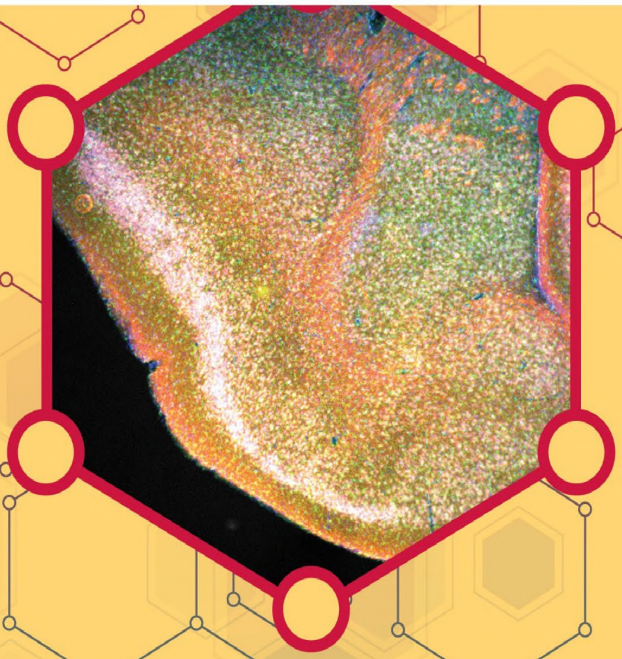
# GRADUATE RESEARCH & SCHOLARSHIP SYMPOSIUM



**Wednesday, March 18, 2026**

## Hybrid Event

**In-Person:** Wednesday, March 18, 2026: 8:30 am to 3:30 pm
Featuring Posters & Podium Presentations

**Online:** Monday, March 16 – Friday, March 20
Virtual Posters & Videos via Symposium by Forager One

Join your peers from all disciplines across campus in this exciting event!

# TABLE OF CONTENTS


Contents

# ACKNOWLEDGEMENTS

The organizers would like to **thank** all of the

***faculty mentors***

for their service and support of our graduate scholars.

THANK YOU

**We would like to thank the following organizations and individuals for their generous time and support of this event:**

Center for African Studies
Center for the Catholic Faith & Culture
Center for Community-Engaged Teaching & Research
Center for Global Health Ethics
Center for Integrative Health
Center for Migration, Displacement & Community Studies
Center for Women's & Gender Studies
Grefenstette Center for Ethics in Science, Technology & Law
Gumberg Library
Mary Pappert School of Music
McAnulty College and Graduate School of Liberal Arts
School of Education
School of Nursing
School of Science and Engineering
Simon Silverman Phenomenology Center
Office of the Provost
Office of Research & Innovation
Rangos School of Health Sciences
Peer Selection Committee

# SCHEDULE OF EVENTS

## Monday, March 16th

All Day — **Welcome - Virtual Symposium Site Launch!**

**Virtual Symposium** via Symposium by Forager One
Browse through posters and videos. Comment and ask questions.

## Tuesday, March 17th

All Day — **Virtual Symposium** via Symposium by Forager One
Browse through posters and videos. Comment and ask questions.

## Wednesday, March 18th

8:30 am to 3:30 pm **GRS In-Person Event – Location: Charles Dougherty Ballroom, Power Center**

**Poster Sessions and Oral Podium Presentations**

Stop by to view posters in-person and ask students questions about their work!

***Detailed schedule on the next page***

## Thursday, March 19th

All Day — **Virtual Symposium** via Symposium by Forager One
Browse through posters and videos. Comment and ask questions.

## Friday, March 20st

All Day — **Virtual Symposium** via Symposium by Forager One
Browse through posters and videos. Comment and ask questions.

## SCHEDULE FOR IN–PERSON EVENT
### Wednesday, March 18, 2026 | Power Center @ Duquesne University

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| **8:00 a.m. – 8:30 a.m.** | **Morning Poster Session Check-in and Light Refreshments**<br>Coffee, tea and breakfast breads provided for participants.<br>Morning Poster Session set up/check-in |
| **8:30 a.m. – 9:00 a.m.** | **Open Poster Session and Judging**<br>Guests are invited to walk around, peruse student projects, and engage with students. |
| **9:00 a.m. - 10:00 a.m.** | **ORAL SESSION 1 (Livestreamed on Symposium by Forager One)**<br>Students participating in the poster sessions **should attend** the formal presentations.<br>**Poster Session is closed at this time. Please respect the formal presenters.** |
| **10:00 a.m. - 11:00 a.m.** | **Open Poster Session and Judging**<br>Guests are invited to walk around, peruse student projects, and engage with students. |
| **11:00 a.m. - 12:00 p.m.** | **ORAL SESSION 2 (Livestreamed on Symposium by Forager One)**<br>Students participating in the poster sessions **should attend** the formal presentations.<br>**Poster Session is closed at this time. Please respect the formal presenters.** |
| **12:00 p.m. - 1:00 p.m.** | **Open Poster Session and Judging/Lunch**<br>Boxed lunches provided for participants. Take a break and get to know other presenters at the symposium! |
| **1:00 p.m. - 2:00 p.m.** | **ORAL SESSION 3 (Livestreamed on Symposium by Forager One)**<br>Students participating in the poster sessions **should attend** the formal presentations.<br>**Poster Session is closed at this time. Please respect the formal presenters.** |
| **2:00 p.m. - 3:00 p.m.** | **Open Poster Session and Judging**<br>Guests are invited to walk around, peruse student projects, and engage with students. |
| **3:00 p.m. to 3:30 p.m.** | **Awards and Closing Remarks**<br>Remember to take down your poster! |

**Award Winners will be contacted via email by Award Sponsors if any additional information is required.**

# ORAL PRESENTATIONS

## SESSION 1A: Charles Dougherty Ballroom A
## Moderator: Julian Cerminara

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|---|---|
| **9:00 - 9:15** | **Sumaiya Tasnim – presentation only**<br>Chemistry \| School of Science and Engineering<br>**Faculty Advisor/s:** Jeffrey Evanseck Ph.D., Mihaela-Rita Mihailescu Ph.D.<br>*$Mg^{2+}$shift of SARS-CoV-2 s2m kissing complex structure: Preorganization toward the A-form to facilitate strand displacement* |
| **9:15 - 9:30** | **Sadhana Srinivasa**<br>Biology \| School of Science and Engineering<br>**Faculty Advisor/s:** Wook Kim Ph.D.<br>*RsmE-dependent spatial positioning manifests cooperative spreading in Pseudomonas fluorescens through alterations in Cyclic-di-GMP levels* |
| **9:30 - 9:45** | **Jonah Babusci – presentation only**<br>Chemistry \| School of Science and Engineering<br>**Faculty Advisor/s:** Jeffrey Evanseck Ph.D., Mihaela-Rita Mihailescu Ph.D.<br>*HIV-1 DIS Kissing Complex to Extended Duplex Pathway: Anchored Palindromes with Simultaneous Strand Fraying* |
| **9:45 - 10:00** | **Michael Kardos – presentation only**<br>Biology \|School of Science and Engineering<br>**Faculty Advisor/s:** Sarah Woodley Ph.D.<br>*Biofluorescence is a Widespread and Highly Variable Phenotype in Plethodontid Salamanders* |

## SESSION 1B: Charles Dougherty Ballroom B
## Moderator: Kyle Perea

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| **9:00 - 9:15** | **Bhargav Kaparthi**<br>Computer Science \| School of Science and Engineering<br>**Faculty Advisor/s:** Raffaele Romagnoli, Ph.D.<br>*Social Safety Devices* |
| **9:15 - 9:30** | **Jeffrey Whitaker**<br>Psychiatric-Mental Health Nurse Practitioner \| School of Nursing<br>**Faculty Advisor/s:** Melissa Kalarchian, Ph.D., Richard Zoucha, Ph.D.<br>*Uncovering the Path: A Mini-Grounded Theory Study of the Adult Attention Deficit Hyperactivity Disorder (ADHD) Journey to Diagnosis* |
| **9:30 - 9:45** | **Corey Jenkins**<br>Music Therapy \| Mary Pappert School of Music<br>**Faculty Advisor/s:** Meng-Shan Lee, MMT, Ph.D., MT-BC<br>*Rethinking Recovery: Music Therapy, Agency, and Individualized Engagement* |
| **9:45 - 10:00** | **Trayvon Lovely**<br>School Psychology \| School of Education<br>**Faculty Advisor/s:** Tammy Hughes, Ph.D.<br>*Supporting Holistic Identity Development for Black Youth* |

## SESSION 2A: Charles Dougherty Ballroom A
## Moderator: Jeetal Vyas

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|---|---|
| **11:00 - 11:15** | **Melanie Salinas – presentation only**<br>Pharmacology \| School of Pharmacy<br>**Faculty Advisor/s:** Lauren O'Donnell, Ph.D.<br>*Oligodendrocyte Maturation Arrest during Viral Infection* |
| **11:15 - 11:30** | **Morgan McCann**<br>Chemistry \| School of Science and Engineering<br>**Faculty Advisor/s:** David Heisler, Ph.D.<br>*Determining Host-Binding Partners with Listeria Internalin Proteins* |
| **11:30 - 11:45** | **Elias Griffin**<br>Chemistry \| School of Science and Engineering<br>**Faculty Advisor/s:** David Heisler, Ph.D.<br>*Diimines as Novel Gram-Positive Selective Antibiotics* |
| **11:45 - 12:00** | **Kaitlyn Shaw**<br>Pharmacology \| School of Pharmacy<br>**Faculty Advisor/s:** Wilson Meng, Ph.D.<br>*Exploring a Low-Cost ELISA-based Method for Detecting Antibody Aggregates* |

## SESSION 32BA: Charles Dougherty Ballroom BA
## Moderator: AMiga$_{e}$h$_{r}$di$_{m}$i MAulib$_{a}$kinp$_{a}$Sh$_{ro}$a$_{v}$ik$_{a}$at

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| 1:10:00 - 1:11:15 | **S$^{Z}$t$^{a}$e$^{c}$p$^{h}$h$^{a}$a$^{ry}$ni$^{H}$e$^{u}$H$^{n}$o$^{te}$sl$^{r}$e$^{-}$y $^{p}$(L$^{ri}$v$^{s}$e$^{e}$V$^{nt}$ir$^{a}$t$^{u}$$^{io}$a$^{n}$l P$^{o}$r$^{n}$e$^{l}$s$^{y}$enter)**<br>T$_{N}$h$_{u}$e$_{r}$o$_{si}$l$_{n}$ogy$_{\|}$ \|$_{Sc}$M$_{ho}$cA$_{o}$n$_{l\,o}$u$_{f}$lt $_{N}$y $_{u}$C$_{r}$o$_{s}$l$_{i}$l$_{n}$ege and Graduate School of Liberal Arts<br>**Faculty Advisor/s:** R$^{A}$e$^{n}$b$^{n}$e$^{a}$c$^{S}$c$^{c}$a$^{h}$ K$^{e}$r$^{id}$o,n $^{P}$k,$^{h}$ P$^{.D}$h$^{\cdot}$.D., CRNP, MSN; Richard Zoucha, Ph.D., PMHCNS-BC, CTN-A<br>*$_{F}$A$_{T}$“$_{N}$G$_{S}$o$_{S}$l$_{,}$d$_{F}$e$_{A}$n$_{A}$C$_{N}$up Full of Abominations”: Evaluating Artificial Intelligence as Structure and Occasion of*<br>*$^{S}$T$^{i}$h$^{n}$e Lived Experiences of Black Mothers of Children with Cerebral Palsy* |
| 1:11:515- - 1:13:030 | **CKeacelmiaeRDajtealylouli**<br>ANnuarslyintigcs\| aSncdhoInofloorfmNautirosinn Mg anagement \| A.J. Palumbo School of Business Administr<br>**Faculty Advisor/s:** PRinchaar rOdzZtuorukc,hPah, .PDh..D., PMHCNS-BC, CTN-A, FTNSS, FAAN;<br>*ICnrditiicceasl oCfa rEed uNcuartsieosn’aDl eScyistieomn- MReaakdiningetsos Engage Patients with Acute Bra*<br>*Mini-Grounded Theory Study* |
| 11:30 - 1:14:45 | **K$_{M}$a$_{a}$ti$_{n}$e$_{o}$ M$_{ela}$cC$_{R}$a$_{o}$b$_{c}$e$_{h}$ –$_{a}$ p$_{N}$r$_{e}$e$_{v}$s$_{e}$e$_{s}$ntation only**<br>P$_{B}$h$_{io}$il$_{m}$os$_{e}$o$_{d}$p$_{ic}$h$_{a}$y$_{l}$ \|$_{En}$M$_{i}$c$_{n}$A$_{e}$n$_{e}$u$_{r}$l$_{i}$t$_{n}$y C$_{\|}$o$_{S}$ll$_{c}$e$_{h}$g$_{o}$e$_{o}$a$_{l}$ n$_{o}$d$_{f\,S}$G$_{c}$r$_{i}$a$_{e}$d$_{n}$u$_{ce}$at$_{a}$e$_{n}$S$_{d}$ch$_{E}$o$_{n}$o$_{i}$l$_{n}$o$_{e}$f$_{e}$L$_{r}$i$_{b}$$_{n}$eral Arts<br>**FFaaccuullttyy AAddvviissoo$^{g}$rr//ss::** R$^{J}$a$^{a}$n$^{mg}$a$^{e}$Z$^{s}$ a$^{S}$k$^{w}$e$^{i}$r$^{n}$z$^{d}$a$^{a}$d$^{l}$e, h$^{P}$,$^{h}$P$^{.D}$h.$^{\cdot}$D. $^{g}$ $^{g}$<br>*$^{L}$E$^{u}$xp$^{d}$l$^{ic}$o r$^{D}$in$^{is}$g$^{g}$t$^{u}$h$^{s}$e$^{t:}$ I $^{R}$m$^{e}$p$^{a}$a$^{s}$c$^{s}$t$^{es}$o$^{s}$f$^{in}$V$^{g}$o c$^{t}$a$^{h}$l$^{e}$F$^{L}$o$^{im}$ld$^{i}$L$^{ts}$es$^{oi}$f$^{o}$ $^{K}$n$^{a}$s $^{n}$o$^{t}$n$^{ia}$P$^{n}$h$^{S}$o$^{u}$n$^{b}$a$^{l}$t$^{im}$ion$^{e}$ u$^{th}$s$^{r}$in$^{o}$g$^{u\ g}$C$^{h}$o m$^{Ho}$p$^{t}$* |
| 11:45 - 2:12:00 | **L$_{Z}$e$_{e}$o$_{re}$n$_{n}$a$_{a}$rd$_{N}$Z$_{ie}$if$_{v}$a$_{e}$c$_{s}$–$_{F}$ p$_{i}$ r$_{u}$e$_{e}$s$_{r}$e$_{o}$n$_{a}$tation only**<br>$_{F}$T$_{o}$h$_{r}$e$_{e}$o$_{n}$lo$_{si}$g$_{c}$y$_{S}$ \|$_{ci}$M$_{en}$c$_{c}$A$_{e}$ng$_{a}$u$_{n}$lt$_{d}$y $_{L}$C$_{a}$o$_{w}$lle$_{\|}$g$_{S}$e$_{c}$a$_{h}$n$_{o}$d$_{ol}$G$_{o}$r$_{f}$a $_{S}$d$_{c}$u$_{i}$a$_{e}$t$_{n}$e$_{ce}$Sc$_{a}$h$_{n}$o$_{d}$o $_{E}$l $_{n}$of $_{i}$L$_{n}$i$_{e}$b$_{e}$e$_{r}$i$_{a}$$_{n}$l Arts<br>**Faaccuulty Advvissoorr/ss::** $^{A}$p$^{n}$a$^{n}$m$^{a}$e$^{S}$la$^{ch}$M$^{ei}$a$^{d}$r$^{\prime S}$ $^{P}$h$^{h}$a$^{\cdot}$ll$^{D\cdot}$Ph.D.; Lindsey F$^{g}$errara P$^{gh}$.D.<br>*$_{l}$W$_{m}$om$_{lic}$e$_{it}$n’$_{B}$s$_{ia}$P$_{s}$e a$_{a}$c$_{n}$e$_{d}$ A$_{th}$g$_{e}$e n$_{L}$c$_{in}$y$_{k}$: R$_{to}$e a$_{J}$d$_{u}$i$_{r}$n$_{o}$g$_{r\,S}$A$_{e}$fr$_{le}$ic$_{a}$ti$_{e\,o}$ M$_{n}$i$_{u}$n$_{c}$u$_{a}$s in$_{ita}$th$_{l\,P}$e $_{u}$F$_{n}$ra$_{is}$m$_{hm}$ew$_{en}$o$_{t}$rk$_{Ca}$o$_{s}$* *Eth$^{p}$ics and the Cultural Production of Evil* $^{p}$ |

| SESSION 3A: Charles Dougherty Ballroom A<br>Moderator: Zaha Makhdoom | |
|---|---|
| **1:00 - 1:15** | **Yong Myoung**<br>Pharmacology \| School of Pharmacy<br>**Faculty Advisor/s:** Paula Witt-Enderby, Ph.D.<br>*Role of Endogenous Melatonin and Melatonin Receptors, MT1 and MT2, on Metabolic Proteins in Bone in AANATKO and MTRKO Transgenic Mice* |
| **1:15 - 1:30** | **Anannya Pushkarna**<br>Medicine \| Nasuti College of Osteopathic Medicine<br>**Faculty Advisor/s:** Melanie Turk, Ph.D.<br>*Awareness of the Medicare Diabetes Prevention Program Among Healthcare Providers Caring for Older Adults* |
| **1:30 - 1:45** | **Jenna Relkin**<br>Physical Therapy \| Rangos School of Health Sciences<br>**Faculty Advisor/s:** Dominic Violi, DPT, CSCS.<br>*Lower Limb Muscle Morphology in Individuals with Coronary Artery Disease: A Cadaveric Pilot Study* |
| **1:45 - 2:00** | **Giang Dinh – presentation only**<br>Media Arts and Technology \| McAnulty College and Graduate School of Liberal Arts<br>**Faculty Advisor/s:** William Gibbs, Ph.D.<br>*Making Accessibility Accessible: Developing and Evaluating a Chrome Extension for Color-Blindness Simulation* |

| SESSION 3B: Charles Dougherty Ballroom B<br>Moderator: Urva Maryam | |
|---|---|
| **1:00 - 1:15** | **Eliza Grimm – presentation only**<br>History \| McAnulty College and Graduate School of Liberal Arts<br>**Faculty Advisor/s:** Andrew Simpson, Ph.D.<br>*And Came "A Flock of White Doves": The Sisters of the Holy Cross and Nursing in the Civil War (1861-1865)* |
| **1:15 - 1:30** | **Kyle Louder**<br>Public History \| McAnulty College and Graduate School of Liberal Arts<br>**Faculty Advisor/s:** Jennifer Taylor, Ph.D.<br>*Slavic Pittsburgh: Past and Present* |
| **1:30 - 1:45** | **Joshua Robinson**<br>Biology \| School of Science and Engineering<br>**Faculty Advisor/s:** Jan Janecka, Ph.D.<br>*Landscape genetics of the American black bear (Ursus americanus) in Pennsylvania* |
| **1:45 - 2:00** | **Marie Navarro Sullivan**<br>Environmental Science and Management \| School of Science and Engineering<br>**Faculty Advisor:** Phillip Reeder, Ph.D.<br>*Communicating Environmental Risk: Lessons from Flint, Love Canal, and PFAS Contamination* |

# AWARDS

**CENTER FOR AFRICAN STUDIES**

**Award for Graduate Student Research in African Studies: $400**

This award is intended to encourage and reward graduate research in African Studies and related areas that engage Duquesne's ongoing commitment to Africa. Evaluations are based upon visual presentation, organization, creativity, and clarity.

**Award for Graduate Student Research in Global Health: $400**

This award is intended to encourage and reward graduate research in Global Studies. Evaluations are based upon visual presentation, organization, creativity, and clarity.

**CENTER FOR CATHOLIC FAITH & CULTURE**

**Common Good Research Award: $500**

The Center for Catholic Faith and Culture (CCFC) joins the Office of Research in supporting outstanding research and scholarship among graduate students at the Graduate Student Research Symposium. Research projects in the liberal arts, business, the professions, the sciences, and music all bear on our prospects for nurturing the common good. The common good refers to the array of tangible and intangible social conditions (e.g., food, shelter, education, healthcare, happiness, human dignity) that are necessary to promote the flourishing and well-being of all persons. Supporting and working for such universal rights is a foundational pillar of the Catholic faith which advocates for a more just society for all, regardless of economic or social status, faith tradition, race, culture, etc.

**CENTER FOR COMMUNITY-ENGAGED TEACHING & RESEARCH**

**Award for Graduate Research: $250**

The aim of this award is to recognize and celebrate research that contributes to authentic partnerships between scholars and community that generates knowledge that is relevant to disciplinary discovery as well as application to community concerns. The award will include a prize of $250 as well as a gift to the researcher's community partner.

**CENTER FOR GLOBAL HEALTH ETHICS**

**Award for Graduate Research in Ethics, 2 awards, $250 each**

This award aims to promote the interest of students for issues in healthcare ethics within contemporary society and culture. It also intends to encourage graduate research in the area of healthcare ethics. The HCE price is for the presentation that best highlights ethical issues in healthcare and ethical dimensions of developments in science and technology for human health and wellbeing.

**CENTER FOR INTEGRATIVE HEALTH**

**Award for Graduate Research: $200**

The Center for Integrative Health (CIH) Award for Graduate Research recognizes outstanding scholarly projects in any field of study that aligns with the commitment of the CIH to improve the health and wellness of our campus and neighboring communities with an emphasis on rural and urban health care disparities through interdisciplinary practice, teaching, and research.

**CENTER FOR MIGRATION, DISPLACEMENT & COMMUNITY STUDIES**
**Outstanding Graduate Research: $200**
This award aims to propagate awareness and concerns related to migration, displacement and community through original research. Eligible projects focus on creating awareness about these issues in our communities from any disciplinary perspective.

**CENTER FOR WOMEN'S & GENDER STUDIES**
**Award for Graduate Research: $150**
The aim of this award is to recognize and celebrate research that considers how the construct of gender identity shapes an individual's or community's experiences and/or how writers, artists, scholars, researchers and practitioners represent or respond to those gendered experiences.

**GREFENSTETTE CENTER FOR ETHICS IN SCIENCE, TECHNOLOGY, & LAW**
**Top Graduate Research Project: $250, Honorable Mention: $100**
The Grefenstette Center for Ethics in Science, Technology, and Law will present its inaugural award to the top undergraduate and graduate research symposium projects that tackle current issues in technological ethics, including but not limited to issues of AI, automation, policy, health care, labor, extremism, social media, and bias. The winning entries will not only analyze an ethical issue in modern technology but create avenues for discourse while offering possible solutions in a rigorously researched and presented project.

**GUMBERG LIBRARY**
**Award for Graduate Research: $500, Honorable Mention: $100**
The Gumberg Library Award for Graduate Research recognizes excellence in application of research methods that demonstrate substantial use of library resources. Outstanding projects in any field of study that incorporate significant use of library expertise, resources, collections, and/or services are eligible.

**HISTORY DEPARTMENT**
**Clio Award for Graduate Research**
**First Place: $200, Second Place: $150, Third Place: $100**
Named for the muse of History, the Clio Award for Graduate Research includes first, second, and third place categories, and is given to History and/or Art History majors who participate in the Annual Graduate Research and Scholarship Symposium (GRS). A panel of judges comprised of the Department Chairperson and the Director of Graduate Research selects the winners.

**MARY PAPPERT SCHOOL OF MUSIC**
**Mary Pappert School of Music Graduate Award: $250**
Students who are in the school of music are eligible for this award**.**

**MCANULTY COLLEGE AND GRADUATE SCHOOL OF LIBERAL ARTS**
**Outstanding Poster or Presentation: $250**
The aim of this award is to recognize excellence in the liberal arts. Projects will be evaluated based upon organization, clarity, and content.

**OFFICE OF THE PROVOST**
**Provost's Award for Outstanding Scholarship, 3 awards, $150 each**
Students from all disciplines who are participating in the GSRS are eligible for these awards. A committee of

administrators and faculty will judge posters and oral presentations based on intellectual merits and demonstration that the research presented meets the stands for its field.

**RANGOS SCHOOL OF HEALTH SCIENCES**
**Award for Graduate Research: $250**
Students who are in the school of Health Sciences are eligible for this award.

**SCHOOL OF EDUCATION**
**Outstanding Graduate Research: $500, Runner-up: $250**
The School of Education Award for Outstanding Graduate Student Research offers a prize and runner-up prize to graduate students who demonstrate research *for* and *with* schools and community. To be eligible, the student must be enrolled in a School of Education program, conduct a study where data were collected and analyzed (preliminary proposals and literature reviews are not eligible), and must be first author on the work presented.

**SCHOOL OF NURSING**
**Award for Graduate Research: $250**
Students from the School of Nursing are considered for this award.

**SCHOOL OF SCIENCE AND ENGINEERING**
**Excellence in Graduate Research, 2 awards, $300 each**
Students whose projects fall within the realm of the basic sciences are considered for this award. Projects are evaluated based upon organization, creativity, clarity, and technical content.

**SIMON SILVERMAN PHENOMENOLOGY CENTER**
**Award for Graduate Research: $250, Runner-up: $100**
The Simon Silverman Phenomenology Center (SSPC) Award for Graduate Research recognizes excellence in phenomenological research. Outstanding projects in any field of study that employ a phenomenological approach—which can be realist, transcendental, existential, hermeneutic—either to articulate the essential structure of a specific lived experience or to interpret a concept or problem in a phenomenological figure or topic will be considered. Projects involving the intersection of phenomenology and pedagogy or phenomenology and clinical practice are also welcome. Some weight will be given to projects that show the use of SSPC's special collection and/or archival materials.

# ABSTRACTS

Some of the Live Oral Presenters will not have posters. All Oral Presentations will be livestreamed under the Live Sessions tab on our online platform and available to view after.

Presentations are available to view all week on Symposium by ForagerOne!

## VIRTUAL POSTERS

NB: These presentations will only be available online.

**Virtual: HIV-1 DIS Kissing Complex to Extended Duplex Pathway: Anchored Palindromes with Simultaneous Strand Fraying**

Jonah Babusci | Chemistry |School of Science and Engineering
Faculty Advisor(s): Jeffrey Evanseck, Ph.D., Mihaela-Rita Mihailescu, Ph.D.

**Abstract:**
The HIV-1 dimerization initiation sequence (DIS) regulates genome packaging through a kissing complex (KC) that converts to an extended duplex (ED) during the viral lifecycle. Although the biological relevance of this strand displacement (SD) transition is well established, an atomistic mechanism remains unclear for the multitude of possible SD pathways. Using nudged elastic band calculations, combined with molecular dynamics simulations, we characterized a minimum energy pathway corresponding to a distinct SD mechanism, defined by anchored palindromes and simultaneous strand fraying. This minimum energy path (MEP) is populated by well-defined intermediate structures, providing opportunities to inhibit SD. Consequently, we bound a complementary oligonucleotide to an intermediate structure along the free energy path. PCA analysis revealed that this ligand prevented the system's ability to transverse the SD pathway, serving as proof of concept that our pathway could be intercepted as a paradigm for antiviral treatment. In addition to our NEB MEP pathway, further unbiased molecular dynamics simulations from the minimum energy pathway suggests a heterogenous ensemble of pathways describing alternative strand displacement mechanisms for future exploration. Preliminary investigation via regular space discretization, and the transition probabilities therein, suggests that alternative 'shortcut' pathways may supersede the minimum energy path. By establishing atomistic details of this transition, this work expands the framework for targeting dynamic RNA elements in HIV-1 and related viral systems.

**Virtual: A Comparative Review of Advantages and Limitations of AI-Based Tools and Traditional Methods for Carbohydrate Estimation for Type 1 Diabetes Mellitus**

Jordan Baney | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Kristin D'Acunto, Ed.D., MPA, PA-C, Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**
**Background:** Type 1 diabetes mellitus is a prevalent disease across the globe that requires precise carbohydrate estimation to support proper insulin dosing. Currently available traditional carbohydrate counting methods can

be challenging to use consistently. Due to this and with the growing use of artificial intelligence (AI), current literature is just beginning to examine the implications and use of AI in carbohydrate counting for the purpose of insulin dosing. Comparative data concerning the strengths and limitations of traditional carbohydrate counting methods versus AI carbohydrate counting tools remains limited. A clearer synthesis of existing evidence is needed to define the role of AI in carbohydrate estimation. This study addresses these gaps.
**Objective**: This study aims to compare the advantages and limitations between AI-based carbohydrate counting tools and traditional carbohydrate counting methods in patients with type 1 diabetes mellitus.
Methods: A narrative review was conducted using PubMed, Embase, and CINAHL to identify studies published between 2021 and 2026. Eligible studies included randomized controlled trials and observational cohorts evaluating AI-based carbohydrate counting tools and traditional carbohydrate counting methods in individuals with type 1 diabetes mellitus. These studies were reviewed and synthesized descriptively to examine reported accuracy, advantages, limitations, and areas of clinical applicability.
**Results**: This study is expected to identify differences in accuracy, usability, and clinical implementation between AI carbohydrate counting tools and traditional carbohydrate counting methods. Emerging themes may include variability in learning requirements, user burden, and accessibility. Areas in which each approach may offer distinct advantages or limitations will be highlighted.
**Conclusion**: By comparing the advantages and limitations of AI-based and traditional carbohydrate counting tools, this review works to enhance understanding of their roles in type 1 diabetes mellitus management. Clarifying the utilization, benefits, and drawbacks of these tools may aid clinicians and patients in making informed decisions regarding carbohydrate estimation strategies and identify areasfor further research.

**Virtual: A Comparative Review of Estrogen-Only and Combined Estrogen-Progestin Replacement Therapy for the Management of Postmenopausal Osteoporosis**

Kiersten Belt | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Kristin D'Acunto, Ed.D., MPA, PA-C

**Abstract:**
**Background:** Hormone replacement therapy (HRT) has been used in postmenopausal osteoporosis to address bone loss associated with declining estrogen levels. Both estrogen-only and combined estrogen-progestin regimens are utilized in clinical practice. However, variability exists in reported effects on bone health and long-term outcomes. Direct comparative evidence remains limited, contributing to the ongoing uncertainty in clinical decision-making.
**Objective:** This review aims to compare existing evidence on the effects of estrogen-only and estrogen-progestin HRT with a focus on reported effects related to bone health and osteoporosis management in early menopause.
**Methods:** A literature review was conducted using PubMed, Embase, CINAHL, and Scopus to identify studies published between 2021 and 2026 involving women receiving estrogen-only and estrogen-progestin HRT in the context of bone health. Eligible studies included randomized controlled trials, retrospective studies, and cohort studies. Evidence was synthesized descriptively to examine reported outcomes and areas of variability across studies.
**Results:** This review is expected to identify the differences and similarities in reported bone mineral density outcomes and fracture-related findings between estrogen-only and estrogen-progestin HRT. Emerging themes may include variability in study design, duration of therapy, patient characteristics, and outcome reporting, contributing to inconsistent findings across the literature.

**Conclusion:** By synthesizing comparative evidence on estrogen-only and estrogen-progestin HRT, the review aims to clarify current understanding of their respective roles in bone health and osteoporosis. These results are important for supporting informed clinical decision-making and identifying areas for future research.

**Virtual: Comparing the effects of empagliflozin and semaglutide on cardiovascular outcomes and mortality rates in patients with type 2 diabetes mellitus**

Claire Belton | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Kristin D'Acunto, Ed.D., MPA, PA-C

**Abstract:**
**Background:** People with type 2 diabetes mellitus have an increased risk for developing cardiovascular disease, which remains one of the most common causes of morbidity and mortality in this patient population. Sodium-glucose co-transporter 2 (SGLT2) inhibitors and glucagon-like peptide-1 (GLP-1) receptor agonists are two classes of glucose-lowering medications that have been extensively studied for their cardiovascular effects. Empagliflozin and semaglutide are two agents in these classes that are frequently used in clinical practice. While many studies have individually examined the cardioprotective effects of each agent, few have been done that directly compared the two. Uncertainty remains regarding how their cardiovascular outcomes compare when examining published literature.
**Objectives:** This study is a comparative synthesis of the cardiovascular outcomes and mortality rates of empagliflozin and semaglutide in patients with type 2 diabetes mellitus.
**Methods:** This study is a narrative review using PubMed, Scopus, and Embase to collect data from studies involving patients with type 2 diabetes mellitus treated with empagliflozin or semaglutide. Studies included are clinical trials and observational cohort studies published between 2021 and 2026. Evidence on reported cardiovascular outcomes from the included studies is synthesized descriptively. Primary outcomes are effects on blood pressure, development of heart failure, hospitalizations for heart failure, incidence of myocardial infarction, incidence of cerebrovascular accidents, and all-cause and cardiovascular mortality rates.
**Results:** It is anticipated that this review will identify similarities and differences in how cardiovascular outcomes and mortality rates are reported for empagliflozin and semaglutide. Heterogeneity is expected to exist in the demographics of study populations, follow-up duration, study design and approach, outcomes of interest, and data reporting.
**Conclusion:** By synthesizing evidence on cardiovascular outcomes in patients with T2DM treated with empagliflozin or semaglutide, this study intends to identify the extent of empagliflozin's and semaglutide's cardioprotective effects. Comparing the outcomes of interest and study populations may help contextualize similarities and differences between these medications and contribute to a deeper understanding of their cardiovascular effects.

