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## RESEARCH MONTH



## KICK-OFF EVENT

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# April is Research Month at Minnesota State Mankato

It is time once again to celebrate and share the research, creative and scholarly activities happening here at Minnesota State University, Mankato.

Thank you for joining us to support our campus community at the Research Month Kick-Off Event!

This April marks the 4th annual Research Month at Minnesota State Mankato.

Join us each week to attend the exciting events on campus, as found on the events calendar.

You can view on-demand sessions as well as the research, scholarly, and creative works featured on the webpage.

Please find this information and more by using the following QR code:



Following the Kick-Off Event, please join us for the Douglas R. Moore Lecture, *"Can We Regenerate Soil Health and Enhance Corn Productivity in the U.S. Corn Belt through Perennial Cover Crops and Poultry Integration"*, presented by Dr. Mriganka De, at 7:00pm in the Ostrander Auditorium.

# 2024 Research Month Kick-Off Event Book Display

## **Aaron Hoy**

### *The Social Science of Same-Sex Marriage: LGBT People and Their Relationships in the Era of Marriage Equality (2022)*

Showcasing research from across the social sciences, this edited volume seeks to provide readers with an empirically grounded sense of how many lesbian, gay, bisexual, and transgender (LGBT) people marry in the US and Canada, what their marriages look like, and how LGBT people themselves are impacted by marriage and marriage equality. Including both quantitative and qualitative social science research, it features 14 primary chapters that examine a diverse set of topics, including demographic patterns in same-sex marriage and cohabitation, marital aspirations and motivations among LGBT people, arrangements and dynamics within same-sex relationships, and the legal benefits and informal privileges associated with marriage. The edited volume will be of interest to scholars across a wide range of disciplines, including sociology, psychology, child and family studies, communications, social work, and economics, while also offering valuable information for anyone interested in families and/or LGBT studies.

## **Aaron Hoy and Emily M. Boyd**

### *The Sociology of Families Reader: Issues, Perspectives, and Debates (2024)*

Through a carefully curated selection of readings highlighting important empirical research on family life in the U.S., *The Sociology of Families Reader: Issues, Perspectives, and Debates* introduces students to the major questions, influential findings, and contested interpretations that animate the sociology of families today.

The volume is organized into nine units, each dedicated to a unique aspect of family life. Units begin with a brief introduction, which situates the readings for that unit within broader patterns and trends playing out in both the institution of family and in society at large. Units I and II examine culturally dominant conceptions of family life and the dramatic ways in which the institution of family has changed over time. The remaining units are arranged in step with the life course, from dating and cohabitation to marriage and divorce. Students read about sexuality, reproduction, and parenting, as well as violence and abuse within the family context. Additional topics include women's conformity or resistance to traditional weddings, family diversity and gender convergence, college hookup culture, marriage equality, how divorce affects children, childfree adults, corporal punishment, and more.

## **Andy Johnson**

### *Being and Becoming Teachers of Writing: A Meaning-Based Approach (2024)*

This book describes how to teach writing to students in kindergarten through 12th grade using a meaning-based approach.

### *The Human Dimension in Education: Essential Learning Theories and Their Impact on Teaching and Learning (2022)*

This book expands on four basic kinds of learning theories: neurological learning theories, behavioral learning theories, cognitive learning theories, and transformative learning theories (humanistic and holistic), with a special focus on the learner. That is, the many dimensions of being a human being. We are, after all, human beings who are teaching other human beings in our classrooms. It makes sense that we should understand these human entities involved in this very human endeavor of teaching and learning.

