

Winners of the 2022 Graduate Academic Conference

Cash Prizes awarded: \$300 for 1st place, \$200 for 2nd place,
\$100 for 3rd place/people's choice



Oral Presentations

1. **Samridhi Satija**, *Chemistry/Facility for Rare Isotope Beams*
2. **Chayce Griffith**, *Horticulture*
3. **Md Shakir Mahmud**, *Civil and Environmental Engineering*

Poster Presentations

1. **Taylor Dickson**, *College of Human Medicine*
2. **Nicholas Michel**, *College of Osteopathic Medicine; Department of Kinesiology*
3. **Maria Kloboves**, *Food Science & Human Nutrition*

3-Minute Thesis

1. **Pragya Saxena***, *Pharmacology and Toxicology*
2. **John Tran**, *Plant Biology*

People's Choice: **Marzieh Ghiasi**, *Epidemiology*

****Advances to MAGS Regional Competition!***

COUNCIL OF GRADUATE STUDENTS

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ORAL PRESENTATION ABSTRACTS

*PRESENTING AUTHOR

#01, USING A MULTIOMICS APPROACH TO IDENTIFY GENE EXPRESSION PATTERNS IN SOAKED DRY BEAN SEEDS WITH CONTRASTING COOKING TIMES

Hannah Jeffery*, Nyasha Mudukuti, Robin Buell, Kevin Childs, Karen Cichy

Dry beans are a nutritious food, but their lengthy cooking requirements are barriers to consumption. Pre-soaking beans reduces cooking times. While soaking allows hydration to occur prior to cooking, there is evidence that enzymatic changes to pectic polysaccharides also occur during soaking that shorten the cooking time of beans. The role of soaking on reducing cooking time is genotype dependent with some genotypes exhibiting larger and faster rates of cooking time reduction than other genotypes. Little is known about gene expression changes taking place during soaking that influence cooking times or gene expression patterns related to genetic variability for cooking time. The goal of this study was to 1) identify gene expression patterns that occur during a soaking time course and 2) compare gene expression in fast cooking and slow cooking bean genotypes. RNA was extracted from beans at five soaking time points (0, 3, 6, 12, and 18 hrs). Whole genome sequencing (WGS) data was also collected from each genotype. The RNA reads were subjected to DESeq2, weighted gene co-expression network analysis (WGCNA), alignment to QTL for cooking time and water uptake, and GO enrichment analysis. Modules correlated with soaking time and cooking time were discovered. More significant differences in gene expression between the fast and slow cooking genotypes were observed at hour six of soaking relative to hour zero of soaking (raw beans) than at any other time point. Candidate genes for cooking time were identified and their relevance to current theories for the control of cooking time is discussed. In the future, variant calling will be done on the WGS data to identify genes of interest within the QTL.

#02, HARVESTING RADIONUCLIDES FROM HEAVY ION-BEAM IRRADIATED TUNGSTEN AT THE NATIONAL SUPERCONDUCTING CYCLOTRON LABORATORY

Samridhi Satija*, Katharina Domnanich, Jake Bence, John Despotopoulos, Nicholas Scielzo, Gregory Severin, Jennifer Shusterman

The interest in 'Isotope harvesting' has peaked because of the tremendous quantities of radioisotopes that will be produced during routine operation of ion-beam facilities such as the National Superconducting Cyclotron Laboratory (NSCL) and the upcoming Facility for Rare Isotope Beams (FRIB). There is an opportunity to harvest these by-product radionuclides without the need for a dedicated beamtime which have wide ranging applications in areas such as medicine, stockpile stewardship, material science amongst others. At the NSCL particularly, aqueous isotope harvesting approaches has been investigated but solid isotope harvesting approaches have been explored to a much lesser extent, although they have great potential owing to the flexibility they offer in collection material, location and time. In this work, ^{88}Zr ($t_{1/2} = 83.4$ d, $E_{\gamma} = 392.8$ keV) which has important stockpile stewardship application was collected from an irradiated tungsten collector, followed by a radiochemical separation from tungsten and other co-implanted radionuclides. This proof-of-concept solid harvesting approach for ^{88}Zr was important for comparison to its aqueous harvesting results which shows an increase in the collection percentage by three times for solid harvesting. This irradiation and collection has facilitated the development of methodologies that can be used to extract exotic radionuclides like ^{172}Hf , important for nuclear data measurements, from the tungsten beam-blocker, which was employed as a dump for the primary beams at NSCL.

