Welcome from the Vice Chancellor for Research, Economic & Community Development

Abstracts:

1. Omori, Marisa
   Assistant Professor, Criminology & Criminal Justice
   Incubating inequality: How is incarceration linked to racial inequality in COVID?

2. Villarreal, Doris
   Assistant Professor, Education
   Literacies of Activism

3. Beauregard, Julie
   Assistant Professor, Music
   Elusive Definitions of Diversity, Equity, and Inclusion: “Diversity Fatigue” and Impact on Music Teacher Education

4. Wood, Claire
   Assistant Research Professor, Missouri Institute of Mental Health
   Connecting the DOTS: Drug Overdose Trust and Safety

5. Tukac, Umit
   Assistant Professor, Nursing
   Deciding a Treatment with an Artificial Intelligence for Veterans with Post-Traumatic Stress Disorder

6. Singh, Vivek
   Assistant Professor, Information Systems and Technology
   Cloud Computing Analytics – A Data-driven Approach to Cloud Management

7. Athamanah, Lindsay
   Assistant Professor, Education
   Peer Mentoring for Students with Intellectual and Developmental Disabilities: The Lived Experiences and Perceptions of College Peer Mentors

8. Bumble, Jennifer
   Assistant Professor, Education
   The Collaborative Practices of Secondary Special Educators

9. Kerhoff, Shana
   Assistant Professor, Education
   Virtual Storytelling with Teachers in Rural Kenya: A Mixed Methods Case Study

10. Manion, Anita
    Assistant Professor, Political Science
    Four Day School Week: Impact on Student Outcomes and Teacher Hiring and Retention

11. Mtibaa, Abderrahmen
    Assistant Professor, Computer Science
    Towards Pervasive Computing at the Edge

12. Sun, Yuanlu (April)
    Assistant Professor, Nursing
    Breast Cancer Survivorship and Occupational Rehabilitation

Welcome and thank you for joining us today at the third annual Early Career Research Symposium sponsored by the Office of Research and Economic & Community Development.

A year ago, we never imagined that we would be doing this event virtually. While the platform has changed this year, our enthusiasm for this event remains stronger than ever. UMSL’s early career research faculty are conducting innovative research on big challenges, many of them impacted by the COVID-19 pandemic. Our faculty are helping teachers become better collaborators and helping communities understand and respond to unforeseen challenges in incarceration, trauma, and addiction. Faculty research and creative scholarship is critical to helping UMSL and the region thrive.

RECD is pleased to sponsor this annual event that celebrates the research and creative works of UMSL’s early career faculty and provides a valuable opportunity for faculty to connect and engage in conversations across disciplines.

Today’s symposium focuses on four critical areas of research including justice and activism, mental and physical health, cloud computing, education and policy. A number of presentations focus on the use of big data and artificial intelligence to help us better understand pressing social problems and public policies.

I am eager to hear these talks and participate in the conversations that follow. If something you hear today interests you and sparks ideas, be sure to reach out to the presenter with questions and ideas. If you are interested in follow-up discussions around any of these themes, reach out to our office and we can help you put together teams to brainstorm as well as help you line up funding and prepare proposals.

Enjoy the symposium and the breakout sessions!

Christopher D. Spilling
Vice Chancellor for Research, Economic and Community Development
Advancing Understanding of Justice
Inequality, Activism, and Diversity

Incubating inequality: How is Incarceration Linked to Racial Inequality in COVID?
Marisa Omori, Assistant Professor, Criminology & Criminal Justice

As many scholars have pointed out, the rise of mass incarceration has also brought about the most racialized system of social control; racial inequality in jails and prisons outpaces even other measures of racial inequality, even in health outcomes (Western 2006). It has had other transformations as well, however; Simon (2007) argues that the war on crime (and mass incarceration) fundamentally reshaped how we are governed, both by the state but also by transforming the organization of other institutions (such as education, families, and workplaces) to be oriented around crime control frameworks. Just as other institutions have become structured by crime control concerns, however, the reverse relationship has happened as well—criminal justice has also become more constitutive of these other institutions, such as healthcare (Sufrin 2017). Thus, while jails and prisons have grown, they have also become spaces for (minimal) healthcare treatment of Black and brown people. COVID-19 has brought this problem to light, of whether (and when) they will become incubators of infectious disease, and if and how they have contributed to already existing racial inequalities in health outcomes. This study, in its early stages, examines whether incarceration increases or perpetuates racial inequalities in COVID?