**Virtual: A Comparative Narrative Review of Multitarget Stool DNA Testing and Colonoscopy for Colorectal Cancer Screening in Average-Risk Adults**

Benjamin Berkebile | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Kristin D'Acunto, Ed.D, MPA, PA-C

**Abstract:**
**Background:** Colorectal cancer (CRC) is the third most commonly diagnosed cancer and the second leading cause of cancer-related mortality in the United States. Rising incidence among adults aged 45–55 has prompted

guideline updates lowering the recommended screening age to 45 years. Colonoscopy and multitarget stool DNA (mt-sDNA) testing represent two widely used screening approaches for average-risk adults, each with distinct characteristics related to detection capabilities, invasiveness, and patient participation. Variability in reported screening performance and adherence has contributed to ongoing discussion regarding their respective roles in population-based CRC screening strategies.
**Objective:** This narrative review compares how mt-sDNA testing and colonoscopy are characterized in the existing literature for average-risk U.S. adults aged 45–75 undergoing colorectal cancer screening. The review examines reported measures of cancer and advanced neoplasia detection, screening adherence, and follow-up outcomes as described across studies.
**Methods:** A narrative review was conducted using peer-reviewed literature identified through comprehensive searches of PubMed, Embase, and the Cochrane Library. Included studies were published within the past five years and involved average-risk adults aged 45–75 undergoing colorectal cancer screening with either mt-sDNA testing or colonoscopy. Evidence was synthesized descriptively to examine reported screening performance, patient adherence, and variability in outcome reporting across screening modalities.
**Anticipated Results:** This review is expected to identify differences in how mt-sDNA testing and colonoscopy are evaluated across the literature, including variability in reported detection of colorectal cancer and advanced neoplasia, screening adherence rates, and downstream follow-up outcomes. Emerging themes may include trade-offs between test accessibility and procedural sensitivity, as well as heterogeneity in how longer-term screening effectiveness is assessed.
**Conclusion:** By synthesizing comparative evidence on invasive and noninvasive colorectal cancer screening strategies, this review aims to clarify how screening performance and participation are reported across modalities. Examining these differences may help contextualize their respective roles within current screening frameworks and inform future evaluation of colorectal cancer screening approaches.

**Virtual: Black College Women's Experiences with College Counseling Centers**
Patrice Bryan | Counselor Education & Supervision | School of Education
Faculty Advisor(s): ZiYoung Kang, PhD., NCC

**Abstract:**
Black college's women's experiences have been defined by their navigation of institutional racism, interpersonal discrimination, and individual resilience factors. As a result, Black college women report high rates of depressive symptoms, anxiety, and stress. The college counseling center is designed to support students while navigating mental health challenges at higher education institutions. Research shows that there are many reasons why Black college students may choose not to engage in counseling at the college counseling center, including cultural mistrust, institutional climate, and mental health stigma. However, Black college women have been found to use the college counseling services more than any other minority group. This study seeks to explore the experiences of Black college women who chose to engage in counseling services at college counseling centers to further inform college counseling practice.

**Virtual: Improving Ethical Practices of Care for Healthcare Sufferers**
Carter Check | Healthcare Ethics | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Joris Gielen, Ph.D., Gerard Magill, Ph.D.

**Abstract:**
The healthcare sector is plagued by moral dilemmas and burnout, stemming from the excessive workloads and insufficient resources that professionals face daily. Addressing these issues is essential for ensuring better care for patients and the well-being of healthcare workers. Overall, the negative impact on both healthcare professionals and patients is significant and cannot be overlooked. Moral healthcare ethics guide healthcare professionals in embracing moral integrity while at the same time navigating complex dilemmas. The essential components of moral health are courage, sensitivity, engagement, moral integrity, resilience, and identity. These qualities not only define our character but also guide our actions and decisions, shaping a more compassionate and just society. Healthcare systems have global instability issues as well as local ecosystem issues that affect healthcare institutions and their employees. As a result, the health of patients is negatively impacted. This challenging environment is forcing healthcare systems to adopt innovative technological procedures, in the key functional areas of the healthcare system. These inventive moves aim at placing healthcare organizations strategically, to boost productivity. Therefore, companioning is a caring approach that focuses on walking along with people when they go through moral challenges.

**Virtual: Innovative Approaches to Managing Hyperuricemia: Current Treatments and Emerging Therapies**
Yenna Choi | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Emily Daum| Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Yanfei Qi, Ph.D., MD, MS

**Abstract:**
Hyperuricemia, a condition defined by elevated serum urate levels, is a major risk factor for gout and comorbidities such as cardiovascular disease and chronic kidney disease. Although urate-lowering therapies (ULTs) such as xanthine oxidase inhibitors and uricosurics remain the first-lines of treatment, their use is limited by adverse effects, treatment resistance, contraindications, and cost, emphasizing the need for new options. Recent studies are revealing alternate therapies including newly synthesized agents, nutraceuticals, and repurposed drugs. Dotinurad, a URAT1 inhibitor, reduced sUA to ≤6 mg/dL in 73.6% of patients within 24 weeks of use, revealing not only uricosuric activity, but also a safer option for those with renal complications. AR882, another upcoming agent, achieved sUA levels below 5 or 4 mg/dL in the majority of participants at 12 weeks of use. A xanthine oxidase inhibitor, tigulixostat demonstrated a mean percentage change in sUA levels of -38.8% to -61.8%, outcompeting the placebo groups in all scenarios. SEL-212, a once-monthly infusion therapy, demonstrated an additional option for patients to explore. In acute gout, the oral NLPR3-inflammasome inhibitor, dapansutrile, is in late-phase trials as an steroid-sparing option with anti-inflammatory properties. In addition to these new urate-lowering therapies, advances in repurposed drugs and nutraceuticals are being made, expanding beyond conventional treatment options and offering alternatives for differing circumstances. The development of these options directly addresses the limitations of current FDA-approved therapies, including safety, efficacy, cost, and adverse effects. This suggests a more individualized and effective future for hyperuricemia management. Uricemin®, a flavonoid-based compound, lowered sUA below 6.5 mg/dL in all participants with borderline hyperuricemia. Quercetin Phytosome™ reduced urate, by 15.2% in males and 13.8% in women, and improved triglycerides, while tart cherry juice lowered urate by 19.2% while also proving useful in decreasing inflammatory markers. In heart failure patients with hyperuricemia, prednisone reduced sUA, with positive effects on the renal system. Additional therapeutics are currently under investigation, with ongoing trials and pending results. This review summarizes current, evidence-based and explorative treatments including nutraceuticals, repurposed drugs, uric acid transport modulators, combination therapies, and more.

**Virtual: A Comparative Analysis on Adherence, Sustainability, and Condition Stabilization in Low-Glycemic Index Diets and Metformin use for Insulin-resistant PCOS**

Isabelle Cuchapin | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Marie Matarazzo, DMS, MPAS, PA-C

**Abstract:**

**Background**: PCOS is a prevalent multifaceted disorder involving derangements in metabolic, reproductive, and neuroendocrine function. Although there is no standardized treatment in place, management often includes pharmacologic interventions and lifestyle modifications, particularly dietary approaches directed at improving insulin sensitivity. Current literature suggests variable outcomes between low-glycemic index diets and metformin for long-term insulin-resistant PCOS treatment, yet comparative data addressing adherence and sustainability remain limited. This study addresses this critical gap.

**Objective:** This study aims to compare patient adherence, long-term sustainability, and condition stabilization between low-glycemic index diets and metformin in patients with insulin-resistant PCOS.

**Methods**: A narrative review is being conducted using PubMed, Embase, CINAHL, and Scopus to identify studies published between 2020 and 2026 evaluating adherence, sustainability, and condition stabilization in patients using either a low-glycemic index diet or metformin for managing insulin-resistant PCOS. Eligible studies include systematic reviews, randomized controlled trials, meta-analysis, and cohort studies. Primary outcomes include treatment adherence rates as well as anthropometric, metabolic, reproductive, and hormonal parameters to assess condition stabilization.

**Results:** It is anticipated that a low-glycemic index diet will demonstrate superior condition stabilization, while metformin use may show higher adherence and long-term sustainability due to overall ease and convenience in daily management. These findings are anticipated to aid in routine clinically informed decision-making by elucidating key therapeutic considerations.

**Conclusion:** By clarifying patient adherence, long-term sustainability, and condition stabilization between prevalent non-pharmacological and pharmacological therapies, this study aims to advise personalized treatment strategies for insulin-resistant PCOS. The results may guide clinicians toward more comprehensive treatment regimens that address all components of the disease – metabolic, reproductive, hormonal, biochemical, and clinical – as well as support future prospective studies focusing on sustained disease improvement and mitigation of complications related to PCOS.

**Virtual: Analyzing the different types of autografts used in athletes requiring ACL reconstruction and how they affect returning to competitive sport**

Michael DAulerio | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Marie Matarazzo, DMS, MPAS

**Abstract:**

**Background:** Athletes who suffer ACL tears commonly need surgical reconstruction in order to return to competitive sports. As autograft harvesting remains a popular choice amongst surgeons to reconstruct the ACL, the choice of which autograft to use — bone-patellar tendon-bone (BPTB), hamstring tendon (HT), or quadriceps tendon (QT) — remains an ongoing debate regarding their affect on athletes' recovery, rehabilitation, and overall rate of returning to sport. Determining if certain autografts influence the time to return to competitive sports is clinically relevant for surgical decision-making, recovery planning, and athlete satisfaction.

**Objective:** This study aims to evaluate whether the type of autograft used in ACL reconstruction influences the time to return in competitive sports. The secondary objective of this study is to compare the differences in functional outcomes associated with each autograft choice.
**Methods**: A narrative review was conducted using PubMed, Scopus, and Embase to discover studies published between 2016 and 2026 assessing autograft selection in athletes undergoing ACL reconstruction. Eligible studies included comparative analyses, randomized controlled trials, and cohort studies. Primary outcomes will include rate to return to competitive sports and functional outcomes.
**Results:** It is anticipated that BPTB autografts will yield higher rates of returning to competitive sports and lower rates of of graft failure when compared to HT autografts and QT autografts. HT autografts are anticipated to demonstrate reduced anterior knee pain in athletes but are also expected to result in longer recovery timelines. QT autografts are expected to yield lower donor-site morbidity, but there is limited research regarding QT autografts
**Conclusion:** By understanding how different autografts influence an athlete's rate of returning to sport, conclusions can be made regarding which autograft choice is most optimal for the athlete in question. The results may guide surgeons toward making more individualized graft choices for athletes and identify areas for future research regarding long-term outcomes of athletes.

**Virtual: Evaluating Diagnostic Accuracy of AI-Enabled Consumer Wearables for Atrial Fibrillation Detection and Subsequent Clinical and Ethical Implications**

Lakyn Davis | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Marie Matarazzo, DMS, MPAS, PA-C

**Abstract:**
**Background**: With growing curiosity over the use of commercial, artificial intelligence (AI)-enabled wearable devices in health care, literature suggests that while they are highly sensitive and specific in detecting conditions like atrial fibrillation (AF), there may still be risks associated with considering their data in diagnostic and treatment plans. Research is limited in outcome-driven studies including anticoagulation assessment as well as factors like cost effectiveness. This review addresses both concerns and the potential for positive outcomes in the use of these devices in diagnosis and management of AF.
**Objective**: To explore the diagnostic accuracy, clinical impact and ethical implication of consumer-available, AI-enabled wearable devices as they compare to current, traditional ECG-based diagnostic modalities.
**Methods**: A narrative review was conducted using PubMed, Scopus, and Embase to compile sources published between 2019 and 2026 including diagnostic accuracy studies, observational cohorts, and randomized controlled trials as well as ethical analyses. The primary outcome is diagnostic accuracy of AI-enabled wearable devices in detecting AF; secondary outcomes include clinical impact and ethical implications such as technical limitations, patient usability and experience, and application to anticoagulation.
**Findings**: It is anticipated that regardless of the sensitivity and specificity of evidence, wearable device limitations of photoplethysmography (PPG) technology and resulting deficiencies in AI algorithms may warrant confirmatory testing to reliably diagnose AF. Furthermore, results are expected to show wearable-detected AF affects patients not only through pharmacologic decision-making but psychological impact, and that limitations of PPG may exacerbate healthcare disparities through algorithmic bias.
**Conclusion:** In clarifying the evidence-based risks and benefits of AI-enabled consumer wearable devices and comparing them to traditional modalities, this study will work to inform clinicians on existing facts which may be presented to educate patients and consequently aid in personalizing patient care. The results may also highlight

the need for future outcome-driven trials including in anticoagulation for device-detected AF, as well as support further enhancement of AI algorithms to improve their real-world accuracy and help better integrate them into clinical practice ensuring maximum benefit and minimal harm.

**Virtual: Comparison of Immune Checkpoint Inhibitors and Standard Chemotherapy on Overall Survival and Quality of Life in Patients with Malignant Pleural Mesothelioma**

Emerson Dickson | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Marie Matarazzo, PA-C, DMS

**Abstract:**
Malignant pleural mesothelioma (MPM) is a rare, aggressive malignancy located in the lining of the lungs, the pleura. It is associated with a poor prognosis & limited therapeutic options. Platinum-based chemotherapy has long been the standard of care but continues to show insufficient survival goals & treatment-related toxicity & often compromises quality of life. The emergence of immune checkpoint inhibitors (ICIs) has introduced a promising therapeutic strategy, benefiting both quality of life & long-term survival. The primary objective of this narrative review is to compare the impact of immune checkpoint inhibitors versus standard chemotherapy on overall survival in patients with malignant pleural mesothelioma. The secondary objective is to evaluate differences in quality-of-life outcomes & treatment tolerability between these therapeutic approaches. A narrative review of the literature was conducted using PubMed, Scopus, & Embase to identify relevant studies published between 2020 and 2026. Eligible articles included randomized controlled trials, observational studies, & major phase II–III clinical trials involving adult patients with malignant pleural mesothelioma treated with immune checkpoint inhibitors or standard chemotherapy. Studies reporting overall survival, progression-free survival, health-related quality of life, or treatment-related adverse events were prioritized. Findings were qualitatively synthesized to evaluate patterns in clinical efficacy and patient-reported outcomes. Immune checkpoint inhibitors are expected to demonstrate improved overall survival compared with standard chemotherapy in selected patient populations, particularly when used in combination regimens. Quality-of-life measures may favor immunotherapy, given its lower cumulative toxicity and potential for improved symptom control, although immune-related adverse events remain a consideration. Variability in treatment response is expected based on histologic subtype and patient characteristics. This review highlights the evolving role of immune checkpoint inhibitors in the management of malignant pleural mesothelioma and their potential to improve both survival and quality of life. Clarifying the comparative benefits of immunotherapy versus chemotherapy is clinically significant for optimizing treatment selection and shared decision-making. The findings may promote future research directions in predictive biomarkers, tumor profiling, and immune-related gene signatures.

**Virtual: Comparative Analysis of Biomechanical Outcomes in Ankle Arthrodesis and Total Ankle Arthroplasty: Impacts on Joint Mobility, Stability, and Gait Mechanics**

Haley Doyle | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Brittney Sobota, MPAS
Bahaa Shaaban, Ph.D

**Abstract:**
**Background**: Although ankle osteoarthritis is less prevalent than hip or knee osteoarthritis, is associated with substantial pain, function limitation, and gait disturbance. Surgical management has traditionally relied on ankle

arthrodesis; however, total ankle arthroplasty has become increasingly utilized as implant design and surgical techniques have evolved. Despite this shift, biomechanical outcomes following these procedures remain variable, and uncertainty persists regarding optimal patient selection and long-term functional sustainability.
**Objective:** This narrative review aims to synthesize existing literature examining biomechanical outcomes of total ankle arthroplasty and ankle arthrodesis, with attention to how joint mobility, stability, and gait mechanics are characterized across studies in the literature.
**Methods:** A comparative review was conducted using Embase, ProQuest, PubMed, and Scopus. Eligible peer-reviewed studies published between 2020 and 2026 included patients who underwent total ankle arthroplasty or ankle arthrodesis and reported biomechanical outcomes. Evidence was synthesized descriptively to examine reported measures of ankle joint mobility (multiplanar and sagittal range of motion), loading and stability (such as plantar pressure, dynamic control, joint motion), gait features (including step length, walking speed, symmetry), and compensatory adaptations at adjacent joints (changes at the knee, midfoot, subtalar, or hip).
**Anticipated Results**: This review is expected to demonstrate substantial heterogeneity in reported biomechanical outcomes following total ankle arthroplasty and ankle arthrodesis. Variabilities is anticipated to be driven by differences in study design, gate analysis methodologies, outcome definitions, and the manner in which compensatory joint adaptions are quantified, potentially limiting direct comparison of biomechanical findings across interventions.
**Conclusion:** This review aims to clarify how postoperative joint function and gait characteristics are reported in the existing literature. Highlighting variability which can help contextualize reported findings, inform clinical interpretation, and identify gaps to guide future prospective research in ankle osteoarthritis management.

**Virtual: From Palo Alto to Appomattox: Mexican-American War roots of Civil War Combat Doctrine**
Thomas Durand | History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): John Dwyer, Ph.D.

**Abstract:**
The American Civil War has often been called the first modern war, but the conflict's military doctrine has its origins in the Mexican-American War. Much of the historical works examining the connection between these two conflicts focus on the experiences of officers in the war. The lack of research on the topics of strategy and doctrine creates a gap in the historiography of the link between the two wars. My paper argues that the foundation of several key military doctrines in the Civil War was established on the battlefields of Mexico between 1846 and 1848. I focus on four topics to prove my thesis: cooperation between the US Army and Navy, combined arms, conducting operations in a hostile region, and siege warfare. Before 1846, the US military's experience with these topics had either been limited and unsuccessful or non-existent. The necessities of the war resulted in the development of these combat doctrines, and the campaigns of General Scott and General Taylor revolutionized the American approach to war. Almost fifteen years later, these new approaches were put to deadly use on the battlefields of the American Civil War. This connection between the development of military doctrine in the mid-1800s merits further study, and as such, my paper will be a new contribution to this field.

**Virtual: Clopidogrel Resistance in Ischemic Stroke: Implications for Ticagrelor-Based Dual Antiplatelet Therapy: A systematic review**

Camryn Eby | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Brittney Sobota, MSPAS, PA-C
Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**

Minor ischemic strokes and high-risk transient ischemic attacks (TIAs) are associated with a significant risk of early recurrent ischemic events. Dual antiplatelet therapy (DAPT) with aspirin & clopidogrel is the current recommendation for secondary prevention. Clopidogrel requires hepatic activation via CYP2C19 & genetic polymorphisms can result in reduced platelet inhibition and higher residual thrombotic risk. Ticagrelor, a direct-acting P2Y12 inhibitor independent of CYP2C19 metabolism, represents a potential alternative to address this therapeutic limitation.

This systematic review aims to synthesize existing literature examining whether ticagrelor plus aspirin is more effective than clopidogrel plus aspirin in reducing recurrent ischemic stroke/TIA following minor ischemic stroke or high-risk TIA, with attention to how clopidogrel resistance, platelet reactivity, pharmacogenomic factors, bleeding risk, and cost are characterized across studies in literature.

This study was designed as a systematic review. Data sources included PubMed, Embase, and the Cochrane Central Register of Controlled Trials. Peer reviewed studies published from 2020-2025 were included and focused on adult patients with minor acute ischemic strokes or high-risk TIAs treated with ticagrelor-aspirin or clopidogrel–aspirin DAPT. Eligible studies included randomized controlled trials, meta-analyses, and observational studies. Evidence was synthesized to examine recurrent ischemic stroke/TIA, with secondary outcomes including platelet reactivity, bleeding risk, and pharmacogenomic associations.

This review is expected to identify heterogeneity in how DAPT regimens are evaluated in the literature, including differences in reported platelet reactivity, recurrent ischemic outcomes, bleeding events, & cost considerations. Variability in study design, patient selection, genetic stratification for clopidogrel responsiveness, outcome definitions, & durations of follow-up likely contribute to the inconsistent findings across studies.

This systemic review aims to clarify how alt. P2Y12 inhibitors are evaluated in the context of secondary stroke prevention. Differences in study design & assessment of clopidogrel resistance limit direct comparisons across existing studies. Current evidence supports the need for standardized approaches to platelet function & pharmacogenomic assessment, as well as studies to better define alt. P2Y12 therapy in individualized secondary stroke prevention.

**Virtual: Comparing the Effectiveness of Vaginal Estrogen Therapy to the Standard Management for Recurrent Urinary Tract Infections in Postmenopausal Women: A Narrative Review**

Chloe Eubank | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Carling Skvarca, DMSc, MPAS, PA-C

**Abstract:**
**Background**: Despite numerous years of preventative and therapeutic research dedicated to reducing the recurrence of urinary tract infections, they remain a significant clinical challenge with suboptimal reduction in postmenopausal women. Current literature discusses how an alternative to antibiotics is needed as the prevalence of antibiotic resistance is increasing in the treatment of UTIs. Vaginal estrogen therapy has emerged as a promising alternative as it restores the vaginal microbiome and genitourinary mucosal integrity. However, comparative effectiveness and adherence data to antibiotic prophylaxis remain limited.
**Objective:** This study aims to compare the effectiveness of vaginal estrogen therapy to standard antibiotic therapy in managing recurrence rates and symptom improvements in postmenopausal women with recurrent urinary tract infections.
**Methods:** A narrative review was conducted using PubMed, Cochrane Library, CINHAL, and Embase databases. Studies published between 2015 and 2025 were collected. Eligible studies included randomized controlled studies, cohort studies, and case series that evaluated the decrease in recurrence rates of urinary tract infections when utilizing vaginal estrogen therapy versus antibiotic management. Primary outcomes included reduction rate in urinary tract infection recurrence rates and symptom-control measures, while secondary outcomes included antibiotic resistance trends and treatment tolerability.
**Results:** The literature suggests that vaginal estrogen therapy is effective in reducing the recurrence of urinary tract infections and improving symptoms in postmenopausal women. Several studies found comparable or superior outcomes to antibiotic prophylaxis, particularly in patients without contraindications to estrogen use. Vaginal estrogen therapy was also associated with reduced antibiotic exposure, therefore improving antimicrobial resistance as well as lowering healthcare utilization and costs.
**Conclusion:** Vaginal estrogen therapy represents an effective alternative to antibiotic prophylaxis in managing recurrent urinary tract infections in postmenopausal women. Integrating this approach into clinical practice may support patient-centered personalized treatment strategies. This will also address antibiotic resistance and medication risks like toxicity in older populations. Further research should focus on long-term adherence to optimize guideline implementation.

**Virtual: A Comparative Analysis of Platelet-Rich Plasma (PRP) and Bone Marrow Aspirate Concentrate (BMAC) for Symptomatic Management of Knee Osteoarthritis**

Evelyn Foster | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Carling Skvarca, PA-C

**Abstract:**
**Background:** The knee is the most commonly affected joint in osteoarthritis (OA), and despite the high prevalence and significant effects on patients' quality of life and functioning, current conservative therapies have only limited benefit. Orthobiologic treatments like PRP and BMAC are emerging as new potential treatments, but literature comparing the effectiveness of different types of orthobiologics to each other and to other treatments is limited. These orthobiologic treatments are expensive and seldom covered by insurance, so it is important for patients and providers to know more about their effectiveness. This study aims to address this gap.
**Objective:** This study aims to compare patient-reported outcome measures after treatment with PRP or BMAC to determine if these are effective therapies for knee osteoarthritis.
Methods: A comparative narrative review was conducted using PubMed, Scopus, Embase, and CINAHL to identify studies published between 2020 and 2026 using either PRP or BMAC for treatment of knee OA. Eligible

studies included adult human subjects in randomized controlled trials, retrospective studies, and observational studies published in English in journals from North America, Western Europe, or Australia. Primary outcomes included changes in various patient-reported outcome scores.
**Results:** The literature suggests that orthobiologics will often be found to lead to at least a short-term improvement in patient-reported outcomes, but not always to a degree that is significantly greater than other, more accessible/established therapies for knee OA. Direct comparison between orthobiologics is challenging due to lack of standardization in preparation of the injections.
**Conclusion:** By assessing the effectiveness of PRP and BMAC, this study aims to help inform both patients and providers in choosing between treatment options for knee osteoarthritis. There are ongoing comparative challenges due to the lack of standardization of preparation of PRP and BMAC, providing opportunities for future research in this field regarding ideal preparation types and/or patient characteristics for treatment with these therapies.

**Virtual: The Music of Oz's Most Powerful**
Gabrielle Frens | Music Therapy | Mary Pappert School of Music
Faculty Advisor(s): Noah Potvin, Ph.D.

**Abstract:**
“The Music of Oz’s Most Powerful” explores the cultural contexts within the stories of "The Wizard of Oz," "The Wiz," and "Wicked" to identify how music reinforces each work's narrative. Research and musical analysis intersect to offer a deep understanding of power structures, characters, and storytelling displayed through the visual and musical elements of each work.

Music is deeply intertwined with the practice of storytelling throughout cultures. Embedded into multimodal works, it can offer a unique sonic experience that contributes to an audience’s understanding of place, context, and characters. One story that demonstrates this is that of "The Wizard of Oz," a classic American fairy tale. It has been a source of inspiration for other works and films as well, such as "The Wiz" and "Wicked," that built upon the world of Oz and reshaped it to fit new narratives. Within each story of Oz, music reinforces themes and aspects of identity aligned with the cultural context of the time at which they were released, empowering or oppressing marginalized groups. While the original sense of wonder found within the story penned by L. Frank Baum remains throughout each new tale, creatives have shaped and molded the stories and sounds of Oz to embrace music’s role in liberation and social change toward a deeper sense of goodness for all.

**Virtual: And Came "A Flock of White Doves": The Sisters of the Holy Cross and Nursing in the Civil War (1861-1865)**
Eliza Grimm | History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Andrew Simpson, Ph.D.

**Abstract:**
At the onset of the Civil War, both the North and South grossly misunderstood the cost the war would have. What was originally intended to be a short series of battles between the two sides turned into four years of the bloodiest conflict the young nation had ever seen. Amidst the bloodshed and chaos of the Civil War, the Sisters of the Holy Cross became integral in providing care to Union soldiers and changing the outlook towards Catholic orders in the United States. They came in droves, described as a “flock of white doves,” to heal the sick and wounded and better

the status of military hospitals. This paper argues that the Sisters of the Holy Cross enlisted as nurses in the Civil War for two primary reasons. Firstly, the Sisters were financially intelligent individuals and recognized the opportunity for financial independence provided by the Union Army's nursing wages. Their service allowed the Sisters to not only expand on their religious mission in the United States by caring for the soldiers but also make their own money while still operating under the constraints of a male dominated nineteenth century Catholic church. Secondly, the Sisters of the Holy Cross utilized their service in the Civil War as a tool to combat anti-Catholic sentiment that prevailed in the early nineteenth century in part due to the Nativist Movement. The rising anti-Catholic sentiment served to threaten the existence of the Sisters' presence on the Western frontier. To properly address each motivational factor, the paper utilizes traditional historical and archival methods to expand these reasons hinging on the financial opportunities and changing sentiment toward the Sisters during and after the war. By the end of the war, the Sisters were incredibly successful in their mission. Throughout the United States, hospitals and nursing schools for women started by the Sisters still exist, and under the tutelage of Mother Angela Gillespie, the Mother Superior of the Church, the condition of Union military hospitals improved on both the land and water.

**Virtual: Comparing Parent-Only (PBT) and Family-Based Behavioral Treatment (FBBT/FBT) Approaches in Pediatric Obesity (Including Overweight): Clinical Outcomes and Implications for Practice.**

Caitlin Harvey | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Carling Skvarca, PhD

**Abstract:**

**Background:** Pediatric obesity is a longstanding, multifaceted condition influenced by behavioral, environmental, and family factors, and it is associated with severe cardiometabolic and psychosocial health problems. Family-based behavioral treatment (FBBT) is the standard treatment; however, time commitments, costs, and family stress can hinder participation for many families. Parent-based treatment (PBT) has recently gained attention as a potentially more accessible alternative, underscoring the need to evaluate its effectiveness and practicality.

**Objective:** This narrative review aims to compare the effectiveness of parent-only versus family-based behavioral interventions in improving child weight-related outcomes among children with pediatric overweight and obesity. Additionally, it seeks to assess differences in psychosocial impacts, feasibility, and practical considerations for clinical application.

**Methods:** A structured narrative review was conducted using PubMed, CINAHL, and PsycINFO to identify randomized controlled trials and systematic reviews evaluating PBT and FBBT among children and adolescents aged 6-18 years with overweight or obesity. Recent studies from the past five years were prioritized, while earlier trials provided essential background. The primary outcomes included changes in BMI, BMI Z score, or percent above median BMI, as well as psychosocial and implementation outcomes.

**Results**: Both parent- and family-based behavioral treatments are expected to yield notable improvements in children's weight-related outcomes. Findings across studies are expected to demonstrate that PBT is as effective as FBBT for these outcomes while offering additional advantages in cost, accessibility, and retention, particularly for families facing logistical or socioeconomic challenges. FBBT may offer additional psychosocial benefits, particularly for children with emotional or behavioral comorbidities.

**Conclusion**: By evaluating parent-only and family-based behavioral interventions, this study aims to clarify their roles in health behavior and lifestyle treatment for pediatric obesity. Rather than supporting a single preferred model, these findings may guide treatment selection by considering family capacity, feasibility, and the child's

psychosocial context. Aligning intervention delivery with these factors may enhance engagement, sustainability, and clinical outcomes in pediatric obesity management.

**Virtual: Comparing accuracy of AI-based ECG analysis to traditional diagnostic criteria for early detection of left ventricular hypertrophy in patients over 45 years old**

Mikayla Hendershot | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Carling Skvarka, DMSc, MPAS, PA-C

**Abstract:**

**Background:** Left ventricular hypertrophy (LVH) is characterized by thickening and enlargement of the left ventricle, which lead to structural changes that are associated with complications such as heart failure, arrhythmias, ischemic events, and premature cardiovascular mortality. Early LVH is frequently asymptomatic, making timely identification essential for risk modification. Although echocardiography and cardiac MRI provide the most accurate assessment of left ventricular mass, they are not ideal for large scale screening. Traditional electrocardiography (ECG) voltage criteria, while more suitable for large scale screening, demonstrate limited sensitivity.

**Objective/Research Question:** The primary objective of this narrative review is to compare the diagnostic accuracy, sensitivity, and specificity of AI-based ECG analysis versus traditional ECG voltage criteria for early detection of LVH in adults older than 45 years. A secondary objective is to evaluate the potential role of AI-enhanced ECG as a useful screening tool in routine clinical practice.

**Methods:** This narrative review utilizes PubMed, Embase, and the Cochrane Central Register for Controlled Trials to analyze studies that compare AI-enhanced 12 lead ECG interpretation with traditional ECG criteria such as Sokolow-Lyon or Cornell voltage criteria. Eligible study designs are newer than 2020 and include randomized controlled trials, systematic reviews, meta-analyses, and high-quality observational cohort studies. Primary outcomes of these studies focus on diagnostic accuracy metrics, including sensitivity, specificity, and predictive values for early LVH detection.

**Anticipated Results**: AI-based ECG models demonstrate higher sensitivity and improved overall diagnostic accuracy compared with traditional voltage-based criteria, particular in early or subclinical LVH. AI approaches also show improved performance in integrating the ECG features with demographic and clinical variables. However, variability in model design, dataset diversity, and reporting standards remains evident.

**Conclusion:** AI-enhanced ECG analysis shows promise for early detection of LVH compared to traditional criteria, allowing for earlier intervention, risk stratification, and reduction in cardiovascular morbidity in adults over 45 years. While future research regarding integration, screenings, and policy considerations are essential, AI may be useful as a decision-support tool in cardiovascular diagnostics.

**Virtual: A "Golden Cup Full of Abominations": Evaluating Artificial Intelligence as Structure and Occasion of Sin**

Zachary Hunter | Theology | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Anna Scheid, Ph.D.

**Abstract:**

This paper argues that generative large language model (LLM) artificial intelligence constitutes not merely a morally risky tool but an emerging structure and occasion of sin that Christians—particularly within the Roman Catholic moral tradition—ought to resist. Drawing on Thomistic metaphysics, Scholastic moral theology, and

legal reasoning, the paper evaluates LLMs as intelligences subject to moral judgment without regard to any 'actual' consciousness. Against claims that LLMs are ethically neutral instruments, it contends that they are increasingly inescapable structures whose design, operation, and use implicate their creators and users in formal and/or material cooperation with grave moral evils.

After addressing competing accounts of intelligence from computationalism, behaviorism, and contemporary Vatican scholarship, the paper defends a Scholastic-based account in which intelligence consists in apprehension and rational procession rather than interior experience. On this account, LLMs qualify as intelligences capable of decisive acts analogous to will and therefore susceptible to moral evaluation. The paper analyzes interlocking domains of harm associated with generative LLMs: intellectual property theft, religious distortion, environmental degradation, psychological injury (including self-harm and radicalization), and economic destabilization. These harms are not accidental but arise from LLMs' inherent qualities—extractive, repetitive, imitative, and decisive—which systematically create occasions for injustice, fraud, deception, and moral corruption.

Using Catholic doctrines of mortal and venial sin, occasions of sin, and cooperation with evil—supplemented by legal concepts such as proximate causation, mens rea, and vicarious liability—the paper argues that continued participation in generative LLM systems entails culpable cooperation. Because LLMs are soulless, unconvertible intelligences incapable of repentance or restitution, their harms cannot be remedied sacramentally or morally from within the system. Consequently, the paper concludes that Christians must, insofar as practicable, boycott generative LLMs as a form of prophetic witness. Generative AI, it contends, represents an Apocalyptic "golden cup full of abominations": an impressive, well-crafted structure whose potential value is outweighed by its capacity to imperil truth, human dignity, and the soul itself.

**Virtual: Biofluorescence is a Widespread and Highly Variable Phenotype in Plethodontid Salamanders**

Michael Kardos | Biology |School of Science and Engineering
Faculty Advisor(s): Sarah Woodley, Ph.D.

**Abstract:**
Biofluorescence, or the absorption and reemission of light by living organisms, has been discovered in most salamander families including the plethodontids, the most diverse family containing over 60% of all salamander species. Despite this variety, most studies of amphibian biofluorescence have included only one or two species of plethodontids. With such limited representation, no studies have attempted to survey this family for phylogenetic patterns in biofluorescence or to unravel the evolutionary history of this phenomenon. In this study, we used a combination of microcopy, histology, and imaging techniques to characterize biofluorescence in eight genera and twelve species spanning the plethodontid family tree. We found evidence of biofluorescence in all twelve species but the sources, localization, and patterns in sexual dimorphism varied widely between species. While biofluorescent pigment-containing cells were scattered diffusely in the skin of almost all species, more derived species also possessed one or multiple types of biofluorescent skin glands. Although biofluorescence was male-biased in Plethodon, we discovered female-biased biofluorescence in Desmognathus and Aneides and no sexual dimorphism in other species. With so much variation in the sources and patterns of biofluorescence across the plethodontid tree, it is likely that this phenotype has evolved multiple times and has experienced strong selective pressures. Together, our results suggest that biofluorescence is a phylogenetically complex trait in plethodontids and may serve unique functions in different species.

