 years) and fifteen healthy older adults (60+ years) completed a battery of motor tasks including: walking, finger tapping, simple reaction time, postural sway, and chewing. Gait metrics were collected using a 20-foot pressure-sensitive walkway. All walking was performed at a preferred speed. Participants tapped an accelerometer affixed to a table at a preferred rate. Upper extremity reaction time was recorded by depressing a mouse button with an associated timing mechanism, whereas a similar foot pedal interface was used to measure lower extremity reaction time. Postural sway data was collected using a force plate. Surface electromyography of the masseter was used to record fast(2Hz), slow(1Hz), and preferred chewing rates. Fast and slow chewing rates were set using an auditory metronome which was switched off during recording. Age comparisons for each task were performed using general linear modeling, with additional considerations for chewing speed effects and interactions for the chewing task. The results reveal that older adults demonstrate a general slowing of movement with the exception of chewing speed which appears to be preserved with aging. Regardless of age, preferred chewing rates were nearly identical. Preservation of chewing rates compared to other motor tasks may be due to the difference in anatomical innervation between muscles of mastication and the limbs. Masticatory muscles receive bilateral innervation including ipsilateral and contralateral inputs from the motor cortices, whereas limb muscles receive mainly unilateral innervation from the contralateral cortex. The neural redundancy may preserve chewing rates despite age-related degradation of the system.



Title of Presentation: Corticomotor Excitability in the Lower Extremity Musculature in Individuals with Chronic Ankle Instability: A Systematic Review and Meta-Analysis

Presenter: Ashley Suttmiller

Co-authors: Ryan McCann

Program: Ph.D. Kinesiology & Rehabilitation

Abstract: Individuals with CAI display neuromuscular control deficits attributed to central nervous system changes. Transcranial magnetic stimulation is a non-invasive method for measuring corticomotor excitability and could enhance our understanding of these alterations. **Objective:** To conduct a systematic review and meta-analysis of current literature investigating corticomotor excitability in lower extremity (LE) musculature in individuals with and without CAI. **Methods:** A search of PubMed, CINAHL, SPORTDiscus, and ERIC was conducted. Inclusion required examination of corticomotor excitability measures in the LE of individuals with and without CAI. Methodological quality was evaluated independently by two investigators and discrepancies were discussed until consensus was reached. Sample sizes, means, and standard deviations of excitability measures were extracted. Random effects meta-analysis modeling calculated pooled effect sizes (ES) and 95% confidence intervals for limb-to-limb and group comparisons. **Results:** 5 articles were included which examined multiple excitability measures and four muscles of the LE: vastus medialis, fibularis longus, soleus, and tibialis anterior. The meta-analysis was limited, but found no group differences in the motor threshold of the soleus ($ES = 0.17[-0.33, 0.68]$) and fibularis longus ($ES = -0.12[-0.64, 0.40]$). Similarly, no limb-to-limb differences were found in the motor threshold of the fibularis longus ($ES = 0.30[-0.20, 0.80]$). Other muscles and excitability variables were measured, but were only examined in individual studies, thus were omitted from the meta-analysis. In particular, corticomotor mapping of the fibularis longus and cortical silent period of the soleus differed between groups. **Conclusions:** There's level C evidence that motor thresholds of the studied LE musculature are not different between individuals with and without CAI. The lack of available literature limited the meta-analysis, preventing inclusion of other corticomotor alterations found to be significant between groups. Continued exploration of these variables in other LE musculature may provide deeper understanding of the central changes contributing to CAI.



Title of Presentation: Describing the Nature and Correlates of Health Service Providers' Competency Workin with Sexual and Gender Identity Minorities: A Systematic Review

Presenter: Corrine N. Wilsey

Program: Ph.D. Health Services Research

Abstract: Disparities in the health services delivered to sexual orientation and gender identity (SOGI) minorities are multiple and widespread across health service disciplines. Many health service providers do not have the knowledge, comfort, confidence, or skills necessary to provide health services to SOGI minorities. The objective of the current systematic review was to review the correlates of competency (defined as knowledge, attitude, and skill) that health service providers possess for working with SOGI minorities. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was utilized to guide search and reporting strategies. PsycInfo/PsycArticles, PubMed/Medline, and Google Scholar databases were searched to find studies that addressed health service providers' competency working with SOGI minorities. There were 31 studies included in the review. Based on a prior quality assessment tool, the quality of each article was assessed using an assessment tool created by the author. Approximately half of the studies utilized the full definition of competency (knowledge, attitude, and skill). The most common competency assessed was knowledge and the least common was skill. The majority of the studies addressed health service providers in the social sciences (mainly counseling students and counseling professionals). The studies mainly targeted researching competencies of health service providers working with sexual orientation minorities. Competency concerning BDSM practitioners was understudied. Health service education needs to emphasize competency working with SOGI minorities. Of particular importance is developing skillsets, as many providers reported that they did not have the skills necessary to provide culturally competent health services to SOGI minorities.

Title of Presentation: Exploring the Influence of Maternity Leave on Maternal Child Bonding

Presenter: Amber Wilson

Co-authors: Kathie Zimbardo and Carolyn Rutledge

Program: D.N.P. Nursing Practice - Advanced Practice

Abstract: **PROBLEM:** Approximately half of the women of child-bearing age are eligible for Family Medical Leave Act (FMLA). However, taking unpaid maternity leave may place a significant financial burden on any family. Lack of maternity leave, or shorter durations of maternity leave is listed as a significant barrier to breastfeeding, yet there have been no changes implemented to improve that since FMLA was signed into action in 1993. **PURPOSE:** The purpose of this study is to explore relationships between participant characteristics, breastfeeding initiation and duration, maternity leave, motherhood, postpartum mood disorders (anxiety/depression), and maternal child bonding and attachment. **EBP QUESTIONS:** (1) Is there a relationship between participant characteristics, breastfeeding initiation and duration, maternity leave, motherhood, postpartum mood disorders (anxiety/depression), and maternal child bonding and attachment? (2) Are there differences in participants characteristics, breastfeeding initiation and duration, postpartum mood disorders (anxiety/depression) and maternal child bonding and attachment between women with at least 12 weeks of maternity leave compared to women with less than 12 weeks of maternity leave? **METHODS:** This descriptive cross-sectional study will be conducted using a single on-line survey posted on social media. **OUTCOMES:** Longer durations of maternity leave and perceived overall good health positively influenced maternal child bonding. This result was consistent with the literature in that length of maternity leave is positively associated with increased mother-child attachment and interactions. Therefore, longer durations of paid maternity leave and longer durations of breastfeeding may represent mediating factors to improved maternal-child bonding. **SIGNIFICANCE:** This study may provide evidence to support mandated maternity leave, which will in turn meet the goals of Healthy People 2020 and The Surgeon General's call to action in 2011 to increase breastfeeding rates and support policies that will improve those rates.



