

Abstracts for Funded FSA Projects – FY23

Brammeier, Heather, ART, CFA

FSA: Infinity Maze: Interactive Sculpture that Centers the Mind with Learning through Play

Infinity Maze, an interactive wall-hanging sculpture, engaged tens of thousands of visitors to the Gerald R. Ford Presidential Museum during ArtPrize 2022 in Grand Rapids, Michigan. This test of the prototype showed that while the design functioned well, the 3D-printed barbells (handheld elements that participants slide through the maze) were not strong enough to withstand heavy use. Based on the success of the prototype, I have been invited to design a longer, more horizontal version of Infinity Maze for a museum. While I create new designs for mazes, I must also find a solution for making much stronger barbells. I will be working with a local business, Black Dog Metal Arts, to fabricate the barbells in materials other than plastic. Black Dog Metal Arts will then install the new barbells in the tracks of the large metal sculpture and help me to move and hang the artwork.

Durr, Pamela M, PT, EHS

FSA: The stomatognathic system and differences among gum chewing on function

Parkinson's Disease (PD) affects nearly 10 million people worldwide. The progressive debilitating effects of the disease leaves persons with a decrease in independence and cost to families and healthcare are \$52 billion annually in the US alone. Given the myriad of symptoms including severe movement dysfunction and cognitive changes with loss of independence as a result, there is a clear need to address interventions that lessen the severity and debilitating effects in a manner that provides accessibility and affordability. This study will evaluate the differences among gum chewing on function (including balance, gait and pupillary reaction) in persons with PD. The effects of gum chewing have been studied in healthy persons where positive influence on balance, reaction time and cognition has been found. Results of this study may guide neurorehabilitation approaches as this intervention is practical, may improve overall functional independence and decrease overall healthcare costs.

Estes, Kyle Wayne, PLSIS, LAS

FSA: Public Goods Distribution in the Republic of Georgia's Kvemo Kartli Region

This research will analyze the roles of ethnicity and informal networks in the distribution of public goods in Kvemo Kartli, Georgia, a multiethnic region with a significant Azeri population. The three research sites will be the capital (Tbilisi), Marneuli, and Gardabani. I will conduct elite interviews of local politicians, administrators, and civil society leaders in all research sites. In Marneuli and Gardabani, I will carry out nonelite focus groups and a randomly sampled survey that will include an innovative "list experiment" approach to explore links between ethnicity and the use of "informal networks" to access state resources. This will build on pilot research conducted in Georgia in 2018 and contribute to a book project comparing Kyrgyzstan, Georgia, and Latvia. Broad and equitable access to state institutions and resources is fundamental to improved human development outcomes and, more specifically, a critical determinant of the future political stability of Georgia.

Metzger, Cyle, ART, CFA

FSA: Deep Cuts: Transgender History in American Art after World War II

This project will result in a published book available to the public and scholars alike. It contributes to a growing body of scholarship that puts pressure on feminist and queer discourses in art history, film, performance, and digital media studies, as well as the humanities and humanistic social sciences to disavow limiting-and in a very real sense harmful-inflexible binary logics of male and female genders. As such, the historical commitments that anchor this book do more than bring transgender and gender-transgressive artists and art to light: they implore historians of art to question whether gender across time periods and geographies is as stable as existing scholarship would have it seem. This project also encourages transgender people and scholars to consider aesthetics and practices of making as not just ways of documenting transgender history, but as tools for expanding how we understand the emergence of gender for everyone, trans- and cisgender alike.

Abstracts for Funded FSA Projects – FY23 (cont.)

Montgomery, Derek E, PSY, LAS

FSA: A meta-analysis of the relationship between theory of mind and reading comprehension in Childhood

The development of children's reading comprehension is undergirded by their capacity to make inferences from causal antecedents that precipitate actions, events, or states in a story. Often, inferences involve taking into account characters' thoughts, motives, and feelings. Theory of mind is the cognitive capacity to reason about mental states and predict behavior based on someone's thoughts and desires. The goal of the proposed study is to conduct a meta-analysis of the research literature that investigates theory of mind-reading comprehension links. A meta-analysis is a quantitative technique that synthesizes the results of multiple studies into an effect size estimate. The meta-analysis will also test for moderator variables that may substantially impact the magnitude of the relation. The results will inform efforts to integrate children's theory of mind skills into instructional efforts aimed at improving children's literacy.

Pavelko, Rachelle L, COM, CFA

FSA: Increasing Mental Health Literacy via Mental Illness Anthropomorphism

Mental health literacy refers to knowledge and beliefs about mental illness which aid in their recognition, management, or prevention of such disorders. This project investigates the effectiveness of using anthropomorphism, the attribution of humanlike qualities to nonhuman entities, in decreasing social biases related to mental illness and increasing mental health literacy. Specifically, this project aims to explore whether humanizing depression, imbuing humanlike intentions and characteristics to the disorder, will generate more supportive and understanding attitudes toward people with depression; increase the willingness of people who suffer from depression to engage in help-seeking behaviors; and enhance public efficacy in identifying individuals who suffer from depression. Findings of this project will offer important theoretical and practical implications regarding the strategic use of anthropomorphism in increasing mental health literacy.