ORAL PRESENTATION ABSTRACTS

*PRESENTING AUTHOR

#03, THE SHAPE OF AROMA: MEASURING AND MODELING CITRUS OIL GLAND DISTRIBUTION

Erik Amezcuita*, Tim Ophelders, Michelle Quigley, Danelle Seymour, Elizabeth Munch, Dan Chitwood

From preventing scurvy to playing key roles in religious rituals, citrus are intrinsically connected to human health and perception. From tiny mandarins to head-sized pummelos, citrus capability of hybridization provides a vastly diverse array of fruit sizes and shapes, which in turn corresponds to a diversity of flavors and aromas. These sensory qualities are tightly linked to oil glands in the citrus skin. The oil glands are also key to understanding fruit development, and the essential oils contained by them are fundamental in the food and perfume industries. We study the shape of citrus based on 3D X-ray CT scan reconstruction of 163 different citrus samples comprising 58 different species and cultivars, including samples of all fundamental citrus species. First, using the power of X-rays and image processing, we are able to compare and contrast size ratios between different tissues, such as the size of the skin compared to the rind or the flesh. Second, we model the fruit shape as an ellipsoidal surface, and later we study and infer possible oil gland distributions on this surface using principles of directional statistics. We finally compare and contrast these overall fruit shape models along their gland distributions across different citrus species. This morphological modeling will allow us later to link genotype with phenotype, furthering our insight on how the physical shape is genetically specified in DNA.

#04, AUXIN AND ABA SPRAYS SIGNIFICANTLY REDUCE BITTER PIT IN 'HONEYCRISP' APPLE

Chayce Griffith*, Todd Einhorn, Randy Beaudry

Bitter pit is a physiological disorder of apple characterized by dark lesions on the surface of fruit. Despite the association of bitter pit incidence with localized calcium (Ca) deficiency, corrective measures to improve Ca content in fruit do not entirely prevent the disorder. Ca transport, in planta, occurs solely in the xylem, and Ca deficiency is primarily the result of gradual xylem dysfunction during fruit development. Auxin promotes xylogenesis in several plant species. Recent research with ABA also demonstrated a positive effect on xylem integrity and Ca concentrations in tomato and apple fruits. We, therefore, have evaluated early-season applications of auxin (both native and synthetic compounds) and ABA to elucidate the effects on xylem function, nutrient content, and bitter pit incidence of 'Honeycrisp' apple. GA was applied as a separate treatment to antagonize xylem development. Throughout the season and at harvest, sampled fruit were infused with dye, sectioned, and imaged to quantify the number of functional vascular bundles. Tissue was collected for mineral analyses. Mature fruit were scored for bitter pit at harvest and after storage and related to seed and nutrient status. Auxins and ABA produced more functional vascular bundles at harvest than control or GA treatments. Bitter pit was reduced by roughly 50% at harvest and after storage for ABA and auxin treatments. Fruit mass and mature seed content decreased with increasing rates of synthetic auxin. Auxin may have merit for reducing bitter pit in susceptible cultivars but additional studies are required to confirm our results and optimize efficacy.