Title of Presentation: Diatom Community Composition Shifts in the Nitrogen-Limited Mid-Atlantic Bight

Presenter: Zuzanna Abdala

Co-authors: Sveinn V. Einarsson, Kimberly Powell, Peter W. Bernhardt, Brittany Widner, and P. Dreux Chappell

Program: M.S. Ocean & Earth Sciences

Abstract: Diatoms are unicellular, photosynthetic eukaryotes with high sensitivities to nutrient availability, often leading to rapid shifts in community composition, making diatoms strong bioindicators for environmental change. The Mid-Atlantic Bight (MAB), located off the eastern U.S., is an ecosystem predominantly limited by nitrogen and is home to a complex distribution of nutrients due to coastal waters interacting with the Gulf Stream. In the summer, waters are strongly stratified and phytoplankton communities are dominated by diatoms. Rivers and estuaries in this region can deliver nitrogen pulses, which can lead to community shifts in response to nutrient availability. Previous studies have produced overall phytoplankton composition for this region, naming the top few diatoms present, though have not provided an in-depth species-level diatom community composition analysis for the MAB. We completed a comprehensive surface water diatom species-level assemblage analysis along the MAB to help elucidate the coastal-driven effects on the ecosystem as a function of distance from the coast. In order to obtain the species-level resolution, high-throughput sequencing techniques were used on the V4 region of the 18S rDNA marker gene. Quantitative PCR was also performed to acquire a more accurate assessment of the quantity of diatoms present in each sample. The community compositions, when analyzed spatially, highlight the locally adapted, coastal water community being dominated by *Leptocylindrus*, *Cylindrotheca*, and *Rhizosolenia*. Offshore Gulf Stream waters were dominated by *Fragilariopsis* and *Pseudo-nitzschia*.

Title of Presentation: Synthesis and Characterization of N-acetyl-glucosamine Based Macrocycles by SN2 Reactions

Presenter: Surya Adhikari

Co-authors: Anji Chen and Guijun Wang

Program: Ph.D. Chemistry

Abstract: Macrocycles are a special class of molecules that exhibit unique properties due to their defined shape and conformation. They often are important compounds for drug discovery and development and have interesting applications in supramolecular chemistry and materials sciences. Using monosaccharides as the template, we can selectively functionalize at different positions of the sugar ring to afford regioselective derivatives that are suitable for macrocyclizations. Recently, our group have designed and synthesized a series of bis-triazole embedded glycomacrocycles utilizing the copper catalyzed azide alkyne cycloaddition reactions (CuAACs), click chemistry as the ring-closing step from readily available N-acetyl-D-glucosamine. In this research, we first utilized click chemistry to install functional groups that are suitable for intramolecular cyclization reaction. Through nucleophilic substitution reaction of carboxylic acid or hydroxyl functional groups introduced at the anomeric position and various leaving groups installed at the 6-position, we have synthesized several macrolactones and other macrocycles. The leaving group effect using different types of sulfonates in the macrolactonization step was evaluated. The detailed synthesis and applications of these novel glycomacrolactones will be discussed.



Title of Presentation: Design, Synthesis and Self-Assembling Properties of Nonsymmetrical Glycoclusters and Glycolipids

Presenter: Jonathan Bietsch

Co-authors: Anji Chen and Guijun Wang

Program: Ph.D. Chemistry

Abstract: Carbohydrate based molecular self-assemblies are important classes of new materials with many potential applications. Carbohydrates have received a great deal of attention as building blocks to achieve functional supramolecular self-assemblies due to their renewability, biocompatibility, biodegradability, and structural diversity. Our lab has been working on the design, synthesis, and study of various carbohydrate derivatives and we have obtained new and advanced functional molecular systems with many potential biological applications. Recently, we found multimeric glycotriazole conjugates functionalized with peracetylated glucose or glucosamine moieties to be effective supramolecular gelators. They are capable of forming supramolecular structures through self-assembly in a variety of solvents including alcohols and aqueous mixtures of ethanol and DMSO. In this study, we have synthesized a series hybrid glycoclusters and glycolipids utilizing various monosaccharides, dendritic lengths and functional groups. This presentation will report our recent progress in the synthesis of glycolipids and glycoclusters with varying carbohydrate moieties, along with the study of their self-assembling properties.

Title of Presentation: Congruence and Discrepancy between Newcomers' Anticipated and Experienced Work Interference with Family Predicting Early Socialization Outcomes

Presenter: Seterra D. Burleson

Co-authors: Debra A. Major and Xiaoxiao Hu

Program: Ph.D. Psychology - Industrial & Organizational Psychology

Abstract: Applying met expectations and newcomer socialization theory, congruence and discrepancy between anticipated work-family conflict (AWFC) and experienced WFC were examined in relation to job satisfaction, affective commitment, and turnover intent. It was hypothesized that when AWFC and WFC are in agreement outcomes would be more favorable. Further, it was hypothesized that when the discrepancy is such that WFC is higher than AWFC outcomes are more favorable than vice versa. Data were collected from 205 adults, first as graduating seniors in college and again three months after starting their post-graduation jobs. Polynomial regression revealed that congruence between work interference with family (WIF) and anticipated work interference with family (AWIF) was related to increased job satisfaction and affective commitment but not decreased turnover. Analyses supported the hypothesis that when WIF is higher than AWIF than vice versa, job satisfaction and affective commitment are higher, but turnover intent was not lower. Hypotheses regarding family interference with work (AFIW) were not supported. Unexpectedly, men reported higher levels of AWIF and AFIW than women. Findings expand understanding of the nature of relationships between WIF and work-related outcomes by applying the concept of met expectations. Future research should examine interventions to provide realistic previews regarding expected levels of WIF for individuals prior to entering the organization to determine if job satisfaction and affective commitment can be improved indirectly through the formation of realistic expectations regarding WIF.