Reed, Ryan, PLSIS, LAS

FSA: Intergenerational Justice: Social Contract Solutions

This project focuses on problems of intergenerational justice, which is an area of political theory that considers what is fair between generations, including those that do not yet exist, and why. While there are many competing approaches to addressing intergenerational justice, including utilitarianism, communitarianism, and egalitarianism, there is a particular current debate in the literature as to whether social contract theory, or contractarianism, is capable of comprehensively addressing justice between generations. Nevertheless, I suspect that there is in fact a contractarian route to intergenerational justice, based upon indirect reciprocity. The stakes are high, as many of the most pressing problems faced by the world are intergenerational in nature. Beyond the obvious case of the climate change crisis, in the larger project, issues surrounding education finance, racial justice, and artificial intelligence, among others, will be addressed.

Soltani, Mahmoodreza, CEC, EGT

FSA: Resilience Assessment of Coastal Corrosion-Damaged Concrete Bridges to Extreme Wave-Induced Loads

In recent years, researchers have been concerned with the extreme wave-induced load resilience of concrete bridges susceptible to salt-erosion environments. This study will present a methodology to develop loss estimation for deteriorating reinforced concrete (RC) structures by combining it with a quantitative analysis method. Bivariate inverse-first order reliability method (I-FORM) will be used to simulate post-extreme wave-induced load depending on the extent of damage after a hurricane or flooding. Then, the structural resilience analysis will be performed by combining I-FORM results with a time-varying function. Finally, the resilience assessment calculation of a concrete bridge model will be considered, and the applicability of the research method established in this study will be verified. This research project will present the structural resilience of concrete bridges showing the effect of reinforcement corrosion and structural loss.

Abstracts for Funded FSA Projects – FY23 (cont.)

Vafaei, Saeid, ME, EGT

FSA: Microfluidics and Nanofluidics: Enhancement of Randomness of Molecules and Nanoparticles

Research in microfluidics and nanofluidics becomes more prevalent in achieving a compact design, as the demand for smaller and more powerful heat removal systems increases. Our initial investigations indicated that adding a connector between two short microchannels (a) provides a higher average heat transfer coefficient compared to a long microchannel, and (b) increases the level of randomness of molecules and nanoparticles, and consequently enhances the heat transfer coefficient. Currently, enhancement of randomness of molecules and nanoparticles in micro scales is the line of nanothermal science. The purpose of this research is to enhance the level of randomness of molecules and nanoparticles, and consequently maximize the heat transfer coefficient in micro scales by designing a connector between two microchannels. The shape and size of the connector will be optimized to maximize the randomness of molecules and nanoparticles. An efficient connector can be used to enhance the thermal management of electronic devices on earth and space. A light, miniaturized, and efficient thermal management plays a significant role in the space technology.

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G G MD Nawaz Ali, CSIS, LAS

FSA: Enhanced Cooperative Perception for Connected and Autonomous Vehicles

Connected and autonomous vehicle is the emerging technology for the future intelligent transportation system for reducing crashes and saving lives. Such technology enables participating vehicles to actively exchange information about their surrounding traffic. This work proposes for developing a framework for estimating decentralized multi-vehicle cooperative perception where each vehicle broadcasts its perception information and also acts as an individual fusing node for the received data. A covariance intersection-based fusion scheme will be used for yielding a single fused state estimate and covariance matrix for each vehicle. The optimal sub-pattern assignment metric will be used to assess the performance of cooperative perception scheme against other state-of-the-art approaches. The workings of the proposed framework and its potential advantages over other solutions will be demonstrated via an integrated traffic simulator of connected vehicles with different traffic scenarios.

Hogan, Jacqueline L, SSW, LAS

FSA: Advance Bradley: Enhancing Campus Gender Equity through an NSF Advance Grant

Starting in 2017, Bradley's Faculty Gender Equity Task Force analyzed a wealth institutional data, and identified ten main problem areas. The group proposed 40 specific action items to increase gender equity in the faculty ranks. Three years after making those recommendations, the Task Force assessed Bradley's progress toward these goals and found that there was no discernible progress or the situation was worse than before on the remaining on 75% of the recommendations. Bradley now lags considerably behind national averages in gender balance in the academic ranks and the VP or higher ranks, the gender pay gap, and other key metrics. We therefore recommend that Bradley apply for an NSF Advance (Adaptation) grant to facilitate the coordinated implementation of gender equity initiatives on Bradley's campus. An internal grant will give me the support I need (specifically a consultant's expertise) to write the large federal grant, and eventually disseminate research findings.