ORAL PRESENTATION ABSTRACTS

*PRESENTING AUTHOR

#08, DRIVER RESPONSE TO A DYNAMIC SPEED FEEDBACK SIGN AT SPEED TRANSITION ZONES ALONG RURAL HIGHWAYS

Md Shakir Mahmud*, Megat Usamah Megat Johari, Anshu Bamney, Hisham Jashami, Timothy J. Gates, and Peter T. Savolainen

Research was performed to evaluate the effectiveness of a dynamic speed feedback sign as a speed reduction strategy on high-speed rural highways transitioning into rural communities. A primary objective of this research was to assess the effectiveness of the DSFS across various speed limits, considering both the rural highway segment (e.g., 55 vs. 65 mph) and upon entry to the community (e.g., 35 vs. 40, vs. 45 mph). A before-and-after observational study was conducted at five speed transition zones on two-lane rural highways in northern Michigan to evaluate the effectiveness of DSFS on motorist speeds while traversing the speed transition zones. The DSFS consisted of a portable changeable message sign positioned on the shoulder in advance of the reduced speed limit zone. The sign was programmed to display the approaching vehicle's speed alternating with speed limit information. Vehicle speeds were continuously tracked using handheld LIDAR for a sample of vehicles approaching and entering the speed reduction zone at each location before and after installation of the DSFS. The results of this evaluation suggest that the DSFS had a significant effect on vehicle speeds throughout the speed transition zone. The DSFS had the greatest effect on speeds when vehicles reached the DSFS, where speeds were 3.2 to 7.8 mph lower, on average, with the DSFS present at the site. This speed reduction effect was sustained through the remainder of the transition zone, continuing to the speed limit sign posted at the entry to the reduced speed limit zone.

#09, MODERNIST WORKERS' FILM MAGAZINES IN MSU SPECIAL COLLECTIONS ARCHIVES

McKayla Slug

The MSU Radicalism Collection houses important 1930s modernist workers' film magazines *New Theatre*/*New Theatre and Film* and *FilmFront*. Leftist sources were often destroyed throughout the 20th century. Though many periodicals have been digitized, they typically appear without color or back advertisements. Preserving them in original, complete forms therefore is vital to studies of American history and radicalism. Periodicals like *New Theatre* and *FilmFront* reveal histories of radical film in the United States that were entangled with movements of avant-garde art and working-class politics in the early 20th century. *New Theatre* and *FilmFront* are crucial archival sources for understanding modernist print culture, film periodicals, and working-class intellectual history.

New Theatre/*New Theatre and Film* (1931-1937) and *FilmFront* (1935) editors self-declared their journals official organs of workers' film movements in America rebelling against Hollywood and mainstream presses. As outlets for film collectives and individuals, these magazines included theory, techniques, reviews, news, and advertisements to build a transnational workers' film movement. Soviet authors Sergei Eisenstein and Dziga Vertov, for example, appeared alongside American writers Harry Alan Potamkin, Leo Hurwitz, and Samuel Brody. These periodicals served as educational resources to spread knowledge and tools to ignite political action and artistic creation amongst readers. This presentation highlights leftist film writing as part of a broad history of American radicalism while exploring the complexities of archiving leftist materials in institutional collections. It centers the educational intentions of these periodicals at their inception in the 1930s and how their educational functions have shifted now as archival materials.

POSTER PRESENTATION ABSTRACTS

*PRESENTING AUTHOR

#37, PHYSICIAN PERCEPTIONS OF HPV VACCINE BARRIERS AND PARENTAL HESITANCY

Taylor Dickson

The HPV Vaccine proves controversial among some patient populations for various reasons including cultural beliefs and fear of sexual promiscuity. Many of these factors are fueled by misinformation that serve as barriers to vaccine administration.

This is a descriptive study utilizing mixed methods. Residents and attending physicians from a County Health Department completed surveys to assess HPV vaccine knowledge, comfortability, and parental barriers to administration. The sample included 30 physicians: 22 residents and 8 attendings.