Title of Presentation: The Caspase-Cleaved Par-4 Tumor Suppressor Folds at Acidic pH

Presenter: Andrea Clark

Co-authors: Komala Ponniah, Meghan Warden, Emily Raitt, Andrea Yawn, and Steven Pascal

Program: Ph.D. Chemistry

Abstract: The prostate apoptosis response-4 (Par-4) tumor suppressor selectively kills cancer cells via apoptosis but leaves healthy cells unharmed. Full length Par-4 is 38 kilodaltons and is predominantly intrinsically disordered in vitro. As an intrinsically disordered protein (IDP), Par-4 is flexible and can acquire different conformations based on environment. Par-4 is cleaved at D131 by caspase-3 which generates the 25 kilodalton fragment (cl-Par-3). CL-Par-4 is the activated fragment that enters the nucleus and inhibits TOPO-1, Bcl-2, and NF- κ B that function in cancer cell pro-survival pathways. Cl-Par-4 has a selective for apoptosis induction in cancer cells (SAC) domain with a nuclear localization signal (NLS2) and a C-terminal coiled coil domain with a leucine zipper. Many apoptotic interactions involving Par-3 are mediated via the coiled coil and leucine zipper. Here, the structure of cl-Par-4 was investigated using circular dichroism (CD) spectroscopy, dynamic light scattering (DLS), and intrinsic tyrosine fluorescence. The results demonstrate pH-dependent folding cl-Par-4 where aggregation occurs at neutral pH, but a largely folded conformation is present at acidic pH. This is the first evidence of structure outside of the coiled coil domain reported in the Par-4 tumor suppressor. These results have implications for understanding both cl-ar-4 structure and function in relation to cellular localization.

Title of Presentation: A Molecular Examination of Agriculturally-Derived Lignin Oxidation

Presenter: Macey Cohen

Co-authors: Tsutomu Ohno and Patrick G. Hatcher

Program: Ph.D. Chemistry

Abstract: Fertilizers are utilized in agriculture to increase crop yields, but the over application of phosphate fertilizers is resulting in excess nutrients in the soil. As a result, phosphate is becoming less available for plants as it is lost to agricultural runoff. In addition to fertilizer input, agricultural land receives large carbon inputs in the form of biomass. After harvesting, biomass from crop residues are incorporated into the soil, slowly degrading through the soil horizon, leaving lignin as the major biopolymer. As a significant contributor to soil organic matter, lignin and its degradation products play an important role in soil dynamics. The interaction between these degradation products and phosphate can impact the bioavailability of the nutrients for the plants, thus altering the crop yield for future growing seasons. Studies have shown that phosphate availability is largely controlled by iron and aluminum hydroxides, which occurs through a two-step sorption process, while lignin has been shown to irreversibly sorb to iron hydroxides due to the presence of phenolic groups. Little research has been done regarding the interaction between lignin and phosphate at the mineral surface. These interactions are believed to play a large role in the bioavailability of phosphate. This research focuses on how the lignin component of organic matter interacts with phosphorus on the surface of minerals after degradation. Lignin was isolated from field-grown corn biomass, and quantified using solid-state ^{13}C NMR. Samples were exposed to hydroxyl radicals and characterized using FTICR-MS. Oxidation occurred in both above- and below-ground lignin, which resulted in slightly different elemental compositions. The ultimate goal is to determine the mechanisms by which nutrients interact with soil organic matter at mineral surfaces, which will help determine how to maximize crop yield while reducing the over- or under-application of phosphate fertilizers.



Title of Presentation: QM/MM MD Simulations of Selective Zf Proteins and Molecular Docking Studies with Reducible Sulfur and Selenium Compounds

Presenter: Ana Dreab

Co-authors: Patricia B. Lutz and Craig A. Bayse

Program: Ph.D. Chemistry

Abstract: Reducible sulfur and selenium (r-S/Se) compounds eject Zn^{2+} from zinc-sulfur proteins such as zinc fingers (ZFs) and metallothionein. The Zn^{2+} ejection leads to the loss of the tertiary and quaternary structure of the protein and therefore the loss of its functions. Zn-S centers are important to different biological processes such as DNA transcription and repair, biochemical recognition and protein regulation. The underlying mechanism is poorly understood and a fully characterization is required to design and use specific sulfur- and selenium-based inhibitors of the therapeutic potential. In the current work, the mechanism of Zn^{2+} release from ZFs by sulfur analog of ebselen and dithiones are explored through a series of QM/MM studies that addresses both the energetics and the sterics of the interactions. Both the charge and the solvent accessibility of all ZF Cys S atoms are calculated to determine the most favorable site for the attack of the electrophilic r-S/Se compound. The results are compared with the experimental data, when available. In addition, we investigate the structural changes due to oxidation of the Zn-S centers of a fragment of transcription factor TFIIIA that contains three ZF domains in the presence or absence of 5S RNA.

