

# College of Science and Mathematics Festival of Research Fall 2025

Abstracts ordered alphabetically by last name

Talk #1      **Divyanshu Aggarwal**      [aggarwal.16@wright.edu](mailto:aggarwal.16@wright.edu)

Research Advisor: Ravi Sahu, PhD

## **Platelet-activating factor-receptor pathway mediates solar radiation-induced extracellular vesicle release in human keratinocytes**

Co-authors: Anita Thyagarajan, Ravi P Sahu

While ultraviolet B (UVB) radiation causes oxidative stress and stimulates the release of extracellular vesicles (EVs), the mechanisms of solar-simulated light (SSL), which represents the physiological source of solar radiation on the kinetics of cellular response and EVs remain unclear. The current studies investigated the role of platelet-activating factor receptor (PAFR) in SSL-induced EV release in HaCaT keratinocytes. The findings demonstrate that SSL inhibits cell viability and augments microvesicles and exosome release in a dose-dependent manner, which were blocked by PAFR and microvesicle inhibition, indicating PAFR could be explored as a potential target for mitigating SSL-induced phototoxic skin responses.

Talk #2      **Chaitanya Anumula**      [anumula.12@wright.edu](mailto:anumula.12@wright.edu)

Research Advisor: William Romine, PhD

## **Understanding Physiological Responses for Intelligent Posture and Autonomic Response Detection Using Wearable Technology**

This study investigates how Iyengar yoga postures influence autonomic nervous system (ANS) activity by analyzing multimodal physiological signals collected via wearable sensors. The goal was to explore whether subtle postural variations elicit measurable autonomic responses and to identify which sensor features most effectively capture these changes. Participants performed a sequence of yoga poses while wearing synchronized sensors measuring electrodermal activity (EDA), heart rate variability, skin temperature, and motion. Interpretable machine learning models, including linear classifiers, were trained to distinguish physiological states and rank feature relevance. The results revealed that even minor postural adjustments led to significant shifts in ANS markers, with phasic EDA and RR interval features showing heightened sensitivity. Surprisingly, micro-movements captured via accelerometry and transient electrodermal reactivity, specifically EDA peak-to-RMS ratios, emerged as dominant contributors to classification performance. These findings suggest that small-scale kinematic and autonomic shifts, which are often overlooked, play a central role in the physiological effects of yoga. The study demonstrates that wearable sensor analytics can decode a more nuanced and granular physiological profile of mind-body practices than traditionally appreciated, offering a foundation for precision-tailored biofeedback systems and advancing objective approaches to yoga-based interventions.

Poster #29      **Tejasvini Bajad**      [bajad.2@wright.edu](mailto:bajad.2@wright.edu)

Research Advisor: Courtney Sulentic, PhD

**AhR Regulation of Human Antibody Production**

Co-authors: Tejasvini Anil Bajad, Uma Maheswary Nedumaran, Shakti Pallikaranai Venkatesa Prasath, Clayton Alex-Buckner, Nasser Alhamdan, Bassam Kashgari, Courtney Sulentic

The aryl hydrocarbon receptor (AhR) is a protein that responds to environmental chemicals and can affect the immune system, including the ability of B cells to make immunoglobulins (Ig) or antibodies. In mouse studies, AhR activation reduced antibody production by inhibiting a transcriptional regulatory region within the Ig heavy chain (IgH) gene (*i.e.* 3'IgHRR). The 3'IgHRR controls IgH gene expression and the ability to switch from making IgM to other antibody isotypes (*i.e.* IgG, IgA, IgE). However, the role of the AhR protein in human B cells remain unclear, because of genetic differences between the human and mouse IgH gene. We generated cells with a transient AhR knockdown and results suggested that reduced AhR expression may differentially impair antibody production. The objective of the current study is to fully and stably knockout AhR expression in the CL-01 human B cell line using CRISPER-Cas9 gene editing. These cells can be induced to express and secrete antibody and switch to making different antibody isotypes. These studies will determine the role of the AhR in antibody production.

Poster #30      **Soumya Bajpai**      [bajpai.9@wright.edu](mailto:bajpai.9@wright.edu)

Research Advisor: Ashot Kozak, PhD

**Specific and non-toxic novel calcium channel blockers: a potential personalized therapeutic for patients with tubular aggregate myopathy.**

Co-authors: Dr. Ashot Kozak, Aleena Elizebeth

Calcium release activated calcium (CRAC) channels are calcium-selective ion channels highly expressed in non-excitable cells, such as immune cells. The plasma membrane CRAC channel consists of a hexamer of Orai1 proteins. The endoplasmic reticulum (ER) calcium sensor STIM1 conveys the filling state of ER calcium stores. Orai1 channels are normally closed and open when ER stores are depleted. Loss-of-function mutations in Orai and STIM result in severe combined immunodeficiency. By contrast, gain-of-function mutations result in Stormorken syndrome and tubular aggregate myopathy (TAM). Here we have examined the properties of novel compounds that block Orai1 channels reversibly. Using ratiometric single-cell calcium imaging, we found that store-operated calcium entry was significantly reduced by these compounds. Proliferation of Jurkat T lymphocytes was also reduced. Additionally, we tested the Orai channel blockers for their ability to affect other ion channels expressed in immune cells such as TRPM7 and TRPM4.