No significant difference ($p=0.08$) was found; 64% ($n=14$) of residents and 75% ($n=6$) of attendings reported feeling "comfortable" regarding knowledge about the HPV vaccine. Regarding comfort level in talking to parents, 59% ($n=13$) of residents and 25% ($n=2$) of attendings felt "comfortable". In contrast, 14% ($n=3$) of residents and 75% ($n=6$) of attendings felt "very comfortable" ($p=0.04$). Comfort in recommending the vaccine revealed, 23% ($n=5$) of residents versus 100% ($n=8$) of attendings reported "very comfortable" ($p=0.001$). As for physicians' perceptions of patient concerns, physicians offered two main explanations: 1) parental concerns about vaccine safety [32% ($n=7$) of residents and 50% ($n=4$) of attendings], and 2) sexually related [residents 27% ($n=6$) and attendings 50% ($n=4$)]. A full reporting of all outcomes will be given in the presentation.

The main outcomes of this study speak to misconceptions about the HPV vaccine. The discrepancy between provider vaccine knowledge and discussion comfortability emphasizes the need for potential policy change in provider education. More education also helps in eliminating vaccine stigma by promoting more informative counseling and shared decision making.

#38, POTENTIAL APPLICATION AND LIMITATION OF EDIBLE COATINGS FOR MAINTAINING TOMATO QUALITY AND SHELF LIFE

Haile Duguma

Tomato is among the most commercialized fruits due to its high nutritional value and health promoting compounds. However, tomatoes have a short shelf life because of numerous deteriorating factors. Plastic packaging materials are used to mitigate perishability. Nevertheless, the exhaustion of nonrenewable natural resources used to produce plastics and the demand for eco-friendly packaging entailed search for other alternatives. Edible coatings have emerged as an effective and environmentally friendly alternative to protect fruits from physical and chemical deterioration, and microbial spoilage. The aim of this review was to assess the recent scientific literature regarding the application of edible coatings in maintaining quality and enhancing shelf life of tomatoes. This review has collected and analyzed the most recent studies about the application of edible coatings of tomato. The available literature has indicated that different edible coatings such as chitosan, pectin, gum, aloe vera gel, gelatin and starch have the potential to maintain physico-chemical and sensory qualities and improve shelf life of tomatoes. Edible coatings and films can be used as an alternative for nondegradable plastic packaging materials due to biodegradability, non-toxicity, availability, and effectiveness in maintaining tomato quality. Despite numerous benefits, most edible coatings have poor barrier properties, and some impart undesirable flavor on produce. This review suggests that blending edible coatings with essential oil and active compounds using nanotechnologies like nanoencapsulation and multilayer could be used to overcome the limitations of edible coatings. This review helps the tomato value chain actors to select an effective edible coating for tomato to enhance shelf life, and reduce quality loss.

POSTER PRESENTATION ABSTRACTS

*PRESENTING AUTHOR

#49, UNDERSTANDING THE TRENDS IN RACE, SEX, AND AGE: AN EPIDEMIOLOGICAL DESCRIPTIVE STUDY OF SOCIO-DEMOGRAPHIC FACTORS FOR COVID-19 DEATHS AND CASES IN MICHIGAN

David Klemet*, Mohaymin Kadir, Ya Yang, Madison Polay, Charles Lim Olsen, Jeanette Batres; Manvinder Toor

While disparities have been observed in the impacts of COVID-19 in the United States, there is limited literature available specific to the state of Michigan. The purpose of this study is to understand if the nationally observed disparities exist in Michigan. This study analyzed disparities by examining data from the Michigan Department of Health and Human Services (MDHHS) with attention to prevalence rates and case fatality rates for COVID-19 in Michigan. Analysis was done through the calculation of crude prevalence. Race-specific and sex-specific prevalences were calculated individually to highlight differences based on socio-demographic factors. Findings revealed that: (1) males are more likely to test positive and die from COVID-19 compared to females, (2) Black/African American individuals have higher fatality rates when compared to other racial groups, and (3) older adults are found to have higher death rates than younger adults. These findings are important as they tease out existing health disparities from COVID-19. This study suggests that COVID-19 mitigation efforts should focus on the socio-demographic factors that are most disproportionately affected by COVID-19.