Title of Presentation: Intra- and Interannual Dynamics of Dinoflagellate Bloom Species in the James River, An Urban Tidal Estuary in Virginia, USA

Presenter: Michael Echevarria

Co-authors: Katherine Filippino, Todd Edgerton, and Margaret Mulholland

Program: Ph.D. Oceanography

Abstract: Algal blooms occur throughout the year in the tidal tributaries of Chesapeake Bay. The James River is the largest river in Virginia and third largest tributary of the Bay. Of the nearly 1500 species found in the estuary, two dinoflagellates; *Heterocapsa triquetra* and *Cochlodinium polykrikoides* have historically formed large seasonal algal blooms in spring and summer respectively, lasting several weeks to months annually. Additionally, the toxic dinoflagellate *Alexandrium monilatum* has emerged as an annual late summer bloom producer with increasing abundance in the region over the last nine years. These blooms have occurred in the lower James River, including meso- and polyhaline waters. Presented here are comparisons of the temporal and spatial extent and magnitude of these three dinoflagellate species over a two-year period (2014-2015). In 2014 dinoflagellate abundance was low compared to prior years. In contrast, massive spring and summer blooms occurred in 2015 with extended durations. In 2015, *H. triquetra* reached a maximum concentration of $>84,000$ cells/ml, with densities $>10^3$ cells/mL observed over a six week period, compared to no visible bloom the year before and a maximum of only 6200 cells/ml. Similarly in 2015, *C. polykrikoides* reached maximum cell densities of $>41,000$ cells/ml, with densities $>10^3$ cells/mL observed over a seven week period, compared to a maximum the year before of $<11,000$ cells/ml. *A. monilatum* reached a maximum of $>7,500$ cells/ml over a three week period in August 2015, with no bloom recorded in 2014. Multiple environmental parameters likely contributed to the interannual variability in bloom formation and duration. Temperature appeared to be a significant factor, with cooler than average surface water during the summer of 2014. In addition, the effect of prevailing wind patterns, precipitation, salinity, nutrient concentrations and sediment re-suspension were examined.



Title of Presentation: High and Low Iron Upwelling and Corresponding Shifts in the Diatom Community

Presenter: Sveinn Einarsson

Co-authors: Zuzy Abdala, Kimberly Powell, Claire P. Till, and P. Dreux Chappell

Program: Ph.D. Oceanography

Abstract: Diatoms are unicellular phytoplankton known for an ability to respond quickly to nutrient pulses, allowing them to bloom in upwelling environments, potentially leading to high sedimentation rates after a bloom. Understanding the effect upwelling has on the diatom community is vital, as climate predictions indicate that upwelling events will become stronger, less frequent, and longer in duration and diatoms are important primary producers with the potential to influence the carbon export budget. Different diatom species are more readily found in areas of low nutrients as opposed to areas of upwelling, depending on both their nutrient requirements for growth and their ability to access different nutrient sources. Along the California coast, upwelling occurring near thin continental shelf regions with low riverine iron input has been associated with iron limitation, while upwelling over a broad continental shelf region and/or close to riverine iron inputs has been found to be iron replete. Diatom quantification and community composition analysis was done on two transects, one transect followed upwelling waters close to a broad continental shelf with high riverine sources and one transect followed upwelling waters over a thinner continental shelf in a drier region. Diatom community composition shifted significantly along both transects suggesting a strong influence of upwelling on the community. Additionally, diatom community composition shifts through the high iron upwelling transect correlated 86% to phosphate and dissolved iron while the shifts in diatom community composition through the low iron upwelling transect correlated 60% to phosphate and copper. Combined, these results highlight the potential importance of both nutrients and trace metals in shaping the diatom community response to upwelling.

Title of Presentation: Identifying Hosts of the Gulf Coast Tick in the Mid-Atlantic Region

Presenter: Christina Espada

Co-authors: Amanda DeVleeschower and Holly Gaff

Program: Ph.D. Ecological Sciences

Abstract: The Gulf Coast Tick (*Amblyomma maculatum*) is undergoing a range expansion from the historic range in the Gulf Coast into the Mid-Atlantic. *Amblyomma maculatum* are known vectors of *Rickettsia parkeri*, the causative agent of Tidewater spotted fever. Movement of ticks beyond a few meters is limited to host movement while the tick is attached, and so it is critical to identify the preferred hosts of this tick species. Determining the community of hosts for all life stages of *A. maculatum* through small mammal sampling, camera trapping, and meso-mammal surveys in the Mid-Atlantic region will help with understanding how *A. maculatum* got to the region and where it is likely to go next. Two pilot studies were conducted to determine useful methodologies for identifying potential host species. Pilot studies conducted were camera trap surveys and convenience sampling through various techniques. Results from these preliminary studies to demonstrate the usefulness of non-invasive techniques will be used to narrow down potential host species that can be specifically targeted. My dissertation will focus on determining the community ecology structure needed to support these ephemeral tick populations and in particular what hosts are driving the high prevalence of *R. parkeri* in our region.



Title of Presentation: Trends in Atmospheric HFC-23 (CHF₃) and HFC-134a Abundances

Presenter: Anton Fernando

Co-authors: Peter Bernath and Christopher Boone

Program: Ph.D. Physics

Abstract: The Montreal Protocol banned the production of major ozone depleting substances such as chlorofluorocarbons (CFCs) to protect the Earth's ozone layer. The emission of hydrofluorocarbons (HFCs) has increased to replace the CFCs. As a result, the atmospheric abundance of HFCs are rapidly increasing. Although these HFCs do not contribute to the depletion of the ozone layer because they contain no chlorine, they are powerful greenhouse gases with large global warming potentials. In January 2019, the Kigali Amendment to the Montreal Protocol came into force to phase out long-lived HFCs. The two most abundant HFCs in the atmosphere, HFC-134a (CF₃CH₂F) and HFC-23 (CHF₃) are measured from orbit by the Atmospheric Chemistry Experiment Fourier Transform Spectrometer (ACE-FTS). These measurements are useful for monitoring the Kigali Amendment to the Montreal Protocol. The ACE measurements provide the first global distributions and confirm the rapid increase in HFC-134a (4.6 ± 0.2 ppt per year) and CHF₃ (0.78 ± 0.05 ppt per year) abundances.