**Virtual: Different diagnostic testing in detecting Lyme disease early and its influence on the development of post-treatment Lyme Disease syndrome (PTLDS)**

Grace Kata | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Carling Skvarca, MPAS, PA-C, DMSc

**Abstract:**

**Background**: Lyme disease in the early stages is frequently underdiagnosed due to not all patients having the characteristic finding such as the rash known as erythema migrans. As a result, many individuals appear in the disseminated or late stages of Lyme disease with Lyme arthritis, carditis, or cranial nerve palsy. Delayed diagnosis and treatment have been highly associated with the development of PTLDS illustrating the necessity the evaluate the current diagnostic strategies in early stage disease detection.

**Objective:** This study aims to evaluate the diagnostic accuracy of serologic testing compared with molecular methods of testing in the early detection of Lyme disease. The secondary objective is to look at how early diagnostic accuracy influences the subsequent development of PTLDS.

**Methods:** This study is a narrative literature review examining peer reviewed literature published within the past 5 years using databases such as PubMed and Embase. Studies included were focused on serologic testing (enzyme-linked immunosorbent assay and Western blot) and molecular testing such as polymerase chain reaction in early stage Lyme disease. The review will only look at human based studies involving adult and pediatric populations across observational and clinical study designs. Primary outcomes will include diagnostic sensitivity and specificity in the early stage of disease as well as associations between diagnostic timing and the development of PTLDS.

**Results:** It is anticipated that serologic testing will show limited sensitivity during the early stages of disease due to the delay in antibody production, while molecular methods may show improved detection in specific early stage presentations. It is anticipated that with earlier and more accurate diagnosis of Lyme disease leading to prompt antibiotic treatment will correlate with a reduced incidence of PTLDS. The findings look to underscore diagnostic gaps that contribute to the delay in treatment and increase in PTLDS.

**Conclusion:** Understanding the current limitations present with diagnostic testing for early stage Lyme disease is crucial to improving patient outcomes and reducing PTLDS and its burden on lives. With an improved early detection approach, it may facilitate timely treatment as well as decrease long term complications. The results may guide clinical practice, diagnostic research, and provide education by emphasizing the need for enhanced diagnostic approaches in early disease detection.

**Virtual: Evolving treatment paradigms in moderate to severe atopic dermatitis: A narrative review on biologics, oral and topical JAK inhibitors**

Katherine Kriznik | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Carling Skvarca, DMSc, MPAS, PA-C, Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**

**Background**: Atopic dermatitis is a chronic inflammatory skin condition that can be refractory to topical corticosteroids in moderate-to-severe cases. Standard treatment options include biologics and oral Janus kinase inhibitors (o-JAKi), each associated with distinct efficacy and safety profiles. Recently, topical JAK inhibitors (t-JAKi) gained regulatory approval, introducing a new local therapeutic option. Given their recent adoption, comparative data and long-term outcome reporting remain limited.

**Objectives**:This narrative review aims to synthesize current literature describing current standard treatment modalities and newly approved t-JAKi for managing moderate-to-severe atopic dermatitis (M2S-AD) emphasizing how symptom control, adverse effects, and patient-reported outcomes are defined and reported in studies.
**Methods**:A narrative review was conducted using PubMed, Scopus, and Embase to identify peer-reviewed studies published between 2020 and 2025 evaluating biologics, o-JAKi, and t-JAKi in patients with M2S-AD. Eligible studies included randomized controlled trials and observational cohort studies. Evidence was synthesized to examine reported pruritus, skin lesion severity, adverse events, treatment adherence, and quality of life outcomes. Results:This review is expected to demonstrate heterogeneity in reported efficacy, safety, and patient-reported outcomes among biologic, o-JAKi and t-JAKi therapies. Variability is anticipated in study design of duration of follow up duration, outcome assessment instruments, and patient populations, with more limited and shorter-term data for t-JAKi from recent adoption.
**Conclusion**:Current evidence evaluating biologic, o-JAKi and t-JAKi therapies for M2S-AD is characterized by inconsistency in efficacy endpoints, safety reporting, and patient-reported outcome measures, with limited comparative and long-term data for t-JAKi. While topical agents demonstrate localized anti-inflammatory and immunomodulatory effects with reduced systemic exposure, variable study designs and outcome assessment limit direct comparison with established systemic therapies. This review aims to clarify how emerging t-JAKi are represented in literature relative to established treatments. Future studies with standardized outcome measures, longer follow-up periods, and head-to-head trials are needed to define t-JAKi clinical positioning, identify appropriate populations, and inform evidence-based integration into treatment algorithms for M2S-AD.

**Virtual: Then Yi-hién's music in the evolution of Taiwanese Society-Music and Cultural intersectional Analysis**
Chingwei Lin | Music Therapy | Mary Pappert School of Music
Faculty Advisor(s): Noah Potvin, Ph.D.

**Abstract:**
This paper presents the evolution of Taiwanese folk music in relation to Taiwan's social and political transformations, focusing on the works of the Taiwanese composer, Teng Yu-hsien (1906–1944). Teng's musical works were primarily composed between 1930 and 1940 during the Japanese colonial period. Most of his music was written in Taiwanese to reflect the local life and social reality in Taiwan. As colonial governance intensified, Japanese authorities later revised several of his works to incorporate Japanese cultural elements, including changes to language and lyrical content. These adaptations reveal the complex cultural negotiations embedded in colonial-era musical production.

Following the end of World War II, Taiwan was placed under Chinese administrative control, and martial law was imposed in 1949, remaining in effect for over thirty-eight years. During this period, Teng's works were officially banned, as their lyrics were perceived as violations to public order and moral standards. Despite this prohibition, his songs continued to circulate informally among the public. Their captivating melodies and use of the Taiwanese language fostered a strong sense of cultural identity, allowing the music to function as a quiet form of resistance and collective memory. After the lifting of martial law, Teng's music reentered public life and has since been reinterpreted across diverse musical genres, including jazz, rock, and classical music. This study also highlights two of his most influential compositions, "　　" [Longing for Spring Breeze] and "　　" [The Rainy Night Flowers], demonstrating how their realistic lyrics and memorable melodies portray the historical

background and cultural landscape of their time. Multiple cover versions by artists from different generations illustrate the continued relevance and adaptability of his repertoire.

By tracing the historical transformations and contemporary reinterpretations of Teng Yu-hsien's music, this paper demonstrates that his works function as a cultural bridge across generations. While older listeners associate these songs with nostalgia and personal memory, younger audiences encounter them as accessible entry points into Taiwan's complex history. Ultimately, this paper positions Teng Yu-hsien's music as a living cultural medium that continues to negotiate Taiwanese identity within a diverse musical landscape.

**Virtual: Early Diet and Lifestyle Modifications Compared with Medication Therapy in Coronary Artery Disease Prevention**

Elizabeth Lund | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Carling Skvarca, DMSc, MPAS, PA-C

**Abstract:**
**Background**: Despite advances in the prevention of coronary artery disease, it remains the leading cause of death worldwide. There are many advancements to secondary prevention, once a patient is already at high risk due to modifiable risk factors such as hyperlipidemia, hypertension, diabetes, obesity, and smoking. This guides how doctors screen for these conditions. There is less research to suggest that screening for risk factors should begin earlier in life, and patients should focus on diet and lifestyle recommendations to prolong the need for medications in the future, and overall reduce their risk of CAD
**Objective**: This paper aims to compare the effects of early diet and lifestyle modifications to medication usage in the development of CAD in patients with increased risk factors. A secondary objective is to observe the effectiveness of current screening recommendations in identifying individuals with CAD risk factors.
**Methods**: A narrative review is being conducted using PubMed and Embase to find studies between 2020-2025 that discuss the efficacy of early diet and lifestyle modifications versus medication usage in preventing CAD in individuals with risk factors. Eligible studies included randomized controlled trials, observational cohorts, and meta-analyses. Primary outcomes included methods for reducing risk factors, efficacy of medication usage, and screening guidelines to identify patients with risk factors.
**Results**: Evidence indicates that early diet and lifestyle modifications will reduce modifiable risk factors for CAD, and therefore reduce plaque buildup over time. However, medications are associated with better compliance and more rapid symptom relief, making them an optimal choice for certain patients. This highlights the importance of shared decision-making between patients and providers.
**Conclusion**: By focusing on identifying early risk factors and encouraging patients to have a healthy diet and lifestyle, clinicians can slow the development of CAD in patients over time. When coupled with medications, this gives patients the best chance at preventing adverse cardiac events. These results can help clinicians when screening for CAD risk factors and guide treatment and prevention.

**Virtual: A Narrative Review of CAR-T Cell Therapy Durability Remission in Adults with Relapsed or Refractory Diffuse Large B-Cell Lymphoma**

Keira McTighe | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**
**Background**: Diffuse large B-cell (DLBCL) is the most common subtype of Non-Hodgkins Lymphoma. It is known as an aggressive blood cancer due to it having a poor prognosis regarding relapse/refractory disease. Though there is data that shows improved outcomes with first line immunotherapy, a large group of patients also experience relapsed/refractory disease which can lead to failure of current first line treatment and a decrease in next step therapy options. CAR-T therapy is a new treatment that has potential to treat those with relapsed or refractory disease.
**Objective**: The main objective of this narrative review is to evaluate the effectiveness of CAR-T cell therapy in improving mortality rates among adults with relapsed or refractory disease. This review also assesses durability of response, potential treatment outcomes, safety considerations and limitations to durability of treatment.
**Methods**: This narrative review will be composed of sources from PubMed, Scopus, Clinical Key, and Embase to identify relevant studies published between 2010 and 2025. The studies chosen will include research, multiple clinical trials and real-world data. It will also evaluate FDA approved CAR-T cell therapies in adults with relapsed or refractory DLBCL. The focus of this review is on the overall response rate, remission status, and mortality rates in those after receiving CAR T cell therapy. It will also assess treatment related toxicities and factors effecting treatment efficiency such as burdens to care. This is a revolutionizing therapy that is continuing to be studied regarding durability in remission and effects of patients mortality rates.
**Results**: The expected results of CAR-T cell therapy in relapsed/refractory DLBCL is overall positive in patients who follow the intense treatment regimen and data shows promising results regarding durable remission. However, there is differences in patients' outcomes which may be due to the population and real-world health acre disparities. It may also be due to disease severity, patient selection, treatment organization and logistics.
**Conclusion**: This narrative reviews goal is to add clarity to the effectiveness of CAR-T cell immunotherapy on relapsed/refractory DLBCL. It will include potential positive outcomes as well as limitations in treatment for patients, providing a wholistic view on the effectiveness of therapy.

**Virtual: A Narrative Review Comparing Daily Nitrofurantoin Prophylaxis with Postcoital Nitrofurantoin Prophylaxis for Recurrent Urinary Tract Infections in Premenopausal Females**

Madi Morgan | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**
**Background**: Recurrent urinary tract infections (rUTIs) are increasingly common in premenopausal females, with recurrence rates as high as 50% in one year. High-risk patients with behavioral and microbiologic risk factors report the most consistent rates of recurrence, despite the availability of various pharmacologic and nonpharmacologic prophylactic strategies. Nitrofurantoin is frequently used in both continuous daily and postcoital regimens as a prophylactic antibiotic. However, there is limited direct comparative data between the two temporal schedules, especially in high-risk patient populations such as sexually active premenopausal females. This limitation illustrates the need for a focused comparison between the two commonly used strategies to analyze their variability in efficacy, patient tolerance, and patient adherence.
**Objective:** This narrative review aims to compare daily continuous nitrofurantoin prophylaxis and postcoital nitrofurantoin prophylaxis in the setting of recurrent urinary tract infections in premenopausal females who participate in sexual activity.
**Methods:** A narrative review was conducted using PubMed, EMBASE, Scopus, and Cochrane Library to identify peer-reviewed studies published from 2020 to 2025 involving nitrofurantoin prophylaxis for rUTIs in

premenopausal females. Evidence was synthesized descriptively to examine the reported outcomes, including recurrence rates, adverse effects, adherence patterns, and patient-centered factors, such as sexual activity patterns and risk factor profiles.
**Results:** This review is expected to identify the presence of any statistically significant reductions in recurrence rates. It will also concurrently evaluate the differences in variability of adverse effects, patient adherence, and antibiotic exposure between the two prophylactic regimens.
**Conclusion:** This review will aim to support the individualized risk-based management of rUTIs in sexually active premenopausal females by analyzing contemporary evidence that compares both daily and postcoital nitrofurantoin prophylaxis. The anticipated findings will help guide the provision of targeted prophylactic strategies while simultaneously reducing unnecessary antibiotic exposure. Future research should aim to further address the limited comparative data in high-risk patient populations for a more cohesive understanding of optimal prophylaxis.

**Virtual: Assessing the Health Status, Health Needs, and Healthcare Access of Venezuelan Migrants in Host Countries: An Integrative Review**

Monica Naumann | Nursing | School of Nursing
Faculty Advisor(s): Rick Zoucha, Ph.D., CTN-A, FTNSS, FETNA, FADLN, FAAN
Alison Colbert, Ph.D., PHCNS-BC, FAAN

**Abstract:**
**Introduction**: The Venezuelan migration crisis is one of the largest in the world. The migratory process can negatively impact one's health status, influence health needs, and compromise access to healthcare. The purpose of this Integrative Review (IR) is to assess three aims: the health status, health needs, and healthcare access of Venezuelan migrants while residing in host countries.
**Methods**: Utilizing Whittemore and Knafl's model for Integrative Reviews, eight databases were searched including PubMed, CINHAL, Academic Search Elite, SCOPUS, Applied Social Sciences Index & Abstracts (ASSIA), Latin America and the Caribbean Literature on Health Sciences (LILACS), Embase, and PAIS Index. Four hundred-forty (n=440) studies were retrieved and screened.
**Results**: Fourteen articles were extracted and four themes were identified, including 1) general self-reported health status is good with low chronic disease prevalence, 2) self-reported, untreated depression and anxiety symptoms were identified, 3) health needs are not prioritized, and 4) less likelihood to seek healthcare, especially if uninsured.
**Discussion**: Migratory patterns are subject to change. Findings of this study may help guide cost-effective, practical health related interventions at present. However, future research should continue to assess these aims to track variations in patterns.

**Virtual: A Comparative Narrative Review of Restricted Elimination Diets and Methylphenidate in School-Aged Children with ADHD**

Emily Peterson | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**
**Background**: Stimulants, including methylphenidate, are considered first-line treatment for attention-deficit/hyperactivity disorder (ADHD) management in children. Although these medications are proven to

reduce core symptoms, they may produce adverse effects and have decreased efficacy over time, limiting tolerability in a subset of patients. As a result, interest in nonpharmalogic interventions such as restricted elimination diets has increased due to their potential to improve hyperactivity and other behaviors through the avoidance of known dietary triggers. However, evidence regarding how dietary interventions and stimulant therapy are evaluated across symptom, safety, and feasibility domains remains variable in pediatric ADHD populations. This review addresses this critical gap.
**Objective:** This narrative review aims to compare existing evidence on restricted elimination diets and methylphenidate in school-aged children with ADHD, with attention to how symptom control, safety, and patient adherence are reported across studies.
**Methods:** A narrative review was conducted using PubMed, Embase, and Scopus to identify studies published between 2020 and 2026 involving children and adolescents with ADHD treated with methylphenidate or restricted elimination diets. Eligible studies included randomized controlled trials and open-label trials. Evidence was synthesized descriptively to examine reported outcome domains.
**Results:** This review is expected to identify differences in how symptom outcomes, safety, and feasibility are reported for pharmacologic versus dietary interventions. Emerging themes may include variability in symptom response among subgroups, heterogeneity in reported safety profiles, and challenges related to both pharmacologic and dietary compliance.
**Conclusion:** By synthesizing current evidence on methylphenidate and restricted elimination diet use in children, this review aims to clarify how pharmacologic and dietary approaches are discussed in the ADHD literature with respect to symptom management, safety profile, and feasibility for patients. Examining these may help to contextualize the role of nonpharmacologic strategies alongside stimulant use and highlight areas where evidence remains inconsistent or limited.

**Virtual: Evolving pharmacologic strategies in polycystic ovary syndrome (PCOS): Implications for metabolic, cardiovascular, and renal outcomes: A narrative review.**
Morgan Posey | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**
**Background:** Polycystic Ovary Syndrome (PCOS) is a common, multifaceted, and complex endocrinopathy in women characterized by metabolic, reproductive, and hormonal disturbances that very widely in clinical presentation and long-term risk. PCOS is managed with diet and exercise, metformin, and oral contraceptives (OCPs), each targeting a different symptom domain. Recent interest has emerged in GLP-1 agonists due to their observed metabolic effects in Type 2 diabetes mellitus; however, how outcomes associated with GLP-1 agonists are portrayed specifically in women with PCOS remains variable across the literature.
**Objective:** This study aims to compare existing evidence on GLP-1 agonists, metformin, and OCPs with attention to how metabolic, cardiovascular, renal, and symptom-related outcomes are reported across studies.
**Methods:** A narrative review was conducted using PubMed, Scopus, and Embase to identify studies within the last 5 years (2020-2025) involving women with PCOS treated with GLP-1, metformin, or oral contraceptives. Eligible studies included randomized-controlled trials, meta-analyses and peer-reviewed articles. Evidence was synthesized descriptively to examine reported outcome domains.
**Results**: It is expected to identify differences in therapeutic effects of GLP-1 agonists, metformin, and OCPs emphasized across PCOS with some studies focused on metabolic, or weight- related outcomes, while others

prioritized reproductive, hormonal, or inflammatory markers. Variability in symptom severity of PCOS and costs of medications contributes to the heterogeneity in treatment and limitations described in PCOS literature.
**Conclusion:** GLP-1 agonists have gained substantial clinical and public attention, while PCOS remains one of the prevalent endocrinopathies affecting women. This review aims to clarify how different therapeutic approaches are utilized in PCOS based on the symptoms they address, such as OCPs in menstrual and hyperandrogenic manifestations and metformin in metabolic abnormalities. Emerging evidence suggests that GLP-1 agonists may offer broader metabolic, cardiovascular, and renal benefits that extend beyond weight reduction, and can help define their potential role in an integrative treatment framework and inform future research directions.

**Virtual: Psychiatric Mental Health Nurse Practitioner Perceptions of Patients with Eating Disorders: A Mini-Focused Ethnography**

Alexandra Potts | Nursing | School of Nursing
Faculty Advisor(s): Richard Zoucha, PhD, PMHCNS, CTN-A, FAAN

**Abstract:**
**Background**: Despite the recent interest in mental health research and clinical practice guidelines for the management of eating disorders (EDs), research examining psychiatric mental health nurse practitioners' (PMHNPs') perceptions of patients with EDs is lacking. This gap is critical, given poor outcomes for patients with EDs and that PMHNPs are arguably among the most likely to provide specialty mental healthcare to patients with EDs.
**Purpose:** The purpose of this mini-study was to examine PMHNPs' perceptions of patients with EDs.
Research Question: The research question for this mini-study is "What are PMHNPs' perceptions of patients with EDs?".
**Methods:** A qualitative focused ethnography method was used to elicit data within the context of this cultural group of PMHNP participants. For data analysis, Leininger's four phases of qualitative data analysis was used.
**Results:** Participants included four PMHNPs, two male and two female, aged 34-54. In the second phase of data analysis, 25 categories emerged. Further analysis resulted in two patterns: Pattern of PMHNP's Culturally Rooted View Serves as a Guide of their Clinical Practice and Pattern of PMHNP's Cultural and Life Experiences Shape Perceptions of ED Care. Due to the mini-study nature, no themes were identified.
**Conclusions and Implications:** These findings highlight the culturally rooted view and influence of cultural and life experiences on PMHNPs' perceptions of ED care and as a guide to clinical practice. While this was a mini-study, the findings suggest the need for larger-scale investigation to enhance further understanding of potential data. Exhaustive research could inform strategies to improve outcomes for patients with EDs through PMHNP-culturally informed care.

**Virtual: A Comparative Narrative Review of Aerobic Exercise and Standard Medical Therapy in Adults with Recurrent Migraines**

Macey Roble | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**
**Background:** Migraine is a prevalent neurologic disorder and a leading cause of disability worldwide. Although pharmacologic therapies remain the cornerstone of treatment, interest has grown in nonpharmacologic strategies due to incomplete symptom control, adverse effects of medications, and medication-overuse

headaches. Aerobic exercise has emerged as a promising intervention; however, its role in routine migraine management remains inconsistently incorporated as an adjunct to pharmacologic treatment and variably reported across the literature.
**Objective:** This narrative review aims to compare existing evidence on moderate-intensity aerobic exercise versus standard medical care alone in relation to migraine frequency, intensity, disability, and acute medication use in adults with recurrent migraines.
**Methods:** A narrative review is being conducted using PubMed, Scopus, and Embase to identify studies published between 2020 and 2026. Eligible studies include randomized controlled trials, cohort studies, and meta-analyses involving adults aged 18 years or older with recurrent migraines. Included studies examine aerobic exercise interventions in comparison with standard medical therapy. Evidence is synthesized to examine how migraine burden, functional impact, and medication use are reported across studies.
**Results:** This review is expected to identify heterogeneity in how aerobic exercise interventions are implemented and assessed in the literature. Emerging themes may include variability in reported migraine frequency, symptom severity, disability measures, and patterns of acute medication use across studies.
**Conclusion:** By synthesizing current evidence on aerobic exercise and standard medical therapy, this narrative review aims to clarify how migraine-related outcomes and medication use are reported in relation to structured physical activity. Examining this variability may help contextualize the role of aerobic exercise within migraine management and identify areas where evidence remains inconsistent or limited.

**Virtual: Oligodendrocyte Maturation Arrest during Viral Infection**

Melanie Salinas | Pharmacology | School of Pharmacy
Faculty Advisor(s): Lauren O'Donnell, Ph.D.

**Abstract:**
Viral infections are frequently linked to demyelination, particularly in young children. Most prior studies examined demyelination in the adult brain, revealing complicated roles for immune cells in viral infections and other demyelinating illnesses, such as multiple sclerosis. However, little is known about how viruses disrupt myelination in childhood when brain cells (e.g., oligodendrocytes (OLs), neurons) and immune cells are actively maturing. Consequently, remyelination in children remains an elusive therapeutic goal. We developed a juvenile mouse model of neuron-restricted measles virus (MV) infection, wherein persistent infection results in progressive demyelination. Our preliminary studies indicate that oligodendrocyte precursor cells (OPCs) proliferate robustly in response to MV infection but cannot fully mature into myelinating OLs. However, capturing complex cell interactions during viral inflammation in a developing brain necessitates global transcriptional profiling. Thus, we analyzed publicly available spatial transcriptomic datasets from other viral infection models (e.g., influenza virus) and discovered similar deficits in the maturation of OL lineage cells. We propose to map the cellular landscape of infection in our model to characterize juvenile immune cells, neuronal infection states, and OL maturation stages at the transcriptional level. We will integrate these results with findings from cell culture, animal behavioral tests, and flow cytometry on matched brain samples. This study will better define mechanisms underlying the disruption of myelination during viral infection, which will serve ultimately as a basis for the rational design of therapies to preserve and restore myelination in the juvenile brain.

**Virtual: Impacts of Resistance and Aerobic Exercise on Cognition in Alzheimer's Disease**

Paige Salmon | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**

**Background:** Alzheimer's disease is a progressive, neurodegenerative disease and is the leading cause of dementia. Pharmacological treatment options for Alzheimer's disease address symptom management rather than disease progression. Disease modifying treatments exist but are costly. Growing interest has emerged in non-pharmacologic interventions including resistance and aerobic exercise as adjuncts to standard management. However, reported effects on cognition and functionality vary across studies and uncertainty remains regarding how different exercise modalities are evaluated in individuals with Alzheimer's disease.
**Objective:** This narrative review aims to synthesize existing evidence on resistance and aerobic exercise interventions in individuals with Alzheimer's disease with attention to how cognitive outcomes, functional measures, and safety considerations are reported across current literature.
**Methods:** A narrative review was conducted using PubMed, Embase, and CINAHL to identify studies published between 2020-2025 that evaluated the effect of resistance and/or aerobic exercise on cognition in individuals with Alzheimer's disease. Eligible studies included randomized controlled trials, cohort studies, and longitudinal observations. Data was synthesized descriptively to examine reported cognitive and functional outcomes.
**Results:** This review is expected to identify variability in how resistance and aerobic exercise interventions are implemented and evaluated in individuals with Alzheimer's disease, including differences in type, duration, intensity, and measures of cognition and functionality. Emerging themes may include variation in cognitive trajectories, functional measures, and safety reports across studies and patient populations.
**Conclusion:** By synthesizing current evidence on resistance and aerobic exercise in individuals with Alzheimer's disease, this review aims to identify how cognitive and functional outcomes are reported in relation to exercise interventions. Examining these differences may help contextualize the role of exercise in management of Alzheimer's disease and identify where areas of evidence remain limited.

**Virtual: Comparing Artificial Intelligence with Clinician Judgment in Melanoma Detection: A Narrative Review Across Different Clinical Settings and Levels of Expertise**

Paige Semanko | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**

Melanoma is the most lethal type of skin cancer, and early detection is critical for improving patient outcomes. Current melanoma diagnostic guidelines rely on clinician judgment using visual inspection, dermoscopy, and histopathological analysis; however, diagnostic accuracy may vary due to subjectivity and clinician experience. Artificial intelligence (AI)-assisted dermoscopic analysis has emerged as a clinical decision-support tool, though its diagnostic performance relative to clinician judgment across clinical settings and levels of expertise remains under investigation.

This review aims to evaluate literature comparing the diagnostic performance of AI-assisted dermoscopic analysis with clinician judgment for melanoma detection across clinical settings and levels of expertise.
This comparative narrative review was conducted using PubMed and Embase to synthesize evidence descriptively from peer-reviewed, primary studies published between 2020 and 2025. Included studies

evaluated AI-assisted analysis of dermoscopic images for melanoma detection compared with dermatologist and non-dermatologist clinicians across clinical settings. Diagnostic accuracy outcomes included area under the receiver operating characteristic curve, sensitivity, and specificity, alongside variability in study design, comparison groups, and clinical context.

This review is expected to identify differences in how AI-assisted dermoscopic analysis and clinician judgment are evaluated across studies, including variability in study design, comparison groups, clinician expertise, and clinical setting. Emerging themes may include differences in diagnostic performance when AI systems are compared with expert dermatologists versus non-specialist clinicians, as well as variation in reported sensitivity and specificity across clinical contexts. Studies are also expected to differ in diagnostic accuracy metrics and methodological approaches.

By clarifying how diagnostic performance of AI-assisted dermoscopy is reported across clinician expertise and clinical settings, this review is expected to highlight the potential effectiveness of AI as a diagnostic tool and its role as an adjunct to clinician judgment. Examining these patterns may help contextualize AI tools within melanoma detection workflows and illustrate how study design and clinical context influence findings. These insights may inform future research and support consideration of AI integration into clinical practice.

**Virtual: A Comparative Narrative Review of Transcatheter and Surgical Mitral Valve Replacement Approach in Patients with a History of Infective Endocarditis**

Hannah Slaughenhoupt | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**

**Background:** Surgical mitral valve replacement remains the conventional approach for many patients with history of prior infective endocarditis while transcatheter replacement has emerged as an alternative for select populations. Anatomical, procedural, and biomedical restraints on this technology complicates its applicability to patients with a history of infective endocarditis and complex mitral valve anatomy. Comparisons between techniques in this patient population is limited, allowing this view to help close a critical gap in research.

**Objective:** This study aims to compare existing evidence on transcatheter and surgical mitral valve replacement approaches in terms of morbidity, mortality, reinfection/ recurrent endocarditis, stroke and embolic event, length of hospital stay, procedural complexity, long term valve performance, and overall risk-benefit profile in patients with a history of infective endocarditis.

**Methods:** A narrative review was conducted using PubMed, Clinicaltrials.gov, and Embase to identify peer-reviewed studies published between 2020 and 2025. Eligible studies included peer- reviewed randomized controlled trials, observation cohort studies, and meta-analyses originating from North America, Europe, and Australia involving patient with prior infective endocarditis undergoing transcatheter or surgical mitral valve replacement. Evidence was synthesized descriptively to examine reported procedural outcomes, complications, and anatomical considerations influencing approach selection.

**Results:** This review is expected to identify variability in transcatheter and surgical approach outcomes in patients with a history of infective endocarditis. Emerging themes may include difference in patient selection criteria, anatomical feasibility, perioperative risk profiles, postoperative complications, and reported durability of valve performance.

**Conclusions:** By synthesizing comparative evidence of risk vs. benefit profiles, this review aims to clarify how anatomical complexity, procedural limitations, and postoperative risk profile influence the evaluation of these approaches. Examining how these are addressed in the literature may help contextualize the evolving role of transcatheter in patients with a history of infective endocarditis and identify areas requiring further focused investigation. With new advancements in transcatheter modalities, the implications of this new technology should be studied in various patient populations.

**Virtual: A narrative review on Ayurvedic adjunct therapies for treatment of side effects in patients undergoing chemotherapy as compared to current therapies**

Maya Smith | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Katlyn Kuenzig, PA-C
Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**
**Background:** Chemotherapy remains a cornerstone of cancer treatment but is typically associated with significant side effects. Despite this, treatment for the side effects related to chemotherapy remains inadequate, directly impacting the patients' quality of life. Originating in ancient India, Ayurveda is the "science of life"; it encompasses many aspects of the human body and physiology, using different therapies to keep the body systems balanced. However, the manner in which Ayurvedic practices and conventional therapies are evaluated and reported remain inconsistent across the literature.
**Objective**: This narrative review aims to synthesize existing literature examining Ayurvedic adjunct therapies to current therapies in chemotherapy side effects with attention to how symptom related outcomes are characterized across studies.
**Methods:** A narrative review will be conducted using PubMed, Cochrane Library, and Embase to identify peer reviewed studies within the past 5 years involving adult patients undergoing chemotherapy who received Ayurvedic therapies, conventional therapies, or both. Eligible studies will include studies written in English including adults 19+ across randomized controlled trials, observational and clinical study designs. Studies included are focused on Ayurvedic practices, chemotherapy side effects, and current Western treatments of those side effects. Evidence will be synthesized to examine the effectiveness of conventional Western therapies and Ayurvedic practices on symptom management.
**Results:** It is anticipated that there will be heterogeneity in how current therapies, such as medications, and Ayurvedic practices including catering to individual doshas, the use of herbs, and therapeutic diets will affect chemotherapy-related side effects.
**Conclusion:** By synthesizing the current literature on Ayurvedic practices to conventional therapies in chemotherapy-related side effects, this review aims to clarify how supportive interventions can be used to manage chemotherapy side effects. This review may help contextualize mixed findings and identify gaps for future research.

**Virtual: A Narrative Review of Low-Molecular-Weight-Heparin Use in Pregnant Patients with Heterozygous Factor V Leiden**

Megan Stevens | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA, Katlyn Kuenzig, PA-C

**Abstract:**
**Background**: Venous thromboembolism (VTE) remains a leading cause of antepartum and postpartum morbidity and mortality. Several risk factors exist for thromboembolism in pregnancy, one of the most significant being inherited thrombophilias, such as heterozygous Factor V Leiden. Current evidence does not support routine thromboprophylaxis in the antepartum period to prevent first-time VTE in pregnant patients with heterozygous FVL, though these guidelines are made off of very low-certainty evidence and thus there is significant variability in the standards of care.
**Objective:** This narrative review aims to synthesize existing literature examining the use of low-molecular weight heparin prophylaxis in pregnancy to no prophylaxis in expectant patients with heterozygous Factor V Leiden with attention to how first time VTE risk and maternal outcomes are reported across studies.
**Methods**: A narrative review was conducted using PubMed, Scopus, and Embase to identify studies published between 2020 and 2026 evaluating prophylactic use of low-molecular weight heparin in expectant patients with heterozygous Factor V Leiden and the incidence of VTE. Eligible studies included randomized control trials, cohort studies, and case-control studies. Primary outcomes included incidence and clinical characteristics of VTE in pregnancy and associations between inherited thrombophilias to this complication.
**Results**: This review is expected to identify heterogeneity in reported VTE incidence and management approaches among pregnant individuals with heterozygous Factor V Leiden. This variability reflects differences in patient populations and clinical practices. Overall, the literature highlights ongoing uncertainty and a lack of direct evidence to guide standardized prophylactic strategies, supporting the need for individualized clinical decision-making.
**Conclusion**: By synthesizing evidence on low-molecular-weight heparin use for antepartum thromboprophylaxis in patients with Factor V Leiden, this review aims to clarify how first-time VTE risk and prophylactic strategies are reported in the literature. The results may emphasize the need to develop pregnancy-specific risk assessment models and to conduct direct trials in this population, to contextualize current uncertainty and identify gaps for future research to reduce variability in clinical practice.

**Virtual: A narrative review of conservative and antibiotic management strategies in acute uncomplicated diverticulitis**

Matthew Swift | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Katlyn Kuenzig, PA-C
Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**
**Background:** Recent guidelines for management of acute uncomplicated diverticulitis (AUD) suggest a more conservative approach to management. Despite these recommendations, audits of clinical practice show clinicians still favor management with antibiotics, stating concerns with long term outcomes as a primary reason. With growing concerns about antibiotic resistance and a shift in clinical approach to antibiotic stewardship, the importance of proper treatment cannot be overstated. Current literature suggests similar outcomes between treatments, but comparative long term outcome data remains limited.
**Objective:** This narrative review aims to review the current literature on treatment outcomes of patients with AUD managed with antibiotics and conservative methods alone. Quality of life, disease recurrence rates, and disease course are characterized or reported across studies.
**Methods:** A narrative review was conducted using PubMed, Scopus, and Embase to identify peer-reviewed studies published between 2021 and 2026 observing and comparing conservative management and antibiotics

management for acute uncomplicated diverticulitis. Eligible studies included randomized controlled trials and observational cohorts. Evidence was synthesized descriptively to examine quality of life scores, disease recurrence rates, hospitalization rate, and treatment length.
**Results:** This review is expected to identify heterogeneity in reported recovery trajectories, recurrence rates, quality of life, and hospitalization rates in long-term comparisons. It is anticipated that antibiotic management will demonstrate symptom control in initial phase of disease and conservative management will show decreased recurrence rates and improved quality of life. These findings are expected to clarify the treatment modalities' benefits and fallbacks, giving clinicians relevant information for routine clinical decision-making.
**Conclusion:** By reviewing the current literature on the use of antibiotic therapy and conservative management in AUD, this study seeks to clarify how short- and long-term outcomes are reported across the literature. The results may guide clinicians toward practices in line with antibiotic stewardship, promote better understanding and education of AUD, and support future clinical studies in diverticulitis outcomes.