Talk #3      **Chloe Bell**      [bell.284@wright.edu](mailto:bell.284@wright.edu)

Research Advisor: Nathan Baker, PhD

**Burning Up and Burned Out: Examining Burnout in Human Services Employees**

Co-authors: Debra Steele-Johnson, David LaHuis, Nathan Baker

This study examined stress and burnout in human services employees (N = 303). Gender, parental status, and perceived organizational support (POS) were tested as moderators of the stress-burnout relationship. POS significantly moderated the relationship ( $b = -.11, p < .05$ ), whereas gender and parental status did not. This emphasizes the importance of organizational support as a buffering factor and highlights the nuanced role of personal and contextual factors in the stress-burnout experience among human services employees.

Poster #28      **Kamalika Biswas**      [biswas.18@wright.edu](mailto:biswas.18@wright.edu)

Research Advisor: Quan Zhong, PhD

**Mitochondrial Proteins modulate  $\alpha$ -Synuclein toxicity**

Co-authors: Shuzhen Chen, Ishita Haider, Yali Chi, Elliott Hayden, Shulin Ju, Quan Zhong

Parkinson's Disease (PD) is the second most common age-related neurodegenerative disease, characterized by the loss of dopaminergic neurons and the aggregation of  $\alpha$ -synuclein. While ~10% of PD cases are familial, most cases are sporadic with largely unknown causes. Both familial and sporadic PD have been associated with mitochondrial dysfunction. Using yeast as a model, this study investigates 16 mitochondrial-associated proteins identified as enhancers of  $\alpha$ -synuclein toxicity. Through growth assay and fluorescence microscopy, I aim to determine how these proteins affect mitochondrial function and  $\alpha$ -synuclein accumulation. Understanding these mechanisms may reveal conserved pathways underlying sporadic PD and provide new therapeutic targets.

*CoSM Research Scholars*

Poster #18      **Dillynn Blevins**      [blevins.79@wright.edu](mailto:blevins.79@wright.edu)

Research Advisor: John Stireman, PhD

**Resistance is Futile: The Ecological Assimilation of the Invasive Shrub *Elaeagnus umbellata***

Co-author: John Stireman III

Invasive plant species are a major ecological threat to natural ecosystems. These invasives often displace native species and may not contribute to ecosystem services. In Southwest Ohio, *Elaeagnus umbellata* (Autumn olive) is an invasive shrub infesting open areas and forest edges. To assess its contribution to local ecosystems, we surveyed caterpillar species diversity, and herbivory relative to native species. Our results indicate that Autumn olive hosts a relatively high diversity of caterpillars, and experiences levels of herbivory, on par with that of native plant species. This suggests that this shrub is being assimilated into the native food web.

*Considine Scholars*

Poster #58      **Syaron Ghising**      [ghising.3@wright.edu](mailto:ghising.3@wright.edu)

Research advisor: Courtney Sulentic, PhD

**Evaluating the effects of perfluorooctanoic acid (PFOA) on antibody production and gene expression in a human B-cell line**

Co-authors: Sailaja Rachakonda, Courtney Sulentic

Perfluorooctanoic Acid (PFOA) is a human-made contaminant resistant to degradation, and bioaccumulative in body, causing potential health risks. Although widespread, the effects of PFOA on human antibody production and related gene expression are still uncertain. Utilizing a human B-cell line (CL-01) that can express different antibody isotypes (IgM, IgG, IgA), we will evaluate the concentration-dependent effects of PFOA on antibody secretion and immunoglobulin (Ig) gene transcription. We hypothesize that PFOA exposure will inhibit antibody production through inhibition of Ig gene transcription and will explore molecular mechanisms and genetic variations influencing Ig gene expression.

Poster #1      **Devkala Budhathoki**      [budhathoki.27@wright.edu](mailto:budhathoki.27@wright.edu)

Research Advisor: Eric Fossum, PhD

**Molecular level control of thermal transitions in Polyarylene ether: Backbone geometry vs. Side chain identity**

Co-author: Fossum, Eric A.

Thermoplastics are versatile polymeric materials whose properties can be precisely tuned through molecular design. Poly(arylene ether)s, PAE, a class of engineering thermoplastics, can exhibit multiple thermal transitions including: a glass transition, crystallization and melting. Thermal transitions are strongly influenced by the chemical structure of the backbone, but can also be affected by the presence of any side chains. The current project seeks to understand the effects of subtle geometrical changes in backbone structure, that are coupled with the ability of long alkyl chain side groups to form crystalline regions, on the overall thermal properties in PAE systems.