Title of Presentation: Design and Analysis of Dynamic Vehicular Clouds

Presenter: Aida Ghazizadeh

Co-authors: Stephan Olariu

Program: Ph.D. Computer Science

Abstract: The rise of the Internet of Things (IoT) and the adoption of smart cities create opportunities for creative and efficient management and utilization of the available resources. One of the characteristics of smart cities is the interconnectivity of the city's infrastructure, which allows data to be transferred between vehicles, infrastructures and roadside units. Vehicles with powerful onboard computers, communication capabilities, and vast sensor arrays are perfect candidates in this hyper-connected environment to utilize into a fluid Vehicular Cloud (VC) capable of performing large-scale computations. In this work, we propose a system design for dynamic Vehicular Cloud systems in smart cities. We then investigate the job completion time in the proposed system for jobs with exponentially, normally and uniformly distributed execution times and offer a tight theoretical analysis of the expected job completion time. A comprehensive set of simulations have confirmed the accuracy of our theoretical predictions.



Title of Presentation: Shifting Baselines in Coral Bleaching Resilience

Presenter: Courtney Klepac

Co-authors: Daniel Barshis

Program: Ph.D. Ecological Sciences

Abstract: Tropical corals live at or near their upper thermal limits and are sensitive to periods of elevated sea surface temperatures. As our global climate rapidly warms, the frequency, magnitude, and duration of coral bleaching events is increasing, resulting in widespread losses in coral cover and increased mortality. Yet, corals native to variable thermal reef environments often resist bleaching temperatures, and these habitats have also promoted increased thermal tolerance. On Ofu Island, American Samoa, branching coral species from a highly variable (HV) pool have higher bleaching resistance than corals from a nearby moderately variable (MV) pool. In addition, MV corals were able to increase heat tolerance when moved into the HV pool, providing promising evidence for the persistence of some reefs under projected climate change. In this study, we investigated the breadth of thermal tolerance in massive coral species in the backreef of Ofu Island. We transplanted populations of two massive corals, *Porites lobata* and *Goniastrea retiformis*, from three contrasting backreefs separated by <5 km into the HV pool. Following six and twelve months, transplanted and native coral samples were weighed and then exposed to a controlled acute thermal stress assay. Physiological bleaching responses – chlorophyll and photosynthetic efficiency – were quantified to elucidate heat stress resistance. For both species, coral transplants in the HV pool had reduced growth, decreased photosynthetic efficiency, and greater chlorophyll loss following acute heat stress. Variation in growth and thermal tolerance was instead driven by native backreef, not acclimatization or genomic differences. More importantly, the thermal regime of the HV pool surpassed regional records and the magnitude of variability increased, potentially exceeding local stress thresholds of massive coral species. This study strongly contrasts previous research, and could be the first demonstration of a shifting baseline from increased to decreased resilience for corals residing in high-frequency variable environments.

Title of Presentation: Exploring Impact of Task Complexity on Performance on a Robotic Arm Task

Presenter: Shelby K. Long

Co-authors: James P. Bliss

College: College of Sciences

Program: M.S. Psychology

Abstract: Use of robotic arms is increasing across domains, but the impact of task features and control method on human performance is still not fully understood. As progress toward full autonomy occurs, humans and automation will likely share control in the future, potentially via shedding tasks to the automation. The goal of this work was to investigate how task complexity impacts task time, errors, task completion rate, and task shedding behavior in a robotic arm task. Using a 2 x 2 split-plot design, 40 undergraduates (24 females) used two control devices, a Leap Motion controller and an Xbox One controller, to complete either a high or low complexity peg board task chosen to simulate IED disarmament. Simultaneously, the participants surveyed aerial images for tanks and responded verbally. There were no significant differences on the task complexity dimension. On the number of tasks shed and completion rate variables, there was a stronger impact of task complexity when using the Leap Motion controller than when using the Xbox One controller. The lack of significant effect could be due to insufficient power to detect the interaction or floor effects as overall performance was poor. These findings provide insight into the potential use of motion-capture based devices in the future in both high and low complexity tasks, as well as the shortcomings of such devices. Researchers should further investigate future motion-capture systems at varying levels of task complexity to determine if they are appropriate for sensitive tasks.



Title of Presentation: Water Quality Impacts from Tidal Flooding in the Lower Chesapeake Bay

Presenter: Alfonso Macias-Tapia

Co-authors: Margaret Mulholland and Derek Loftis

Program: Ph.D. Oceanography

Abstract: Little is known about the chemical and biological effects of flooding on adjacent aquatic environments. Terrestrial systems accumulate various types of compounds and debris that can potentially be carried in floodwaters into adjacent water bodies. In the Lower Chesapeake Bay, the incidence and duration of coastal flooding has increased due to the high relative rates of sea level rise in the region. While there are estimates of stormwater inputs into coastal systems, material (e.g., sediment, nutrients and contaminating bacteria) transported into the lower Chesapeake Bay as floodwaters recede have not been measured. Here, we report estimates of nutrient loads transported into a lower Chesapeake Bay sub-estuary in receding floodwaters during the 2017 King Tide (an extreme tide event). A total of 213 water samples were collected during the short time of the flood retreat. Particulate carbon and nitrogen (PC and PN, respectively), total suspended solids (TSS), and ammonium, nitrite, nitrate, urea, and phosphate concentrations were determined in all the samples while in 40 additional samples, Enterococcus abundance was determined. Water quality results were mapped with interpolations along the flooding extension. Inundation depths were extracted from GIS raster by computing difference with lidar-derived digital elevation model and water surface elevation for locations where water level sensors are located and water quality data were collected. Interpolation of the variables was done using Spline with Barriers, with a smoothing coefficient value of 0.2 and using a buffer line as an inland barrier, so that overland flood values are not interpolated over dry land. Interactive maps were built and loads were calculated based on these interpolations. The results of this study suggest that the nitrogen transported to adjacent estuarine systems during this single flooding event exceeded the total maximum annual load allocated for runoff to the Lafayette River sub-estuary alone.