**Virtual: $Mg^{2+}$shift of SARS-CoV-2 s2m kissing complex structure: Preorganization toward the A-form to facilitate strand displacement**

Sumaiya Tasnim |Chemistry | School of Science and Engineering
Faculty Advisor(s): Jeffrey Evanseck, Ph.D., Mihaela-Rita Mihailescu, Ph.D.

**Abstract:**
The SARS-CoV-2 pandemic underscored the central role of structured viral RNA elements in regulating replication, host interactions, and viral fitness, motivating a detailed physical understanding of RNA tertiary organization. The highly conserved stem–loop II motif (s2m) of SARS-CoV-2 undergoes a magnesium-dependent strand displacement transition between monomeric, kissing-complex (KC), and extended-duplex (ED) states. While experiments demonstrate that $Mg^{2+}$ promotes both KC formation and duplex maturation, the atomistic mechanisms by which $Mg^{2+}$ participates remain undefined. Here, we establish that $Mg^{2+}$ functions to pre-organize the KC structure towards the A-form of RNA to facilitate strand displacement through electrostatic stabilization and entropic narrowing. Using multi-microsecond atomistic molecular dynamics simulations of s2m monomers and dimers with and without $Mg^{2+}$, we combine ion-resolved proximity analysis with stacking geometry metrics, glycosidic χ torsions, sugar-pucker populations, and $Mg^{2+}$ radial distribution functions to quantify $Mg^{2+}$- induced structural ordering. Residue-resolved $Mg^{2+}$ coordination analysis reveals that three Mg2+ ions span the palindromic core (residues 20–23 and 61–64) and adjacent flanking regions in the dimer, which shifts the conformation towards the A-form of RNA, shared by the ED, characterized by three narrow twist/roll-like dihedral basins, strong funneling of plane–plane separations into the canonical π–π stacking regime with minimal long-distance tails, and tilt distributions peaking near ~90°, consistent with face-to-face stacking. In addition, Shannon entropy indicates the $Mg^{2+}$-bound dimer exhibits A-form enrichment with a majority C3'-endo population (~0.54) and inverted sugar-pucker kinetics. Together, these results demonstrate that $Mg^{2+}$ deterministically reshapes the KC structural ensemble into an ED-like, A-form–enriched state before tertiary rearrangement, providing a direct mechanistic explanation for $Mg^{2+}$- dependent s2m dimerization and duplex formation and establishing divalent ions as active architects of RNA conformational landscapes.

**Virtual: A comparative narrative review of Delandistrogene Moxeparvovecc and corticosteroid therapy in Duchenne muscular dystrophy**

Jasmine Urzua-Alba | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Katlyn Kuenzig, Ed.D

**Abstract:**
**Background:** Duchenne muscular dystrophy (DMD) is an X-linked recessive neuromuscular disease caused by a mutation in the DMD gene resulting in progressive loss of neuromuscular function. Despite the current use of systemic corticosteroids for symptomatic management of DMD, there remains no cure, with a median survival age ranging from the late 20s to early 30s. Recently gene-based therapies such as delandistrogene moxeparvovec have emerged as new therapeutic approach at targeting the measured dystrophin in patients with DMD aiming to delay symptom presentation and improve quality of life. However, reported outcomes and comparisons with established standards of care remain limited.
**Objectives:** This narrative review aims to synthesize existing literature comparing gene therapy and systemic corticosteroids in patients with Duchenne muscular dystrophy with attention to amount of dystrophin expressed and onset of symptom presentation based on symptom control scores.
**Methods:** A narrative review was conducted using ScienceDirect, Scopus, PubMed, and Proquest to identify peer reviewed studies between the years 2020 and 2026 in patients with Duchenne muscular dystrophy using delandistrogene moxeparvovec gene therapy or systemic corticosteroids. Eligible studies included cohort studies, randomized controlled trials, and meta-analyses.
**Results:** This review is expected to identify how dystrophin expression and onset/progression of symptoms in patient with DMD vary between patients treated with delandistrogene moxeparvovec gene therapy and the current standards of care.
**Conclusion:** By comparing the current evidence this review aims to clarify how gene-based interventions are evaluated alongside corticosteroid therapy. This review aims to inform clinicians about available treatment options to delay disease progression and improve life expectancy in patients with Duchenne muscular dystrophy. The findings also support the need for future studies investigating the long-term effects of gene therapy in this population.

**Virtual: A Comparative Study of The Use of Adjunctive Stimulant Therapy in Adults with Schizophrenia**
Cole Vernet | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Katie Keunzig, MPAS, PA-C

**Abstract:**
**Background:** Schizophrenia is a chronic mental health condition that is associated with recurrent hospitalizations and persistent negative and cognitive symptoms despite antipsychotic treatment. Adults with comorbid ADHD or other prominent cognitive impairment may be considered for adjunctive stimulant therapy. However, concerns remain regarding the potential psychotic symptom exacerbation and acute care utilization. Existing literature addressing stimulant use in this population varies widely in design, patient selection, and outcome reporting. It is critical to analyze the safety of stimulant use in patients with schizophrenia to further treat their symptoms. Further research is essential to better understand the condition and provide patients with appropriate treatment.
**Objective:** This narrative review aims to synthesize existing evidence on the use of stimulants on patients with schizophrenia with attention to how hospitalization rates and symptom exacerbation are characterized across studies in the literature.
**Methods:** A narrative review will be conducted using Elsevier, Embase, and PubMed to analyze relevant peer-reviewed studies published within a 10-year timeframe. Studies that include adults 18 years or older with a DSM-5 diagnosis of schizophrenia on a maintained and stable antipsychotic therapy with or without the use of

adjunctive prescription stimulants are eligible. This study will evaluate randomized clinical trials, cohort studies, observational studies, and other research studies.
**Results:** This review is expected to identify heterogeneity in reported hospitalization and symptom related outcomes associated with adjunctive stimulant use, influenced by differences in specific treatment regiments and dosages of prescription stimulants. Variability in specific dosages could impact patient outcomes and contribute to adverse effects.
**Conclusion**: This review aims to clarify how hospitalization and symptom related outcomes are reported across diverse contexts. Potential findings may allow for safer stimulant prescribing, patient tailored treatment regiments, and guide future research on treatment strategies. The variability in treatment methods may help to contextualize inconsistent findings and identify gaps in literature.

**Virtual: Impact of Early-Life Antibiotic and Probiotic Exposure on the Gut Microbiome: Implications for Childhood Asthma Risk**

Elizabeth Whelan | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Katlyn Kuenzig, MPAS PA-C

**Abstract:**
**Background:** Antibiotics are among the frequently prescribed medications in early childhood. In the United States, children receive an average of 6.8 antibiotic courses by age five, and approximately half of infants are exposed to at least one antibiotic within the first year of life. These exposures take place during critical periods of immune system development and gut microbiome maturation, when alterations in microbial composition may influence immune programming. Disruption of the developing gut microbiome during these windows has been proposed as a potential contributor to immune dysregulation and asthma pathogenesis. Within this context, probiotic supplementation during pregnancy and early childhood has been increasingly studied for its potential to support gut microbiome development. Despite growing interest in gut microbiome influences on asthma, existing findings remain heterogenous and dependent on exposure timing and study design.
Objective: This narrative review aims to synthesize existing literature to examine how the timing of antibiotic use and the potential role of probiotic supplementation relates to the gut microbiome and childhood asthma-related outcomes.
**Methods:** A narrative review was conducted using PubMed, Scopus, and Embase to identify studies published between 2020 and 2026 across North America, Europe, and Australia. Eligible studies included randomized controlled trials, cohort studies, clinical trials, meta-analyses, and case-control studies evaluating systemic antibiotic or probiotic exposure during prenatal, perinatal, neonatal or early childhood periods. Included populations consisted of pregnant individuals, infants, and children. Evidence was synthesized to examine exposure timing, microbiome-related findings, and asthma-related outcomes across studies.
**Results:** This review is expected to identify variations in how early-life antibiotic exposure and probiotic supplementation are evaluated across studies, including differences in exposure timing and methodology. Emerging themes may include variability in reported associations based on developmental period, probiotic strains, and study design, as well as asthma outcome definitions.
**Conclusion:** This review aims to clarify how timing, exposure context, and microbiome-related outcomes are represented across the literature. This insight may inform future research directions focused on early developmental windows and microbiome-informed prevention strategies in clinical practice.

**Virtual: A Narrative Review of Creatine Supplementation and Cognitive Outcomes in Otherwise Healthy Adults.**

John White | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shaaban, MD, MCh, MS, MA
Katlyn Kuenzig, PA-C

**Abstract:**

**Background:** Creatine supplementation continues to grow in popularity due to its well-established advantages for skeletal muscle growth and performance. Recently, interest has grown surrounding the supplement's potential advantages for cognitive function and brain health, especially in those with creatine-deficient syndromes who are known to suffer from cognitive impairment. However, the literature remains inconsistent on whether adults without underlying metabolic or neurologic disease can see clinical benefits in cognition from creatine supplementation.

Objective: This narrative review aims to synthesize existing evidence on creatine supplementation with attention to how cognitive function and brain health outcomes have been reported throughout literature.

**Methods:** A narrative review will be conducted using peer-reviewed literature identified through PubMed, Scopus, and Embase. The eligible studies will consist of randomized controlled trials and observational studies published within the past 5 years that include the desired healthy adult population and evidence will be synthesized descriptively to examine reported cognitive outcomes.

**Results:** This review is expected to identify heterogeneity in reported cognitive outcomes associated with creatine supplementation, including differences in study populations, cognitive testing methods, and supplementation methods. Emerging themes may include variability in
findings under conditions of physiologic stress or sleep deprivation as well as differences in overall brain health.

**Conclusion:** By evaluating clinical trials and existing peer-reviewed literature, this review will aim to clarify how cognitive and brain health outcomes are reported across different study designs and contexts. It may guide informed decision making for clinicians and may serve as a foundation for future studies looking to specify optimal dosing strategies or further neuroprotective properties.

**Virtual: A Review of Pennsylvania Schools' Board Bullying Policies for LGBTQ+ Youth**

Alexandra Zawodny | School Psychology | School of Education
Faculty Advisor(s): Laura Crothers, Ed.D.

**Abstract:**

Bullying remains a persistent problem for school-aged children in the U.S., with approximately 20% of high schoolers experiencing bullying at school (CDC, 2024). The Pennsylvania Public School Code (Section 13-1303.1-A) requires all schools to have antibullying policies that contain a clear definition of bullying, consequences for policy violations, and procedures for reporting and investigating incidents. However, this state-level mandate does not require schools to identify specific student populations that are at increased risk for bullying.

At the federal level, Title IX prohibits discrimination based on sex in federally funded education programs. In 2021, the U.S. Department of Education clarified that discrimination "on the basis of sex" includes discrimination based on sexual orientation and gender identity. This interpretation is particularly significant for LGBTQ+ students, who experience disproportionately high rates of bullying compared to their peers (Reisner et al., 2015; Webb et al., 2021).

Mallory and colleagues (2021) found that Lesbian, Gay, and Bisexual students were nearly twice as likely as heterosexual students to report bullying at school (32% vs. 17%) and online (26% vs. 12%). Given this heightened vulnerability, school policies must effectively integrate state antibullying requirements with federal civil rights protections. The National School Climate Survey found that LGBTQ+ students experienced less victimization in schools with comprehensive antibullying policies that explicitly included LGBTQ+ protections (Kosciw et al., 2022).

Incorporating both state and federal law into school policies not only ensures legal compliance, but also signals a commitment to supporting LGBTQ+ students. However, it remains unclear how these mandates are implemented at the district level. This study reviews bullying policies from all 499 Pennsylvania public school districts in effect during the 2024-2025 school year. We aim to determine (1) the percentage of districts with a fully adopted antibullying policy, (2) the proportion of policies that reference Title IX, and (3) the extent to which policies go beyond Title IX to explicitly protect LGBTQ+ students. Policies will be systematically reviewed and coded to assess these components. Findings will identify districts with robust protections and highlight policy language that may inform future revisions to better protect vulnerable student populations.

**Virtual: A Review of Social Media Policies of Pennsylvania School Boards**

Alexandra Zawodny | School Psychology | School of Education
Athena Vafiadis | School Psychology | School of Education
Faculty Advisor(s): Laura Crothers, Ed.D.

**Abstract:**
Social media plays a central role in adolescents' daily lives, with students spending approximately five hours per day on platforms such as Instagram, Snapchat, and TikTok (Rothwell, 2023; Vogels & Gelles-Watnick, 2023). While these platforms provide opportunities for connection and self-expression, they also expose youth to significant risks, including engagement in harmful online trends and cyberbullying (Dowdell, 2011). Cyberbullying remains a persistent, widespread issue in the United States, with 16% of high schoolers reporting victimization in 2024 (CDC, 2024). Research consistently links cyberbullying to negative psychological outcomes, including increased anxiety and depression, lower life satisfaction, and heightened risk for suicidal behaviors (Giumetti & Kowalski, 2022). Additionally, involvement in cyberbullying has been associated with offline consequences, such as physical fighting and school avoidance due to fear of continued harassment (Guo, 2021). Despite the prevalence and harmful effects of cyberbullying, there is currently no federal definition of the term. In Pennsylvania, the Public School Code (Section 13-1303.1-A) mandates that all school entities adopt antibullying policies that include a clear definition of bullying, outlined consequences for policy violations, and procedures for reporting and investigating incidents. Although the law states that bullying includes intentional harm delivered through electronic means, it does not explicitly identify social media as the primary environment in which cyberbullying occurs (Act of June 1, 1949, § 3(1); Kowalski et al., 2019). The present study reviewed 499 PA school district board policies that were active during the 2024–2025 academic year. The purpose of the study was threefold: to determine the percentage of districts that have fully adopted antibullying policies, to examine how many policies explicitly address cyberbullying, and to evaluate the extent to which social media is specifically referenced as a context for cyberbullying. Each policy was systematically reviewed to assess the inclusion of required components and references to electronic or social media-related bullying. Findings from this review aim to inform future revisions to district-level policies. By identifying gaps in how social media and

cyberbullying are addressed, schools may be better equipped to strengthen policy language and develop more effective strategies to prevent and respond to cyberbullying incidents.

**Virtual: Women's Peace Agency: Reading Africae Munus in the Framework of Emilie Townes' Womanist Ethics and the Cultural Production of Evil**

Leonard Zifac| Theology | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Anna Scheid, Ph.D.

**Abstract:**
This paper attempts a critical reading of Africae Munus (AM) through the ethical framework of Emilie M. Townes's womanist thought, arguing that a womanist lens reveals both the strengths and limitations of AM's treatment of women's agency in African peacebuilding. While AM calls the Church in Africa to reconciliation, justice, and peace, it relies heavily on maternal and supportive depictions of women, failing to confront patriarchal structures that restrict women's participation in public, political, and ecclesial life. Townes's concept of the "cultural production of evil" illuminates how systemic sexism and patriarchal narratives normalize women's marginalization. By integrating womanist ethics with Catholic social teaching, the paper demonstrates that meaningful peace cannot emerge without dismantling the cultural, religious, and political stereotypes that inhibit women's participation and leadership in peacebuilding. Drawing on African feminist theologians, empirical studies, and post-conflict case examples, the paper argues for a paradigm shift toward a "new womanism" in Africa—one that recognizes women not as auxiliary actors but as essential architects of peace. The proposed womanist–Catholic synthesis emphasizes structural change, shared agency, solidarity, and the need to name and challenge patriarchy as a form of systemic sin. Ultimately, the paper contends that sustainable peace in Africa requires the transformative inclusion of women's voices, leadership, and lived wisdom at every level of church and society.

# POSTERS

These posters will be available to view during the in-person open poster sessions in the Charles J. Dougherty Ballroom C and the Shepperson Suite, Power Center on March 18, and also online throughout the week of March 16 – 20 on Symposium by Forager One.

**Note:** The number in front of each title corresponds to the physical place the student's poster will be located at the in-person event.

*Indicates that this student is also presenting during the oral presentations.

**1: Role of Endogenous Melatonin and Melatonin Receptors, MT1 and MT2, on Metabolic Proteins in Bone in AANATKO and MTRKO Transgenic Mice**

Yong Myoung | Pharmacology | School of Pharmacy
Faculty Advisor(s): Paula Witt-Enderby, Ph.D.

**Abstract:**

**Background**: Melatonin/MT2 melatonin receptors (MT2Rs) increases bone density and formation through induction of osteoblastogenesis leading to decreases in osteoclastogenesis. PPARg, a metabolic driver of osteoblastogenesis and key proteins involved in musculoskeletal health, is attenuated by exogenous melatonin in bone and osteoblasts differentiated from MSCs. Melatonin interventions targeting PPARg and PPARg-modulated pathways may prove to be effective therapeutic strategies for preserving bone and metabolic health.
**Objective**: To determine the role of endogenous melatonin and MTRs, MT1 and MT2, on bone-expressed metabolic proteins, PPARa/g/b, UCP1, C/EBPa/b, DIO2, and ACRP30 in an AANAT (melatonin-depleted) knockout (AANATKO) mice, or MT1RKO, MT2RKO mice.
**Methods**: Bone cell lysates (male and female) transgenic mice were subjected to western blot analysis using the Odyssey and LiCor Imaging systems. Protein levels, quantified by Revert 700, were used to normalize proteins. Combined, within and between group differences were analyzed by one-tailed t-tests, one-way or two-way ANOVA, respectively to identify genotype- or sex-specific differences.
**Results**: When compared to wildtype (WT), combined male and female AA-NATKO (melatonin-depleted) bone demonstrated significant increases in UCP1 and decreases in DIO2 with trends (p=0.06-0.09) towards increases in PPARb/g and decreases in PPARa. Within group analyses in females demonstrated significant increases in UCP1, decreases in DIO2 and trends (p=0.07-0.08) towards increases in PPARg and decreases in PPARa vs WT; no differences occured in male. For MT1KO/MT2KO (dKO; male + female) increases in C/EBPa vs WT occurred. In females vs WT, dKO increases PPARg (p=0.02; possibly driven by MT2R), C/EBPa (p=0.04; driven by MT1R) and ACRP30 (p=0.0043; driven by MT1R or possibly MT2R) and decreases in UCP1 (p=0.03; driven by MT1R or possibly MT2R).
**Conclusion**: These results demonstrate important roles for endogenous melatonin and melatonin receptors in modulating metabolic processes critical to bone health. Disruptions in endogenous melatonin signaling are observed in idiopathic adolescent scoliosis and disruptions in one's routine (e.g., shift workers),changes in bone marker rhythms and increased risk of fracture has been observed. Interventions targeting normalization of nocturnal melatonin levels and/or rhythms may prove to be an effective therapeutic strategy for maintaining healthy bone throughout the lifetime.

**2: Lower Limb Muscle Morphology in Individuals with Coronary Artery Disease: A Cadaveric Pilot Study**

Jenna Relkin | Physical Therapy | Rangos School of Health Sciences
Faculty Advisor(s): Dominic Violi, DPT, CSCS

**Abstract:**

Coronary artery disease (CAD) is associated with sedentary behavior and reduced muscular health. CAD risk assessment via imaging and blood panels continues to burden the American healthcare system while outpatient providers are limited in effective and accessible screening tools. Calf muscle thickness normalized by tibia length may provide an objective assessment of activity level and risk of CAD.

**Purpose**: This pilot study investigated whether individuals who died from CAD exhibit lower normalized calf muscle thickness compared to those who died from non-coronary artery disease (non-CAD) causes.

**Methods**: Seven cadaveric donors (3 CAD, 4 non-CAD) were dissected to measure gastrocnemius and soleus muscle thickness at their thickest points on the medial aspect using digital calipers. Three measurements were taken per muscle, averaged, and verified using tape measurements for accuracy. Tibia length was measured from the medial tibial plateau to the medial malleolus and used to normalize total muscle thickness. Donor age and cause of death were recorded. Independent t-tests compared normalized calf thickness (gastrocnemius and soleus) and normalized soleus thickness between groups, and linear regression assessed age as a covariate.

**Results**: Normalized calf muscle thickness was significantly lower in the CAD group (mean = 0.0808 ± 0.0060) compared to the non-CAD group (mean = 0.1110 ± 0.0187; $p = 0.042$). Normalized soleus thickness alone was an even stronger predictor, with the CAD group showing significantly lower values (mean = 0.0396) than the non-CAD group (mean = 0.0649; $p = 0.035$). When age was included as a covariate, the effect of CAD was no longer statistically significant ($p = 0.115$), and age itself was not a significant predictor ($p = 0.848$).

**Conclusion**: Preliminary findings suggest that individuals who died from CAD may exhibit lower normalized soleus thickness, potentially reflecting long-term physical inactivity. Prior research shows that reduced daily step count in older adults leads to measurable declines in leg lean mass and muscle protein synthesis, supporting the role of walking in preserving muscle health while potentially protecting cardiovascular health.

**Significance /Novelty**: This study serves as the first phase of a larger investigation that will explore the relationship between calf morphology and pericardial fat mass. These findings underscore the potential of simple, accessible interventions such as walking programs to prevent CAD.

**3: When Everyone Knows You: Confidentiality and Dual Roles in Rural Practice**

Zoe Cutillo | Healthcare Ethics | McAnulty College and Graduate School of Liberal Arts
Angela Ruby | Healthcare Ethics | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Joris Gielen, Ph.D.

**Abstract:**

Rural healthcare delivery occurs in settings characterized by small populations, limited medical infrastructure, and overlapping social and professional relationships. Conventional models of confidentiality presuppose a clear boundary between clinicians' professional and personal roles, as well as patients' ability to seek care from alternative providers. In rural contexts, however, patients often lack meaningful options for anonymous or geographically distant care, complicating the practical application of these confidentiality standards.

**4: Indices of Educational System Readiness**

Kaceme Djellouli | Analytics & Information Management | A.J. Palumbo School of Business Administration
Faculty Advisor(s): Pinar Ozturk, Ph.D.

**Abstract:**

Educational equity initiatives increasingly rely on large-scale distribution of school supplies and material resources, yet current evaluation methods remain largely cross-sectional, survey-based, and difficult to standardize across schools or track over time. As a result, stakeholders often lack timely, comparable evidence of whether distributed resources are sufficient for classroom needs, delivered efficiently, and equitably allocated across settings.

This project developed the Education System Indices (ESI); a comprehensive measurement framework that integrates operational supply-chain data (e.g., volumes, delivery timing, distribution frequency, and estimated depletion) with educator-reported assessments of resource adequacy, classroom readiness, and instructional impact. The framework generates indices at the educator level that can be aggregated to the school, district, and regional/state levels to support both classroom level decision making and cross-regional equity analysis.

Providing standardized indices across multiple levels of the education system supports educators, nonprofit leaders, donors, and policymakers in determining what constitutes a sufficiently resourced classroom, identifying disparities in access across need levels and monitoring whether material investments translate into improved instructional readiness and opportunity over time.

This work advances educational resource allocation by providing a scalable, data-integrated system grounded in both research evidence and operational practice. By bridging operational data with educator experience and equity outcomes, ESI offers nonprofit organizations and educational networks a replicable model for moving beyond isolated reporting toward sustained, evidence-based resource allocation.

**5: Comparative Analysis of Biomechanical Outcomes in Ankle Arthrodesis and Total Ankle Arthroplasty: Impacts on Joint Mobility, Stability, and Gait Mechanics**

Haley Doyle | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Brittney Sobota, MSPAS, PA-C, Bahaa Shaaban, MD, MCh, MS, MA

**Abstract:**

**Background**: Although ankle osteoarthritis is less prevalent than other osteoarthritis diagnoses, its optimal management remains uncertain. Unlike hip and knee osteoarthritis, treatment strategies for ankle osteoarthritis have evolved in recent years, shifting from ankle arthrodesis toward total ankle arthroplasty because of advances in implant design and improved postoperative outcomes. The current literature reports variable outcomes. Despite advances in understanding TAA and AA outcomes, critical knowledge gaps remain regarding optimal patient selection and the long-term sustainability of the implant.

**Objective**: This research paper aims to analyze and compare the biomechanical outcomes of total ankle arthroplasty and ankle arthrodesis, focusing on joint mobility, stability, and gait mechanics to inform personalized surgical decision-making.

**Methods**: A comparative analysis was conducted using Embase, ProQuest, PubMed, and Scopus to identify studies published between 2020 and 2026 that evaluated clinical outcomes of total ankle arthroplasty and ankle arthrodesis, with an emphasis on ankle joint mobility, stability, and gait mechanics. Eligible studies included

randomized controlled trials and observational cohorts. Primary outcomes focused on biomechanics: ankle joint mobility (multiplanar and sagittal range), loading and stability (plantar pressure, dynamic control, joint motion), gait features (step length, walking speed, symmetry), and adjacent joint compensation (changes at the knee, midfoot, subtalar, or hip).
**Anticipated Results**: Total ankle arthroplasty is expected to demonstrate superior ankle joint mobility, stability, and gait parameters, benefiting populations seeking treatment for ankle osteoarthritis.
**Conclusion**: This study aims to inform personalized treatment strategies for ankle osteoarthritis by comparing outcomes between ankle arthrodesis and total ankle arthroplasty. The results may guide surgeons toward more patient-centered optimization and support future prospective studies of ankle osteoarthritis management.

**6: A Fighting 'Glance': Understanding the Complexities of Disabled Labor Through Pittsburgh**

Kaelin Hughes | History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Andrew Simpson, Ph.D.

**Abstract:**
In 1937 and 1954, blind broom-makers at the Pittsburgh Branch of the Pennsylvania Association for the Blind engaged in strikes advocating for increased wages and improved working conditions. Concerns included abolishing piece-work compensation models and high enough wages to live on without receiving government assistance. Executives at the Association denied these conditions numerous times, citing the lack of profit from the blind-laborers' products, financial deficits, and threatening to close the workshop entirely. Furthermore, executives encouraged workers to apply for pensions prior to the 1954 strike to alleviate financial burdens of paying out more wages. The workers' organization and demands in response intrigued the greater Pittsburgh community and enticed them to critique the executives, calling for improved conditions. Despite these protests, the laborers reached agreements with the executives for far less than their initial demands. The idea that the blind could not engage in meaningful work outside of sheltered workshops permeated discussions concerning organizations and policymaking, raising questions about the value of blind labor for finances at an organizational, state, and federal level with pensions and contracted goods. Drawing from archival records of Pittsburgh's blind-centric institutions, such as the Pittsburgh Blind Association and the Western Pennsylvania School for the Blind, policy histories concerning labor and social welfare, histories of sheltered workshops, and social histories of the blind, this research argues the significance of the two strikes within a larger conflict between disabled labor and industrial capitalism, hinging on ideas favoring low-cost, exploited labor versus expenditures of social welfare for the blind.

**7: Italian Tensions: Interpretation, Conflict, and the Introduction of Phenomenology in the context of Italian Thought**

K. Darius Branche | Rhetoric and Philosophy Communication | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Janie Marie Fritz, Ph.D.

**Abstract:**
It goes without saying that every philosophy in a national environment must encounter obstacles in its introduction, not only as it engages 'indigenous' forms of philosophizing that have become institutionalized and current, but also it must withstand the criticism which is the reserved fate of all new philosophical trends. With phenomenology it was of course no different, but these tensions were expressed in a somewhat different

manner. This paper will explore these tensions in the relations between two Italian thinkers the philosopher Galvano Della Volpe and the Jurist and Hermeneutics scholar Emilio Betti, especially in their encounter with the philosophers Jean-Paul Sartre and Hans-Georg Gadamer respectively. For Della Volpe, his encounter with Sartre was at a talk that he gave at the Gramsci Institute of Rome in 1961 regarding the problem of the construction of the subject in Marxism. The lectures at the institute were later published in a small volume called 'What is subjectivity?'. For Betti, the conflict was more literary as he responded to Gadamer's work in articles and lectures and even mentioned a reply Gadamer had given him towards his criticisms. This paper will also explore established trends in Italian thought, represented by the work of Gramsci, D'Annunzio, and Benedetto Croce that act as the intellectual underpinning of this conflict and the sources of the fruitful 'tensions' that created difficulties in phenomenology's reception in Italy. Also, the paper will discuss Sartre's work on Flaubert (one of the main themes of the lecture), Gramsci's role as the tutelary deity of the conflict in Marxism (and of the conference at the eponymous institute), requiring subjectivation, as well as the relation of a phenomenological Hermeneutics and its relation to 'totality' and how this can be coherent within the philosophical thought of Sartre and Gadamer. By writing this paper, I hope to make a novel contribution towards the understanding of philosophical tendencies in Italy, as well as the relation between Marxism and Phenomenology, theories of aesthetics, and the continued importance of the concept of 'totality' in our modern world.

**8: Awareness of the Medicare Diabetes Prevention Program Among Healthcare Providers Caring for Older Adults**

Anannya Pushkarna | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Melanie Turk, Ph.D.

**Abstract:**

**Introduction**: Prediabetes is a prevalent condition among older adults and represents a crucial opportunity where early interventions can help prevent the onset of type 2 diabetes mellitus. Lifestyle modifications are first-line management. The Medicare Diabetes Prevention Program (MDPP), a 12-month lifestyle change program initiated in 2018, is fully covered by Medicare, yet uptake remains limited. This study assessed healthcare providers' beliefs about prediabetes and awareness of the MDPP.

**Methods**: A cross-sectional survey was administered electronically to a national sample of physicians, nurse practitioners (NPs), and physician assistants (PAs). Questions addressed beliefs about prediabetes, barriers to care, and knowledge/awareness of the MDPP. Likert-scale items were collapsed into "Strongly agree or agree", "Neither disagree nor agree", and "Strongly disagree or disagree" for analysis. Descriptive statistics compared responses across provider types.

**Results**: A total of 195 providers completed the survey, including physicians (n=92), NPs (n=50), and PAs (n=53). Most agreed prediabetes is a significant public health issue (95.4%) and screening should be a priority (81.5%). Lifestyle modifications were viewed as effective (93.3%), and providers felt confident managing prediabetes (78.5%). However, substantial barriers to care were identified, including time constraints in performing the screening and educating the patient, the patient's difficulty with lifestyle changes, and the lack of accessible resources for the elderly. Although 61.4% of providers believed that patients who complete the MDPP would benefit and have less chance of progressing to type 2 diabetes, only 34.4% were familiar with the program, 29.1% knew how to refer patients to the program, and 35.4% knew that it is covered by Medicare. No differences were found among types of providers.

**Conclusion**: Healthcare providers recognize the importance of preventing and treating prediabetes and understand the importance of the MDPP. However, knowledge about the MDPP is lacking. Education and

interventions should be implemented to improve providers' knowledge and familiarity with the MDPP to prevent type 2 diabetes in older adults.

**9: Risk, Rewards, and Responsibility: Ethical Implications for Using CRISPR as a Treatment Mechanism for Parkinson's Disease**

Lauren Kenst | Healthcare Ethics | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Gerald Magill, Ph.D

**Abstract:**
This work aims to examine via an ethical lens, the use of CRISPR-Cas9 modified DNA as a method of treatment for Parkinson's Disease (PD). Explored in the work are the potential risks of gene therapy and genome editing, rewards of such research (such as disease eradication), and the need for ethical responsibility associated with the developing gene therapy technology.

One of the major questions driving this research is to investigate whether it will be possible to use this technology in the future to edit the genomes of persons carrying gene sequences related to PD and prevent the development and/or progression of the disease altogether. Relatedly, the aim is to investigate the ethical implications when editing germline cells to produce PD null family trees, by generating CRISPR babies. When these CRISPR babies go on to reproduce and have children of their own, their children would run the risk of carrying the edited gene, along with any potential mutations that could occur during cell division.

This is where the potential risk may outweigh the benefits: when editing germline cells, as that cell line matures into a human being and reproduces, a number of uncontrollable variables are introduced. These variables include the person's partner and their germline – as in, whether they are carriers of the trait sought after, or random genetic mutations that can and do occur during both meiotic and mitotic cell division. If the germline is edited in vitro, rather than using the current technology of somatic cell editing, this poses a number of ethical risks, bringing immense responsibilities to the providers continuing this research.

**10: The Ethical Contribution of Principlism for Interpretation Services in Patient-Centered Care**

Aigerim Aliakparova | Healthcare Ethics | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Gerard Magill, Ph.D.

**Abstract:**
Contemporary medicine recognizes patient-centered care approach as the ethical and clinical gold standard. It prioritizes not only the diagnosis and treatment of disease but also the patient's lived experience, personal values, and capacity to participate in decision-making. Central to this model is the practice of respectful, reciprocal communication between patients and healthcare providers. However, for individuals who speak other languages than English, communication is very often compromised due to language barriers, and this usually results in dramatic misunderstandings, compromised safety, and inequitable care outcomes.

In light of these concerns, this paper will explore how these four principles of principlism, such as autonomy, beneficence, non-maleficence, and justice, serve as an ethical foundation for integrating professional medical interpretation services into patient care and employs the Four-Box Model developed by Jonsen, Siegler, and Winslade, which applies the principlist framework to clinical ethics case analysis.

This work will examine how language access intersects with each of these domains, demonstrating that interpretation services are not auxiliary tools but rather integral to ethically sound and clinically effective care. The ethical importance of communication is especially clear in diverse populations, where language and cultural barriers can otherwise deepen existing health disparities. Accordingly, this paper aims to contribute to the ongoing discourse on health equity by elucidating how medical interpreting intersects with and reinforces core ethical commitments in patient-centered care.

**11: Preparing for Battle: Impacts of Pond Water on Tadpole Microbiome, Immune Priming, and Development**

Rosemary Westcott | Biology | School of Science and Engineering
Faculty Advisor(s): Sarah Woodley, Ph.D.