#50, ASSOCIATIONS OF MATERNAL OBESITY WITH NEWBORN REPRODUCTIVE MARKERS

Maria Kloboves*, Diana C. Pacyga, Susan L. Schantz, Rita S. Strakovsky

Background: Maternal obesity may impact offspring reproductive health. Therefore, we evaluated newborn anogenital distance (AGD) and 2:4 digit ratios (2:4D) as early reproductive health predictors. **Methods:** Pregnant women aged 18-40 year from Illinois (n=460) reported pre-pregnancy weight and height to calculate pre-pregnancy BMI. At 10-14 weeks gestation, we measured waist and hip circumferences, weight, % fat, visceral fat level, % muscle, and BMI. At birth we measured newborn 2nd and 4th left/right fingers to calculate the 2:4D. In females, we measured AGDshort (anus-to-fourchette) and AGDlong (anus-to-clitoris). In males, we measured AGDshort (anus-to-scrotum) and AGDlong (anus-to-penis). Sex-stratified linear regression models accounted for important sociodemographic/lifestyle factors. **Results:** Most mothers were college educated and non-Hispanic white, and half were under-/normal weight pre-pregnancy. Maternal anthropometrics were associated with AGD (not 2:4D), only in female newborns. AGDlong was 0.99 and 1.02 mm longer per each interquartile range (IQR) increase in pre- (95%CI: 0.33, 1.65) and early-pregnancy (95%CI: 0.19, 1.86) maternal weights, respectively. AGDshort was 0.68 and 0.66 mm longer per each IQR increase in pre- (95%CI: 0.20, 1.16) and early-pregnancy (95%CI: 0.12, 1.20) maternal weights, respectively. AGDlong was also 0.75 mm (95%CI: 0.16, 1.33) longer per each IQR increase in maternal pre-pregnancy BMI. AGDlong was 0.91 mm (95%CI: 0.20, 1.61) longer per each IQR increase in hip circumference, whereas AGDshort was 0.55 mm (95%CI: 0.06, 1.04) and 0.58 mm (95%CI: 0.04, 1.12) longer per each IQR increases in hip and waist circumference, respectively. **Implications:** Obesity during pregnancy may alter the female AGD, warranting further investigation.

POSTER PRESENTATION ABSTRACTS

*PRESENTING AUTHOR

#53, "IT'S A FEELING THAT ONE IS NOT WORTH FOOD": A QUALITATIVE STUDY EXPLORING THE PSYCHOSOCIAL EXPERIENCE AND ACADEMIC CONSEQUENCES OF FOOD INSECURITY AMONG COLLEGE STUDENTS

Anthony Meza

Background: The issue of food insecurity is one of growing concern among institutions of higher learning in the United States. In addition to studies on the prevalence and risk factors, research is needed to better understand the mechanisms by which food insecurity affects students' health and well-being. **Objective:** To critically explore the experience of food insecurity among college students and its impact on psychosocial health and academic performance. **Design:** In-depth qualitative interviews were conducted with college students to gain a better understanding of the mechanisms by which food insecurity affects their psychosocial health and academic performance. **Participants/setting:** Twenty-five undergraduate students from a large public university in California who were recruited from a campus food pantry. **Results:** Students discussed several themes related to the psychosocial effects of food insecurity: the stress of food insecurity interfering with daily life, a fear of disappointing family, resentment of students in more stable food and financial situations, an inability to develop meaningful social relationships, sadness from reflecting on food insecurity, feeling hopeless or undeserving of help, and frustration directed at the academic institution for not providing enough support. Students also discussed how food insecurity affected their academic performance through physical manifestations of hunger and the mental trade-off between focusing on food and focusing on academics. **Conclusion:** These findings contribute to the understanding of what it means to experience food insecurity in higher education and can inform how universities support students' basic needs.