Title of Presentation: A Metabolic View of Growth, Bleaching & Disease Using Temperature-Based Metabolic Budget Models of the threatened Elkhorn Coral, *Acropora Cervicornis*

Presenter: Harmony A. Martell

Co-authors: Elizabeth A. Goergen and David S. Gilliam

Program: Ph.D. in Ecological Sciences

Abstract: The ability to predict metabolic deficits in coral holobiont metabolism is becoming increasingly important as water temperatures continue to rise. Physiological sensitivities to acute and cumulative thermal stress were compared in the threatened coral *Acropora cervicornis* from Broward County, Florida. Rates of respiration and photosynthesis were measured in acute and cumulative exposures at five distinct temperatures between 25 C to 37 C. The ratio of daily gross photosynthesis to respiration (Pg:R) was derived from these measurements to provide a means of estimating real time metabolic surplus using in situ temperature data (Poster 1). Remarkably, Pg:R model predictions agree with the thermal bleaching threshold for this population. To evaluate the utility of temperature-based metabolic models, the relationship between metabolism and growth, and the prevalence of bleaching and disease of outplanted corals on the inner Florida Reef Tract were examined, exploiting several years of in situ temperature and monitoring data (Poster 2). This technique offers the ability to combine a relatively simple lab-based model with real time environmental data. The potential utility of this model is examined in the context of growth, disease prevalence, and bleaching, offering managers and restoration practitioners the ability to identify at-risk species, prioritize conservation and restoration target areas, and predict the timing of greatest vulnerability.



Title of Presentation: Expression of Connexin-43 by CD11c⁺ Dendritic Cells is Required for Maintaining CD4⁺ Foxp3⁺ Regulatory T Cell Population.

Presenter: Caroline Miller

Co-authors: Lauren Browning and Piotr Kraj.

Program: M.S. Biology

Abstract: Immunosuppressive Foxp3⁺ Regulatory T cells (T_R) are a subset of CD4⁺ T cells that maintain homeostasis of the immune system. They have been shown to be sustained by the interaction between MHC present on antigen presenting dendritic cells with the T Cell Receptor for antigen (TCR) that is expressed on T_R cells. Here, we show that in addition to MHC/TCR interaction, Connexin-43 (Cx43) expression by dendritic cells is required to maintain the T_R population. We have observed that mice that lack Connexin-43 expression on a major subset of antigen presenting cells- CD11c⁺ dendritic cells, have a lower percentage of T_R cell population, which in turn also have a lower level of Foxp3 expression. These mice show increased incidence of dermatitis as they age. The dendritic cells from these mice efficiently presents antigen to effector T cells. The changes of T_R subset were associated with an altered phenotype of these cells, demonstrated by lower expression of CD39, an ectonucleotidase which is involved in its immunosuppressive function. We propose that the presence of Cx43 on the surface of dendritic cells is required for effective communication between T_R cells and dendritic cells which is essential to sustain T_R cell proliferation and Foxp3 expression.

Title of Presentation: Synthesis and Self-Assembling Properties of Cationic Glycolipids

Presenter: Joedian Morris

Co-authors: Guijun Wang

Program: Ph.D. Chemistry

Abstract: Low molecular weight gelators derived from carbohydrates are quite important molecules with a vast amount of applications in many different fields. Monosaccharide based compounds can be modified at different positions with a variety of functional groups to investigate their impact on the gelation process and obtain advanced functional biomaterials. Herein, we have synthesized and studied the gelation properties of several monosaccharides with amino functionalities and some of their respective quaternary ammonium salts. Two series of analogues with variable carbon chain lengths between the amino group and the sugar moiety were examined. Certain derivatives were found to be effective gelators in organic solvents. The amines were converted to their respective ammonium salts with different acids to investigate the possibility of forming spontaneous hydrogels. We also studied other glycolipid based organogelators for their applications in drug delivery and for binding pollutants and dyes. In this presentation, the effect of changing the carbon spacer on both the amines and their salts will be demonstrated; their gelation properties and applications will also be discussed.



Title of Presentation: Characterizing the Activity of Antimicrobial Peptide against the Pathogenic Bacterium Clostridium Difficile in Anaerobic Environment

Presenter: Adenrele Oludiran

Co-authors: Erin Purcell

Program: Ph.D. Chemistry

Abstract: Clostridium difficile is an anaerobic Gram-positive pathogen with high treatment costs and mortality and very high antibiotic tolerance. Antimicrobial host-defense peptides (HDPs) produced naturally by animal immune systems are promising candidates to develop novel therapies for bacterial infection because they cause oxidative stress that damages multiple targets in bacterial cells, so it is difficult for bacteria to evolve resistance to these attacks. Piscidins, fish-derived HDPs that can also form complexes with copper (Cu) to enhance their activities, are very active against multiple bacterial species in an aerobic environment. We examined their activity against C. difficile and other species in an anaerobic environment and found that the interaction of piscidins and copper is different in different oxygen environments. Piscidins are highly active against C. difficile and could be a good candidate for drug development.

Title of Presentation: Synthesis and Characterization of Stable and Purified Silver Nanoparticles (Ag Nps) for Biomedical Applications

Presenter: Krishna K. Raut

Co-authors: Rebecca M. Richardson, Preeyaporn Songkiatisak and X. Nancy Xu

Program: Ph.D. Chemistry

Abstract: Silver nanoparticles (Ag NPs) have been used for a wide range of applications because of their distinctive optical properties and unique biological effects. These properties highly depend on their sizes, shapes and their surrounding environments. Furthermore, Ag NPs possess high quantum yield of Rayleigh scattering, which enables them to serve as highly sensitive imaging probes and sensors for live cell imaging, as well as assays for sensitive detection of biomarkers for early disease diagnosis. We have successfully synthesized, purified and characterized Ag NPs with average diameters of 2, 12 and 43 nanometer (nm). We have studied the stability of Ag NPs in aqueous solution and cell culture medium, which shows our Ag NPs are stable (non-aggregated) in aqueous solution and given cell culture medium over a long period of time. We have studied their cytotoxic and therapeutic effects on various biological organisms and explored a wide range of their biomedical applications. The detailed experimental designs and updated results will be presented.