Literacies of Activism
Doris Villarreal, Assistant Professor, Education

This paper explores how one bilingual teacher’s activism and commitment to the community she serves influenced how the teacher and her students engaged in a critical examination of language and issues around immigration. Drawing on social and cultural perspectives of language and literacy, activism is positioned as a literacy and as such a transformative act. The findings from this study contribute to scholarship centered on bilingual teacher activists and their work in the classroom to support emergent bilinguals as well as their activist work outside of the classroom.

Elusive Definitions of Diversity, Equity, and Inclusion: “Diversity Fatigue” and Impact on Music Teacher Education
Julie Beauregard, Assistant Professor, Music

Definitions of diversity, equity, and inclusion (DEI) are problematically vague in education as a survey of DEI statements from tertiary institutions, professional organizations, and scholarship reveals. Though intentions to move toward greater heterogeneity are apparent, related initiatives often fail to follow through in impactful ways, thus the status quo is maintained. “Diversity fatigue” is a phenomenon that most effects:

The very people who are the most committed to doing diversity work . . . [We] are also battling another type of diversity fatigue, among those who see diversity efforts as merely politically correct. Yet others are just generally tired of the term ‘diversity,’ which they believe has been so co-opted and diluted that it no longer has any meaning. (Lam, 2018, p. 1)

In higher education, and music teacher preparation programs particularly, a dearth of genuine DEI is enacted through curriculum, content, pedagogy, and practices, and embodied by students, faculty, staff, and administration. In music teacher preparation programs compounding issues of Eurocentrism, competition, and hyper-specialization are present. Ways in which “diversity fatigue” manifests in music teacher preparation programs are identified, and ways to combat it offered.

Promising Treatments and Rehabilitation Approaches in Addiction, PTSD, & Breast Cancer Survival
Connecting the DOTS: Drug Overdose Trust and Safety
Claire Wood, Assistant Research Professor, Missouri Institute of Mental Health

Innovative approaches are needed to address the opioid overdose crisis. The goal of Connecting the DOTS: Drug Overdose Trust and Safety Project, a large-scale SAMHSA-funded project, is to reduce opioid overdose mortality by “connecting the dots” between prevention and response initiatives by prioritizing nine of Missouri’s highest need counties that accounted for 80% of overdose deaths in 2018. Specifically, this project aims to foster collaboration between historically siloed organizations and community stakeholders, provide occupational safety and harm reduction training to first responders (customized the existing SHIELD curriculum [Safety and Health Integration in the Enforcement of Laws on Drugs; Beletsky, 2019], distribute naloxone, and increase the integration of care coordination services within first responder agencies.

Deciding a Treatment with an Artificial Intelligence for Veterans with Post-Traumatic Stress Disorder
Umit Tokac, Assistant Professor, Nursing

Posttraumatic stress disorder (PTSD) is a psychiatric disorder common among individuals who have experienced a life-threatening event and is characterized by a hyperaroused state, consistent re-experiencing or reliving of the traumatic event, and numbing or avoidance of stimuli related to the trauma (Iribarren et al., 2005). PTSD is one of the biggest veteran health concerns, which requires either using current PTSD treatments effectively or developing a new intervention treatment to decrease PTSD’s effect on veterans’ lives. There are two main types of PTSD treatment: psychotherapy or medication (U.S. Department of Veteran Affairs, 2019). These treatment methods help to minimize or sometimes eliminate the symptoms of PTSD. However, there is no scientific way to know how well a particular treatment works on a particular person, and treatment effects can vary widely from one person to the next (U.S. Department of Veteran Affairs, 2019).

The Partially Observed Markov Decision Process (POMDP) is an artificial intelligence model that has been used in robotics, economics, and cancer treatments. POMDPs are a tool for planning and work by selecting a sequence of actions that will lead to an optimal outcome. A POMDP can be in one of several distinct states at any point in time, and its state changes over time in response to events (Boutilier, Dean, & Hanks, 1999). POMDP will be eligible to help clinicians to provide more personalized treatment to minimize or eliminate the PTSD symptoms in a short amount of time (thus costing less) and enable veterans to return to civilian life more quickly than the current practice.

This project aims to build POMDP methods that clinicians at the Harry S. Truman Memorial Veterans’ Hospital can use to provide personalized PTSD treatment to veteran patients. The implementation of this method will minimize or eliminate the PTSD symptoms in a short amount of time (thus costing less) and enable veterans to return to civilian life more quickly than the current practice.