## **David J. Bissonnette**

### *INSATIABLE: A Nation's Unappeasable Hunger (2022)*

INSATIABLE identifies the obesity epidemic more as a symptom of a much more profound social malaise that nobody wants to talk about. The obesity epidemic, when considered from an epidemiological perspective, is but one epidemic--although an important one--among varied epidemics now sweeping through American society and changing the very fabric of our culture and social norms. What started out for me as an investigation into the causes of obesity, turned out to be an eye-opening discovery. The Medical and Dietetic professions have likely not been treating obesity correctly over the last 50 years. The Surgeon General of the United States, Dr Richard Carmona, framed the obesity crisis quite accurately in the 2008 when he said: "...we understand the social determinants of health which are so important and inextricably intertwined with the health of the nation; you can't fix the health problem until you deal with the socio-economic determinants of health." In this way, one-on-one doctor-patient and dietitian-patient interactions will do nothing to solve this calamitous medical disaster.

Using many interpretive lenses, Dr. Bissonnette draws the reader into an in-depth exploration of many other epidemics such as depression, anxiety, substance abuse, adverse childhood experiences, hopelessness, and loneliness, now peppering the American landscape. Explore how nutrition, medicine, history, sociology, philosophy, theology, and spirituality conspire together to offer a profound understanding of the modern-day obesity epidemic, of the many chronic diseases, and social upheavals now devastating our country, offering, in the end, a long-lasting remedy.

## **Department of History and Gender Studies**

**Betty A. Bergland and Lori Ann Lahlum, eds.**

*Norwegian American Women: Migration, Communities, and Identities*

**Maria Bevacqua**

*Rape on the Public Agenda: Feminism and the Politics of Sexual Assault*

**Angela Jill Cooley**

*To Live and Dine in Dixie: The Evolution of Urban Food Culture in the Jim Crow South*

**Laura Harrison**

*Brown Bodies, White Babies: The Politics of Cross-Racial Surrogacy*

*Losing Sleep: Risk, Responsibility, and Infant Sleep Safety*

**Lori Ann Lahlum and Molly Rozum, eds.**

*Equality at the Ballot Box: Votes for Women on the Northern Plains*

# 2024 Research Month Kick-Off Event Poster Session

## **Aaron Hoy**

### **“I would like to, but my world wouldn’t end if I didn’t”: Marital aspirations among sexual minority young adults**

Despite the legalization of same-sex marriage across the US, research on young adults’ marital aspirations has tended to overlook sexual identity altogether or focus exclusively on those who identify as heterosexual. To address this, in this article, I draw upon quantitative and qualitative data from an online survey to describe the marital aspirations and motivations of a convenience sample of sexual minority young adults (N=256). Descriptive analyses indicate that although a majority of respondents would like to marry someday, a similar number claim that getting married is not “a major life goal.” Those who want to marry cite several primary reasons, including companionship and lifelong commitment, but also qualify their marital aspirations in several ways, including by questioning both the necessity and normativity of marriage. The relatively small number of respondents do not want to marry express similar concerns and critique marriage as a heteronormative institution.

## **Abigail Bakke**

### **Are industry and academia listening to each other? A citation analysis of UX research resources**

Abstract: The academia-industry disconnect is a problem that affects many fields. For this study, I focused on my home fields of Technical Communication and User Experience. I was curious whether academic sources and practitioner resources were listening to each other. I conducted a citation analysis of an academic sample and a practitioner sample and determined that yes, these groups appear to be operating in silos, rarely citing each other. I make recommendations for bridging the gap.

## **Allison Land**

### **Viral protein localization and implications for immunity**

HIV is a small virus that contains just a few efficient genes/proteins that serve several roles. This research is focused on one of these proteins, called Vpx. Vpx has two major functions: (1) To help transport the viral genome to the host cell’s nucleus, the location where the viral genome is copied and (2) counteract a specific human anti-viral immune protein, that functions to destroy viral genome building blocks, preventing viral genome replication. Both roles require Vpx to be in the host nucleus, yet observed Vpx localization is varied. Here, we describe the mechanism of this variation, which was investigated using strategic mutagenesis and confocal microscopy.