**Abstract:**
Tadpoles acquire many of their microbiota from the environment in which they develop. Experimental manipulation of that environment has been found to alter their gut and skin microbiomes, which in turn impacts physiology and development. In other animals, these microbiota serve to prime the immune system, but little is known about the role of the microbiome in immune priming in tadpoles. Here, we analyzed the gut microbiome, immune priming via immune gene expression, and development in Xenopus laevis (African clawed frog) tadpoles raised in either autoclaved or natural pond water to establish low-diversity and high-diversity microbiomes, respectively. We used a known quantity of a bacterial spike-in during DNA extraction to allow for integrated bacterial density and absolute abundance analysis after 16S sequencing. We also analyzed key immune gene expression via direct mRNA detection with a custom NanoString code set and correlated expression with aspects of the microbiome. We found that tadpoles raised in autoclaved pond water have: 1) lower gut bacterial diversity but similar bacterial density, 2) altered immune gene expression, 3) a more rapid rate of development, and 4) more severe tail deformities compared to those raised in natural pond water. Establishing this microbiome manipulation model in this species will allow for the further use of molecular tools to better understand the effects of the microbiome on tadpole immunity at the molecular level.

**12: Diimines as Novel Gram-Positive Selective Antibiotics**

Elias Griffin | Chemistry | School of Science and Engineering
Faculty Advisor(s): David Heisler, Ph.D.

**Abstract:**
Antibiotic-resistant pathogens are one of the leading global health crises, causing ~48 million infections and $75 billion in healthcare costs annually. It is estimated that by 2050, about 40 million people will have died from antibiotic-resistant pathogens. Owing to the lack of new antibiotic, there is an urgent need to identify new scaffolds that possess potential antibacterial properties. Nitrogen-containing compounds, such as imidazoles and diimines, have been shown to have diverse bioactivities, including antibacterial. Therefore, we screened an initial library of imidazole and diimines compounds for their antimicrobial potential against common human pathogens (Salmonella, E. coli, Shigella, Listeria, and Staphylococcus) Using a zone of inhibition assay in conjunction with liquid growth inhibition assays, we identified one imidazole and two diimines with antibacterial properties against Gram-positive Listeria and Staphylococcus. One of these compounds was found to be bactericidal without being toxic towards mammalian cells at the same concentrations. Furthermore, we found that treatment of Listeria infected mammalian cells with the compound reduces bacterial burden by over 99%.

These data collectively demonstrate the potential of diimines as novel antibacterial scaffolds, paving the way for their optimization to enhance their effectiveness.

**13: RsmE-dependent spatial positioning manifests cooperative spreading in Pseudomonas fluorescens through alterations in Cyclic-di-GMP levels**

Sadhana Srinivasa | Biology | School of Science and Engineering
Faculty Advisor(s): Wook Kim, Ph.D.

**Abstract:**

**Background**: Cooperative spreading on agar surface involves two distinct Pseudomonas fluorescens genotypes working together. They self-segregate in space, where type-1 (T1) positions at the colony base/edge and provides lubrication, while type-2 (T2) positions at the top and generates outward force to collectively spread out. T1 emerges from a WT population through mutations that abolish the function of RsmE. T2 emerges from a T1 colony to drive cooperative spreading through mutations that elevate cyclic-di-GMP (c-di-GMP). A new T1, with reduced c-di-GMP, emerges from a T2 colony to drive the same cooperative phenotype, and this sequential bidirectional selection occurs repetitively. RsmE is a post-transcriptional repressor and c-di-GMP is a second messenger that regulates multiple extracellular secretions. Although both RsmE and c-di-GMP appear to drive cooperative spreading, the underlying molecular mechanism remains unclear.

**Results**: A mutation from a T2 variant that elevates c-di-GMP was introduced into WT with functional RsmE (pT2). In contrast to T2 with non-functional RsmE, pT2 failed to spread cooperatively with T1. Furthermore, two distinct evolutionary outcomes emerged from aging colonies of pT2: edge sectors that develop early, but fail to spread, and internally localized patches that appear after extended growth. Genome sequencing revealed that sector isolates acquired c-di-GMP reducing mutations, akin to the emergence of T1 from T2, yet they were unable to spread cooperatively with either pT2 or T2. In contrast, the patch mutants contained rsmE mutations leading to loss of functionality, which genetically makes them a genuine T2 variant. As expected, new T1 mutants evolved from the patch mutant colonies to manifest cooperative spreading. Microscopy of mixed colonies showed that while genotype segregation occurs in all cases, only the combination with a non-functional RsmE achieved the specific spatial arrangement required for cooperative spreading.

**Conclusions**: Although alterations of c-di-GMP drive cooperative spreading, this is possible exclusively in the absence of RsmE function. RsmE and c-di-GMP likely regulate both overlapping and distinct sets of extracellular secretions that are necessary for spatial segregation and cooperative spreading.

**14: Enhancing Forensic Toxicology Through Post-Mortem Applications: Evaluating the Viability of Skin Swabbing as a Drug Testing Matrix**

Hannah Schaeffer | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Stephanie Wetzel, Ph.D.

**Abstract:**

The CDC reported 70.3 million individuals abuse drugs, resulting in 89,740 overdose-related deaths in 2024. Drug abuse influences drug testing practices, particularly in criminal investigations, as law enforcement uncovers patterns through trafficking routes, polydrug networks, adulterated substances, user demographics, cross-addiction, and distribution platforms. Frequently abused drugs within this application include amphetamine, cocaine, cannabinoids, phencyclidine, morphine, buprenorphine, oxycodone, fentanyl, and methadone.

This study examined the viability of utilizing skin swabbing as a potential method for the extraction, detection, and quantification of drugs present within collected samples. Furthermore, forward advancements in this novel technique were formulated through comprehensive statistical analysis and compared to established toxicological matrices by effectiveness, testing duration, and cost efficiency.

Nine samples were collected from each of the four overdose decedents (n=36) at Westmoreland County Coroner's Office and Indiana County Coroner's Office: four skin swabs, two oral fluid samples, one vitreous humor sample, one blood sample, and one urine sample. Apart from the skin swabs, each matrix underwent different previously established solid-phase extraction methods. The skin swab extraction method combines DNA extraction methods for buccal samples from swabs and toxicology methods for solid phase extraction from tissue samples.

The Agilent 1200 Series LC Stack and 6460 Triple Quad Mass Spectrometer were used in conjunction with Dynamic Multiple Reaction Monitoring (MRMs) to identify the presence of seven target drugs: methamphetamine, benzoylecgonine, alprazolam, morphine, 6-monoacetylmorphine, oxycodone, and fentanyl.

Results were cross-referenced against autopsy toxicology reports to perform statistical analysis. Preliminary testing revealed skin swabbing as a viable method for drug testing. While this research only utilizes postmortem individuals as its subjects, introducing a gap in the field, it is hypothesized that findings will be reciprocal to living subjects.

**15: The Effect of Sport Specialization on Athletes' Sleep: A Critically Appraised Topic**

Casey Padgett | Other | Rangos School of Health Sciences
Julia Doolittle | Athletic Training | Rangos School of Health Sciences
Faculty Advisor(s): Erica Beidler, Ph.D., Justin DiSanti, Ph.D.

**Abstract:**

**Context:** Sport specialization is defined as year-round participation in a singular sport and has been associated with increased injury rates, decreased quality of life, and other psychological challenges. The relationship between sport specialization and sleep is not fully understood. Our objective was to assess and critically appraise existing literature on this topic to determine the effect level of sport specialization (i.e., high, moderate, low) has on athletes' sleep as compared to low and moderately specialized athletes.

**Methods:** A comprehensive search was conducted in Fall 2025, utilizing PubMed, SportDiscus, CINAHL, Embase, and Google Scholar, to assess the clinical question. The primary search terms included "sport specialization," "athlete," and "sleep." Eligible studies were those published between 2016-2026 with a preferred publication year between 2021-2026, conducted in the United States or internationally, and evaluated the impact of sport specialization on athletes' sleep. Included studies were critically appraised using the PEDro scale and STROBE checklist.

**Results**: A total of 40 studies were retrieved. After screening and applying inclusion and exclusion criteria, 4 were included. Findings were incongruent across the included studies. Post et al. and Watson et al. found high sport specialization significantly affects sleep quality (P=0.04; P<0.001) as measured by the Pittsburgh Daytime Sleepiness Score (PDSS). Daytime sleepiness and prior injury were reported items that impacted sleep quality. Garcia et al. and Stockbower et al. found no difference in sleep quality or duration between sport specialization groups.

**Conclusions**: (SORT Level B). There is insufficient evidence to support or reject the statement that sport specialization has a noteworthy effect on athletes' sleep. Our included studies utilized patient-reported outcomes. Further research should use standardized patient-reported outcomes while leveraging wearable technology for more objective results. Our recommendation is that improving sleep hygiene may be beneficial to all athletes' physical and psychological health, regardless of sport specialization status.

**16: Effects of Daytime Napping on Athlete Mood After a Normal Night Sleep: A Critically Appraised Topic**

Grace Dietrich | Other | Rangos School of Health Sciences
Christina Amrick | Athletic Training | Rangos School of Health Sciences
Faculty Advisor(s): Erica Beidler, Ph.D., Carolyn Baker, MLIS, MOT

**Abstract:**
**Context**: Despite receiving a normal night sleep, athletes may suffer from mood disruptions as a result of their demanding training schedules, travel, school, and cumulative stress. Although napping during the day is frequently employed as a recovery technique, its impact on athletes' emotional state is not well defined. Following a normal night sleep, what effect does daytime napping have on athletes' mood compared with no daytime napping?
**Methods:** In Fall 2025, we conducted a systematic literature search to examine the clinical question. We implemented searches on PubMed, CINAHL, SPORTDiscus, APA PsychInfo, and Scopus. The following were the basic PICO search terms used: athletes (P), daytime nap (I), no daytime nap (C), and mood states (O). Seventy-five articles were retrieved and exported into the Covidence systematic review management software for the original search, and after screening for the inclusion/exclusion criteria, five articles were included in our critical appraisal. We utilized the PEDro scale and STROBE checklist as critical appraisal tools.
**Results**: All included studies, Romdhani et al. (2021a); Romdhani et al. (2021b); Bentouati et al. (2023); Souabni et al. (2023); BenSalem et al. (2025), found daytime napping had a positive impact on mood state in athletes compared to no napping. Two studies, Romdhani et al. (2021) and BenSalem et al. (2025), compared nap length and found longer naps produced a greater improvement in overall mood states. Furthermore, all studies excluding Bentouati et al. (2023), demonstrated a moderate to high magnitude effect [d = 0.38 to 2.45] illustrating that naps improve mood regardless of their length of time.
**Conclusion**: Based upon the included studies there is SORT Grade A evidence to support the implementation of a daytime nap with athletes as a mood improvement intervention. After a normal night sleep, a daytime nap of 40 or 90 minutes is proven to improve an athlete's mood state compared to a shorter nap or no nap, by increasing the different POMS subscales. From a sports medicine strategy, athletic trainers may use daytime napping to improve athletes' overall mood state.

**17: A Changing Professional Environment: Remote Work and Audit Quality in Public Accounting**

Abby Alexander | Accountancy | A.J. Palumbo School of Business Administration
Faculty Advisor(s): Congcong Li, Ph.D.

**Abstract:**
COVID-19 has had a lasting impact on the public accounting profession, particularly through the significant shift to remote work. Audit processes have been affected in return, as many auditors are given the option to remotely work fully from home or in a hybrid work model. Although it allows the same work to be done and removes local constraints, it introduces new challenges to audit team communication, evidence collection,

supervision for junior accountants, and overall quality. These important aspects of the public accounting profession raise the question of how they can be maintained in an increasingly remote environment. Studies show that workers seek a flexible work environment when applying for positions, and organizations with return to office mandates experience a higher employee turnover. Because of this, public accounting firms face pressure to meet professional goals while satisfying employees' work preferences. While remote work may be linked to increased productivity and efficiency, the audit process may need to be readjusted to better align with the modern digital landscape. Attentive updates to audit plans and processes should be considered to sustain the quality of audits, as they rely heavily on collaboration. This project seeks to examine how flexible work arrangements can be integrated into a thoughtfully adapted audit process. Incorporating flexible work arrangements alongside a carefully modified audit process is crucial for navigating the lasting changes brought about by COVID-19.

**18: Exploring a Low-Cost ELISA-based Method for Detecting Antibody Aggregates**

Kaitlyn Shaw | Pharmacy | School of Pharmacy
Faculty Advisor(s): Wilson Meng, Ph.D.

**Abstract:**

**Purpose**: Immunoglobulin gamma (IgG) is the main structural platform for the development of therapeutic monoclonal antibodies (mAb). Highly concentrated (>100 mg/ml) antibody products of IgG have been developed to extend the duration of action of mAb drugs. However, highly concentrated mAb formulations can result in protein denaturation and irreversible association, or aggregation of IgG molecules. IgG are sensitive to physical and chemical stresses, including changes in pH and temperature. Aggregation compromises drug potency and increases the risk of immunogenicity, creating a significant challenge for the quality and safety of high-cost biologic products. The purpose of this study was to develop and validate a rapid and sensitive method for detecting protein aggregation in IgG solutions.

**Methods**: Human plasma-derived IgG (Sigma-Aldrich), reconstituted in phosphate-buffered saline (PBS) at concentrations of 0.001–0.02 mg/ml, was subjected to controlled heat stress (60°C for 15 minutes) to induce aggregation. Arginine was added to a subset of samples as a control. Aggregation was evaluated using an ELISA-based detection method. Both stressed and non-stressed samples were seeded onto polystyrene microtiter plates blocked with 2% bovine serum albumin (BSA). After incubation at room temperature for 2 hours, aggregates were detected using a horseradish peroxidase (HRP)–conjugated anti-human IgG secondary antibody. Following a washing step, an HRP substrate (TMB) was added and color change was quantified by measuring absorbance at 450 nm.

**Results:** Results demonstrated that IgG aggregates exhibited high affinity for the polystyrene surface, displacing weakly adsorbed BSA, while native monomeric IgG remained in solution, confirming assay sensitivity and validity. Reduced aggregation was observed in the presence of arginine, a well-established aggregation-suppressing excipient. In the presence of 5% aggregates, assay selectivity increased by 24.9% relative to the blank, corresponding to a 1.25-fold increase. The limit of detection (LOD) was 0.094% (w/v) and the limit of quantification (LOQ) was 0.285% (w/v).

**Conclusion:** These results support the plate-based method as a rapid and cost-effective approach for monitoring IgG aggregation and suggest its utility as part of quality control programs.

**19: Navigating Digital Ethics: Managing Risk in Telehealth, Social Media, and Online Communication**

Gabriella Gilbert | Counselor Education & Supervision | School of Education
Faculty Advisor(s): Jered Kolbert, Ph.D.

**Abstract:**

Due to the rapid expansion of telehealth, social media, and other digital communication platforms, new ethical challenges have been created for counseling professionals and the mental health community alike. This poster will explore practical strategies for managing risk, maintaining client confidentiality, and upholding professional boundaries in online and digital contexts. Participants will examine case studies and current best practices for telehealth sessions, social media use, electronic documentation, and professional communication, with an emphasis on minimizing legal and ethical liability. The poster will also highlight the importance of applying the ACA Code of Ethics when navigating digital counseling spaces, including principles related to confidentiality, informed consent, dual relationships, and cultural competence. Through interactive discussion, attendees will develop concrete strategies for evaluating and mitigating risk in their digital practice, ensuring ethical and professional integrity across all client populations.

**20: Slavic Pittsburgh: Past and Present**

Kyle Louder | Public History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Jennifer Taylor, Ph.D.

**Abstract:**

As America's foremost industrial city during the turn of the century and through both world wars Pittsburgh's growth and progress was invariably tied to narratives of immigration and labor that remain as relevant in the twenty-first century as they did in the nineteenth century. By 1910, twenty-six percent of Pittsburgh's population was foreign-born as the city's prosperous industries offered hopes of upward mobility through better wages than what could often be found in the homeland; many of these immigrant laborers originated from Slavic Europe. As these Slavic Europeans settled in Pittsburgh, they raised churches, established businesses, bought homes, and founded schools to create community in their new home. Settlement in America was not easy as Slavic people were othered for cultural differences, discriminated against for lack of English literacy, and persecuted for apparent involvement in the labor movement; however, they showed resilience as they built rich and vibrant communities throughout the city. The legacy of the first Slavic laborers and their families can be experienced throughout the city today in magnificent churches, lively social clubs, acclaimed restaurants, and popular festivals.

I will present an interactive, digital map of Pittsburgh's Slavic institutions of the past and present. The map, produced in StoryMapJS, includes churches, restaurants, social clubs, and other relevant organizations with Slavic roots. Each location on the map features institutional history and broader historical context researched using an array of primary and secondary sources. To include local voices in the project I collaborated with community stakeholders whenever possible, which gave me access to valuable archives, interviews, and other source materials. The intention of this project is to offer a platform for Slavic narratives to be told while offering those interested in exploring Pittsburgh's Slavic culture a path to follow. Additionally, I hope this project will bring awareness to contemporary immigrant groups through the community-building of past generations of foreign-born Pittsburghers.

**21: Society Safety devices**

Bhargav Kaparthi | Computer Science | School of Science and Engineering
Faculty Advisor(s): Raffaele Romagnoli, Ph.D.

**Abstract:**
Safety challenges in personal security and public transportation continue to pose serious risks, particularly for women and long-distance drivers. This research presents the design and development of two IoT-based smart wearable safety systems aimed at preventing harm and reducing accident risks through real-time detection and alert mechanisms.

The first system, Shock-Enabled Smart Shoes, is a wearable self-defense solution designed to enhance women's safety in emergency situations. The shoes are integrated with a non-lethal shock circuit that can be instantly activated through a concealed side-button mechanism to temporarily disable an attacker and allow escape. In addition, the system supports real-time emergency alerts with GPS location tracking, which are sent to pre-registered contacts to enable rapid response. The design emphasizes portability, discretion, and ease of use while maintaining the appearance of a normal shoe, making it practical for everyday wear.

The second system, Public Specs, addresses road accidents caused by driver drowsiness. This head-mounted smart eyewear continuously monitors eye-blink patterns using an infrared (IR) sensor controlled by an Arduino Nano. When prolonged eye closure is detected, indicating fatigue or sleep onset, the system immediately activates an audible buzzer and vibration alert to awaken the driver. The device is lightweight, wearable, and minimally distracting, making it suitable for long-distance and nighttime driving.

Together, these systems demonstrate how embedded electronics and IoT technologies can be effectively applied to real-world safety problems. By combining wearable design with real-time sensing and alert mechanisms, the proposed solutions aim to reduce accidents, improve personal security, and promote proactive safety responses. This research highlights the potential of smart wearable technologies in enhancing both individual protection and public safety.

**22: Experiential Based Learning Beyond the Classroom: A Qualitative Review of Opportunities in Ethics and Professional Development in Music Therapy Coursework**

Gabriella Battistelli | Music Therapy | Mary Pappert School of Music
Erika Johnson | Music Therapy | Mary Pappert School of Music
Julian Shay | Music Therapy | Mary Pappert School of Music
Temitope Ogundele | Music Therapy | Mary Pappert School of Music
Faculty Advisor(s): Meng-Shan Lee, Ph.D.

**Abstract:**
The students integrated ethical inquiry, interdisciplinary collaboration, and direct clinical engagement to explore the role of music therapy within neurorehabilitation settings. Foundational work included a review of ethical literature and baseline research related to acquired brain injury (ABI), spinal cord injury (SCI), and stroke patients. The students had in-person observations and collaboration with physical therapists (PTs), speech therapists (STs), occupational therapists (OTs), and other members of the care team which informed a holistic understanding of patients' needs and therapeutic interventions. Music therapy experiences were provided

across group sessions, individual sessions, and co-treatments; allowing for diverse clinical applications at both clinical and community settings. Advocacy efforts were carried out in four professional settings; emphasizing awareness, accessibility, inclusion, and the broader role of music therapy within interdisciplinary care. Throughout the semester, students learned how to translate evidence-based literature into clinical practice, which involved collaborating with other disciplines in co-treatment sessions. Patients found emotional support and motivation in group music therapy sessions that engaged their caregivers, care team, and family. Community members reported emotional support within shared, group musical experiences and increased understanding and awareness of music therapy. Clinical staff (STs, PTs, and OTs) gained an increased understanding of how music therapy can be used as a co-treatment for patients on SCI and ABI units as well as the effects of music therapy on patient recovery. Clinical staff received advocacy support in their efforts to include music therapy in the further development of creative arts therapy programs at Mercy Hospital. Students exhibited professional growth, expressing boosted confidence with facilitating music experiences and presentations in clinical, community, and academic settings. Providing experiential based and collaborative learning outside of the classroom undergirds and strengthens students' professional development while helping to fill in gaps of awareness of music therapy among community members, patients, and clinical staff. Group music experiences create support systems among patients who are in current treatment, and student presentations advocate for the efficacy of music therapy.

**23: Analyzing the Effects of Environmental Conditions on the Firing Pin Toolmark Impressions on Cartridge Cases**

Morgan Czyzyk | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Matthew Regentin, MSFS, Lyndsie Ferrara, M.S.

**Abstract:**
Environmental factors can significantly affect the condition of cartridge cases recovered from crime scenes, often leading to corrosion, discoloration, and surface deterioration. These effects can obscure toolmark impressions and hinder a forensic examiner's ability to make accurate identifications. While previous research has explored the impact of environmental exposure on breech face toolmark impressions, little attention has been given to firing pin impressions. The purpose of this study is to evaluate how different environmental conditions—specifically soil, water, and a combination of both—affect the integrity of firing pin toolmarks on 9mm brass cartridge cases over a five-month period. Forty-five cartridge cases were divided evenly among the three environments, while three additional cases were preserved as controls. Following exposure, the cartridge cases were examined under a comparison microscope to assess the condition of the firing pin impressions. It was hypothesized that the combined soil and water would result in the greatest degree of deterioration, producing the highest number of inconclusive results. Additionally, three cleaning methods—ultrasonication, synthetic oil, and acetone—were applied to determine their effectiveness in restoring obscured toolmarks. Each method was evaluated based on its ability to improve the clarity of impressions and facilitate identification. Post-exposure analysis indicated that the combined soil and water environment produced more inconclusive results than either soil or water alone. Further analysis will be conducted to identify which cleaning method was most effective in revealing the toolmark impressions. Ultimately, these findings aim to improve toolmark examination procedures for environmentally compromised ballistic evidence and increase the number of viable identifications.

**24: See-Judge-Act in the Age of Viral Violence: Moral Agency, Praxis, and Social Media**

Thomas Elias | Theology | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Anna Scheid, Ph.D.

**Abstract:**

Over the past two years, millions of young adults in the United States have encountered the war in Gaza not through traditional media but through an unrelenting stream of social media images and videos: bombed apartment blocks, families fleeing airstrikes, children pulled from rubble, and civilians pleading for aid. Psychological research links exposure to unfiltered depictions of war with heightened trauma symptoms. This phenomenon extends beyond Gaza: the livestreamed 2019 mosque shootings in New Zealand, real-time footage from Russia's invasion of Ukraine, and the rapid circulation of videos following the 2025 assassination of Charlie Kirk. These cases exemplify how violence is disseminated instantly and uncontrollably to vast audiences on social media.

In the age of social media, people undergo the moral processes online, in response to war, terror, and injustice. While these platforms amplify global awareness, they also strain the capacities of moral agents to see clearly, judge responsibly, and act meaningfully. Drawing on Catholic social thought, digital ethics, and psychological research, this project explores how viral violence destabilizes each stage of the Catholic See–Judge–Act method. Phenomena like algorithmic curation, misinformation and disinformation, and repeated exposure to graphic content destabilize moral perception at the level of seeing, disrupt deliberative judgment through desensitization and moral fatigue, and constrain action by limiting responses to clicktivism or inaction. Viral violence creates epistemological confusion, fragmented judgment, and diminished moral agency, particularly among young adults whose moral formation unfolds in digital environments.

Despite viral violence's disruptions to moral epistemology, discernment, and agency, See–Judge–Act remains a viable method for navigating the moral landscape of viral violence on social media, leveraging the functional strengths and moral capacities already present on social media. This paper argues that See–Judge–Act and the Catholic Social Tradition can reorient moral formation on social media toward attentiveness, communal judgment, and effective action. It offers a constructive account of moral praxis for young adults formed in digital environments like social media to deal with the phenomenon of viral violence.

**25: Uncovering the Path: A Mini-Grounded Theory Study of the Adult Attention Deficit Hyperactivity Disorder (ADHD) Journey to Diagnosis**

Jeffrey Whitaker | Nursing | School of Nursing
Faculty Advisor(s): Melissa Kalarchian, Ph.D.
Richard Zoucha, Ph.D.

**Abstract:**

**Background**: ADHD is recognized as a common, impairing, and frequently underdiagnosed condition that persists from childhood into adulthood (Asherson et al., 2016). Little qualitative work has examined how adults themselves construct and navigate the process of receiving an ADHD diagnosis, using methods that foreground power, context, and meaning making.

**Purpose**: To explore how adults who experience symptoms of ADHD navigate the process of obtaining a formal diagnosis.

**Research Question:** What is the process by which adults who experience symptoms of ADHD receive a formal diagnosis?
**Methods**: Constructivist grounded theory is used to explore the diagnostic trajectories of adults across school, work, family, culture, and clinical settings. Charmaz's method of critical quantitative data analysis was applied for interpretation.
**Results:** Participants included three men, two women, and two transgendered men aged 27 - 43 all diagnosed with ADHD as an adult. In the second phase of analysis, six focused codes emerged. Further analysis resulted in two selective codes, “Someone should have caught this” and “That could be me”.
**Conclusions and Implications**: Adult ADHD diagnosis appears to be a negotiated, multi-stage process shaped by stigma, cultural scripts, and clinician heuristics. Participants described long trajectories where inattentive and hyperactive symptoms were framed as anxiety, low effort, or personality issues rather than neurodevelopmental difference. Findings point to the need for developmentally and culturally attuned assessment, attention to masking and burnout, and more accessible pathways to adult ADHD evaluation. Future research should test whether this process model holds across more diverse groups, including adults with limited access to specialty assessment, racially minoritized populations, and people diagnosed later in midlife. Comparative qualitative work across primary care, psychiatry, and community screening contexts could clarify how clinician heuristics and referral pathways shape who is recognized and who is missed. Longitudinal designs that follow adults before and after diagnosis could map how masking, burnout, and self-interpretation change over time, and could inform interventions aimed at reducing diagnostic delay and improving assessment fit in routine care.

**26: Moved to virtual only**

**27: Determining Host-Binding Partners with Listeria Internalin Proteins**
Morgan McCann | Chemistry | School of Science and Engineering
Faculty Advisor(s): David Heisler, Ph.D.

**Abstract:**
Listeria monocytogenes is a gram-positive opportunistic foodborne human pathogen with a high mortality rate in those who are elderly, immunocompromised, or pregnant. Listeria relies on its dissemination from initially infected intestinal mucosa cells to distal tissues for its pathogenesis. A class of proteins initially thought to only be responsible for internalization of Listeria into cells, termed internalin proteins, has recently been shown to be involved in multiple steps of infection, but most remain understudied. All internalin proteins are defined by an N-terminal leucine rich repeat (LRR) domain, a well-conserved domain that mediates non-covalent protein-protein interactions. We aim to define the interaction between host proteins and LRR domains of internalin proteins to understand the roles of these proteins during an infection. Ubiquitin associated interaction trap (UBAIT) systems have been used to capture the protein targets of mammalian and bacterial ubiquitin E3 ligases. Here, we modified this approach by replacing the IpaH2.5 E3 substrate binding domain from Shigella with the LRR domains from the internalins to identify host-binding partners. Using mammalian cell lysates, we identified potential binding partners for eight of the internalin LRR domains that suggests roles in regulating mammalian gene expression and cell cycle. We also found that internalin Lmo0549 interacts with host autophagy proteins. Although evasion of autophagy by Listeria has been described, it has not previously been shown that internalin proteins directly interact with autophagic machinery. Further investigations will confirm direct host-binding

partners with internalin protein LRR domains and determine the roles these proteins play to promote the pathogenesis of Listeria.

**28: Black Galleries: The Legacies of the Black Home**

Reiley Freed | Public History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): Jennifer Taylor, Ph.D., Andrew Simpson, Ph.D.

**Abstract:**
Black Galleries: Legacies of the Black Home examines the Black domestic sphere as a radical, curated space of leisure, identity formation, and cultural preservation, positioning home life as a foundational site of Black activism. Drawing from material culture, oral history interviews, and interdisciplinary sources, this work traces the connection between the American Black Home and the Black museum experience through what is termed the "lost artists" theory. This framework argues that Black creatives historically excluded from traditional arts institutions were forced to explore their interests in design, curation, and preservation within the confines of their own homes.

Denied access, resources, institutional validation, or exposure, these individuals cultivated design sensibilities and curatorial practices within their homes, transforming private interiors into sites of creative expression and cultural memory. These domestic practices functioned not only as outlets for artistic exploration, but as tools of self-definition amid shifting social conditions shaped by the Great Migration, evolving constructions of Black femininity, and the emergence of a Black middle class.

**29: Universal Emancipation: English Working Class and Trade Unionist Views on the Emancipation Proclamation**

James Miller | History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): John Mitcham, Ph.D.

**Abstract:**
As the Civil War raged in the United States, English newspapers kept readers updated as the war evolved. Through an analysis of primary sources, the perspectives of the English working class and trade unionists on the war can be discovered. By analyzing five contemporary publications, The Bee-Hive, Reynolds's Weekly, Lloyd's Weekly Newspaper, the Manchester Daily Examiner & Times, and the British Miner and General Newsman, this research examines laborers' views on the Emancipation Proclamation. What is discovered from this analysis is that this proclamation was understood as a transformative evolution in the Civil War, from an isolated struggle into a war between classes with transnational consequences. In short, the Emancipation Proclamation caused the rise of and advocacy for one of the earliest instances of proletarian internationalism. Because of the perceived evolutionary nature of this executive order, it is necessary to examine English working class and trade unionist views before the Emancipation Proclamation, following its announcement, and after its implementation, to understand how these perspectives developed following this abolitionist direction. The Union was initially understood as a power somewhat sympathetic to abolition, or, in less favorable understandings, a bully blocking their cotton. By 1863, the Union became an agent of free labor waging war against a slave owning aristorcracy, whose victory or defeat would reverberate internationally, and, by proxy, in England.

**30: [3+2] Cycloadditions to generate beta-substituted pyrroles from azanorbornene intermediates**

Aiden Lane | Chemistry | School of Science and Engineering
Faculty Advisor(s): Thomas Montgomery, Ph.D.

**Abstract:**

Pyrroles are a common class of aromatic N-heterocycles that are common structural motifs in polymers, FDA approved drugs, and other functional materials. Synthesizing beta substituted pyrroles continues to be a synthetic challenge due to the intrinsic reactivity of the alpha positions. In this we report a novel synthesis of beta substituted pyrroles using 7-azanorbornenes as intermediates. Previously we have established a novel [3+2] cycloaddition to generate 7-azanorbornanes from substituted N-oxides and alkenes. More recently we have discovered that this same [3+2] cycloaddition can generate the 7-azanorbornene if we instead use an alkyne as the dipolarophile. Subsequently, the 7-azanorbornene can then be heated to undergo a retro-Diels Alder reaction to afford the pyrroles in excellent yield. To this extent we have demonstrated the synthesis of over 50 pyrroles featuring various functional groups like halides, aldehydes and alkynes.

**31: Microclimatic Variations on the Duquesne University Campus**

Berk Bahceci | Environmental Science & Management | School of Science and Engineering
Faculty Advisor(s): Philip Reeder, Ph.D.

**Abstract:**

Microclimatic Variations on the Duquesne University Campus

This research focuses on the microclimate of the Duquesne University campus. Urban areas tend to have higher surface/air temperatures compared to suburban and rural areas, even when the weather forecast is the same for each location, because urban infrastructure absorbs heat and then re-radiates that stored energy back into the atmosphere, thus creating microclimates on an urban university campus like Duquesne. Studies measuring the temperatures of infrastructure (streets, buildings, sidewalks, green spaces) in urban areas are mainly conducted in summer, when incoming solar radiation is at its maximum and temperatures are highest. The existence of these urban microclimates is often referred to as the Urban Heat Island Effect, which is defined as the condition when metropolitan areas become significantly warmer than surrounding suburban and rural areas due to human development, with cities acting like "islands" of trapped heat. The Duquesne campus contributes to the Pittsburgh urban heat island effect. To add new information to the base of knowledge about urban heat islands, a digital laser thermometer was used to collect a total of 16 temperature measurements from the north, south, east, and west facades of four campus buildings (Trinity Hall, Canevin Hall, the School of Music, and Towers Hall), and from impervious surfaces and green spaces adjacent to these buildings (a total of 14 readings). Data collection was completed eight times in the late afternoon, when the re-radiation of stored heat energy is expected to be at its highest, between mid-November 2025 and mid-February 2026. The days on which data were collected encompassed a variety of regional air temperatures and meteorological conditions, including rainy, snowy, rain/snow mix, sunny, cloudy, and partly cloudy. This research revealed a variety of microclimatological zones on the Duquesne campus that varied both spatially and temporally throughout the study. Measuring temperatures on different weather days, at various locations, assisted in developing a preliminary conceptual model related to the factors that most influence microclimate on the Duquesne Campus, and thus within the Pittsburgh Urban Heat Island.

**32: Degradation and Stability of THC Standards in Oral Fluid Using LC-QQQ-MS**

Kendall Michaels | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Stephanie Wetzel, Ph.D.
Lyndsie Ferrara, Ph.D.

**Abstract:**
Tetrahydrocannabinol (THC) has been legalized in states across the country for medical and recreational usage. With legalization came the increase in THC usage, purchases, and those driving under the influence of drugs (DUID)1. Unlike driving under the influence of alcohol where the legal limit for blood alcohol concentration while operating a vehicle is 0.08%, there is no universal limit for THC consumption. Law enforcement has not introduced a validated method of on-site THC testing for DUID's and must bring their samples to a lab to be tested. However, degradation may occur over time and not accurately depict the correct concentration at the time of driving. This research hypothesizes that the degradation of THC standards in saliva will increase within seven days. Oral fluid samples with Δ8-THC, Δ9-THC, and Δ10-THC underwent solid phase extraction to remove the THC from synthetic oral fluid, followed by liquid chromatography triple quadrupole mass spectrometry that assessed the degradation of the samples over one week. THC standards are similar in both their molecular structures and chromatography. The concentration of THC in the oral fluid decreased over the 7-day period. These results support the idea that on-site DUID testing is necessary to accurately determine one's THC concentration at the time of driving.