Nezami, Mehdi, MTG, FCB

FSA: Valuation Effect of Target Firms' Customer Satisfaction in the Pre-Deal Phase of M & As

The main objective of this study is to provide a comprehensive framework that examines the valuation effect of a target firms' customer satisfaction in the pre-deal phase of mergers and acquisitions (M&As). The study makes three important contributions to the extant literature. This study provides the first empirical evidence of the effect of targets customer satisfaction on (a) the initial acquisition premium (i.e., the initial value premium that an acquiring firm places on a target firm beyond its pre-acquisition market valuation), (b) the likelihood of bid competition (i.e., receiving multiple bids from different acquirers), and (c) the likelihood of upward bid revision (i.e., a raise in the initial offered price).

Abstracts for Funded FSA Projects – FY22 (cont.)

Saleeby, Patricia, SSW, LAS

FSA: Evaluation of Classification and Coding Content in Social Work Education and Practice

Classifications and medical coding are essential aspects in health and mental health systems. Social workers are increasingly employed in these clinical settings. However, social work education lacks educational content addressing classifications and coding. The purpose of this project is to secure data necessary to better understand the situation in social work education and to identify potential educational interventions based on data findings. Project objectives include (1) Evaluating the status of educational content on classification and coding in social work education including the ICD, ICF, BPT and HCPCS; (2) Assessing the value of such content in social work clinical practice; and (3) Identifying potential intervention strategies for preparing social workers in working with these classifications. It is anticipated that the proposed project will help identify and substantiate the perceived gap in social work education and practice for health/mental health social workers.

Schaffer, Owen, CSIS, LAS

FSA: Investigating the Impact of Task Significance, Vitality, and Relaxation on Digital Game Enjoyment

An online controlled experiment with 452 total participants is proposed to test the impact of Task Significance, Vitality, and Relaxation on Enjoyment. Participants will play one of 8 versions of a custom research game online (2x2x2 factorial experimental design), and then complete an online survey. Narrative Framing will be used to vary Task Significance by presenting different reasons for player action to the different experimental groups. Gameplay Pacing and Music Tempo will be manipulated to vary Vitality and Relaxation, with faster gameplay and music intended to increase Perceived Vitality and slower gameplay and music intended to increase Relaxation. Game difficulty is controlled with dynamic difficulty adjustment to hold optimal challenge constant. This experiment will advance the study of game enjoyment by testing the effectiveness of these paths to enjoyment in digital games. The results of this study will have important implications for both theory and practice.

Schnupf, Udo, CHM, LAS

FSA, Molecular Dynamics Study The structural and hydration behavior of G-Quadruplexes

Guanine-rich sequences of DNA can fold into four-stranded, ion-stabilized complexes called guanine quadruplexes, or G-Quadruplexes (G4s). These non-Watson-Crick nucleic acid structures are important conformational knots in genes, and are abundant in telomeres, and may play a role in initiating DNA replication and cancer cell proliferation, and thus are potentially important targets for anti-cancer drugs that might interfere with the replication process. The proposed project will use a coordinated combination of various computer simulations to characterize the interactions of water with G4s and the impact that water has on the stability of the G4s. The information gained will provide the scientific community with a deeper understanding of the structural behavior of G4s in their natural environment which is essential for the design of novel anticancer drugs.

Wang, Tianjiao, COM, CFA

FSA: An Investigation into the Content and Influence of Advertising for Mental Health Mobi

Abstract: As mobile health applications (apps) become increasingly influential in daily life, they present an important opportunity for studying communication surrounding mental health. Despite the growing popularity, little research has examined the content of mental health apps advertising and how these messages may affect people's perceptions of mental health issues. To address this gap, this study aims to explore: (1) how popular mental health apps frame mental health and illness, and (2) the influence of messaging in mental health app advertising on young adults' mental health literacy. The proposed research will contribute theoretically a better understanding of the content within popular mental health apps, and also provide knowledge that can guide users and researchers to select apps that encompass the optimal features for future interventions.

Abstracts for Funded FSA Projects – FY22 (cont.)

Whetstone, Sarah L, SSW, LAS

FSA: Exploring Social Contexts, Cultural Meanings and Diverse Participation in Pole Sports

Since the early 2000s, "pole" in the US has shifted from a marginalized erotic dance into mainstream commercial fitness and professional sports--yet it continues to be stigmatized through historical associations with sex work. This project uses ethnography and in-depth interviews with "pole fitness" participants in Illinois to explore the social contexts, cultural meanings, and diverse forms of participation in contemporary pole. Most studies ask whether pole challenges or reproduces masculine domination, but today's "polers" come to the practice from a variety of backgrounds and motivations--some even using pole to process and heal gender-based trauma. Pole communities are increasingly gender expansive, racially diverse, and inclusive of all ages, abilities, sexualities, and body types. My work examines pole as a complex site of contested meanings with implications for larger questions of bodily autonomy, gendered agency, and collective resistance.