Poster #31      **Mittal Chauhan**      [chauhan.42@wright.edu](mailto:chauhan.42@wright.edu)

Research Advisor: Ravi Sahu, PhD

**Repurposing arsenic compounds to enhance targeted therapy response in non-small cell lung cancer**

The goal of this study is to evaluate the therapeutic potential of repurposed arsenic compounds in overcoming drug resistance in non-small cell lung cancer (NSCLC). NSCLC remains the most prevalent and treatment-resistant form of lung cancer. This research investigates the effects of arsenic trioxide and sodium arsenite in enhancing the efficacy of EGFR-targeted therapies such as gefitinib and erlotinib.

Using PAFR-expressing A549 and H1299 cell lines, we examined cell survival, migration, and microvesicle particle release. The findings demonstrate that arsenic compounds significantly inhibit cell growth and migration in a time- and dose-dependent manner, suggesting a promising strategy against NSCLC resistance.

*ASK (Applying Scientific Knowledge)*

Talk #4                    **Maitreyee Chavan**                    [chavan.14@wright.edu](mailto:chavan.14@wright.edu)

Research Advisor: Courtney Sulentic, PhD

### **Role of hs1.2 Enhancer Allelic Variation in TCDD-Induced Changes to Human Antibody Secretion**

Co-authors: Maitreyee Chavan, Mili Bhakta-Yadav, Courtney Sulentic

2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), a potent aryl hydrocarbon receptor (AhR) ligand, is a known immunotoxicant that disrupts antibody production in B cells. Previous studies showed TCDD inhibits IgG and IgA secretion but has minimal effect on IgM. This project investigates whether genetic variation in the hs1.2 enhancer within the 3' IgH regulatory region influences B-cell sensitivity to TCDD. Using CRISPR/Cas9-edited human B-cell lines carrying different hs1.2 alleles, antibody secretion (IgM, IgG, IgA) will be quantified by ELISA and RT-qPCR. Results will reveal whether hs1.2 variants alter TCDD responsiveness, offering insight into genetic susceptibility to immunotoxic environmental exposures.

Poster# 32                    **Amanda Chisholm**                    [chisholm.8@wright.edu](mailto:chisholm.8@wright.edu)

Research Advisor: Keiichiro Susuki, MD, PhD

### **Elucidating the Mechanism of Axon Initial Segment Shortening in Type 2 Diabetes**

Co-authors: Jennae Shelby, Ricky Hsu, Islam Akhmedov, Nathan Sheriff, Keiichiro Susuki

Type 2 diabetes-associated cognitive impairment remains untreatable. We previously showed reduced axon initial segment (AIS) length in diabetic mice and in cultured neurons exposed to diabetes-related factor methylglyoxal. Since AIS shortening decreases neuronal excitability, it may contribute to cognitive deficits in diabetes. Endoplasmic reticulum (ER) stress has been implicated in neurodegeneration, and can be triggered by transient receptor potential ankyrin 1 (TRPA1) activation. Here, we show that pharmacological TRPA1 activation and ER stress induction both shorten AIS in cultured neurons. Furthermore, ER stress inhibition prevented methylglyoxal-induced AIS shortening. These results highlight these pathways as potential mediators of diabetes-related neuronal dysfunction.

Poster #14                    **Ryanne Cimat**                    [cimatu.2@wright.edu](mailto:cimatu.2@wright.edu)

Research Advisor: Katie Hossler, PhD

### **Microplastics in Municipal Wastewater: Quantification and Fate in East Montgomery and Fairborn Treatment Facilities**

Co-authors: Katie Hossler, Lucas Clark

Microplastics (MPs) are emerging contaminants in wastewater, yet their quantification and fate within treatment plants remain poorly constrained in Ohio. This study develops a practical framework to isolate and characterize MPs larger than 250  $\mu\text{m}$  from influent, aeration basins, and digested sludge at the East Montgomery and Fairborn wastewater treatment plants. MPs will be enumerated and classified by morphology and size. Aeration basin samples will be examined for microbial community structure to evaluate potential links between MPs and wastewater biota. This research will advance stage-specific monitoring of MPs in wastewater treatment and contribute to understanding their partitioning and removal efficiency.

Poster #15      **Molly Comer**      [comer.51@wright.edu](mailto:comer.51@wright.edu)

Research Advisor: Stacey Hundley, PhD

**Cultivating Connection: Analyzing the Positive Relationships Edible Gardens Have with Local Communities and Ecosystems**

Co-author: Stacey Hundley

A community-based garden is important in facilitating society's relationship with the environment. Edible gardens create a bond through delicious food and healthy ecosystems. Small gardens across an industrialized landscape provide populations of pollinators opportunities to survive through food and shelter access. This study examined pollinator activity at the Maimon Memorial Garden (MMG) at Cox Arboretum and explored the impact of donating produce. Throughout the season, plant growth in the MMG positively impacted pollinator populations. The advantages of an edible garden are discussed, as well as suggesting the best crops to be grown for the benefit of households, communities, and ecosystems.