Title of Presentation: Study of Cytotoxic and Therapeutic Effects of Silver Nanoparticles Against Colon Tumor Cells

Presenter: Rebecca Richardson

Program: Ph.D. Chemistry

Abstract: Silver nanoparticles (Ag NPs) have antimicrobial activity and therapeutic effects that have led to their wide range of applications in the medical field. With a drastic increase in the advancement and utilization of Ag NP based therapeutic agents there is a dire need for rational design of Ag NPs and study of their cytotoxic effects in order to develop safer and more effective therapies. We synthesized and characterized 43.2 ± 12.1 nm Ag NPs that are stable (non-aggregating) in cell culture medium up to 120 h, and investigated the time and dose dependent uptake and cytotoxicity of Ag NPs on human colon tumor cells. A dose and time dependence were shown in the growth of tumor cells treated with 2.5, 5, and 20 pM Ag NPs with significant decrease in cell population in Ag NP treated cells compared to control after 120 h ($p < 0.05$). No growth inhibition was seen in the blank control experiments for the tumor cells treated with the supernatant (absence of Ag NPs). We also studied the underlying molecular mechanisms of the inhibitory effects of Ag NPs upon the growth of the tumor cells. We found that the Ag NPs induced cell cycle arrest and/or inhibition, genotoxicity, and apoptosis. The number of individual Ag NPs taken up by metabolically active cells over time were quantitatively analyzed and showed fewer Ag NPs in the nucleus than the cytoplasm. The number of accumulated NPs in the nucleus remained constant while the total number of cytoplasm NPs increased over 72 h after which, they began to decline suggesting efflux of Ag NPs from the cells might have occurred. This study offers new insight into the underlying cytotoxic mechanism of Ag NPs against colon tumor cells and demonstrates the potential therapeutic effects of stable and purified Ag NPs against tumors.

Title of Presentation: Competition Study between the Genetically Engineered Cyanobacteria *Synechocystis Pcc 6803* and *thermosynechococcus Elongatus Bp1* and their Respective Wild Type Cyanobacteria Strain

Presenter: Oumar Sacko

Co-authors: James W. Lee

Program: Ph.D. Chemistry

Abstract: The growth of genetically engineered or GE cyanobacteria may pose a risk if the transformant escapes to the environment. This study was conducted with two GE cyanobacteria containing the YFP-R-Lipase-Tetracycline DNA construct; the GE *Synechocystis PCC 6803* or *6803-YFP* and the GE *Thermosynechococcus elongatus BP1 BY20*. The construct contains a nitrate promoter gene, a lipase gene as well as a tetracycline antibiotic resistance gene. In an attempt to simulate the behavior of a possible escape of the GE cyanobacteria into the environment, we conducted a competition study. The purpose was to determine whether the GE cyanobacteria would outcompete, co-exist or lose ground to the wild type cyanobacteria. Briefly, a growth study was conducted by co-culturing wild type cyanobacteria with the GE cyanobacteria in medium supplemented with nitrate. Microscopy cell counting and cell plating on solid medium with tetracycline antibiotic were used to monitor the cells in the co-culture over time. Starting with a known initial ratio of the wild type versus the GE strain, the cultures shown that the ratio was maintained throughout the 4-week incubation time. The preliminary results therefore suggest that the GE cyanobacteria strains harvested in our lab do not have a competitive advantage compared to the wild type strain.



Title of Presentation: Temporal Dynamics of Plant-Frugivore Networks in the Tropical Wet Forests of Hispaniola: Understanding the Role of Phenology in Shaping Community Assembly

Presenter: Spencer C. Schubert

Co-authors: Eric L. Walters

Program: Ph.D. Ecological Sciences

Abstract: Seed dispersal mutualisms play a critical role in structuring plant and animal communities in tropical forests. The relatively aseasonal climatic conditions in tropical environments favor year-round primary production and a variety of phenological patterns. The continuous turnover and abundance of different fruit resources across time and space drive movements and feeding behavior of avian consumers. Yet, how this spatiotemporal complexity shapes the plasticity (i.e. ‘rewiring’) of species interactions in mutualistic communities remains poorly understood in seed dispersal systems. To investigate the consequences of seasonal change on the composition of local communities and their interaction patterns, we monitored local communities at six private farms in the central Dominican Republic continuously over a full annual period. We recorded 6,092 frugivory interactions involving 45 avian species and 48 plant species. Weighted centrality analysis showed that mutualistic dependence of the plant community was highly skewed toward a core set of four endemic birds. The composition of networks was strongly driven by the local abundance of resource and consumer taxa, which were highly heterogenous across the study region. Moreover, by explicitly accounting for the temporal changes in bird and fruit resource abundance at the local scale, we determined that the period over which birds and ripe fruits are present in the system correlated positively with the number of mutualist partners. Our results demonstrate the importance of phenology in determining species role within plant-frugivore networks and reveal new insights into the dynamic reassembly of plant-frugivore communities across seasons.

Title of Presentation: Distribution and Magnitude of Dinitrogen Fixation in the Eastern Tropical North Pacific Oxygen Deficient Zone

Presented by: Corday Selden

Program: Ph.D. Oceanography

Abstract: As a fundamental component of life’s building blocks, proteins and nucleic acids, nitrogen plays a vital role in shaping Earth’s biosphere. When biologically-accessible forms of nitrogen like nitrates become scarce, organisms cannot grow and reproduce. Indeed, humankind’s population growth would have already reached its maximum if it were not for industrial production of such compounds from N_2 gas, which makes up 78% of the atmosphere but cannot be used as a nitrogen-source by most organisms because the bond linking the two N atoms is too strong for them to break. While human innovation enabled industrial production of biologically-accessible nitrogen, this process—known as N_2 fixation—has been carried out on Earth for billions of years by microbes. Inputs of new biologically-accessible nitrogen via N_2 fixation is counterbalanced by denitrification, the microbially-mediated transformation of bioavailable nitrogen to N_2 . How these processes balance through time and space is essential to understanding Earth’s history and, because nitrogen availability limits the ability of phytoplankton in the ocean to sequester atmospheric carbon, Earth’s future as well. Here, we present recent work exploring the spatial coupling between N_2 fixation and denitrification in the ocean.