#54, VALIDATING A SEMI-AUTOMATED TOOL FOR QUANTIFYING KNEE CARTILAGE THICKNESS AND ECHO-INTENSITY ON ULTRASOUND IMAGING

Nicholas Michel*, Matthew Harkey

Objective: To validate a semi-automated technique to segment ultrasound-assessed femoral cartilage without compromising accuracy compared to a traditional manual segmentation technique in participants with an anterior cruciate ligament injury (ACL). **Design:** We recruited 27 participants with a primary unilateral ACL injury at a pre-operative clinic visit. One investigator performed a transverse suprapatellar ultrasound scan with the participant's injured knee in maximum flexion. Three femoral cartilage ultrasound images were recorded. A single expert reader manually segmented the femoral cartilage area in each image. Additionally, we created a semi-automatic program to segment the cartilage using a random walker-based method. We quantified the average cartilage thickness and echo-intensity for the manual and semi-automated segmentations. ICC_{2,k} and Bland-Altman plots were used to validate the semi-automated technique to the manual segmentation for assessing average cartilage thickness and echo-intensity. A dice correlation coefficient was used to quantify the overlap between the segmentations created. **Results:** For average cartilage thickness, there was excellent reliability (ICC_{2,k}=0.99) and a small mean difference (+0.8%) between the manual and semi-automated segmentations. For average echo-intensity, there was excellent reliability (ICC_{2,k}=0.97) and a small mean difference (-2.5%) between the manual and semi-automated segmentations. The average dice correlation coefficient between the segmentations was 0.90, indicating high overlap between techniques. **Conclusions:** Among knees with a recent ACL injury, our novel semiautomated segmentation technique is a valid method that requires less technical expertise than manual segmentation.

3 MINUTE THESIS COMPETITION

3:15-4:15



PRESENTER & TITLE

THU DUONG

WHETHER YOU ARE READY TO DELIVER OR NOT, YOUR CLOCK MAY BE ABLE TO SAVE THE DAY

FAHMI DWILAKSONO

EVALUATION OF OPERATIONAL PERFORMANCE AND ENVIRONMENTAL IMPACT OF A COMMERCIAL SCALE ANAEROBIC DIGESTER UTILIZING MULTIPLE FEEDSTOCKS

MARZIEH GHIASI

SYMPTOM-BASED SUBGROUPING IN CHRONIC PELVIC PAIN

MUMTAHIN HASNAT

DEVELOPMENT OF AN ENHANCED PAVEMENT CONDITION SCORE FOR MICHIGAN

OSCAR ISTAS

CAN WE IMPROVE NATURAL ENEMIES TO TARGET INVASIVE SPECIES?

RAHUL JAIN

WHERE DO THE ELEMENTS COME FROM?

MD SHAKIR MAHMUD

EVALUATION OF DYNAMIC SPEED FEEDBACK SIGNS ON FREEWAY INTERCHANGE RAMP

MARIA MILAN

CHARACTERISTICS OF RESIDENTIAL INFRASTRUCTURE IN RURAL ALASKA - TO IMPROVE EFFICIENCY AND COMFORT

SAMRIDHI SATIJA

ISOTOPES ARE COOL- HARVESTING RADIONUCLIDES FROM WASTE

PRAGYA SAXENA

COMPOUND 48/80 INCREASES BLADDER WALL COMPLIANCE INDEPENDENT OF MAST CELLS

AMIT SHARMA

CHILDREN'S EXPERIENCE OF JOYFUL LEARNING THROUGH PLAY WITH (MATH) GAMES/TOYS

JOHN TRAN

MUTANT ANALYSIS OF A POLYOL MONOSACCHARIDE TRANSPORTER IN ARABIDOPSIS INVOLVED IN LIGNIFICATION