Breast Cancer Survivorship and Occupational Rehabilitation
Yuanlu (April) Sun, Assistant Professor, Nursing

Current literature reported a reduced work engagement and work ability among breast cancer survivors and those who developed treatment-related lymphedema. My research used qualitative study design, meta-analysis and systematic review methods to assess the current needs of breast cancer survivorship care focusing on return-to-work and management of chronic treatment effects, such as lymphedema. The preliminary results of my study showed that the return-to-work experience was highly individualized and built on the interactions among the survivor, the lymphedema disease processes, their work activities, and an array of contextual factors. Both lymphedema and its management negatively influenced women’s physical, emotional, and interpersonal functions, which in turn had an impact on their work lives. Few interventional studies have been developed that effectively help the return-to-work process. The study suggested that multidisciplinary models of care for breast cancer survivors are needed to meet individuals’ needs. Need for supports is especially critical for survivors in underserved communities and for racial, ethnic and cultural minority populations.
Towards Pervasive Computing at the Edge
Abderrahmen Mtibaa, Assistant Professor, Computer Science

Mobile devices (e.g., smartphones, tablets) are increasingly capable devices with significant computational power. The demand for sophisticated mobile applications has been fed by this increased capability. As a result, users take for granted the ability of their devices to perform complicated tasks such as image or audio or video processing, reality augmentation, collaborative processing and decision making. There continue to be two main roadblocks to unleashing the full computational power of mobile devices. The first is the continued power constraints in modern devices where battery technology advances have not kept pace with the advances in processing capability. Second, is that users demand applications whose computing requirements often transcend what can be accomplished on a single device.

While mobile applications are often built to offload computationally heavy tasks to the cloud, which has greater computational resources, in our work, we consider environments in which computational offloading is performed among a set of mobile devices forming what we call a Mobile Device Cloud. This context arises in several scenarios. The first is where the mobile devices all belong to the same user, for example, a user’s smartphone, tablet and laptop, or where the devices belong to the same household. The second context is where the devices are carried by a group of people on a single collaborative mission. This can happen, for example, in military or disaster relief scenarios. In such scenarios, the incentive to collaborate on computational tasks is further amplified if a connection to a cloud is costly (in terms of money or power due to large communication delays), unreliable, or simply unavailable. Our efforts have highlighted the need for a general experimentation platform for mobile device cloud systems. Such experimentation platforms need to enable general evaluation with a range of computational models and profiles derived from real systems.

Spot Market Provisioning of Cloud Computing Resources: Price Association and Budget Estimation
Vivek Singh, Assistant Professor, Information Systems and Technology

Adopting spot instances from auction-based cloud market can significantly benefit organizations by reducing their computing cost. However, price dynamics of spot instances present managerial challenges in estimating medium-duration budget for spot instance usage. In this paper, we find that the prices of spot instances are related to each other – based on their similarity on three dimensions – hardware properties, software, and location of data center, and their sub-dimensions. We leverage this finding and develop a forecasting model – Spot Instance Price Association Model (SIPA) – to estimate monthly budget for spot instance usage. We find that the SIPA model has lower mean absolute percent error (MAPE) and root mean square error (RMSE) compared to standard autoregressive and moving average models. Our paper contributes to the theoretical understanding of auction market in cloud computing by demonstrating the relationship of prices of similar spot instances across hardware, software and data center location dimensions. Moreover, we also contribute to practice by presenting a budget forecasting model for spot instance usage which is useful in selecting appropriate cloud resources.

Innovations in Education and Policy: Peer Mentoring, Collaborative Practices
Digital Storytelling & Teacher Hiring and Retention

Peer Mentoring for Students with Intellectual and Developmental Disabilities: The Lived Experiences and Perceptions of College Peer Mentors
Lindsay Athamanah, Assistant Professor, Education

Peer mentoring programs provide an opportunity for individuals with and without intellectual and developmental disabilities (IDD) to learn, socialize, and work together in supportive and inclusive environments. In this study, we used
a phenomenological research design to explore the impact of a college campus-based peer mentoring program on the experiences and perceptions of participating college peer mentors (n = 13) toward high school students with IDD who were enrolled in a school-to-work transition program housed on campus. Using thematic analysis across four different data sources, we identified three main themes that peer mentors discussed based on their experiences in the program: (a) mentors’ personal development: constructing meaning of self, (b) mentee growth: perceived work and social impact, and (c) campus community benefits: normalizing disability. Peer mentors reported their own attitudes toward individuals with IDD were changed based on participating in the peer mentoring program and they observed improvements in their mentees’ personal and work-related social relationships. We discuss how these outcomes have impacted the peer mentors’ attitudes, career choices, and lives in general. We also provide implications for future research and practice regarding development and implementation of peer mentoring programs in the community.