**33: Microglia Transiently Inhibit Alpha-Synucleinopathic Lesions Upon CNS Repopulation In Vivo**

Pooja Salgar | Pharmacology | School of Pharmacy
Faculty Advisor(s): Rehana Leak, Ph.D.

**Abstract:**
Microglia, the resident immune cells of the brain, are responsible for modulating debris clearance, synaptic pruning, neurogenesis, and inflammation. In pathological conditions such as Lewy body disease, it is unclear if microglia are beneficial or destructive. We investigated the role of microglia in experimental Lewy body disease by targeting the receptor for their trophic factor, colony-stimulating factor 1 (CSF1). To induce Lewy-like pathology, we infused aggregated alpha-synuclein (preformed fibrils or PFFs) into the olfactory bulb of male and female mice at eight months of age. Five months later, the CSF1 receptor antagonist, PLX5622, was administered in the diet to induce microglial depletion, followed 12 days later by withdrawal to induce microglial repopulation. In the microglial depletion stage, α-synuclein aggregates of high molecular weight were increased. Conversely, six weeks after PLX5622 withdrawal, the acute repopulation of microglia lowered α-synuclein aggregate counts in the anterior olfactory nucleus, amygdala, and hippocampus. However, five months after PLX5622 withdrawal, when the mice were 18.5 months old, α-synuclein aggregates had returned in all three brain regions and were no longer lower than in mice fed the control diet. These data suggest that repopulated microglia provide temporary protection against α-synucleinopathy during the acute repopulation stage, but this protection waned as the animals continued to age. Thus, to understand the role of repopulated microglia in clearance of α-synuclein aggregates, we evaluated galectin-3, which marks and helps repair damaged lysosomes, and the adaptor p62, which serves as a receptor for autophagic digestion of aggregates. We observed galectin-3+ structures in microglia, suggesting successful engulfment of α-synuclein aggregates, but there was no net change in galectin-3 expression by immunoblotting, suggesting possible failure of autophagic compensation or a small effect size limited to microglia. Although levels of insoluble p62 were raised by experimental Lewy body

disease, there was no significant impact of the PLX5622 diet on this measure at any time point. Overall, microglia are able to engulf α-synuclein aggregates, but their capacity to lower α-synuclein aggregation is only evident at early disease stages, perhaps due to phagocytic exhaustion and cellular senescence.

**34: Rethinking Recovery: Music Therapy, Agency, and Individualized Engagement**

Corey Jenkins | Music Therapy | Mary Pappert School of Music
Faculty Advisor(s): Meng-Shan Lee, MMT, Ph.D., MT-BC

**Abstract:**
Autonomous recovery within mental health care emphasizes the individual's capacity for self-directed participation, meaning making, and agency throughout the recovery process. Central to this framework is individualized engagement, through which individuals actively shape how they participate in care based on personal needs and preferences. Rather than defining recovery solely through symptom reduction or clinical outcomes, autonomous recovery centers lived experience, personal identity, and the individual's interpretation of their own healing journey. The purpose of this project is to examine how music therapy (MT) supports autonomous recovery through individualized engagement in acute inpatient mental health settings. MT aligns closely with this framework by creating opportunities for engagement that position individuals as active contributors to their recovery rather than passive recipients of treatment. Within acute inpatient mental health settings, MT offers flexible, person-centered approaches that support agency, choice, and personal meaning within structured or time-limited environments. Research demonstrates that MT fosters connection, emotional expression, and reflection in ways that are often experienced as more personal than traditional clinical care, allowing participants to engage in recovery through experiences that feel humanizing, accessible, and meaningful. Participant accounts across qualitative and quantitative studies highlight individualized engagement in MT, describing experiences of self-expression, identity exploration, relational connection, and supportive environments that foster autonomous recovery. These narratives illustrate how individualized engagement serves as a means through which autonomy is experienced, reinforcing participant agency within the therapeutic process. This review highlights the importance of therapist intention and flexibility in shaping autonomy-supportive practice. Research shows that music therapists are uniquely positioned to design interventions that prioritize accessibility, emotional support, and multiple forms of participation, supporting self-directed engagement without relying on long-term treatment structures. By emphasizing autonomy within sessions, music therapists can support the development of skills such as self-advocacy, decision-making, and personal meaning making that extend beyond the therapeutic space and into daily life, reinforcing recovery as an active and self-initiated process.

**35: Survivability of Fingerprints on Metal Surfaces After Heat and Flame Exposure**

Loreniz Colom | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Matthew Regentin, MSFS, Jason Clark, M.S., CLPE, CSCSA

**Abstract:**
Latent fingerprints are critical forensic identifiers, yet their survivability in fire-related environments remains poorly understood due to the complex effects of heat, soot deposition, and modes of heat transfer. This study examined the recoverability of fingerprints deposited on metal surfaces following exposure to both controlled kiln heating and live fire conditions, simulating scenarios encountered in arson investigations. Fingerprints from multiple donors were subjected to extreme heat for varying exposure durations and subsequently developed

using black powder, magnetic powder, and cyanoacrylate fuming with fluorescent dye staining. Results demonstrated that fingerprints can persist on metal surfaces even after exposure to high temperatures for short time intervals. Across all conditions, cyanoacrylate fuming paired with fluorescent dye and alternate light source examination consistently produced the most suitable ridge detail for identification. These findings indicate that brief, high-temperature exposures such as those occurring in flash fires or explosions may still allow for successful fingerprint recovery. By clarifying the relationship between heat exposure and development method effectiveness, this study provides practical guidance for investigators handling fire-damaged evidence and expands the forensic toolkit for arson investigations.
Keywords: Fingerprints, fire, recovery, heat, temperature

**36: An Investigation of Nucleophile Effects in an Interrupted Polonovski Reaction**
Malavika Satheesan Nair | Chemistry | School of Science and Engineering
Faculty Advisor(s): Thomas Montgomery, Ph.D

**Abstract:**
Interrupted Polonovski reactions provide access to highly reactive iminium intermediates through activation of tertiary amine N-oxides and have been reported as useful transformations in organic synthesis. Despite their potential, the scope and limitations of external nucleophiles capable of intercepting these intermediates remain underexplored. This lack of understanding restricts the broader application of interrupted Polonovski chemistry in synthetic design. In this work, we investigate the effect of nucleophile identity on an interrupted Polonovski system employing various N-oxides and trifluoroacetic anhydride. A range of heteroatom nucleophiles was evaluated, revealing strongly nucleophile dependent outcomes. π-Nucleophiles favored carbon-based interception, while amines and nitrogen containing heterocycles preferentially underwent nitrogen substitution or showed no reactivity. These findings define key reactivity trends and limitations of the interrupted Polonovski reaction and provide mechanistic insight to guide future applications.

**37: Determination of Gunshot Residue to Mimic an Explosives Detection Canine Training Aid Using GC-MS**
Jessica Dudich | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Matthew Regentin, MSFS, Stephanie Wetzel, Ph.D.

**Abstract:**
As firearms and explosives related crimes continue to rise, the ability for canines to perform their detection tasks will become more and more crucial. Explosives detection itself includes the actual detection of trace amounts of gunshot residue, firearms, spent shell casings and other articles in close proximity to the firearm that was used. Canines used for explosives detection have a high standard for performance because their success and failure have repercussions. Therefore, selecting suitable dogs is critically important because unfit behavioral traits can negatively affect training and contribute to a hindered canine/handler relationship. Explosives detection canines are often tasked with locating firearms in open areas, and because of this, canine/handler teams must be well trained in this task. Leaving a firearm unattended in a large, open training environment is objectively unsafe for both the handler and the canine. There have been attempts from canine/handler teams to mimic a firearm, but the problem lies in the difference of odor availability. The purpose of this study was to determine the amount of gunshot residue present on a firearm and develop a training aid that mimics the odor availability of an actual firearm. A gunshot residue threshold was obtained from wet swabbing a Glock 43X with isopropyl alcohol using varying shots fired. The swabs were analyzed using Ethylene

glycol dinitrate (EGDN) and nitroglycerin to create a standard curve, along with Gas Chromatography-Mass Spectrometry (GC-MS) to attempt the quantitation of nitroglycerin left behind on the firearm. Nitroglycerin in smokeless powder burns cleanly, and due to this, quantitation was not achieved. However, this study provides valuable information to the explosive detection community regarding the levels of residual nitroglycerin and the limit of detection for GC-MS. Additional research is needed to establish a canine training aid that mimics the odor available on a discharged firearm.

**38: A novel 3+2 cycloaddition toward 3,4 disubstituted pyrrolidines, a common drug scaffold**

Luke Forrester | Chemistry | School of Science and Engineering
Faculty Advisor(s): Thomas Montgomery, Ph.D.

**Abstract:**
Pyrrolidines are ubiquitous motifs found in many drugs and natural products exhibiting antibacterial, antioxidant, and anticancer activity. Despite their prevalence, methods to synthesize 3,4-disubstituted pyrrolidines typically require expensive metal catalysts and/or preinstalled auxiliary groups. This work explores a 3+2 cycloaddition between an azomethine ylide and masked enolates to synthesize 3,4-disubstituted pyrrolidines bearing an alcohol handle. While this cycloaddition has been applied to other substrates, its use with masked enolates may provide a desirable pathway towards these valuable compounds with potential for future modification. In addition, the synthesis of the masked enolate species and associated stereochemical considerations are discussed.

**39: The Freikorps & The Sturmabteilung: The Rise of German Far-Right Paramilitaries**

Jonah Zolnak | History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): John Mitcham, Ph.D., Andrew Simpson, Ph.D.

**Abstract:**
The Great War ended in 1918, leading to a revolution in Germany that turned the German Empire into a republic. The Weimar Republic was tenuous at best, as numerous paramilitary organizations emerged across Germany on the left, right, and center of the political spectrum. The Freikorps and the Sturmabteilung (SA) are two of the most notable and influential paramilitary groups. The Weimar Republic used demobilized World War I veterans to restore order in Germany, and especially in cities like Munich. This center-right to right-wing paramilitary was a tool of the Weimar Republic until the failed Kapp Putsch. The government dismantled the organization, and some members joined the NSDAP and the SA. The SA was a far-right paramilitary and an arm of the NSDAP, which sought to destabilize the Weimar Republic and boost the party's popularity. These organizations mirror each other: one was used to increase state power, and the other to undermine it.

This paper, poster, and presentation use Munich as a case study to examine how political violence was used to support and hinder the stability of the state. Munich was the site of a major battle between the Freikorps and the Bavarian Red Army. Munich was the city where the NSDAP and the SA were headquartered. This paper, poster, and presentation explore political violence in civil conflict and through street violence. Therefore, an essential part of the research for this topic involved German-language primary-source archival research at the Stadtarchiv München, the Bayerische Staatsbibliothek, and the Bayerisches Hauptstaatsarchiv. This paper, poster, and presentation will show how paramilitaries and political violence undermine democracies, what

drives people to these organizations, and how the state uses paramilitary organizations as a tool to increase state power, while undermining democratic values.

**40: Cohort-based Learning for Counselor Education and Supervision Programs: A Critical Narrative Review**

Sage Logan | Counselor Education and Supervision | School of Education
Melissa Castello | Counselor Education and Supervision | School of Education
Alex Dang | Counselor Education and Supervision |School of Education
Gabriella Myers-Gilbert | Counselor Education and Supervision | School of Education
Miranda Weaver | Counselor Education and Supervision | School of Education
Faculty Advisor(s): Matthew Joseph, Ph.D.

**Abstract:**
Cohort-based learning models within higher education are well researched for a wide range of professions and disciplines, being the subject of countless variations of research foci. Many of these studies focus on either intragroup dynamics such as psychosocial safety and wellbeing or outcomes-based factors such as attrition rate and quality of performance. Despite there being a saturation of literature on various programs and professions, there is a contrasting lack of similar research for Counselor Education and Supervision (CES) cohorts. In this research study, we perform a critical narrative review, thoroughly mapping current research so that we may more precisely conceptualize the gap between existent non-CES cohort research and less-established CES cohort research. A critical lens within this review is employed, indicating theoretical translational validity of existent literature and understandings of cohort-model phenomena and outcomes. By mapping existing literature and demonstrating a theoretical translatability of current non-CES research, future directions of a CES-focused research agenda are established. Implications based on concerns of both intragroup dynamics and outcomes are discussed, with emphasis being placed on continuing future research upon CES cohort models.

**41: Comparing Platelet-rich Plasma Injections Versus Traditional Progressive Rehabilitation Programs in Recovery Timelines for Athletes with Acute Hamstring Injuries**

Halle Walcutt | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Katlyn Kuenzig, PA-C

**Abstract:**
**Background**: Hamstring injuries are one of the most common musculoskeletal injuries in athletes, and they lead to prolonged time away from competition with high rates of reinjury. Standard management relies primarily on exercise-based rehabilitation, but return-to-play timelines remain variable and often lengthy. Platelet-rich plasma (PRP) injections have emerged as a potential adjunctive therapy in sports medicine, though uncertainty remains regarding their role in recovery and reinjury prevention in athletic populations.
**Objective:** The primary objective of this narrative review is to compare existing evidence regarding PRP and standard progressive rehabilitation programs in the management of hamstring injuries in athletes, with particular attention to reported recovery timelines and reinjury patterns.
**Methods**: A narrative review of the literature was conducted using PubMed, ProQuest (Physical Education Index), and Scopus. Peer-reviewed articles published in English within the past five years were included, focusing on athletes in North America, Western Europe, and Australia. Studies included involved athletes with acute hamstring injuries that evaluated PRP injections or standard rehabilitation programs. Evidence was synthesized from these articles to examine reported clinical outcomes and areas of variability across studies.

**Anticipated Results:** The literature is expected to identify variability among reported recovery timelines and reinjury rates between PRP-augmented rehabilitation and standard exercise-based rehabilitation alone. Emerging themes may include differences in study design, injury severity, treatment protocols, and outcome reporting.
**Conclusion:** Hamstring injuries impose substantial physical, financial, and competitive burdens on athletes. By synthesizing available evidence, this review aims to clarify current understanding of the respective roles of PRP injections and standard exercise-based rehabilitation in recovery time for athletes. Improved characterization of reported outcomes and limitations may inform clinical decision making and highlight areas requiring further research in sports medicine.

**42: Moved to virtual only**

**43: Recommendations: Probation Officers Working with Autistic Youth**

Kiera Reilly | School Psychology | School of Education
Joseph Beck | School Psychology | School of Education
Areanna Carone | Child Psychology | School of Education
Osato Charles-Omoregbee | School Psychology | School of Education
Faculty Advisor(s): Tammy Hughes, Ph.D., APBB

**Abstract:**
Probation officers (POs) working with individuals with Autism Spectrum Disorder (ASD) play an essential role in providing updates about the child's functioning at school to the court system. The range of challenges, symptoms, and the levels of intensity associated with ASD can be unknown to POs. How ASD might impact probation adherence can be underappreciated. Students with a disability often fall deeper into the justice system. This presentation focuses on practical recommendations for school teams. This includes: a) practical descriptions differentiating developmental disabilities from psychiatric disorders, b) differences between disorders and special education eligibility, explicitly identifying the types of communications schools should provide POs regarding ASD, c) how to explain the role of 504/IEP accommodations used at school because they also apply to the use of typical probation assessment protocols used in justice decision making (e.g., Youth Level of Service; YLS), d) how the need to adjust the delivery of instruction and other support services at school is required to accommodate the learning needs of youth with ASD, and e) how to determine if learning has occurred (outcomes in terms of demonstrated knowledge and skills rather than the documenting that treatments have been provided). The match between evidence-based practices and progress monitoring used in schools will be discussed in terms of the Risk-Needs-Responsivity practices used in juvenile justice systems. Recommendations for providing information to POs are discussed. Best practice recommendations regarding: guided touch, elopement, ankle bracelets (home monitoring and confinement), and coordinated community-school services are examined. Data from 48 probation officers documenting an increased knowledge base regarding ASD shows that training can be effective. However, this will be presented alongside data showing POs remain unclear on how to apply the information they learned in day-to-day practices (intake, intervention selection, assembling conditions of probation) and how to characterize what they know in court files.

**44: Parent-Reported School-Based Concussion Management Procedures**

Kristen Hinshaw | School Psychology | School of Education
Faculty Advisor(s): Ara Schmitt, Ph.D.

**Abstract:**
Concussions are a form of mild traumatic brain injury that can disrupt cognitive, emotional, and academic functioning, making effective school-based management essential for student recovery. Best practice recommends structured return-to-learn procedures that include a gradual re-integration to school activities, provision of individualized accommodations, consistent progress monitoring, and an emphasis on collaboration between families and the school. Despite established best-practice guidelines, implementation within schools remains variable. This study examined parent-reported school-based concussion management to identify current practices and potential gaps in services. Participants included 89 parents of youth aged 8–18 who had sustained a concussion within one month of attending a hospital-based concussion specialty clinic. Parents completed an electronic survey assessing notification of the school, communication processes, academic supports, and follow-up procedures for their child's concussion. Descriptive statistics summarized the frequency of school-based concussion management practices across key variables, and chi-square analyses examined differences based on whether the concussion occurred during school or outside of school. Results indicated that most parents reported notifying the school of their child's concussion, and among those, the majority knew whom to contact for school planning. Follow-up coordination, however, was limited, with minimal parents reporting a post-concussion meeting with the school. Obtainment of concussion medical records by the school, academic adjustments, and performance updates were also limited. Formal team-based planning was rare, with only 10.1% of families reporting the development of a scheduled meeting to reassess the student's medical and academic needs. Overall, findings suggest that despite awareness of student concussions, schools may lack systematic procedures for follow-up and academic support, highlighting a need for improved school–family communication and alignment with recommended concussion management practices.

**45: Synthesis of Highly Substituted Morpholines via Palladium Catalysis**
Elizabeth Colecchia | Chemistry | School of Science and Engineering
Faculty Advisor(s): Thomas Montgomery, Ph.D.

**Abstract:**
N-heterocycles are the most common structural components of FDA approved drugs as 82% of recently approved small molecule drugs contained at least one N-heterocycle as of 2024. Needless to say, developing efficient methods for synthesizing highly substituted and diverse N-heterocycles in high yields is vital for future drug development. Palladium catalysis has been proven to be a robust and effective method to access a wide variety of N-heterocycles and other intricate moieties in high yields. Functionally this works when palladium and propargyl carbonates react to yield a π-allyl palladium intermediate. This highly reactive intermediate can then react with a bis-nucleophiles, such as sulfonamides, amides, or hydroxyls, to generate N-heterocyclic compounds in high yields. By utilizing this methodology with a tosyl-protected amino ketone as the bis-nucleophile, a highly substituted novel morpholine derivative can be accessed in a facile and robust one-pot synthesis. Current optimization studies are being done to utilize this catalytic cycle to produce the morpholine moiety in a high yield.

**46: Shamrocks in Gray: Irish Confederate Perspectives on the American Civil War (1861-1865)**
Eliza Grimm | History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): John Mitcham, Ph.D.

**Abstract:**
According to the 1860 U.S. Census, 967,366 immigrants left the green shores of Ireland to settle throughout the United States in the period between 1820-1860. Many of whom were fleeing the effects of famine and persecution at the hands of Great Britain. They settled throughout the eastern United States with the hope of procuring land, employment, and security. The outbreak of the American Civil War in 1861 threatened those opportunities, and Irish immigrants would fill the ranks in the armies of both the North and South to try and secure their futures. Current historiography on Irish immigrants in the Civil War focuses heavily on the famed Irish brigades who fought with the Union, and little historical consideration has been given by historians to those fighting with the Confederacy. This paper seeks to begin to fill that historiographical gap, and highlight how the Irish Confederates viewed their role in the war. Unique in its design, this paper consists entirely of in-depth primary source analysis including correspondence, diaries, music and newspaper articles to accurately capture the thoughts and motivations behind the Irish Confederates' choice to fight with the South. Ultimately, one can conclude that the Irish felt at home fighting in the Confederate army because it was their adopted country and they found the Southern fight for freedom reflected their own struggles against the British Crown. Additionally, they felt that the Irish fighting for the Union were selling themselves out to a foreign invader and had forgotten what it truly meant to be Irish. By studying the perspective of first generation Irish immigrants fighting in the Confederacy, this paper also lends itself to the growing field of transnationalism within the discipline of history.

**47: Outcomes and Complications of Open vs. Laparoscopic Pyloromyotomy in Infants with Hypertrophic Pyloric Stenosis: A Comparative Review**

Noelle Compher | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Kristin D'Acunto, Ed.D., MPA, PA-C

**Abstract:**
**Background**: Infantile hypertrophic pyloric stenosis is a common surgical condition managed with either open or laparoscopic pyloromyotomy, with laparoscopic approaches becoming increasingly accessible and widely adopted. However, there remains inconsistent and limited evidence regarding how these techniques compare in terms of surgical outcomes such as operative time, length of hospital stay, complication rates, and risk of reoperation.
**Objective**: This review aims to compare laparoscopic versus open pyloromyotomy in infants with hypertrophic pyloric stenosis with attention to how symptom resolution, length of hospital stay, and postoperative complication rates are characterized across studies.
**Methods**: A narrative review was conducted using PubMed, CINAHL, Embase, and Scopus to identify studies published between 2020-2026 comparing surgical outcomes of both open and laparoscopic pyloromyotomies in infants. Eligible studies included retrospective studies, cohort studies, and cross-sectional studies. Criteria synthesized and compared across multiple articles included the number of laparoscopic versus open pyloromyotomies performed, operative time, length of stay, complication rates, surgical site infections, mucosal perforation, reoperation, and readmission.
**Results**: This review is expected to identify differences in how operative time, length of hospital stay, complication rates, and risk of reoperation are reported between open and laparoscopic pyloromyotomies in infants with hypertrophic pyloric stenosis. Emerging themes may include heterogeneity related to surgeon

experience, institutional resources, and learning curve effects, which may contribute to the variability in reported findings across studies.
**Conclusion**: The selection of either open or laparoscopic pyloromyotomy in the treatment of infantile hypertrophic pyloric stenosis has a direct impact on postoperative outcomes and complication rates. A lack of clear superiority in many studies highlights the importance of individualized decision making supported by the surgeon's level of experience, while also emphasizing the need for surgical training and institutional resources to reduce complication rates. The results will likely indicate a necessity for continued comparative studies and may inform clinical judgement and institutional guidelines rather than standardizing a single operative approach.

**48: Landscape genetics of the American black bear (Ursus americanus) in Pennsylvania**

Joshua Robinson | Biology | School of Science and Engineering
Faculty Advisor(s): Jan Janecka, Ph.D.

**Abstract:**
The American black bear (Ursus americanus) is a versatile and wide-ranging species with recovering populations across North America. In Pennsylvania, the population of American black bears has grown from approximately 3,000 to 16,000 bears in the last 50 years due to forest regeneration and careful management. To maintain numbers below the social carrying capacity, 20% of this population is harvested annually. However, the current harvest methodology does not take the genetics of the species into account. In a previous analysis of population genetic structure, three populations were identified within Pennsylvania, which appear to be associated with the Allegheny Plateau in the northwest, Pocono Mountains in the northeast, and the Great Appalachian Valley in the south. The Allegheny Mountains and Susquehanna River are hypothesized to be barriers between these subpopulations. To determine the landscape features that hinder gene flow in this species, we conducted a landscape genetic analysis using 14 nuclear microsatellites of 264 black bears across Pennsylvania. First, we converted 18 environmental variables, including elevation, slope, roughness, 11 land cover variables, road density, and presence of large streams, interstate highways, and the Susquehanna River, into resistance surfaces. Resistance surfaces represent hypotheses that model the influence that environmental variables have on gene flow with larger values indicating higher cost to movement. Second, we utilized circuit theory, which simulates random movement through an environment, to determine the difficulty of movement between two individuals, or pairwise resistance distances. Third, we used maximum likelihood population effects modelling to assess the relationship between environmental variables and genetic distance while taking isolation-by-distance into consideration. Four environmental variables were identified as greater predictors of gene flow than isolation-by-distance alone: roughness, slope, percent cover of croplands, and percent cover of development. Therefore, the difficult terrain of the Allegheny Mountains and agricultural-development mosaic in eastern Pennsylvania hinder gene flow in black bears. These landscape features further support the presence of three genetic clusters in Pennsylvania, which should be delineated into three wildlife management units that can be managed and harvested separately as three subpopulations to ensure long-term persistence of the species.

**49: Moved to virtual only**

**50: A machine learning approach for engineer-to-order firms to predict supplier performance in critical supply chains**

Maximilian Hradecny | Analytics & Information Management | A.J. Palumbo School of Business Administration
Faculty Advisor(s): Michael Sherwin, Ph. D.

**Abstract:**
Accurately predicting supplier performance is essential for effective downstream decision-making and overall organizational success. Current industry approaches to supplier selection continue to rely heavily on expert judgment, institutional knowledge, and simplified rating systems rather than empirical, data-driven methods. This limitation is particularly consequential in the nuclear industry, which operates primarily within an engineer-to-order (ETO) manufacturing environment. Unlike make-to-stock (MTS) systems, ETO supply chains face structural constraints such as a limited pool of qualified suppliers, irregular demand patterns, extended lead times, and high product costs, while lacking traditional risk-mitigation mechanisms such as inventory buffering or supplier redundancy.

Given these challenges, effective supplier performance management is critical in nuclear ETO environments. Motivated by current industry practice, this study proposes a machine learning based framework for predicting key dimensions of supplier performance, including delivery reliability, hardware quality, and documentation quality. Gradient boosting (GB) is evaluated in combination with synthetic minority over-sampling techniques and systematic hyperparameter tuning to address class imbalance and improve predictive accuracy. The proposed approach is benchmarked against three commonly used machine learning methods: binary logistic regression, random forest, and support vector machine.

Using operational data obtained from a nuclear manufacturing firm, models are trained and tested to assess predictive performance across the selected methods. Gradient boosting demonstrates superior performance relative to the alternative approaches and is therefore selected for implementation. The trained GB model is subsequently applied to illustrate its practical value in supporting critical decision-making processes, such as supplier selection in high-risk, low-flexibility supply chains.

This work presents the first study to leverage real production data from the nuclear industry to predict individual supplier performance using machine learning techniques. The results highlight the potential of data-driven approaches to enhance supplier evaluation and risk management in complex ETO supply chain environments.

**51: Efforts Toward the Total Synthesis of a Novel Mono-Heteroatom-Substituted Singlet Carbene**
Nick Frankos | Chemistry | School of Science and Engineering
Faculty Advisor(s): Thomas Montgomery, Ph.D.

**Abstract:**
Singlet carbenes are a family of molecules featuring a divalent carbon atom with an sp2-hybridized lone pair and a vacant p-orbital. Recently, singlet carbenes have attracted much attention from the synthetic community due to their potential applications in transition-metal chemistry and catalysis. Herein, we are pursuing the total synthesis of at least one novel mono-heteroatom-substituted singlet carbene from commercially available starting materials. Our current synthetic scheme is hindered by tedious purification demands at the penultimate step of our route, which complicates full characterization efforts. The presented work explores reaction optimization and purification efforts toward the total synthesis of a novel mono-heteroatom-substituted singlet carbene.

**52: Moved to virtual only**

**53: Characterization of G-Quadruplex Structures in the SHMT1 5'UTR: Implications for Regulating Methylation in Multiple Sclerosis**

Rosalia Palumbo | Chemistry | School of Science and Engineering
Faculty Advisor(s): Mihaela-Rita Mihailescu, Ph.D., David Heisler, Ph.D.

**Abstract:**
Multiple sclerosis (MS) is a fatal neurodegenerative disease that progresses by eroding the myelin sheath and exposing the neuron, leading to neuronal degradation and death. While MS remains without effective treatment or cure, studies have identified a series of genes dysregulated in MS patients and predicted to be involved with disease onset and progression. These genes are primarily involved in controlling methylation of DNA – a process required for regulation of gene expression and critical for cellular health. Having identified a series of potential genetic risk factors, current research is focusing on how to manipulate the expression of these genes to offset DNA methylation errors in MS patients; altered expression is frequently obtained by targeting secondary structure formation. The gene of interest in this study, serine hydroxy methyltransferase 1 (SHMT1), is a key player in DNA methylation and was determined to be upregulated in MS patients. Previous work in our lab characterized the formation of G-quadruplex and i-Motif secondary structures in the DNA of the SHMT1 gene but because gene expression can be regulated at both the DNA and RNA level, this work characterizes the G-quadruplex formation of the corresponding mRNA sequence. We used native polyacrylamide gel electrophoresis, circular dichroism spectroscopy, proton nuclear magnetic resonance, and ultraviolet thermal spectroscopy to determine that the SHMT1 mRNA forms a highly stable parallel G-quadruplex in the region corresponding to the GQ-region in the DNA sequence. Additionally, we evaluated the effect of the GQ structure on protein expression via Firefly luciferase assays and observed an inhibitory effect tied to GQ formation. Future work will investigate how these GQs affect expression of the SHMT1 protein, offering a novel therapeutic target for treatment of abnormal methylation in MS patients.

**54: A Cross-Cultural Comparison of Infant Handling Practices During Principal Motor Development Periods**

Amanda Eadie | Physical Therapy | Rangos School of Health Sciences
Faculty Advisor(s): Regina Harbourne, DPT

**Abstract:**
Across cultures, infants have crucial development periods in which they require significant neuromuscular development to be able to accomplish more complex motor tasks and explore their environment. However, different cultures practice various ways of baby handling that may support this development or hinder it. In the United States, caregivers typically hold their infants in carriers, bouncers, or seats – otherwise known as containment devices – for several short bouts of time during the day. In comparison, Tajikistan infants in Central Asia are tightly swaddled in the “gahvora” for extended time throughout the day and night. Mali (West Africa) caregivers use specific “exercises” of stretching, suspension, and postural challenges that may suggest accelerated motor milestones in developing infants. The purpose of this study is to explore the variety of practices across Western, Central Asian, and African cultures and the effect(s) that each of them affords on infant motor development.

**55: Biophysical characterization of a G-quadruplex structure in pre-miR-615: implications for miR-615 maturation**

Gabriela Garza | Chemistry | School of Science and Engineering
Faculty Advisor(s): Mihaela-Rita Mihailescu, Ph.D.

**Abstract:**
Cancer remains one of the leading causes of death worldwide, with an estimated 2 million new diagnoses and over 600,000 deaths in the United States in 2025 alone, but there is still no cure for the disease. Recent developments have suggested the potential of the microRNA (miRNA) miR-615 as novel therapeutic target in cancer. Specifically, the association of the intronic miR-615 with poor prognosis has been observed in various types of cancer, such as esophageal, renal, and lung cancers. The overexpression of miR-615-3p and HOXC5 is believed to increase the viability, proliferation, and migration of these cancer cells by inhibiting hTERT protein expression, which is the protein component of the telomerase enzyme. We noted that the sequence of pre-miR-615 is G-rich and hypothesized that it could form a G-quadruplex structure which could impact the mature levels of this miRNA. The GQ structure formation was demonstrated by biophysical methods such as 1H nuclear magnetic resonance (NMR) spectroscopy, circular dichroism (CD) spectroscopy, native polyacrylamide gel electrophoresis, and UV thermal denaturation spectroscopy. Thus, this study identifies a potential novel therapeutic target in cancer as stabilizing/destabilizing this pre-miR-615 GQ structure will lead to the alteration of the mature miR-615-3p levels.

**56: A Comparison of the Resilience of Bulletproof Backpacks with Level IIIA Body Armor and Varying Contents Against 0.223 Rifle Rounds**

Melanie Tanis | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Matthew Regentin, MSFS

**Abstract:**
With the rise of school shootings, bulletproof backpacks with Level IIIA ballistic protection have become commercially available. These backpacks are commonly rated as protection against handgun ammunition, such as 9mm or 0.40 caliber rounds. This study focuses on testing and analyzing the protective abilities of these handgun-rated backpacks against higher velocity 0.223 caliber rifle ammunition while the backpacks hold varying amounts of school supplies. This experiment was performed using different types of 0.223 ammunition such as 55 grain full metal jacket, 62 grain bonded, frangible, and green tip armor piercing rounds. A 0.223 round has shown to be capable of penetrating Level IIIA soft body armor, but has less penetration compared to handgun ballistics when entering soft tissue.1 The firearm used was a Colt M4 Carbine with an 11.5 inch barrel. Common school supplies, including notebooks and laptop computers, were inserted into the backpacks for some of the experiment trials. To analyze the degree of damage or penetration to the ballistic plate, each layer, counted from front to back, of the ballistic resistant material was peeled back to determine what layer of material served as the final block for the projectiles. The effects of projectiles on the backpacks were also analyzed using the stereomicroscope for penetration distance and fiber durability. Trials had varying levels of damage to the ballistic plate based on the differing contents and differing ammunition. One conclusion being that at least two notebooks and one laptop computer were sufficient in preventing penetration of the backpack if 55 grain full metal jacket ammunition was used in the shooting. This research aims to improve safety measures in schools and increase the awareness of protective measures students can take to potentially decrease the casualties of these mass shooting events.

**57: Elucidating the Role of the HNRNP K MRNA 3'-UTR G-Quadruplex Structure in Mediating its Interactions with MIR-1249-3P**

Manju Kasaju | Chemistry | School of Science and Engineering
Faculty Advisor(s): Rita Mihailescu, Ph.D., David Heisler, Ph.D.

**Abstract:**
The progressive degeneration of motor functions, leading to decline in voluntary muscle functions such as walking, eating, hand movement, and ultimately respiratory failure, is the characteristic trait of amyotrophic lateral sclerosis (ALS). Hexanucleotide expansion (G4C2)x of the C9ORF72 gene has been found to account for more than 40% of the familial ALS cases. Studies showed that the levels of heterogeneous nuclear ribonucleoprotein K (hnRNP K) are reduced in ALS patients and moreover, its overexpression can reduce the C9ORF72 mRNA toxicity, resuming the normal function of DNA repair. However, limited studies have been conducted on mechanism governing the expression of hnRNP K, which is an important regulator of axonal homeostasis. We demonstrated the presence of a parallel G-quadruplex (GQ) in the 3'-untranslated region (UTR) of hnRNP K mRNA. Additionally, the GQ forming site in the 3'-UTR of hnRNP K mRNA has been identified as a binding site for miR-1249-3p, a microRNA shown to regulate its translation. Thus, this study focuses on biophysical characterization of the binding interactions of miR-1249-3p with 3'-UTR of hnRNP K mRNA and investigating the role of the GQ in mediating these binding interactions in cells via luciferase reporter assay. We used native polyacrylamide gel electrophoresis, circular dichroism spectroscopy, 1H nuclear magnetic resonance spectroscopy, and fluorescence spectroscopy to characterize the binding interactions of the 3'-UTR of hnRNP K mRNA with miR-1249-3p. This project uncovers the role of GQ and its interactions with miR-1249-3p in the translation regulation of hnRNP K.