Poster #33      **Pauline Dalton**      [dalton.87@wright.edu](mailto:dalton.87@wright.edu)

Research Advisor: Michael P. Craig, PhD

**Quest for Reversible Modification of Keratin Building Blocks**

Co-authors: Victor A. Roman, Jonathan Roth, Sanaz Farajollahi

Keratin, a strong protein from wool and hair, is hard to process due to its tough structure. A new water-based method using thiol-based Michael-type addition can turn it into flexible bioplastics, improving its processability. To create sustainable materials and enable reprocessing, scientists are exploring how to make this reaction reversible. Additionally, they are investigating phosphorylation, which adds negative charges to the keratin's surface. This makes the protein more water-compatible and easier to disperse, which is an exciting finding as it works without needing to break the protein's internal bonds.

Talk #5      **Josh Delos Reyes**      [delosreyes.3@wright.edu](mailto:delosreyes.3@wright.edu)

Research Advisor: Yuqing Chen, PhD

### **Partial Difference Sets in Abelian Groups**

We will introduce the strongly regular graph and their automorphism groups, and their regular subgroups. We will discuss partial difference sets that is a subset of regular automorphism groups, or Cayley graph of a partial difference set is a strongly regular graph. At the end, we will present a couple of examples of cyclotomic partial difference sets in elementary abelian 3-groups of order 729, which is obtained from 2-weight quasicyclic codes.

*Considine Scholars*

Poster #34      **Prakriti Dhungel**      [dhungel.4@wright.edu](mailto:dhungel.4@wright.edu)

Research Advisor: Courtney Sulentic, PhD

### **Role of AhR Transactivation Domain in Regulating B-cell Antibody Production**

Co-authors: Karen Prarthana Kirloskar, Milli Bhakta Yadav, Eimaan Virani, Courtney E.W. Sulentic.

B cells secrete antibodies that play a critical role in immune defense, and antibody production is regulated by both genetic and signaling factors. The aryl hydrocarbon receptor (AhR) is a transcription factor that senses external and cellular signals and modulates immune responses through its transactivation domain (TAD). To investigate the role of AhR TAD in antibody production, we compared a human B-cell line, CL-01 WT (heterozygous for TAD AhR function), with a CRISPR/Cas9- edited 10F10 clone expressing only functional AhR TAD+ alleles. Cells were stimulated with T cell-mimicking signals (CD40L and IL-21), and antibody secretion was measured across Ig isotypes. Preliminary results indicate that CL-01 WT cells exhibit higher antibody production in response to CD40L +IL-21 stimulation compared to 10F10 cells, suggesting that AhR TAD status modulates B-cell responsiveness to T-cell-derived signals. These findings provide new insight into how AhR-mediated signaling influences antibody production in human B cells.

Poster #59      **Carson Dolvin**      [dolvin.4@wright.edu](mailto:dolvin.4@wright.edu)

Research Advisor: Ion Juvina, PhD

### **Pro-Environmental Educational Outcomes in an Ecologically Inspired Game-Based Learning Environment**

Co-authors: Preston Menke, Jarean Carson, Josh Wong, Afra Moharrami, Carson Dolvin

Game-based learning spans diverse domains guided by differing theories, often producing designs that fail to meet learning conditions. This study proposes that such mixed design characteristics contribute to unclear learning outcomes. It examines an ecologically inspired interface that embeds educational content within a realistic, system-based driving simulation. Participants will complete driving tasks designed to reduce emissions through adaptive, system-oriented behaviors. A between-subjects experiment will compare an ecological interface to a conventional symbolic interface, measuring

learning, performance, and transfer. Results are expected to clarify how environmentally grounded feedback enhances meaningful learning in digital game-based environments.

Poster #35      **Malohat Egamberdieva**      [egamberdieva.2@wright.edu](mailto:egamberdieva.2@wright.edu)

Research advisor: Quan Zhong, PhD

### **Effect of Cytoskeleton-Binding Proteins on Alpha-Synuclein Toxicity in Yeast**

Co-authors: Shuzhen Chen, Yali Chi, Ishita Haider, Elliott Hayden, Shulin Ju, Quan Zhong.

Parkinson's disease is a progressive neurodegenerative disorder that affects movement and quality of life for millions of people worldwide. A key characteristic of the disease is the accumulation of the toxic protein alpha-synuclein within neurons. My research focuses on understanding how cytoskeleton-binding proteins, which maintain cellular structure and transport, influence alpha-synuclein toxicity. Using yeast as a model organism, I aim to investigate whether changes in these proteins can increase cellular stress and reduce cell viability. Understanding these outcomes may help reveal how cytoskeleton-binding proteins contribute to cellular damage related to Parkinson's disease.

Talk #6      **Widad El-zein**      [el-zein.2@wright.edu](mailto:el-zein.2@wright.edu)

Research advisor: Shulin Ju, PhD

### **Yeast Modeling Reveals Cell Size Increase by ALS-Associated MATR3**

Co-authors: Rahul Shah, Fawaz Ghouse, Elliott Hayden, Shuzhen Chen, Quan Zhong, Shulin Ju

Matrin-3 (MATR3) is a nuclear RNA-Binding protein that has been found to cause ALS when it is mutated. The exact mechanism behind its pathology remains unknown. *Saccharomyces cerevisiae* has been used to model neurodegenerative diseases including ALS. When MATR3 is introduced to yeast, the protein mislocalizes and aggregates in the cytoplasm and leads to cell death, recapitulating what is seen in motor neurons of ALS patients. In addition to these features, we also see an increase in the size of the yeast cells. This study explores a potential relationship between the increase in cell size and the pathology of MATR3 in yeast.