## **Amy Haycraft**

### **Psychedelic agents: Creation and implementation of emerging evidence for nursing curriculum**

As psychedelic agents' potential therapeutic uses expand, educational curriculum development is necessary. The study aim was to create and pilot nursing curriculum on the topics of physiological adaptations to trauma, psychedelic agent impact on neuromodulation and neuroplasticity, and discuss psychedelic assisted therapy clinical evidence and potential applications. Pretest-posttest study findings revealed students found the content interesting, significant increases in knowledge attainment, and a shift away from support of psychedelic recreational use toward clinically supervised research. These findings support that trauma physiology and psychedelic agent nursing educational curriculum could effectively be integrated into a baccalaureate mental health nursing course.

## **Durga Bhusal**

### **Translanguaging as a socially sustaining pedagogy: Rethinking power dynamics in the ELT classrooms**

In this presentation, I explore the notion of translanguaging as an inclusive and socially responsive pedagogy to challenge the influence of raciolinguistic ideology in Nepalese ELT classrooms. This study employed a qualitative research methodology, employing policy document analysis, classroom observations, and interviews with teachers from diverse sociocultural backgrounds. The interview protocols followed a qualitative content analysis approach outlined by Schreier (2012). The presentation will highlight into two main findings. The first finding highlights the use of translanguaging as a tool for promoting social justice, as observed through teachers' facilitation of learning by embracing learners' varied linguistic and semiotic resources rather than enforcing rigid racial and social language boundaries. The second finding demonstrates how the implementation of translanguaging pedagogy recognizes the interconnectedness and cooperation between students' racial/ethnic identities and linguistic practices (Li, 2023). The overall findings indicate that teachers enacted translanguaging by incorporating students' familiar forms of communication, thereby promoting a more inclusive and equitable teaching-learning environment.

Based on the findings, I propose initiating a dialogic conversation with the attendees by delving into translanguaging as a socially responsive pedagogy, how it disrupts global racialized discourses, and how it creates more equitable learning environments for multilingual racialized students.

**Kalpana Shrestha**

## **Reading response journal as a self-reflective metacognitive practice: Enhancing academic writing culture in a first-year composition classroom**

The article explores how a weekly reading-response journal (RRJ) as a self-reflective practice enhances first-year composition (FYC) multilingual students' academic writing (AW) development. Using Bowen's (2009) document analysis framework, the case study examines 11 FYC multilingual students' semester-long weekly RRJ along with three phases of reflections on those written artifacts and analyzing a 5-minute long individual in-person conference. The findings indicate that the weekly RRJs in FYC class significantly contribute to enhancing foundational AW skills, specifically facilitating cognitive, metacognitive, linguistic, citation, and content knowledge of multilingual learners and fostering reflective writing habits among them. Based on the findings, the study suggests providing enough space for actual reading instruction with a careful selection of reading texts addressing diverse learner's backgrounds. Additionally, offering constructive feedback on their reflective writing is recommended.

**Kara De La Fosse**

**Co-PI: Rachel Schickling**

## **Recontextualizing nursing skill performance evaluations: Empowering diverse students for mastery**

**Purpose:** The purpose of this scholarly reflection is to illustrate an innovative method to promote equity and mastery of fundamental nursing skills to serve diverse student populations.

**Method:** The method of evaluation is established from a comparative analysis of the fundamental nursing skill performance of students before and after the recording option and checklist were established and instituted.

**Implemented change:** The initiative was to devise an innovative approach promoting academic excellence with fundamental nursing skills. Eliminating the single-attempt assessment to prove competency within an environment where anxiety and stress are paralyzing. Extending the opportunity for students to record unlimited attempts to demonstrate their best performance contributed to optimal proficiency. Personal investment in academic excellence is a motivating factor for devotion to practice intensely.

**Results:** Outcomes from one university exhibit stellar skill performance evaluation mitigating anxiety and promoting equitable opportunity for success.

**Implications:** Diversity in learning styles is exemplified in nursing programs as educators strive to deliver equitable opportunities for all to succeed. Re-envisioning on-site skill performance evaluations enabling all students to submit their best performance for critique was critical. Transitioning to a recorded submission, with self-evaluation and peer evaluations afforded opportunities for fair evaluations. Removing the anxiety component enabled a focus on the skill ultimately enhancing proficiency and comfort levels.