**58: Development and Characterization of a Piezoelectric-based Droplet-on-demand 3D Bioprinter for Regenerative Medicine**

Maksim Shcherbatyuk | Biomedical Engineering | School of Science and Engineering
Faculty Advisor(s): Bin Yang, Ph.D., Kimberly Williams, Ph.D.

**Abstract:**
Droplet-on-demand (DOD) bioprinting is an emerging biomanufacturing technique that supports efforts to improve scalability and precision in the bioprinting field. DOD bioprinting enables precise droplet placement, advancing the ability to pattern bioinks for cell culture and the fabrication of personalized scaffolds for regenerative medicine. Hydrogels such as calcium-crosslinked alginate provide a highly biocompatible and tunable matrix with adequate diffusion of nutrients and waste; however, their relatively high viscosities present challenges for traditional inkjet-based DOD systems. While recent advances in DOD bioprinting have demonstrated promising applications, most existing systems are constrained to low-viscosity bioinks and small droplet diameters. In addition, air-jetting-based droplet generation systems have achieved consistent droplet formation but lack the capability for precise spatial patterning and three-dimensional structure generation. To address these limitations, we developed a novel piezoelectric-based DOD three-dimensional bioprinting system capable of generating consistent droplets of an alginate-based bioink. Droplets produced by this system are larger than those commonly reported in the literature (>500 microns in diameter) and are generated from a relatively high-viscosity bioink compared to conventional inkjet-based printers (>10 mPas). The system demonstrates high-throughput droplet generation with precise two-dimensional patterning and the ability to

fabricate basic three-dimensional structures within a gelatin-CaCl2 support bath. This work characterizes and validates a new DOD bioprinting platform to advance droplet-based biomanufacturing and tissue engineering applications.

**59: Long-term patient outcomes with leadless pacemakers in comparison to traditional transvenous pacemakers**

Angela Fichter | Physician Assistant Studies | Rangos School of Health Sciences
Faculty Advisor(s): Bahaa Shabaan, MD, MCh, MS, MA

**Abstract:**

**Background**: TVPMs are devices that are used to treat conditions such as bradyarrhythmia's. These devices have long term complications that affect the patient's outcomes, such as lead fractures, stenosis, infections, and hematomas. LPMs were invented years after to eliminate the complications of the TVPM. These are intracardiac and do not have leads or a pocket. It is important for clinicians and patients to understand the difference between their long-term complications.

**Objective:** The objective is to compare TVPM outcomes and complications to LPM. The secondary objective is to understand the quality of life the patients have no matter what comorbidities they may have.

**Methods**: A structured comparative literature review was formulated using PubMed, Cardiovascular Medicine, and UpToDate. Search terms were used such as keywords like pacemakers, complications, Micra, and mortality. MeSH terms were also used in search terms. Inclusion criteria consisted of patients 18 or older, studies comparing the complications and outcomes, randomized controlled trials, and meta-analyses explaining long term outcomes. Articles included were no older than 5 years. The exclusion criteria consisted of non-FDA approved devices, leadless ICDs, mortality due to outside factors of pacemaker. Primary outcomes include the readmission rates due to complications, mortality, and the quality of life.

**Anticipated Results/Key Findings**: Based off current data, LPM have lower rates of complications and higher patient outcomes. These trends are expected to continue while long term pacing efficacy and mortality will still be comparable to TVPM devices. The LPM have been reported comfortable and are expected to help mental health and confidence in these patients since they do not have a pocket scar. There are limitations to keep in mind for such as difficulty for device retrieval and cardiac perforation risk.

**Conclusion**: Understanding the complications and outcomes between TVPM devices and LPM devices is important to patients and clinicians. There are differences in quality of life, safety, and mortality for these devices. Data suggests that LPM have fewer complications, improve mental health, and improve patient experience. Research is needed for patients who follow up longer than 10 years and dual chamber systems.

**60: Investigation of Microglial Senescence and Phagocytic Exhaustion in Lewy Body Disease**

Jhanvi Jhaveri | Pharmacology | School of Pharmacy
Faculty Advisor(s): Rehana Leak, Ph.D.

**Abstract:**

Microglia, the innate immune cells of the central nervous system (CNS), are responsible for engulfment of synaptic and myelin debris as well as phagocytosis of protein aggregates in age-related neuropathological conditions. Despite their attempts at clearing debris, microglia cannot remove all proteinopathic aggregates of the aging brain, including the misfolded alpha-synuclein (α-syn) that accumulates in Lewy body disease (LBD). To elucidate why microglial phagocytosis fails to contain the spread of α-syn aggregates in LBD, we modeled limbic

LBD by infusing preformed α-syn fibrils into the mouse olfactory bulb and fed the mice with the orally bioavailable CSF1R inhibitor, PLX5622, to deplete the microglial niche in the CNS. We observed that microglia engulfing α-syn aggregates expressed galectin-3, a marker of damaged lysosomes and cellular senescence. Additionally, microglial depletion lowered one of the most abundant structural proteins of the myelin sheath, myelin basic protein (MBP), in the fibril-treated males. These findings suggest that α-syn aggregates inflicted damage to microglial lysosomes and may contribute to phagocytic exhaustion, cellular senescence, and the spread of Lewy-like pathology in male mice. Next, we used bulk RNA sequencing of the human olfactory bulb and amygdala to evaluate correlations between markers of senescence, microglial reactivity, and myelin integrity in LBD versus unaffected controls. We discovered a positive correlation between markers of microglia and mature myelinating oligodendrocytes in the olfactory bulb of unaffected controls, but the correlation was inverted in the LBD samples, suggesting that high expression of microglia markers in LBD reflects disease-associated microglial reactivity. We also observed that the microglia markers HEXB, TMEM119, LGALS3, and ITGAM were positively correlated with the senescence markers T53BP1, SMAD2, H2AFX, and GLB1. Together, these findings imply that diseased microglia may not be able to clear engulfed cargo, such as myelin debris and α-syn aggregates, due to the potential for lysosomal damage and cellular senescence.

**61: Emoji or Email? Decoding Generational Friction in the Digital Workplace**

George DeNardo | Business Administration-Sustainable Business Practices | A.J. Palumbo School of Business Administration
Faculty Advisor(s): Wenqi Zhou, Ph.D.

**Abstract:**
Today the modern workforce has a plethora of generational diversity ranging from Baby Boomers, Generation X, Millennials, and now Generation Z. This study identifies generational identity as a latent variable that dictates communication preferences and serves as a primary driver of workplace conflict.

While traditional research focuses on technical adoption, this work examines the socio-emotional friction within specific digital modalities. We analyze divergent attitudes toward asynchronous messaging, synchronous video conferencing, and the etiquette of one-to-one versus group-based platforms (e.g., Slack DMs vs. public channels). Through a multi-generational survey, the research explores the "why" behind the friction: why a "quick call" feels efficient to one generation but intrusive to another, and how public mentions can be interpreted as either transparent or performative.

The findings reveal how nuances in digital etiquette—from response-time expectations to emoji usage—escalate into interpersonal tension. Ultimately, this work provides a framework for bridging the digital divide, helping organizations transform generational friction into a collaborative advantage.

**62: Utilizing Forensic Pathology Slide Sorting to Support Cold Case Resolutions in Pennsylvania**

Katherine Scheller | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Pamela Marshall, Ph.D.

**Abstract:**
Cold cases are defined as unresolved criminal investigations which have been suspended due to a lack of viable leads or investigative progress. There are over 200,000 cold cases still awaiting resolution in the United States

alone. These cases have profound emotional and societal impacts, leaving victims' families without closure and communities without answers. However, advancements in forensic science create new pathways for re-examining previously archived evidence. This research initiative supports cold case investigations in Pennsylvania by identifying, organizing, and evaluating archived forensic pathology slide samples that may contain retained evidentiary value. An active cold case list was obtained from neighboring District Attorney(DA) offices interested in partnership. Each case was cross-referenced with corresponding autopsy slides stored at the Westmoreland County Coroner's Office. The slide samples were systematically reviewed and matched to their respective cases. In collaboration with the DA office and cold case units, each case was assessed for the potential utility of evidence for further forensic testing. By integrating archival pathology resources with modern forensic methodologies, this study aims to uncover new investigative leads and support case resolutions. The approach holds significant forensic relevance, offering a pathway to justice for victims and families who have long awaited answers. If successful, this model may serve as a scalable template for expansion across Pennsylvania, the east coast, and potentially nationwide.
Keywords: Cold Cases, Forensic Pathology, Slide Archiving, Criminal Investigation, Pennsylvania

**63: Western Equine Encephalitis Virus (WEEV) 3'-UTR SL1 Hairpin: Palindrome mutations abolish kissing complexation**

Eric Chartier | Chemistry | School of Science and Engineering
Faculty Advisor(s): Jeffrey Evanseck, Ph.D., Mihaela-Rita Mihailescu, Ph.D.

**Abstract:**
The Western Equine Encephalitis virus (WEEV), an alphavirus, causes fever and, in some cases, severe neurological disease in humans. We identified a 17-nucleotide stem-loop (SL1) containing a palindromic GUAC region in the 3'-UTR of the WEEV RNA genome which we showed forms a kissing complex (KC), implying a role in genome dimerization. However, a systematic investigation into the structural determinants as well as the dynamic and energetic underpinnings of KC formation in alphaviruses has not yet been reported. We address this gap by combining unbiased microsecond molecular dynamics (MD) simulations with in vitro data on WEEV SL1 and several other alphavirus variants. Our experiments shows that stem-loop alterations affect dimerization; notably, SL1 palindrome mutations abolish KC formation whereas other loop mutations only modulate the total conversion. We generated monomer and KC structures for WEEV SL1 and other mutant variants (C10U, U6C, U12C, and A4:U14) using the predictive Vfold3D/IsRNA pipeline and performed with MD simulations. Structural analysis utilizing principal component analysis and root mean squared fluctuation indicate that C10U —the non-dimerizing mutant—has a more rigid stem loop region compared to the other monomeric structures. Entropic analysis of the loop revealed C10U exhibited reduced flexibility compared to WT and U6C, decreasing overall stem loop entropy by 10%. We find that mutations within or adjacent to the palindromic GUAC region disrupt dimerization by suppressing intermolecular kissing interactions and result with inward facing nucleotides in the palindromic regions. Thus, the palindrome region that should be available for KC formation is sequestered by intra-loop interactions, weakening intermolecular contacts necessary for KC formation. Our results rationalize why C10U fails to form a KC and establish a framework for probing the mutational scope of alphavirus KCs, providing a foundation on structural determinants of RNA dimerization in viral replication.

**64: Complex Trauma Group Therapy with Incarcerated Youth**

Osato Charles-Omoregbee | School Psychology | School of Education
Sophie Levitt | School Psychology | School of Education
Travyon Lovely | School Psychology | School of Education
Joseph Beck | School Psychology | School of Education
Faculty Advisor(s): Tammy Hughes, Ph.D.

**Abstract:**
The Academic Institute is a school within the Allegheny County Jail (AIACJ) that provides education to students housed in the facility. Those placed in special education are eligible for school support through the age of 21, just as they would be in their home school district. Many of these students have experienced traumatic events and other Adverse Childhood Experiences (ACEs) throughout their lives (i.e., parental neglect, physical and sexual abuse, gun violence, neighborhood violence, etc.). Being housed at ACJ while waiting for their court hearing is itself a traumatizing experience, not only because it is a carceral system but because jails were not designed to house children. As outlined by the U.S. Department of Justice (2012), Standard § 115.14 prohibits contact between children and adults in carceral settings. Unaccustomed to teen behaviors, correctional officers can be quick to respond with the use of tasers, bean bag shotguns, and physical redirection to establish immediate compliance. Due to the student's history of traumatic experiences resulting in dysregulated emotions and behaviors as well as limited maturity and experience coping with carceral systems, the purpose of this project is to provide effective, evidence-based treatment for youth with complex trauma. Specifically, trauma-focused treatments are provided to improve their coping skills when dealing with distress related to triggers. This poster will describe how to combine the NCTSN, What is Complex Trauma? resource guide and the Trauma, Addiction, Mental Health, and Recovery (TAMAR) curriculum to effectively address trauma symptomatology that undergirds emotional and behavioral dysregulation allowing youth an opportunity to mature.

**65: Moved to virtual only**

**66: Mitigating The Disease of Violence**

Joseph Beck | School Psychology | School of Education
Areanna Carone | Child Psychology |School of Education
Asiyah Harris | School Psychology |School of Education
Travyon Lovely | School Psychology | School of Education
Faculty Advisor(s): Tammy Hughes, Ph.D., ABPP

**Abstract:**
Community violence is described as any altercation between unrelated individuals that happens outside the home. Individuals may or may not know each other. Altercations can include physical aggression between parties and even shootings in public areas (CDC, 2025). Racial/ethnic minority groups and economically disadvantaged families are disproportionately exposed to community violence at higher rates than their white affluent counterparts (Ohmer et al., 2016).

Prolonged exposure to violence can lead to chronic psychological distress. Maladaptive coping strategies often used by children and adolescents to survive the presenting stress include distrust in others, avoidance of social and recreational activities, and overall emotional detachment. These coping strategies may unintentionally

disrupt healthy psychosocial development (Burdett Schiavone, 2009). To mitigate the effects of violence, stakeholders can use a public health model of viewing violence as a disease, which provides a framework to identify its sources and mitigate its effects. This model treats violence as a public health issue, similar to other medical conditions (Ezell et al., 2023)

To mitigate exposure to violence through the public health model of violence, Positive Childhood Experiences (PCEs) are promoted for healthy development. PCEs comprise supportive, nurturing, and stable experiences during childhood. These experiences include having at least one caring and consistent adult, feeling safe and supported at home or in the community, opportunities for meaningful social connection, and environments that foster belonging, competence, and emotional expression (CDC, 2023). PCEs are critical for young people because they buffer the negative effects of stress and adversity, support adaptive stress-response systems, and promote positive identity formation. PCEs are associated with higher self-esteem, better mental health outcomes, stronger interpersonal relationships, and increased resilience across the lifespan (Bethell et al., 2019).

**67: Synthesis Optimization of Aza-dipyrromethene Ligands for Future Derivatization**

Emily Vargo | Chemistry | School of Science and Engineering
Faculty Advisor(s): Thomas Montgomery, Ph.D.

**Abstract:**
Fluorophore research has increased through recent years, particularly of azadipyyromethene (aza-DIPY) ligands due to their photophysical properties in the visible to near-infrared region, as well as their derivatization capabilities, and high molar extinction coefficients. Additional functionalization and metal chelation on the aza-DIPY core motif enhances these characteristics, increasing the appeal within fluorescence imaging techniques. Prior lab work investigated synthesizing a novel bis(phenolate) aza-DIPY with a proximal aryl-positioned alkyne functionality, proposing a red-shift in the spectra and allowing potential for biorthogonal “click” chemistry. However, optimization of early synthetic steps remained challenging with nonreproducible results, difficulty in purification methods, and low yields. This work proposes a modified pathway from previous efforts through the elimination and optimization of fundamental steps in synthesizing the aza-DIPY core motif. Furthermore, this study aims to apply these optimized conditions towards synthesizing a substrate scope of novel substituted aza-DIPY ligands for variable transformations to achieve desired photophysical properties ideal for biomedical imaging.

**68: Reassessment of Saw Mill Run Water Quality Using Biological and Chemical Parameters.**

Sydney Stahl | Other | School of Science and Engineering
Faculty Advisor(s): Brady Porter, Ph.D.

**Abstract:**
Saw Mill Run is an urbanized stream located south of Pittsburgh, Pennsylvania. The stream runs parallel to Route 51, beginning in Castle Shannon, PA and draining into the Ohio River. Saw Mill Run was assessed in 1997 and 2016 as part of the Pennsylvania Department of Environmental Protection’s (PADEP’s) surface water quality assessment program. The 2016 assessment included water chemistry as well as macroinvertebrate and fish assemblages. The stream has not been assessed since, providing an opportunity to analyze a decade of urban influence on Saw Mill Run. Six sites included in the 2016 assessment will be revisited as well as an additional site. Data on water chemistry parameters will be collected by grab samples, field equipment, and a gauge.

Macroinvertebrate and fish assemblages will follow PADEP's methodologies. Data collected within this study will be compared to 2016 data collected by PADEP. Preliminary data was collected at two sites during the fall of 2025. Initial comparisons of the 2025 data to the baseline 2016 data show differences in both chemical and biological data. Though slight differences are apparent in overall water quality from 2016 to 2025, notable differences are observed in pH, conductivity, and dissolved oxygen levels for sites assessed in 2025 compared to those in 2016. A striking difference is also seen between levels of species richness and overall abundance of fish. If these trends continue, we expect water quality parameters to improve and fish assemblages to increase in abundance and diversity. Reassessment of Saw Mill Run will support more effective stream management and restoration practices and provide benchmark data for future reassessments.

**69: Moved to virtual only**

**70: Navigating Negotiations: An Analysis of the Panama Canal Treaty Negotiations of 1977**

Piers Berry | Public History | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): John Dwyer, Ph.D.

**Abstract:**
The Panama Canal is a remarkable feat of engineering that connects the Pacific and Atlantic Oceans. The territory surrounding the canal and the canal itself were owned and operated by the United States for the first three quarters of the twentieth century. However, in 1977 the United States and the Republic of Panama agreed that the United States would willingly cede control over the Panama Canal and Canal Zone by the end of the twentieth century. This took place across two treaties, which would be called the Carter-Torrijos Treaties. Named after President Jimmy Carter of the U.S. and the Panama's Strongman Leader Omar Torrijos, these treaties marked a stark departure in U.S.-Latin American relations in the Cold War, which were previously dominated by aggressive American efforts to exert control and maintain hegemony over the region.

This project explores the negotiations between the Carter administration and Panamanian diplomats using liberal institutional theory and emphasizes the individuals involved in negotiations. This project asserts that the Carter-Torrijos Treaties were a shining example of the Carter administration's moralistic, liberal foreign policy and that they should serve as a model for bilateral negotiations in U.S.-Latin American relations. The primary sources used in this project include memoirs of key players in the Carter administration, U.S. government documents, and the Carter-Torrijos Treaties.

This project finds that the liberal institutional theory of international relations was the most effective theory to reach a peaceful, respectful conclusion in the treaty negotiations. It also finds that the respectful and fair diplomats employed by the U.S. were crucial in reaching such a conclusion in the 180 days that the negotiations lasted, and it finds that the individual negotiators and officials, rather than international and domestic pressures, deserve the most credit for passing the treaties. By analyzing the treaties themselves and comparing the interests of both the U.S. and Panama, this project finds that the treaties were ultimately fair to both nations.

**71: Moved to virtual only**

**72: Structural impact of Mg2+ on HCV X55 hairpin; preorganization of the monomer loop nucleotides for kissing dimerization**

Unnikrishnan Puthumana | Chemistry | School of Science and Engineering
Faculty Advisor(s): Jeffrey D. Evanseck, Ph.D., Mihaela-Rita Mihailescu, Ph.D.

**Abstract:**
The X55 RNA segment of hepatitis C virus (HCV) are the first 55 nucleotides of the highly conserved 98-nucleotide non-coding sequence of its 3' terminus, recognized as a regulatory element in the viral lifecycle. Experiment indicates two distinct and slowly interconverting X55 conformations involving either a two-stem-loop (SL1/3) or one-stem-loop (SL1/2) structure, where the relative abundance is modulated by either environment or mutations. SL1/2 harbors the dimerization loop sequence (DLS), necessary to form the kissing complex (KC) and ultimately for viral replication. The kissing dimerization of RNA is strongly dependent on magnesium ions ($Mg^{2+}$), yet the atomistic details on how the Mg2+ preorganizes each X55 conformation for dimerization remain poorly understood. Initial structures of both SL1/2 and SL1/3 conformers were generated using the Vfold3D/ISRNA pipeline and were subjected to unbiased microsecond-scale molecular dynamics simulations in explicit TIP3P waters with $Mg^{2+}$ ions corresponding to concentrations of 0 mM, 8 mM, and 25 mM. Root-mean-square fluctuation (RMSF), principal component analysis (PCA), and entropy analyses revealed that for both SL1/2 and SL1/3, increasing $Mg^{2+}$ concentrations promote unfolded, linearized conformations with the loop nucleotides available for dimerization, while the absence of $Mg^{2+}$ leads to intramolecular folding due to hydrogen bonding between the negatively charged backbone and nucleotide bases sequestering nucleotides required for dimerization. The intramolecular folding in zero-Mg2+ systems was validated against previously reported experimentally derived 3D shapes from Small Angle X-ray Scattering (SAXS) measurements. These results suggest that $Mg^{2+}$ functions as a structural regulator by suppressing non-productive folding pathways and preserving dimerization-competent substates. By characterizing the conformational landscape of two distinct monomeric X55 conformers across ionic environments, we establish a foundation for pathway investigations to unravel the Mg2+ dependency of the energetic barriers and structural transitions that underlie kissing complexation in X55, as well as other conserved viral RNA.

**73: Moved to virtual only**

**74: Sulfoxonium ylide formation from S-oxides: Expanding the chemical scope of N-oxide chemistry**

Jing Zhang | Chemistry | School of Science and Engineering
Faculty Advisor(s): Jeffrey Evanseck, Ph.D.

**Abstract:**
We are now well beyond the "golden age" of antibiotic discovery, where over the last two decades, only a few new antibiotics families have been identified and approved for human use. To address this issue, we leveraged our reported novel mechanistic insights of generating the azomethine ylide from tert-butyl pyrrolidine N-oxide involving a "multi-ion bridge" as a sulfoxonium ylide precursor to enlarge the chemical space of potential pharmacologically active systems to include S-heterocycles. Specifically, this project examines the mechanistic, structural, and energetic consequences of the immediate ionic atmosphere of aggregation and charge upon generating sulfoxonium ylides to build upon the synthesis of novel pharmaceutical compounds and provide feasible methods to synthesize novel drugs. The M06-2X density functional with the jul-cc-pv[D,T,Q]z Dunning basis sets, were used to map out the reaction pathways. The computations reveal different coordination effects

between S-oxide and N-oxide with two LDA and two THF systems. In addition, there is a significant difference between the rate limiting steps between N-oxide and S-oxides, which is the second deprotonation step. Specifically, the first deprotonation activation energy of 3-pyrroline oxide is 8.2 kcal/mol, while it is 1.4 kcal/mol for 2,5-dihydrothiophene oxide. The second deprotonation activation energy of 3-pyrroline oxide is 16.8 kcal/mol, while it is 3.7 kcal/mol for 2,5-dihydrothiophene oxide. The computations suggest that the synthesis of S-heterocycles are possible and facile as compared to N-heterocycles.

**75: The Use of Miro, a Digital Whiteboard, for Usability Testing Analysis for WHEEL-LEARN: an Online Lifestyle Behavior Intervention for People with Spinal Cord Injury**

Tessa Markham | Media Arts and Technology | McAnulty College and Graduate School of Liberal Arts
Emily Talierco | Physical Therapy | Rangos School of Health Sciences
Faculty Advisor(s): Theresa Tartamella, Ph.D, PT, DPT, William Gibbs, Ph.D.

**Abstract:**
Miro is a digital whiteboard platform that user experience (UX) designers use to brainstorm, ideate, and collaborate. However, limited studies have investigated Miro as a tool for analyzing usability test results and prioritizing iterative refinements to designs. A novel method of analysis and prioritization in Miro used data collected from people with spinal cord injury (SCI) and healthcare professionals who completed usability testing on WHEEL-LEARN, a lifestyle behavior intervention website designed to reduce barriers to physical activity for people with SCI. This newly developed process in Miro enabled improvements to the website. The objective is to describe the methods used for applying Miro to analyzing and prioritizing usability testing data for this study.

WHEEL-LEARN usability testing sessions were recorded via Zoom while team members typed notes in a Google Sheets spreadsheet. All notes were transferred into Miro following a six-step process: comments were moved into a new sheet, the sheet was exported as a comma separated list file, this file was opened in a text editor to remove quotations, the updated file was imported into a blank sheet, and the new sheet's content was pasted into Miro as sticky notes. Each note was categorized using Miro's sticky notes, tags, stickers, and screen spotlighting. A unique method of prioritization used similar features to transform participant feedback trends into actionable design refinements.

Following the completion of usability testing by nine participants, Miro enabled efficient thematic analysis where comments were moved under the appropriate theme. Miro's AI Assist streamlined thematic analysis by indicating initial themes present within the data. Exemplary quotes were indicated using Miro's sticker feature, allowing the team to quickly return to the note and corresponding theme. Priority identification within Miro provided the ability to visually and quantitatively determine design changes based on qualitative data.

Using the priority lists, the team completed iterative refinements to the website, including creating a physical activity tracking calendar to improve self-monitoring, and separating lessons into smaller sections to increase readability. Miro provided seamless analysis of usability data through visualization of thematic analysis, thematic categorization of participant comments, exemplary quote identification, and logical prioritization of refinements.

**76: Supporting Holistic Identity Development for Black Youth**

Travyon Lovely | School Psychology | School of Education
Asiyah Harrison | School Psychology | School of Education
Sophie Levitt | School Psychology | School of Education
Faculty Advisor(s): Tammy Hughes, Ph.D.

**Abstract:**
Identity development is a central task of adolescence and plays a critical role in shaping psychosocial functioning, well-being, and behavioral outcomes across the lifespan (Meulenbeek et al., 2025). This poster provides an integrated review of classical and contemporary theories of identity development, with particular emphasis on psychosocial, racial/ethnic, and prosocial identity formation for Black youth. The poster further places identity development within broader sociocultural contexts by reviewing racial and ethnic identity theories relevant to both minoritized and dominant group populations. Attention is given to how systemic inequities, including exposure to adverse childhood experiences (ACEs), community violence, and limited access to positive role models, disrupt healthy identity formation and impede the development of prosocial identities for Black youth.

Drawing from resilience and positive youth development frameworks, the poster identifies promotive and protective factors that support holistic prosocial identity development despite exposure to risk. Specifically, adolescent-centered third places (e.g., after-school programs and clubs), high-quality mentorship, and the application of intersectionality theory are discussed as critical mechanisms for fostering self-reflection, belonging, and prosocial engagement among Black youth. By synthesizing theory and empirical research across multiple domains, this paper underscores the importance of multilevel, culturally responsive approaches to supporting Black adolescent identity development and offers implications for prevention, intervention, and school and community-based practice.

**77: Assessing the Impact of Fish Habitat Restoration on the Fish Community in Patterson Creek**

Maria Sorce | Environmental Science & Management | School of Science and Engineering
Faculty Advisor(s): Brady Porter, Ph.D.

**Abstract:**
Suitable habitat and good water quality are important for cold water and trout fisheries. Unfortunately, waterways in Pennsylvania have been altered, limiting habitat availability and decreasing water quality. Native trout fisheries have declined and stocked trout fisheries struggle to maintain adequate water quality and habitat. Habitat restoration projects using logs and stone rip rap can create a variety of habitats needed for fish, lessen sedimentation, and decrease water temperature. This study focuses on a fish habitat restoration project in Patterson Creek, a high-quality trout stocked fishery, located in West Franklin Township, Armstrong County, Pennsylvania. Because the location is a children's fishing area and stocked with trout, the project focused on increasing pool habitat. Pre and post habitat construction fish surveys were conducted to determine location and makeup of the fish community. Water quality, habitat, and fish biotic integrity were compared. Fish habitat and community makeup were analyzed utilizing a multivariate analysis. It is hypothesized that fish species preferring pool habitat will increase with an increase in pool habitat.

**78 - 82: Moved to virtual only**

**83: Impact of 3D vs 2D Learning Tools on Medical Image Identification Skills in Master of Biomedical Sciences Students**

Emily Daum | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Reese Petrosky | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Alicia Morgan, Ph.D.

**Abstract:**
Spatial reasoning and cross-sectional imaging interpretation are essential skills for future medical professionals. Within biomedical education, many technological advances exist which aim to improve three-dimensional (3D) anatomy understanding. However, limited comparative data exists evaluating two-dimensional (2D) and 3D learning resources. The Master of Biomedical Sciences Program at Duquesne University Nasuti College of Osteopathic Medicine had adopted a newer augmented reality (AR) software, originally developed by Case Western University, known as HoloAnatomy. This program allows students to visualize life-size anatomic structures through AR headsets in an interactive, 3D modality. During the 2025-2026 academic year, students in the residential cohort (n=33 participants) utilized both this 3D AR (anatomy lab provided tool) and 2D (not required) resources, while the online cohort (n=10 participants) was limited to a provided 2D technology (Visible Body). While Visible Body is marketed as a "3D anatomy platform," it is screen-based and limited in how immersed a student can be within the body. This study aims to evaluate whether access to 3D AR anatomy tools is associated with improved performance in cross-sectional medical image identification compared to 2D resources alone. Neither cohort received formal training in medical image interpretation; this assessment is a measure of the translation of foundational anatomy to applied medical imaging scenarios. At the conclusion of each semester, students complete a cumulative standardized assessment comprised of cross-sectional medical images (CT, MRI, ultrasound) to evaluate the translation of anatomical identification skills in real-world applications. After the completion of one assessment, thus far, no statistically meaningful differences were observed between residential and online cohorts. Cohorts performed similarly in accuracy and response times; performance patterns were driven primarily by anatomic region rather than modality, supporting instructional equity across cohorts. While both platforms provide interactive "3D" visualization, they differ in interaction design: Visible Body allows independent manipulations and layer dissection, whereas HoloAnatomy is instructor-curated, spatially anchored models. Further investigation will continue to assess the potential significance of the educational impact of supplementary 3D and AR technology on longitudinal development of spatial reasoning and cross-sectional image interpretation skills for students preparing to enter medical school.

**84: MEHP-Induced Macrophage Polarization: A Potential Mechanism Underlying Phthalate-Mediated Inhibition of Leydig Cell Function**

Allison Lunney | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Jonah Vaglia | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Muhammad Rajput | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Olivia Vogler | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Niya Szymanski | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Kassim Traore, Ph.D.

**Abstract:**
Di(2-ethylhexyl) phthalate (DEHP) and mono-2-ethylhexyl phthalate (MEHP), the major metabolite of DEHP, are highly prevalent endocrine disrupting chemicals (EDCs) present in numerous consumer products including food packaging, detergents, toys, and cosmetics.

MEHP has been shown to affect testosterone production directly via its effects on Leydig cells, but also has been implicated in immune system modulation. These observations raise the possibility that MEHP might affect male steroidogenesis both by its direct effects on Leydig cells and perhaps also indirectly through its effects on macrophages. As yet, however, MEHP effects on macrophages and the potential relationship between macrophage response and Leydig cell steroidogenic function are poorly understood.

Using in vitro methodology, we investigated the effects of MEHP on macrophage function and of downstream effects of changes in macrophage function on Leydig cell steroidogenesis. RAW 264.7 cells were incubated with 0-300 μM MEHP for 24 hrs. Tumor necrosis factor alpha (TNF-α) were quantified by enzyme-linked immunosorbent assay (ELISA). The Agilent Seahorse XF Real-time ATP Rate Assay (Fig. 1) was used to calculate the rate of cellular ATP production, oxygen consumption rate (OCR) and extracellular acidification rate (ECAR). Superoxide production by RAW 264.7 cells was measured using MitoSOX™ red, a cell permeant fluorescent dye that labels mitochondria in live cells. Mitochondrial mass was measured by assessing the uptake of MitoTracker Green.

We found significant dose-dependent changes in response to MEHP exposure, including increased cell size and granularity, increased mitochondrial content and membrane potential, decreased ATP production and oxygen consumption, and elevated intracellular and mitochondrial-derived oxidative stress. These changes suggested a pro-inflammatory response of the RAW 264.7 cells to MEHP. MEHP exposure activated the p38 MAPK pathway linking oxidative stress to inflammatory signaling and increase in TNF-α secretion. In vitro exposure of MA-10 Leydig cells to TNF-α was found to inhibit steroid (progesterone) production by these cells. Together, these observations suggest that TNF-α was secreted by MEHP-activated macrophages and that exposure to TNF-α can inhibit LH-stimulated steroid (progesterone) production by MA-10 Leydig cells suggest the possibility of the involvement of an immune-mediated mechanism resulting from MEHP exposure on impaired Leydig cell steroid production.

**85: A Field-Ready Method for Wildlife Identification Using Nanopore Technology**

Rosemary van der Net | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Jan Janecka, Ph.D., Pamela Marshall, Ph.D.

**Abstract:**
Genetic sampling can provide diagnostic identification of species and individuals, creating great potential for forensics and solving wildlife crimes1. Wildlife crime often occurs in remote areas, which lack officers and eyewitnesses, making the use of DNA evidence crucial. While traditional DNA extraction kits are effective, they often require extensive equipment and time, and are limited in throughput, making them impractical for field deployment. This study explores the use of Nanopore MinION technology, a portable real-time DNA sequencer, in combination with a novel field-friendly DNA extraction protocol to streamline wildlife genetic analysis. The objective was to develop a rapid, time-efficient, and scalable DNA extraction method suitable for field conditions, capable of processing multiple scat samples simultaneously, and compatible with MinION

sequencing. The protocol utilizes tris-HCl, proteinase K, and Axygen paramagnetic beads to isolate and bind DNA directly from scat samples, eliminating the need for centrifugation. To test the protocol, scat samples collected between 2018 and 2024 from Bhutan in South Asia and Powdermill Nature Reserve in Pennsylvania, which were previously extracted through traditional means, were extracted using the method proposed. The samples were then sequenced on an Illumina MiSeq to confirm accurate amplification. Additionally, a practical field test confirmed the effectiveness of this method for preparing amplicons for MinION sequencing, allowing for rapid identification of scat contents. Overall, the new protocol offers advantages in terms of time-efficiency and practicality, allowing for the extraction of up to 16 samples in under 3 hours and the MinION sequencing provided 1.75 million reads in under 3 hours as well. Results suggest the proposed methodology will cut down time of analysis whilst increasing throughput, proving it a valuable method for fieldwork.