Collaborative Practices of Secondary Special Educators
Jennifer Bumble, Assistant Professor, Education

The persistence of disappointing employment, educational, and community outcomes for youth with disabilities demands new and effective practices for changing the post-school landscape. Transition collaboration is an essential practice both mandated by special education legislation and linked to improved postschool outcomes. This session focuses on a mixed methods study examining the collaborative practices of 509 secondary special educators in one state. The findings provide insight into the “transition networks” of secondary special educators and how they engage partners both within and beyond the school system to provide services and supports to their transition-aged students (14-22). Findings suggest that while special educators communicate with a wide range of partners in the transition process, most partnerships are concentrated within the school system. Further, data indicated that larger transition networks were associated with working in a high school, years of experience, primarily supporting students with moderate/severe disabilities, and reporting high levels of knowledge about how to establish collaborative partnerships. Educators shared their perspectives related to collaboration, provided myriad recommendations for establishing effective transition networks, and outlined practical considerations for special educators, administrators, and school districts.

Digital Storytelling with Teachers in Rural Kenya: A Mixed Methods Case Study
Shea Kerkhoff, Assistant Professor, Education

Literacy involves social and cultural norms dependent on the context of the communication. Following this line of reasoning, literacy practices in Kenya may look different from literacy practices in another country, and what digital literacy looks like in Kenya may be different from what it looks like in the U.S., Europe, or Australia (Coiro, 2020), where much of the research is conducted (Ndimande, 2018). There is a need to understand the digital literacy needs of the students in Kenyan schools and share successful practices of integrating technology from teachers’ perspectives.

This case study investigated professional development with preschool, primary, and secondary school teachers in Kenya focused on literacy in relation to two Kenyan government priorities: (a) digital literacy for all children, and (b) full utilization of government-distributed tablets (KICD, 2019). Many participants were not able to attend all three days because of family obligations or because they took turns teaching each others’ classes as the others participated. The process of creating digital stories promoted digital literacy and culturally sustaining pedagogy. Participants mixed traditional storytelling with the current practice of using slides to communicate in education settings. Within each group, at least one member had used PowerPoint in their teaching. For many participants, the shift in the use of slides to convey content information to using slides for multimodal creative writing was new. Combining the cultural artifact of the story and the digital mode of slides created a hybrid product and practice of new and old.

Four Day School Week: Impact on Student Outcomes and Teacher Hiring and Retention
Anita Manion, Assistant Professor, Political Science

In 2009, Missouri lawmakers passed legislation allowing public school districts to implement a four-day school week with
approval of their local school board. Of the 518 school districts in Missouri, 99 have four-day weeks. This trend has accelerated recently, with 38 districts in Missouri moving to 4-day weeks this academic year. Most districts with four-day weeks are small rural districts attempting to achieve cost savings and enhance teacher recruitment and retention. The number of new teachers in Missouri declined by 30% from 2012-17, making recruitment and retention more challenging for rural districts. Missouri is not alone in this approach; schools in 25 states have moved to a four-day schedule. While there have been studies examining cost savings and teacher and parent satisfaction in these schools, there has been limited research with mixed results analyzing student outcomes. District administrators anecdotally report that they are better able to recruit and retain teachers with a four-day work week. However, this will be the first known study to evaluate if the transition to four-day weeks has a positive effect on teacher hiring and retention and the first study to determine the impact on student outcomes in Missouri. This study uses data from the Missouri Department of Elementary and Secondary Education to evaluate the impacts of four-day weeks on teacher recruitment and retention, and student outcomes. The project applies a difference in differences quasi-experimental design to analyze a panel data set covering the school years from 2000-01 to 2019-20, encompassing ten years prior to the implementation of four-day school weeks and ten years after implementation. The findings of this research will inform decision-making for hundreds of school districts and other public institutions who have implemented four-day weeks or are considering a move to four-day weeks.

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- Carl Sagan

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