## **A new conceptualization model explaining incivility etiology in undergraduate nursing students**

**Background:** Incivility in undergraduate nursing programs has been exemplified since the onset of the global pandemic. The nursing profession relies strongly on teamwork and unity. Incivility impedes learning and negatively impacts the teaching and learning environment for both students and faculty. Student civility and conduct behaviors are established prior to entrance into undergraduate nursing programs. To promote a community of professionalism, current beliefs about incivility must be addressed and mitigated early in nursing programs to uphold standards and expectations. There is little tolerance for incivility in professional nursing practice, necessitating the importance of understanding the root causes of nursing student

behaviors before effective interventions can be implemented.

**Aim:** To provide a globally accepted conceptualized model to undergraduate nursing faculty that provides insight into the causative factors of incivility in nursing programs.

**Methods:** A systematic review of the literature was conducted to determine the prevalence of models that explains causative factors of uncivil actions by undergraduate nursing students. To date, no model exists that accounts for the biological, psychological, and sociological factors that impacts civil behavior in the classroom.

**Results:** Causes of incivility has influences in the biological, psychological, and sociological domains, and each must be considered as it relates to the whole person, because external experiences impact internal (i.e., classroom) behaviors. The Conceptualization Model of Incivility Etiology in Undergraduate Nursing Students was created to explain causative factors of incivility in undergraduate nursing students. The model's foundational concepts derive from Bandura's Social Cognitive Theory and Clark's Civility Index.

**Conclusions:** For the first time a holistic account of biological, psychosocial, and sociological causes of incivility has been identified. Non-academic influences are now accounted for when understanding causes of uncivil behavior in undergraduate nursing students. Now that causes of incivility are understood within this context, faculty will be able to implement interventions to mitigate incivility more effectively.

## **Keenan Hartert**

### **Cooperative networks between MYC and XPO1 associated with decreased t-cell presence and a depleted tumor microenvironment may be addressed by the synergistic combination of AZD4573 and selinexor**

Diffuse Large B-cell Lymphoma (DLBCL) is the most commonly diagnosed white blood cell cancer, adding 90,000 patients per year. Those that fail first-line treatments face a dismal outlook despite the advent of Chimeric Antigen Receptor T-cell (CAR-T) therapy. Our integrative genomic analyses highlight the MYC oncogene's role promoting a poor patient prognosis and immune response. Patients expressing high levels of this gene bear lower T-cell levels, reducing potential CAR-T success. Following these results, we designated a novel drug combination targeting key MYC partner genes: XPO1 and CDK9, observing strong synergy rates that could play a role in future clinical trials.

### **Working 20+ hours per week is a factor associated with lower biology exam scores**

Rising tuition rates are detailed as a driver of increased student employment, potentially leading to reduced time and academic performance. We observed this relationship across 3 cohorts of Genetics (BIOL-211), totaling 238 students. Students working 20 hours or higher scored significantly fewer total points, exam points, were more likely to incur a failed assignment, and attended class less. These data represent an important metric for identifying and treating underlying factors associated with reduced STEM performance and retention. Future directions aim to identify and rescue this population in future courses, measuring the effects of these efforts.

**Masaki Hara**

**Research Mentor: Dr. Susan Colvin**

## **The influence of ecoregions and land use and land cover on fish assemblages in southern Minnesota**

Level III ecoregions of the conterminous United States provide an ecosystem framework for facilitating environmental understanding and aiding management practices. In southern Minnesota near Mankato, there are two level III ecoregions: to the west are the Western Corn Belt Plains, and to the east the North Central Hardwoods. Formerly, Tall Grass Prairie prior to settlement, the Western Corn Belt is predominately used for agriculture due to its fertile mesic prairie soils, temperate climate, and adequate precipitation during the growing season. Pockets of prairie habitat still occur along with wetlands specific to this ecoregion, specifically prairie potholes. The North Central Hardwoods contain a mosaic of deciduous forests, wetlands and lakes, with predominant land uses of cropland agriculture, pasture, and dairy operations. Land use impacts can cause reduced water quality, impaired ecosystem functioning, and loss of fish habitat which will negatively influence fish diversity, ecosystem functions, natural resource-based economies, and recreational opportunities. Understanding fish diversity and population dynamics, land use, land cover, and water quality helps us to understand the relationship between fish species and their habitat, and how environmental factors affect fish distributions in these ecoregions. This research project investigates how land use and land cover may impact fish assemblage diversity in lakes in these ecoregions. Specifically, we will examine how land use and land cover may affect fish diversity and distributions, and water quality similarly or disparately between ecoregions.