**86: Move to Virtual Only**
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**88: Solvent Reorganization Along the [3+2] Cycloaddition Pathway of tert-butyl Azomethine Ylide with Styrene**

Nicholas Rivord | Chemistry | School of Science and Engineering
Faculty Advisor(s): Jeffrey Evanseck, Ph.D.

**Abstract:**
Solvation and aggregation continue to be a challenge in the accurate modeling and prediction of the kinetics, thermodynamics, and selectivity of organic reactions. Specifically, selecting a physical model for the alignment of experiment and computation continues to be an issue for the observed 90% endo selectivity [3+2] cycloaddition of tert-butyl azomethine ylide and styrene. The necessary exo transition structure and reaction pathway has proven elusive when assuming the same aggregation model of two LDAs, two THFs, and Li2O added explicitly which was used in the formation of the azomethine ylide. We hypothesize that the aggregate undergoes a reorganization after the formation of the azomethine ylide but before the transition structure of the [3+2] cycloaddition for the reaction to take place in agreement with the 90% endo selectivity. To investigate this transition structure and reaction pathway, different solvent models are tested via the Nudged Elastic Band method to observe whether any reorganization of the aggregate occurs along the reaction pathway. The reactant and the product geometries are found, optimized, and implemented into the NEB computations using the Dunning basis set: maug-cc-pV(D+d)Z and the Minnesota functional: M06-2X producing a minimum energy pathway going from one stationary point to the other. While probing the reaction pathways, we determined the minimum energy pathway of the vacuum phase, the implicit solvent (PCM), as well as a series of models building up to the two LDA and two THF aggregate that is added in explicitly. Our study reports on the pathways and the solvent reorganization that occurs along the pathways to determine endo selectivity.

**89: Ludic Disgust: Reassessing the Limits of Kantian Sublime through Horror**

Katie McCabe | Philosophy | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): James Swindal, Ph.D.

**Abstract:**
The nature of disgust, as Immanuel Kant would have it, is that of repulsion -- of insistence. The Sublime, however, involves a violent movement of the intellectual faculty for understanding that vibrates between horror

at the excessive grandness (be it spatial or conceptual) and comfort with said excess; this produces the "sublime" experience of pleasure and terror at grand natural events, the concept of the infinite, God, etc., in which the subject cannot be fully present to themself. Because of these seemingly incommensurable qualities (abjected awareness vs. depersonalized dissociation), one would be seemingly justified in positing that experiences of disgust cannot also be experiences of the sublime; at least in a Kantian sense. Though scholarship on the topic has made considerable connections between fear and sublimity, the disgust inherent in horror (as Noel Carroll would have it) tends to call to mind images wholly incompatible with either the Burkean or Kantian sublime.

In the last forty years or so, though, philosophical and psychological literature has seen an immense increase in content focused on the act of play. Video games, in particular, present a particularly interesting artifact for analysis, blending passive and active aesthetic experiences, crafting an immersion wholly unique to the medium, and innovating interactive mechanics that afford an agency unseen in more linear forms of narrative experience.

I offer a qualified case for a Kantian-horror-sublime. Specifically, I posit that video games (amongst other ludic mediums) offer a unique solution to three major objections. This involves careful attention to Kant's characterization of the sublime as well as the potentially generative quality of disgust. In doing so, I consider how the ludic mechanics such as immersion and (dis)empowerment aid in evoking the sublime where other mediums (e.g. film, literature) cannot. I attempt to showcase how horror media (evidenced by Bloodborne, Silent Hill 2, and Darkwood) can successfully evoke the same sublime that Kant associates with nature or God. Through an analysis of Kant's requirements, an understanding of ludic immersion, and an analysis of disgust that draws the boundaries around its capacity for enhancing aesthetic enjoyment, it's possible for ludic horror-sublime to come out unscathed.

**90: The Influence of Graded Exercise Testing Performance on Concussion Recovery Timelines in Collegiate Athletes**

Olivia Mule | Health Sciences | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Erica Beidler, Ph.D., ATC, Jacob Turnbull, DO, CAQSM, FAOASM

**Abstract:**
As exercise tolerance testing is now recommended as a best-practice approach in sport-related concussion (SRC) management, understanding its clinical utility in real-world settings remains an important area of investigation. Although the Buffalo Concussion Treadmill Test (BCTT) has been evaluated in controlled laboratory environments, its relationship with recovery timelines in sports medicine practice has not been well characterized. This study aims to examine the association between BCTT performance metrics (i.e. minutes to termination, heart rate at termination) and recovery timelines (i.e. days from injury to symptom free, days from injury to return to sport) following SRC. This retrospective chart review was conducted using medical records from the collegiate athletic program at Duquesne University. Participants included 105 collegiate athletes who sustained a SRC between 2021 and 2025 and completed the BCTT as part of the Duquesne University Athletics concussion management protocol. All SRCs were diagnosed by an athletic trainer on the sports medicine team, using a multi-faceted clinical examination in alignment with the concussion definition outlined in the 6th International Concussion Consensus. The BCTT is an assessment that monitors heart rate and symptoms during graded exertion to identify a heart rate threshold that guides exercise prescription post-SRC. BCTT performance outcomes of interest include heart rate at test termination and total minutes completed. Recovery outcomes of

interest include days from injury to self-reported symptom resolution, assessed using a standardized symptom checklist, and days from injury to completion of the return to sport protocol. We will use analyses to determine if there is a relationship between BCTT performance metrics and recovery timelines. The data analysis is ongoing, and we hypothesize that poorer performance on the BCTT, defined by higher heart rate and fewer minutes to termination, will be associated with longer time to symptom resolution and completion of RTS protocol following SRC. The results from this study will provide important information to guide the clinical application of early post-concussion exercise testing and prescription.

**91: The Effects of Synthetic Substrates on DNA Degradation and Inhibition Using Blood Exposed to High Temperatures**

Janae Chase | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Matthew Regentin, MSFS

**Abstract:**
The widespread use of household items made from synthetic materials presents significant challenges in fire-related forensic investigations. When exposed to fire, these materials combust more rapidly than traditional non-synthetic materials, increasing the risk of flashover fires. As a result, DNA samples are degraded and inhibited, which creates challenges in DNA recovery and analysis. Despite the growing prevalence of synthetic materials, there remains a critical gap in the forensic community's understanding of how these materials impact DNA analysis following a fire event, as well as effective strategies to mitigate their effects. This research aimed to assess the extent to which synthetic materials contribute to DNA degradation and inhibition when exposed to high temperatures, using human blood as the source of DNA. Blood was applied to several synthetic and non-synthetic substrates and exposed to different temperatures through radiant heating. Under high temperatures, synthetic materials were hypothesized to have higher degradation indices (DI) and increased stochastic effects, such as heterozygote peak height imbalance, lower relative fluorescence units (RFU), allele dropout/drop-in, and locus dropout in DNA profiles when compared to non-synthetic materials. The objective was to establish whether there is a notable difference in DI of each synthetic substrate and its non-synthetic counterpart. The DI values for the control and heated samples indicated there was little difference in overall DNA degradation or inhibition between the two substrate groups at room temperature and at elevated temperatures from 91 °C to 223 °C, and preliminary electropherogram data suggested degradation in both substrate types to varying degrees. The findings of this research had significant implications for forensic investigations, particularly in obtaining DNA profiles from arson and other fire-related crimes.

**92: The Implication of life satisfaction and PTSD on mental health outcomes when Internal Conflicts, Psychopathology, and Emotional Intelligence, Emotional Peace, and Mindfulness are at Play.**

Miloha Angie Fontaine | Clinical Mental Health Counseling | School of Education
Faculty Advisor(s): Michael Sickels, Ph.D.

**Abstract:**
**Purpose**: To understand from the participants' perspectives what role emotional intelligence plays in helping people manage stress and cope with traumatic experiences, we aim to conduct a series of studies. This study is the preliminary exploration of factors such as internal conflicts, psychopathology, trauma experiences, and emotional intelligence that may impact mental health outcomes. This study analyzes whether life satisfaction and post-traumatic stress disorder (PTSD) can predict mental health outcomes.

**Background**: Intelligence regulates our emotions and provides a sense of peace in the inner self. EI has long been grouped with cognitive intelligence, which is related to IQ (Zeidner et al., 2009). Western perspectives have historically separated reason and emotion from action and passion, as argued by Zeidner et al. A few terms refer to the concept of peacefulness. In the context of this study, the concept of emotional peace (EP) is an umbrella term to refer to emotional intelligence and mindfulness because determinants of individual peacefulness are related to mindfulness and knowledge (Nelson, 2021). The significant impacts of EI on mental health and overall well-being justify the need to expand the literature on the relationship between EI and emotional peace and the likelihood of developing psychopathology.
**Methods**: Hypothetically, emotional disturbance may impact mental health in general and generate psychopathological conditions in certain individuals. A regression analysis was conducted to assess whether life satisfaction and PTSD can predict mental health outcomes.
**Results:** The multiple regression model statistically significantly predicts that life satisfaction and PTSD are good predictors of mental health outcomes, F(2, 4011) = 20.65, p < .001, $R^2$ = .010. The ANOVA test indicates that p <.05; thus, the predictors of life satisfaction and PTSD add statistically significantly to the prediction of mental health outcomes.
**Conclusion/ Implications**: Those results validate the hypothesis and justify the need to further explore the topic. Those results are consistent with the literature arguing that extreme emotional disturbance (Kirschner et al., 2004) may impact mental health in general and generate psychopathological conditions in certain individuals. The present author aims to further study this topic both quantitatively and qualitatively, as the literature suggests (Zeidner et al., 2009).

**93: Brexanolone, a first-in-class neurosteroid medication: Mechanism of action, clinical, and translational science**

Laura Gayanova | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Katrina Sian| Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Yanfei Qi, Ph.D., MD, MS

**Abstract:**
Brexanolone is an FDA-approved treatment for postpartum depression (PPD) that works by positive-allosteric modulation of type A γ-aminobutyric acid (GABAA) receptors. As an intravenous version of allopregnanolone, it is known for its quick onset of action and lasting impact on depressive symptoms. Clinical trials have shown that brexanolone can reduce depressive symptoms within 60 hours of infusion, and the side effects after treatment are minimal. This is critical, as current first-line treatment for PPD can take up to several weeks before any symptom improvement is observed. Moreover, with the increasing percentage of women experiencing PPD prior to or right after delivery, as well as the prevalent stigma associated with PPD, there is an even greater need to address this growing health concern. The terminal half-life of brexanolone is 9 hours, which indicates brexanolone's necessity for a continuous IV infusion to maintain its effects. Brexanolone also undergoes non-CYP-mediated metabolism, primarily through keto-reduction, glucuronidation, and sulfation; therefore, no dose adjustments are needed for individuals with renal impairment. While primarily used for PPD, brexanolone is under investigation for other conditions, including Post-traumatic stress disorder (PTSD), Alcohol Use Disorder, Super-Refractory Status Epilepticus, and Tinnitus. With delivery challenges and monitoring requirements making widespread use difficult, future research focusing on alternative delivery methods and expanded indications could help make brexanolone more accessible and broaden its clinical utility.

**94: Move to virtual only**

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**96: The Logic Of Forever War: Destruction In And Of Itself**

Alex Barnett | Philosophy | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): James Swindal, Ph.D.

**Abstract:**
Often, forever wars are seen as a synthesis of simple addition: a forever war is equivalent to the stable concept of war with the addition that it lasts for a long time. Against this seemingly commonsensical position, I argue that it is not their length but their internal logics and aims that distinguish them. Previous wars were fought with the intention of a quick resolution, any additional fighting past what was necessary was seen as non-ideal due to its adverse effect on a nation's population, economic infrastructure, etc. This logic is inverted in forever war: the direct goal is not territorial conquest or market access–the goal is to destroy and to gain the profits that this destruction brings for as long as possible.

I argue this new logic of war developed under the particular material conditions of the late 20th century. There was an increasing development in the means of destruction that enabled war to be carried entirely one-sidedly, the erection of a unipolar global order that allowed the U.S. (or its allied client states) to destroy without repercussion, and the changing of the core of production toward a military Keynesianism in which both the constant production of weapons and the continual "rebuilding" of nations through contractors became necessary for the American economy. All of this made continual global destruction both a possibility and a necessity for late-stage capitalism. I analyze the U.S. Iraqi War and the Libyan "Revolt" as two paradigmatic examples of forever war, demonstrating that in each case the goal was not resource acquisition on the part of the U.S., as is often asserted, but rather it was more directly the all-out destruction of these respective nations. I further conclude that any global future peace will first require the destruction of the unipolar world that gave rise to forever wars.

**97: Making Accessibility Accessible: Developing and Evaluating a Chrome Extension for Color-Blindness Simulation**

Giang Dinh | Media Arts and Technology | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor(s): William Gibbs, Ph.D.

**Abstract:**
Accessibility is a core component of user experience. As digital products continue to grow in complexity, designers often focus on solving interaction or feature-related problems, yet a fundamental consideration remains: users' perceptual abilities.

With an estimated 300–350 million people worldwide experiencing color-vision deficiencies, evaluating color choices is an essential aspect of accessibility. While guidelines such as WCAG offer standards, they are frequently abstract, difficult to visualize, and disconnected from designers' day-to-day workflows. Many existing color-blind accessibility tools are not intuitive or require multiple steps, creating friction that discourages regular accessibility checks, especially among junior designers who are still developing foundational skills.

Making accessibility assessment more accessible and usable for designers can lead to more informed design decisions and more consistent accessibility practices, ultimately benefiting users. This project focuses on two core activities: (1) developing an accessible tool that support designers in recognizing color-related accessibility issues, and (2) evaluating how it influences their understanding, decision-making, and confidence in designing for inclusivity.

I have developed a Chrome extension that allows designers to view any webpage through multiple types of color-blindness simulations directly within the browser. The tool enables quick saving or copying of simulated results for documentation and design review purposes. A formal evaluation is planned to explore questions such as: Does the extension make accessibility considerations more intuitive? Does real-time simulation help designers recognize issues earlier? How does the tool shape their awareness and workflow?

By lowering the barrier to accessibility practice, this work aims to empower more designers to integrate inclusive design principles from the beginning of their process. The project contributes to ongoing conversations about practical accessibility education and the importance of tools that meet designers where they are.

**98: The Effects of Latent Print Development Techniques on Over the Counter Drug Detection by Liquid Chromatography Triple Quadrupole Mass Spectrometry**

Jessica Pichat | Forensic Science and Law | School of Science and Engineering
Faculty Advisor(s): Stephanie J. Wetzel, Ph.D., Lyndsie Ferrara, Ph.D.

**Abstract:**
Fingerprints can be left on any surface when handled with bare hands and can be key evidence to tie a suspect to the location of a crime or a piece of evidence. Latent prints are the most common type of fingerprints1 found at crime scenes. They occur when fingerprints are not visible to the naked eye and are often the result of sweat and oils from the finger left on the surface.2 Latent prints need to be developed to visualize the specific ridge patterns, which allow examiners to make identifications when compared to reference fingerprints. These development techniques are effective in visualization but consequentially could destroy other types of evidence from being obtained, such as chemical substances. While most crime laboratories have systems in place regarding evidence processing in different units, this research examined the effects of fingerprinting development techniques on the detection of over the counter (OTC) drugs by liquid chromatography triple-quadrupole mass spectrometry (LC-QQQ-MS). Prior research has confirmed the ability to detect drugs from undeveloped fingerprints using various instruments.3, 4 However, minimal research has been performed to analyze the effect of fingerprinting techniques on the detection of drugs from fingerprints5 and no prior studies utilized LC-QQQ-MS for analysis. Common development techniques utilized by crime laboratories such as black fingerprinting powder, magnetic fingerprinting powder, ninhydrin, 1,8-Diazafluoren-9-one (DFO), and cyanoacrylate fuming were tested on OTC drug contaminated latent prints that were deposited on either glass or paper. Samples were extracted and analyzed for the presence of the OTC drugs (caffeine, acetaminophen, and acetylsalicylic acid) by LC-QQQ-MS. Most development techniques had little to no effect in the detection of the drug present, however, it was noted that the porous samples developed by ninhydrin and DFO had less drug recovery than the nonporous samples. These results can inform laboratories of new possibilities of evidence processing orders when both drugs and possible latent prints are present. In conclusion, this research indicates that drug chemistry can be used to detect drugs from fingerprints that have undergone development techniques.

**99: Traumatic Failure of Primary Latarjet Revised With Distal Tibial Allograft Reconstruction**

Ryan Marra | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Jacob Turnbull, DO

**Abstract:**

**Introduction**: Recurrent anterior shoulder instability in young, high-demand patients is frequently associated with anterior glenoid bone loss, which may increase failure rates of isolated soft-tissue stabilization procedures (1–3). The Latarjet procedure is a well-established treatment for substantial anterior glenoid defects, demonstrating lower recurrence rates compared with soft-tissue repair in appropriately selected patients (4–6). Although outcomes following primary Latarjet are generally favorable, traumatic postoperative complications such as coracoid graft fracture and hardware failure are rare and present complex revision challenges (7,8). There is limited consensus regarding optimal revision strategies following traumatic failure of coracoid transfer procedures (9). This report describes a traumatic failure of a primary Latarjet procedure and evaluates distal tibial allograft (DTA) reconstruction as a revision option.

**Methods:** An adolescent male with recurrent anterior instability and significant anterior glenoid bone loss underwent primary Latarjet stabilization after imaging demonstrated a chronic bony Bankart lesion. Three months postoperatively, the patient sustained a high-energy traumatic injury. Imaging revealed coracoid graft fracture with hardware loosening. Revision surgery included hardware removal and anterior glenoid reconstruction using a DTA, an anatomic graft matching native glenoid curvature and cartilage properties. Rehabilitation followed a structured protocol, and outcomes were assessed clinically and radiographically.

**Results:** Postoperatively, the patient demonstrated progressive improvement without recurrent instability. Imaging confirmed appropriate graft positioning and incorporation without complications. At final follow-up, the patient had near-full range of motion, restored strength, and returned to unrestricted activity.

**Discussion**: DTA reconstruction represents an effective revision strategy after traumatic Latarjet failure in young, high-demand patients (9–13). This technique offers the added advantages of restoring native glenoid anatomy while avoiding donor-site morbidity and the technical limitations associated with repeat coracoid transfer procedures.

**100: Suzetrigine, a non-opioid small-molecule analgesic: Mechanism of Action, Clinical, and Translational Science**

Rhea Rajasingham | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Yanfei Qi, Ph.D., MD, MS

**Abstract:**

The discovery and approval of Suzetrigine (VX-548) marks a significant breakthrough in pain management. It is the first non-opioid analgesic approved since the approval of celecoxib in 1998. Suzetrigine selectively blocks voltage-gated sodium channel Nav1.8, and acts exclusively on peripheral nociceptors without crossing the blood-brain barrier, providing analgesia while sparing central nervous system side effects such as dependence, addiction, sedation, and respiratory depression. In vitro experiments have demonstrated that Suzetrigine is a state-dependent inhibitor with nanomolar potency against human Nav1.8, exhibiting >31,000-fold selectively compared to other subtypes of sodium channel and molecular targets. Suzetrigine is rapidly absorbed following oral administration with peak plasma concentrations (Tmax) in approximately 3 hours under fasting conditions and an effective half-life (t 1/2) of 23.6 hours. Suzetrigine is primarily eliminated via hepatic metabolism. Recent phase II and III clinical trials have validated Suzetrigine's efficacy in acute postoperative pain settings,

demonstrating statistically significant reductions in pain intensity over 48 hours following abdominoplasty and bunionectomy. Additionally, Suzetrigine has shown favorable safety and tolerability in broader acute pain indications and is under continued investigation for chronic neuropathic conditions such as diabetic peripheral neuropathy. Pharmacokinetic and pharmacodynamic data support Suzetrigine's rapid oral absorption, state-dependent Nav1.8 inhibition, and limited off-target activity as confirmed by nonclinical safety studies. Suzetrigine received approval for use in January of 2025 in the United States only. Ongoing trials are exploring novel formulations, long-term safety, and integration into multimodal regimens for surgical and non-surgical pain.

**101: Rotavirus Induced Alterations in Cellular Metabolism of MA104 Cells: Insights from Agilent Seahorse on ATP Production and Glutamine Catabolism**

James Hasselbeck | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Brandon Romell | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Crystal Boudreaux, Ph.D., Delbert Abi-Abdallah, Ph.D.

**Abstract:**
Rotavirus remains one of the leading causes of diarrheal disease in infants and young children worldwide, contributing significantly to morbidity and mortality particularly in low and middle income countries. While vaccination has reduced disease burden in developed nations, gaps remain in our understanding of how rotavirus manipulates host cell metabolism during infection. Viruses rely on host cellular machinery to synthesize proteins and genetic material, often redirecting metabolic resources to support replication. Understanding how rotavirus rewires host metabolism at distinct stages of its replication cycle may reveal novel therapeutic targets to reduce disease severity.

This study investigated the effects of rotavirus infection on cellular metabolism, with emphasis on ATP production and glutamine utilization, using the Agilent Seahorse XF HS Mini Extracellular Flux Analyzer. MA104 cells (simian kidney cell line) were infected with the SA11-4F rotavirus strain at a multiplicity of infection of five. Real time ATP production rate and glutamine oxidation assays were performed in triplicate following manufacturer protocols. Cytoplasmic and mitochondrial ATP contributions were calculated from oxygen consumption rate and extracellular acidification rate measurements collected at 0, 10, 20, 30, 40, and 50 minute intervals.

At three hours post infection, infected cells demonstrated a marked increase in glycolytic ATP production (104.77 pmol/min) compared to non-infected controls (32.01 pmol/min), with total ATP production also elevated. Mitochondrial ATP production did not increase substantially at this timepoint. By five hours post infection, both glycolytic and mitochondrial ATP production declined in infected cells (65.9 pmol/min) relative to non-infected cells (109.5 pmol/min).

These findings suggest that rotavirus shifts host cell metabolism toward glycolysis during early infection to support cytoplasmic replication, potentially transitioning toward glutamine catabolism in later stages for viral assembly and release. This metabolic rewiring may represent a targetable vulnerability, offering potential avenues for adjunct antiviral interventions in vulnerable pediatric populations.

**102: Lost in Translation: A Systematic Review Evaluating Clinical Readiness of AI-Based Speech Recognition Technologies for Dysarthria**

Damar Blanchet | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Abigail Thomson | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
John Altpeter | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Dina Silvestri | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Phillip Bryant, DO

**Abstract:**
Dysarthria, a motor speech disorder associated with conditions such as amyotrophic lateral sclerosis (ALS), Parkinson disease, stroke, and other neurologic disorders, significantly impairs communication and reduces quality of life. Recent advances in artificial intelligence (AI)–based automatic speech recognition (ASR) systems offer promising a solution; however, their performance in dysarthric populations remains inconsistent. This systematic review evaluated the accuracy, adaptability, and clinical applicability of contemporary AI-driven speech-to-text technologies in individuals with dysarthric speech and identified methodological gaps limiting translation into practice. Across included studies, ASR systems consistently demonstrated reduced performance in dysarthric speech compared to typical speech, with word error rate (WER) strongly correlating with dysarthria severity. We found that approaches incorporating speaker-specific fine-tuning, transfer learning, and domain adaptation yielded meaningful improvements over baseline models, with transformer-based and self-supervised architectures showing greater robustness to acoustic variability than traditional systems. Nevertheless, substantial heterogeneity was observed in dataset size, speech task selection, reporting standards, and validation methods. Additionally, few studies examined longitudinal adaptation, real-world usability, or integration into clinical environments. Although AI-based speech-to-text systems show increasing promise, small sample sizes, limited external validation, and methodological inconsistency constrain generalisability. Standardized benchmarks, larger multi-centre datasets, and user-centred outcome measures are essential to advance equitable, clinically meaningful assistive communication technologies for individuals with dysarthria.

**103: The impact of asymmetrical weight-bearing on pelvic remodeling**

Grace Scanlon | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Hannnah Shanley | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Damar Blanchet | Oseopathic Medicine | Nasuti College of Osteopathic Medicine
Brayden Bowerman | Osteopathic Medicine| Nasuti College of Osteopathic Medicine
Joseph Bhangdia | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Alicia Morgan, Ph.D.

**Abstract:**
**Introduction:** Asymmetrical weight-bearing and muscle use can influence skeletal remodeling, as well as produce compensatory changes in joint alignment and soft tissue mechanics, but the extent to which torso asymmetries (i.e., via scoliosis) contribute to the development of pelvic asymmetry is unclear. Because the pelvis includes regions strongly shaped by load-bearing as well as genetics, the long-term effects of scoliosis warrant investigation. This study evaluates pelvic asymmetry in individuals with and without scoliosis using 3D geometric morphometrics.
**Methods**: Decedent CT scans (N=29; n=12 scoliosis,17 control) from the New Mexico Decedent Image Database were segmented to create 3D pelvic and spine models. This mixed sex sample had a mean age of 50 ± 23 years.

Cobb angles were calculated from reconstructed 2D spinal composites. Single and semilandmarks (104/side) were applied to each pelvic side in separate sessions. Shape differences and asymmetries between groups were quantified using Procrustes alignment and principal component analysis (PCA) in MorphoJ and mean right–left coordinate differences were evaluated using appropriate parametric or nonparametric tests.
**Results:** Individuals with scoliosis exhibited significantly greater pelvic asymmetry than controls ($p < 0.05$). Preliminary PCA showed that asymmetry was most pronounced in the iliac crest, greater sciatic notch, acetabular margin, and arcuate line, with PC2 reflecting variation in obturator foramen breadth. Current sample size limited interpretation of differences across curvature types.
**Discussion and Significance**: Findings indicate that scoliosis-associated loading contributes to measurable pelvic remodeling. Factors such as the degree and type of curvature as this study continues to increase the sample will further clarify factors influencing specific regions of pelvic morphology. These findings may guide clinicians on gait normalization and treatment strategies aimed at reducing Cobb angle, limiting asymmetrical loading, and preventing long-term functional impairment. Recognizing how altered mechanics propagate through the axial–appendicular chain may enhance diagnostic reasoning and inform patient-specific interventions.

**104: Communicating Environmental Risk: Lessons from Flint, Love Canal, and PFAS Contamination**
Marie Navarro Sullivan | Environmental Science & Management | School of Science and Engineering
Faculty Advisor(s): Phillip Reeder, Ph.D.

**Abstract:**
Environmental risk communication plays a critical role in shaping public understanding, trust, and response during environmental health crises. A project utilizing a comparative case study of three major U.S. contamination events - Love Canal (1970s), the Flint Water Crisis (2014-2019), and contemporary PFAS contamination - was completed to examine how environmental risks have been communicated to the public over time and how these approaches shape public perception and outcomes. The analysis uses established research on risk perception to examine transparency, communication of uncertainty, media coverage, and the roles of key institutions and stakeholders in each case. Through a qualitative review of scholarly literature, government reports, and media sources, patterns of effective and ineffective risk communication were identified. Cases marked by delayed, unclear, or dismissive messaging were associated with public mistrust and harm, while clearer and more responsive communication supported better public understanding and engagement. By comparing these events across different time periods, this research shows how environmental risk communication has changed through time and highlights lessons that remain relevant for current and future environmental health challenges. Overall, the findings emphasize the importance of clear, timely, and honest communication in improving public responses to environmental contamination.

**105: Additive Effects of MEHP and Nanoplastics on Macrophage Mitochondrial ROS Production**
Jonah Vaglia | Osteopathic Medicine | Nasuti College of Osteopathic Medicine
Faculty Advisor(s): Kassim Traore, Ph.D.

**Abstract:**
Di-(2-ethylhexyl) phthalate (DEHP), a widely used industrial plasticizer, is present in numerous consumer products, including food packaging, detergents, flame retardants, toys, cosmetics, and pesticides. Exposure to mono-(2-ethylhexyl) phthalate (MEHP), the active metabolite of DEHP, has been shown to inhibit steroid production in MA-10 cells and in Leydig cells isolated from Brown Norway rat testes. Nanoplastics, generated

through the degradation of plastic materials, are extremely small particles capable of interacting with biological systems at the cellular and molecular levels. Most importantly, nanoplastics can adsorb endocrine-disrupting chemicals (EDCs), such as phthalates, and interfere with steroidogenic processes. In previous studies, we demonstrated that MEHP exposure alters macrophage secretion of both pro-inflammatory and anti-inflammatory cytokines in a dose-dependent manner, and that these changes can disrupt steroidogenesis. Macrophages are now recognized as key regulators of Leydig cell function. In the present study, we investigated whether MEHP and nanoplastic exposures exert additive effects on macrophage function. Using an in vitro approach, RAW 264.7 murine macrophages were treated with MEHP (0–300 μM), polystyrene nanoplastics (0–300 μM), or matched combined exposures at equivalent concentrations. Mitochondrial superoxide production was quantified using MitoSOX™ Red and flow cytometry. Hydrogen peroxide ($H_2O_2$) generation was assessed using 2′,7′-dichlorodihydrofluorescein diacetate (DCFH-DA) staining followed by flow cytometric analysis. We found that MEHP exposure produced a robust, concentration-dependent increase in both MitoSOX- and DCF-derived fluorescence, indicating marked induction of mitochondrial superoxide, hydrogen peroxide production, and oxidative stress relative to controls. In contrast, nanoplastic exposure alone elicited only a modest response. However, combined MEHP and nanoplastic exposure resulted in a dose-dependent increase in mitochondrial superoxide that exceeded either treatment alone, consistent with an additive effect.

Together, this study suggests that alterations in mitochondrial function and enhanced reactive oxygen species (ROS) generation are closely associated with macrophage metabolic reprogramming, polarization, and amplification of inflammatory responses. Together, these findings suggest that plastic-derived materials, including phthalates and nanoplastics, exert additive effects on macrophage polarization, with mitochondrial dysfunction likely playing a central role in their mechanism of action.

# LIST OF PARTICIPANTS BY SCHOOL

*Denotes Live Oral Presenter
Name | Abstract #

**A.J. Palumbo School of Business Administration**

Abby Alexander | 17

*Kaceme Djellouli | 4

Maximilian Hradecny | 50

George DeNardo| 61

**McAnulty College and Graduate School of Liberal Arts**

Aigerim Aliakparova | 10

Alex Barnett | 96

Piers Berry | 70

K. Darius Branche |7

Carter Check | Virtual

Zoe Cutillo | 3

*Giang Dinh | Oral and Virtual

Thomas Durand | Virtual

Thomas Elias | 24

Reiley Freed | 28

*Eliza Grimm | 46 and Oral Only for 2nd project

Kaelin Hughes | 6

*Zachary Hunter | Oral and Virtual

Lauren Kenst | 9

*Kyle Louder | 20

*Katie McCabe | Oral and Virtual

Tessa Markham | 75

James Miller | 29

*Leonard Zifac | Oral and Virtual

Jonah Zolnak | 39

**Mary Pappert School of Music**

Gabriella Battistelli | 22

Gabrielle Frens | Virtual

*Corey Jenkins | 34

Chingwei Lin | Virtual

**Nasuti College of Osteopathic Medicine**

Damar Blanchet | 102

Yenna Choi | Virtual

Emily Daum | 83

Laura Gayanova | 93

James Hasselbeck | 101

Allison Lunney | 84

Ryan Marra | 99

Olivia Mule | 90

*Anannya Pushkarna | 8

Rhea Rajasingham | 100

Grace Scanlon | 103

Jonah Vaglia | 104

**Rangos School of Health Sciences**

Jasmine Urzua-Alba | Virtual

Jordan Baney | Virtual

Kierten Belt | Virtual

Claire Belton | Virtual

Benjamin Berkebile | Virtual

Noelle Compher | 47

Isabelle Cuchapin | Virtual

Michael D'Aulerio | Virtual

Lakyn Davis | Virtual

Emerson Dickson | Virtual

Grace Dietrich | 16

Haley Doyle | Virtual

Amanda Eadie| 54

Camryn Eby | Virtual

Chloe Eubank |Virtual

Angela Fichter | 59

Evelyn Foster | Virtual

Caitlin Harvey | Virtual

Mikayla Hendershot | Virtual

Grace Kata | Virtual

Katherine Kriznik | Virtual

Elizabeth Lund | Virtual

Keira McTighe | Virtual

Madi Morgan | Virtual

Casey Padgett | 15

Emily Peterson | Virtual

Morgan Posey | Virtual

*Jenna Relkin | 2

Macey Roble | Virtual

Paige Salmon | Virtual

Paige Semanko | Virtual

Hannah Slaughenhoupt | Virtual

Maya Smith | Virtual

Megan Stevens | Virtual

Matthew Swift | Virtual

Cole Vernet | Virtual

Halle Walcutt | 41

Elizabeth Whelan | Virtual

John White | Virtual

**School of Education**

Joseph Beck | 64

Patrice Bryan | Virtual

Miloha Angie Fontaine | 92

Gabriella Gilbert | 19

Kristen Hinshaw | 44

Sage Logan | 40

Travyon Lovely | 76

Osato Charles-Omoregbee | 64

Keira Reilly | 43

Alexandra Zawodny | Virtual (2 projects)

**School of Nursing**

Monica Naumann | Virtual

Alexandra Potts | Virtual

*Jeffrey Whitaker | 25

**School of Pharmacy**

Jhanvi Jhaveri | 60

*Yong Myoung | 1

Pooja Salgar | 33

*Melanie Salinas | Oral and Virtual

*Kaitlyn Shaw | 18

**School of Science and Engineering**

*Jonah Babusci |Oral and Virtual

Berk Bahceci | 31

Eric Chartier | 63

Janae Chase | 91

Elizabeth Colecchia | 45

Loreniz Colom | 35

Morgan Czyzyk | 23

Jessica Dudich | 37

Luke Forrester | 38

Nick Frankos | 51

Gabriella Garza | 55

* Elias Griffin | 12

Bhargav Kaparthi | 21

* Michael Kardos | Oral and Virtual

Manju Kasaju | 57

Aiden Lane | 30

* Morgan McCann | 27

Kendall Michaels | 32

Malavika Satheesan Nair | 36

Rosalia Palumbo | 53

Jessica Pichat | 98

Unnikrishnan Puthumana | 72

Nicholas Rivord | 98

* Joshua Robinson | 48

Hannah Schaeffer | 14

Katherine Scheller | 62

Maksim Shcherbatyuk | 58