Poster # 6      **Tim Fauley**      [fauley.2@wright.edu](mailto:fauley.2@wright.edu)

Research advisor: William Romine, PhD

### **Correlated Color Temperature and Flow States**

Flow has been shown to enhance performance but research on the predictors of flow is limited. A promising environmental factor is lighting, specifically color temperature and spectrum. My research will examine if color temperature and spectrum are conducive to a flow state. I will examine cool and warm light with varying spectral content to determine if participants are able to more easily achieve deeper

states of flow. I hypothesize that cool 6500K light and blue light in the 480 nm spectrum will be more conducive to flow states.

Poster #36      **Sonika Gautam**      [gautam.38@wright.edu](mailto:gautam.38@wright.edu)

Research advisor: Courtney Sulentic, PhD

### **Hormonal and Environmental Signals Alter Antibody Production in Human B cells**

Co-authors: Sonika Gautam, Harleen Kaur Arora, Prakriti Dhungel, Courtney Sulentic

The immunoglobulin heavy chain (IgH) locus is essential for antibody class switching and secretion, with activity influenced by the 3' IgH regulatory region (3'IgHRR). This enhancer cluster integrates immune and environmental cues, though its role in human B cells is not fully understood. To investigate this, we treated a Burkitt's Lymphoma B-cell line (CL-01) and CRISPR/Cas9-edited variants (4E10 & 4D5) carrying different hs1.2 enhancer genotypes that carry modifications in the 3'IgHR with hydrocortisone and the aryl hydrocarbon receptor (AhR) ligands TCDD and Iindirubin. Hydrocortisone was chosen for its established immunomodulatory role, while TCDD and Iindirubin represent environmental and dietary AhR agonists. Antibody secretion was quantified by ELISA. Preliminary results indicate that hydrocortisone increases immunoglobulin secretion in CL-01 cells, and this increase is altered by co-treatment with AhR ligands-TCDD further enhances the effects, whereas Iindirubin partially reverse it. These findings support the hypothesis that hormonal and environmental pathways converge at the 3'IgHRR to influence antibody production in humans.

Poster #22      **Emily Gelske**      [gelske.2@wright.edu](mailto:gelske.2@wright.edu)

Research advisor: Don Cipollini, PhD

### **Prairies in pieces: how habitat fragmentation impacts agricultural success**

Co-authors: Don Cipollini

Pollinators are important not only for biodiversity, but also for human food production. Unfortunately, some agricultural practices can contribute to pollinator and biodiversity declines. I intend to investigate how the sizes of pollinator habitats impact agricultural success and how insecticides may act as a pollinator deterrent. This will be done through the transplantation of cucumber plants next to pollinator gardens of various sizes coupled with insecticide treatments. I will use fruit size, seed production and yield as a proxy for agricultural success. These results will help us understand how practices used to improve biodiversity can impact the agricultural industry.

Talk #7      **Sruthi Bommarreddy**      [bommarreddy.20@wright.edu](mailto:bommarreddy.20@wright.edu)

Research Advisor: Debra Steele-Johnson, PhD

### **Learned Helplessness in a Work Context: Psychometric Evaluation of a Measure**

Co-authors: Debra Steele-Johnson, Ellis Elizebeth, Andrew Tangeman

We examined whether Learned Helplessness (LH) in work settings is multidimensional. Animal welfare workers (N =132) completed a work-adapted 16-item LH scale. CFA showed that the theorized three-factor attributional model had good fit for a 13-item version of the scale. Results indicated global/specific, internal/external, stable/unstable attributional factors but also substantial inter-factor correlations. Our results indicated the need for future measure development and for comparing unidimensional and multidimensional models broader nomological network.

Poster #37      **Hanna Ghouse**      [ghouse.10@wright.edu](mailto:ghouse.10@wright.edu)

Research advisor: Kathrin Engisch, PhD

### **The Quantitative Assessment of Computational Simulations Involving Vulnerabilities in Miniature Excitatory Postsynaptic Current Detection**

Co-author: Kathy Engisch

The miniature excitatory postsynaptic current (mEPSC), the fundamental unit of neuronal communication, is a neuron's response to a spontaneously released vesicle of glutamate. In homeostatic plasticity, mEPSC amplitudes increase following prolonged activity blockade. Two analyses used to determine the effect magnitude, the quantile ratio plot and the rank order plot, conflict on homeostatic plasticity's uniformity. We hypothesize that detection inadequacies distort the effect. To test this hypothesis, we produced a known uniform change by altering membrane potential, and, applied simulated distortions to a calculated uniform effect. The raw-data ratio plot best demonstrates undistorted uniformity, but is limited to same-cell alterations.