**Niveditha Sankar (Co-PI)**

**PI: Dr. Rachel Cohen**

## **The headaches of brain stereotactic surgery: Behavioral effects on green anole lizards, *Anolis carolinensis*.**

The amygdala is a complex brain structure required for emotion processing. However, how it regulates behaviors such as aggression is unknown. Green anoles can be used as models since previous work showed that the anole amygdala has more neurons during the non-breeding season, when the animals are not territorial, suggesting a relationship between aggression and the amygdala. This study aims to understand the amygdala's function by injecting a neurotoxin (staurosporine) into the area and investigating impacts on aggressive behavior. No significant difference in behaviors between saline and staurosporine-injected groups were observed suggesting that amygdala does not directly regulate anoles' aggression.

## **Robert Shields**

### **Utilizing a Bayesian approach to forecast time series**

Time series gives an analyst a range of different models that can be used on time dependent data. One of the most popular models is the ARIMA model. While ARIMA is an effective tool, there are some drawbacks. By utilizing a Bayesian approach, analysts can more elegantly handle uncertainty and do not need as much data to get effective forecasts. Thus, this can help overcome some of the drawbacks found in ARIMA. The model that will be compared to ARIMA is called Bayesian Structural Time series (BSTS). The objective of this project is to analyze the benefits/pitfalls of each model.

## **Shourav Dey**

### **Deep learning applications for early disease diagnosis from facial images**

As estimated by the Lupus Foundation of America, at least 5 million people worldwide including 1.5 million Americans (approx.) have some form of Lupus. Diagnostic procedures for SLE present challenges due to its' elusive etiology and diverse symptomatology. However, among the symptoms of SLE, the Butterfly Malar Rash (BMR), manifesting as a butterfly-shaped rash across the cheekbone and nasal bridge, is a prominent indicator. The challenge in detecting BMR is due to their similarity with other rashes from rosacea, and fifth disease. We developed a CNN-based model that can differentiate between BMR and other rashes in facial images. We also conducted a comparative study with other BMR detection models and observed that our proposed model outperforms the existing models with an accuracy of 93.2% on the dataset used in this work.

## **Wendy Schuh**

### **Applied Health Science Student Researchers: Maggie A. O'Connell, Mackenzie M. Rich, Madeline L. Charbonneau, Alysha M. Kruger**

#### **College students' attitudes about vaping**

While prevalence of vaping is well-documented among young adults, college student attitudes about vaping and how it affects them is less understood. Undergraduate students in the Minnesota State University, Mankato Eta Sigma Gamma education honorary organization will share results from an IRB-approved qualitative research study. Through informal audio-recorded interviews, approximately 40 students answered the following questions: 1. What are your opinions about college students and vaping? And 2. How has vaping use affected you, personally? Findings, implications, and recommended next steps will be shared.

## **Xeng Yang**

### **Diabetes health indicator using machine learning techniques**

Machine Learning techniques such as Logistics Model, Decision Trees, Random Forest, Gradient Boosting, and Naïve Bayes Methods are used to find predictions of classification models. Case studies on whether patients diagnosed with diabetes or not will be discussed, and comparisons of the accuracy between different types of models will be made using ROC curves. We will discuss which model is adequate to predict whether a person could have diabetes or not and elaborate the model to interpret on how to prevent or improve oneself health condition. K-fold cross validation is performed to ensure the model is not overfit.



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