Title of Presentation: Synthesis and Self-Assembling Property of a Series of D-Galactose and D-Glucose Triazole Derivatives

Presenter: Pooja Sharma

Co-authors: Anji Chen, Dan Wang, and Guijun Wang

Program: Ph.D. Chemistry

Abstract: Carbohydrate based low molecular weight gelators (LMWGs) have gained extensive interests due to their interesting applications in the areas of biomedical sciences, environmental remediation and optical electronic devices etc. The gelators can form the gels in a variety of organic solvents (organogels) or in water (hydrogels). Many monosaccharides, for instance, glucose, galactose and glucosamine have been used in the design of LMWGs. These systems have intrinsic advantage of being naturally abundant and biocompatible which makes them suitable candidates for carrying out drug delivery studies and various other biomedical applications. The self-assembly of the sugar molecules is attributed to the non-covalent forces like hydrophobic interactions, hydrogen bonding, π - π interactions and CH- π interactions. Previously we have found that certain D-glucose and D-glucosamine derivatives were effective LMWGs. In this study, we carried out further structure modifications on peracetylated glycosides containing triazole moieties and studied their tendencies of gelation. The influence of distance of triazoles to the sugar anomeric carbon was analyzed. The structure and self assembling properties of two series of glucose and galactose derivatives will be reported.

Title of Presentation: Using Empirical Mode Decomposition to Identify Multi-Decadal Climate Variability and Its Contribution to Sea Level Acceleration

Presenter: Lauren Sommers

Co-authors: Ben Hamlington, Tal Ezer, and Sophie Clayton

Program: Ph.D. Oceanography

Abstract: Climate variability has an effect on sea level on a global scale. There are decadal impacts of sea level with the climate events El Nino Southern Oscillation (ENSO) and Pacific Decadal Oscillation (PDO). The Pacific is effected by ENSO and PDO and they have been shown to impact climate and sea level. There also appears to be multi decadal periods seen within tide gauges. With a 113-year reconstruction of sea level, we examine decadal to multi-decadal variability seen in the sea level fluctuations in the Global Oceans. We use empirical mode decomposition (EMD) as a low pass filter. We break down regional sea level into a series of intrinsic mode functions (IMFs) and attempt attribution of these IMFs to specific climate modes of variability. We applied Empirical Orthogonal Function analysis (EOF) to the low filtered time series. On a basic level, the resulting EOF Loading Vectors (LVs; i.e. spatial maps) exhibit large-scale patterns, focused largely in the Pacific Ocean. In the first and second EOF, there is a multi-decadal signal that bearing similarity to ENSO. The first two principal component time series (PCTS) exhibits a signal with a period of ~60-106 years, while the third and fourth EOF displays a shorter period near ~53 years and exhibits a regional pattern similar to PDO. In each of the four EOFs, the variability appears to be dominated by signals centered in the Pacific Ocean. By identifying and separating these periodic climate signals, we can gain a better understanding of how the sea level variability associated with these modes can impact sea level on shorter timescales and serve to exacerbate the effects of long-term sea level change.



Title of Presentation: The Impact of Mandatory Substance Abuse Counselor Reporting Requirements on Child Maltreatment Reporting Outcomes

Presenter: Bilgé Yilmaz

Co-authors: Kelli E. Will and Andrew D. Plunk

Program: Ph.D. Clinical Psychology

Abstract: Child maltreatment takes on numerous forms, including physical abuse, psychological abuse, sexual abuse, and neglect, and affects an estimated 38% of children in the United States (U.S.). Due to the deleterious effects of maltreatment, 48 states mandate most health professionals to report suspected abuse and neglect. Yet, only 14 states specifically require substance abuse counselors to report suspected abuse and neglect. Substance abuse is commonly implicated in maltreatment cases, with an estimated 40 to 70 percent involving alcohol or drug use among perpetrators, which points to the importance of examining the association between substance abuse counselor reporting and the outcome of reports. The present study seeks to examine how state-level mandatory reporting policies are associated with child maltreatment reporting through analysis of the National Data Archive on Child Abuse and Neglect (NDACAN), which is a national repository of child maltreatment reports. Specifically, this study aims: 1) to examine how the implementation of substance abuse counselor reporting requirements is associated with the reporting process, including the disposition of reports and the presence of substance abuse; and 2) to examine differences in the above outcomes based on whether there were non-specific reporting requirements vs. requirements that mention substance use counselors specifically. It is expected that there will be a higher proportion of substantiated Child Protective Services (CPS) reports when and in states where substance abuse counselors are mandated to report suspected child abuse or neglect. If these differences do indeed exist, this finding would point to a benefit of requiring such professionals to report, which could aid in informing future policy.

Title of Presentation: Global Measurements of Atmospheric OCS, OC³⁴S and O¹³CS

Presenter: Mahdi Yousefi

Co-authors: Peter F. Bernath

Program: Ph.D. Physics

Abstract: Global atmospheric measurement of carbonyl sulfide (OCS), including the minor OC³⁴S and O¹³CS isotopologues, were made by the Atmospheric Chemistry Experiment Fourier transform spectrometer (ACE-FTS) in low Earth orbit. ACE-FTS data provide volume mixing ratio (VMR) profiles of OCS, OC³⁴S and O¹³CS from 8 km in troposphere up to 31 km in the stratosphere. The global zonal and seasonal distributions of OCS isotopologues were studied. The results indicate a slight enrichment of OC³⁴S and a significant enrichment of O¹³CS as the altitude increases. OCS may be an important contributor to the background Stratospheric Sulfate Aerosol (SSA) that cools the climate by increasing the Earth's albedo. There are discussions in the literature about the extent of the contribution of OCS to the SSA. ACE-FTS data indicate that OCS is a major contributor.

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