Poster #38      **Junu Gole**      [gole.5@wright.edu](mailto:gole.5@wright.edu)

Research advisor: Courtney Sulentic, PhD

### **Gut Mucosal Immunity and Food Allergy**

The gastrointestinal tract has a unique role beyond digestion, as it must distinguish harmless dietary antigens and commensal microorganisms from pathogens. Failure in this recognition process can lead to loss of oral tolerance, causing food allergies with defects in regulatory T cell function, epithelial barrier, antigen-presenting cell reprogramming, and gut microbiome balance. Peripheral regulatory T cells (pTregs) are essential for maintaining tolerance to dietary and microbial antigens, as they prevent allergies by controlling overactive immune reactions (Th-2 driven IgE responses) that produce allergy-related antibodies (IgE). The overall objective of this review is to summarize recent research regarding the mechanisms by which antigen-sampling dendritic cells, peripheral regulatory T cells (Tregs), and microbiota together establish tolerance, and how disruptions in these systems lead to food allergies. The review also highlights the role of the aryl hydrocarbon receptor (AhR) as a common molecular sensor that integrates dietary and microbial signals to regulate immune differentiation, dendritic cell

tolerogenicity, and epithelial function. Lastly, new treatment approaches that try to restore the AhR-microbiota-Treg axis and long-lasting oral tolerance, including barrier-repair techniques, oral immunotherapy, dietary prebiotics and AhR-targeted ligands, and microbiota modulation are discussed.

Poster #56      **Delaney Grant**      [grant.95@wright.edu](mailto:grant.95@wright.edu)

Research advisor: David Ladle, PhD

**Sustained Peripheral Nerve Injury in Military Relevant Operational Environment: Role of Mitochondria**

Combat-sustained peripheral nerve injuries (PNIs) are often the result of high-energy blast mechanisms and lead to impaired sensation and motor function. The cellular responses to PNI and how they contribute to (or limit) recovery in sensory neurons remain unknown; however, mitochondrial dysfunction has been observed in several other peripheral neuropathies. We aim to understand the role mitochondria play in responding to PNI, specifically crush and transection injuries. Our analysis of mitochondria in satellite glial cells and neuronal cells reveals altered mitochondrial counts and morphology following sciatic nerve crush and sciatic nerve transection injuries.

Poster #11      **Madeline Greene**      [greene.166@wright.edu](mailto:green.166@wright.edu)

Research advisor: Megan Rúa, PhD

**When form meets function: Root traits as mediators of ectomycorrhizal exploration type fungal abundance**

Co-authors: Mariah Slaughter, Sarah Addison, Steve A. Wakelin, Megan A. Rúa

The root microbiome is a dynamic hub of fungal activity that supports whole-plant function. Among fungi, mutualists like ectomycorrhizal fungi (EMF) are essential for nutrient acquisition and growth promotion, but how trees shape their ability to colonize and explore the soil for nutrients is unknown. We grew *Pinus radiata* seedlings with a large heterogeneity in root morphology for 1-year in greenhouse conditions and quantified root characteristics, and colonization by EMF exploration type. In support, the abundance of contact- and short-distance exploration types decreased with increasing root diameter and length. These results indicate that root characteristics can dictate EMF exploration.

*WestRock Scholars*

Poster #21      **Mesa Grine**      [grine.3@wright.edu](mailto:grine.3@wright.edu)

Research advisor: Don Cipollini, PhD

***Callicarpa dichotoma*: an ecological evaluation of traits in an emerging invasive plant**

Co-author: Don Cipollini

Most instances of invasive plant species can be directly traced to anthropogenic sources. Invasive plants can alter ecosystems due to their hardiness and ability to exploit resources that are essential for native plants. This study aims to evaluate the invasive tendencies of an Asian shrub species, Asian beautyberry (*Callicarpa dichotoma*), planted ornamentally because of its showy purple berries. To do this, we will investigate its tolerance, herbivory, growth rate, apparent nutrient availability, and its overall likelihood to negatively affect foreign habitats. We suspect it will outperform native plants of similar characteristics and perform similarly to invasive plants with alike characteristics.

*WestRock Scholars*

Poster #39      **Dibya Guragai**      [guragai.2@wright.edu](mailto:guragai.2@wright.edu)

Research advisor: Mike Kemp, PhD

**Synthetic Nucleoside labels for studying cell-free DNA**

Co-authors: Alexandra Carpenter, Michael Kemp

Cell-free DNA (cfDNA) originates from dying cells or can be actively secreted by living cells, and it exists unbound, in extracellular vesicles, or associated with macromolecular complexes. This cfDNA plays roles in intercellular communication and immune responses and is clinically used for diagnostics through PCR and DNA sequencing. In our lab, lesions in cfDNA were previously observed after treatment with DNA-damaging agents such as UVB and cisplatin. Building on these findings, we sought a mechanism of labeling DNA with a synthetic nucleoside to enable robust tracing using fluorescent labels and sensitive detection of low-abundance cfDNA. We evaluated three nucleoside analogs—BrdU (bromodeoxyuridine), EdU (5-ethynyl-2'-deoxyuridine), and F-ara-EdU (2-deoxy-2-fluoro-5-ethynyluridine)—for their ability to incorporate into DNA and serve as tracers in the cell-free space. We monitored labeling efficiency, cell viability, and the involvement of apoptotic pathways, including the use of the pan-caspase inhibitor zVAD-FMK to block apoptosis. BrdU was found to be poor nucleoside label. EdU generated strong labeling signals even in the absence of UVB treatment; however, it reduced cell viability and induced caspase-dependent apoptosis. Blocking apoptosis with zVAD-FMK did not reduce the release of EdU-labeled cfDNA, indicating that cfDNA can also be released via caspase-independent mechanisms such as active secretion. In contrast, F-ara-EdU produced robust labeling after UVB exposure without reducing cell viability. Our findings demonstrate that while EdU is effective for cfDNA labeling, its cytotoxicity and induction of apoptosis limit its use in applications where cell viability must be preserved. F-ara-EdU, by contrast, provides strong labeling following UVB exposure with minimal toxicity, making it a safer and more reliable for studies where minimizing toxicity is important. Overall, these results underscore the importance of choosing nucleoside analogs for tracking cfDNA.

Poster #40      **Hana Habib**      [habib.13@wright.edu](mailto:habib.13@wright.edu)

Research advisor: Ashley Dalrymple, PhD

**Using the Posterior Root Muscle (PRM) Reflex to Infer Changes in Spinal Cord Excitability**

Co-authors: Abigail T. Harrison, Grange M. Simpson, Kyle J. Valestrino, Ashley N. Dalrymple

Transcutaneous spinal cord stimulation (tSCS) is a noninvasive neural stimulation technique that activates the spinal dorsal roots to assess excitability via the posterior root muscle (PRM) reflex. This study investigated age-related differences in spinal cord excitability as a control for understanding changes post lower-limb amputation. Electrical pulses were applied at T12-L1 using tSCS while recording PRM reflexes using electromyography from lower-limb muscles. Preliminary findings (n=30) suggest little change in PRM reflex thresholds with age ( $R^2=0.017$ ) but this trend may change with additional data. A large set of normative data enables comparisons between age-matched controls and individuals with lower-limb amputation.

Poster #41      **Ishita Haider**      [ishita.haider@wright.edu](mailto:ishita.haider@wright.edu)

Research advisor: Quan Zhong, PhD

**Linking alpha-synuclein toxicity to autophagy**

Co-authors: Breonna Gillespie, Sonu Yadav, Isabel Reyna, Shulin Ju, Quan Zhong

Alpha-synuclein, a presynaptic membrane-binding protein, is linked genetically to Parkinson's Disease (PD). Misfolding and abnormal accumulation of alpha-synuclein are hallmarks of PD. Previously, it was shown that elevated levels of alpha-synuclein induce cellular toxicity, which can be suppressed by overexpression of a conserved Rab GTPase in yeast and human cells. The underlying rescue mechanism remains unclear. We have found that mutations disrupting the autophagy-related function of this Rab GTPase fail to suppress alpha-synuclein toxicity. Together with several other lines of evidence, we suggest that the accumulation of alpha-synuclein and its disruption of cellular homeostasis are linked to dysregulation of autophagy.

Poster #57      **Pooneh Hajmirza Mohammadi**      [hajmirzamohammadikamalabadi.2@wright.edu](mailto:hajmirzamohammadikamalabadi.2@wright.edu)

Research advisor: Hongmei Ren, PhD

**Systemic MyoAAV3-Lipin1 Gene Delivery Mitigates Muscle Pathology and Improves Function in mdx Mice**

Research advisor: Hongmei Ren, PhD

Sarcolemmal instability is a hallmark of Duchenne Muscular Dystrophy (DMD), an X-linked disorder caused by dystrophin mutations leading to muscle degeneration, inflammation, and fibrosis. No cure exists, and AAV-based dystrophin gene therapy is constrained by limited vector capacity and immunogenicity, highlighting the need for complementary strategies. Lipin1, a phosphatidic acid phosphatase regulating lipid metabolism and membrane homeostasis, supports dystrophin function and maintains muscle integrity. Its 3-kb coding sequence enables efficient AAV packaging with minimal immune risk. Reduced Lipin1 in DMD patients and mdx mice correlates with severe pathology. Systemic MyoAAV3-Lipin1 delivery improves muscle morphology, reduces fibrosis, and supports Lipin1 as a promising therapeutic candidate.

Poster #60      **Gabriel Hernandez Blanco**      [hernandezblanco.2@wright.edu](mailto:hernandezblanco.2@wright.edu)

Research advisor: Debra Steele-Johnson, PhD

**Differential effects of negative personal attributes on employee voice**

Co-authors: Debra Steele-Johnson, Bincy Davis

We examined how negative personal attributes (*i.e.*, pessimism, anxiety, and frustration), affect employee voice. Drawing on conservation of resources theory, we proposed that these attributes influence voice in complex ways, depending on their dimensionality, stability, and the nature of their relationship. We proposed that studying the complexity of these variables advances theory and practice by offering a nuanced perspective on when and how negative traits might inhibit or encourage voice behavior.

Poster #3      **Eric Jackson**      [jackson.379@wright.edu](mailto:jackson.379@wright.edu)

Research advisor: Allen Hunt, PhD

**Corrections to universal scaling in fluid transport in porous media**

Predicting fluid flow through porous media presents a number of challenges due to the geometric and topological complexity of the flow paths. This problem has been treated in the framework of theory, based on scaling arguments. The same scaling should apply for all problems in the same universality class. In this work, several factors which may put the problem in a different class or lead to non-universal behavior are examined including particular distributions of the underlying pore-space both with and without spatial correlations, boundary effects, and the implications of multiple percolating phases.

Poster #42      **Vijayalakshmi Jogi**      [jogi.3@wright.edu](mailto:jogi.3@wright.edu)

Research advisor: Mike Kemp, PhD

**Developing a high-throughput assay for analyzing damaged Cell-free DNA**

Co-authors: Vijayalakshmi Jogi, Michael G. Kemp

Cell-free DNA in biological fluids is widely used for noninvasive molecular testing and can be used for diagnosis and treatment monitoring of various disease conditions, yet whether cell-free DNA carries these damaged DNA adducts has not been well studied. DNA damaging agents like UV radiation, anti-cancer drug Cisplatin and Benzo(a)pyrene diol epoxide (BPDE) from cigarette smoke causes formation of bulky DNA adducts in the genomic DNA like Cyclobutane pyrimidine dimers (CPDs), Cisplatin DNA adducts and BPDE DNA adducts respectively. We developed a high-throughput, 96-well plate-based assay to detect these bulky DNA adducts in the cell-free fractions. To study the regulation of adduct release we used both pharmacological and targeted genetic approaches of DNA-repair and cell death pathways. This assay could potentially be used to detect DNA adducts in cell-free DNA from research

and clinical samples and for studying cell-free DNA release and therapeutic modulation of treatments in variety of disease states.

Poster #19      **Olivia Johnson**      [johnson.2005@wright.edu](mailto:johnson.2005@wright.edu)

Research advisor: Don Cipollini, PhD

**Tick Talk: A tick-by-tick examination of abundance, infection status, and environmental drivers across Ohio**

Co-author: Don Cipollini

We sampled nine field sites across Ohio in May, July, and September 2025 to assess tick abundance, diversity, and infection status. The highest diversity was found in May, including deer, dog, lone star, and Asian long-horned ticks. *Borrelia burgdorferi* was the only detected pathogen, found only in deer ticks from three counties. We report the first deer tick in Putnam county. Lone star ticks were found only in the most southern sites. Our findings indicate that climate warming likely contributes to range expansion of the lone star tick, while deer and dog tick distributions are influenced by land use change.

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Poster #20      **Kayci Johnson**      [johnson.2014@wright.edu](mailto:johnson.2014@wright.edu)

Research advisor: Jeffrey Peters, PhD

**Determining the Genetic Population Structure of the Endangered Northeastern Bulrush, *Scirpus ancistrochaetus*, using Genomic Sequences**

Co-authors: Dr. Jeffrey Peters, Dr. Kendra Cipollini

Climate change and anthropogenic stressors pose a devastating conservation threat to many species. *Scirpus ancistrochaetus*, commonly called Northeastern Bulrush, is listed as endangered by the U.S. Fish and Wildlife Service (2022), and it is estimated that there are only 120 sites where it can be found in the United States. Genetic diversity is critical to conserving the endangered plant. The objective of this research is to use next-generation sequencing technologies to better estimate the amount of genetic diversity remaining in *S. ancistrochaetus*, determine the distribution of the diversity, and create conservation units.

*WestRock Scholars*

Poster #27      **Nishat Khalid**      [khalid.19@wright.edu](mailto:khalid.19@wright.edu)

Research advisor: Hongmei Ren, PhD

**The role of lipin1 in satellite cells in skeletal muscle regeneration and its implication in Duchenne Muscular Dystrophy**

Co-authors: Nishat Khalid, Hongmei Ren

Duchenne muscular dystrophy is a severe X-linked disorder characterized by progressive muscle degeneration and impaired regeneration. Lipin1, a phosphatidic acid phosphatase essential for satellite cell activation, is reduced in dystrophic muscle. This study examines the role of lipin1 in satellite cell activation and muscle regeneration using pax7-lipin1 knock out and mdx;lipin1 transgenic mice. Loss of lipin1 reduced satellite cell activation and reduced the expression of regulatory factors including myoD and myogenin, while lipin1 over-expression enhanced satellite cell activation and enhanced the expression of regulatory factors including myoD and myogenin. These findings suggest that lipin1 restoration promotes skeletal muscle regeneration, highlighting its potential therapeutic target for improving muscle function and slowing disease progression in DMD.

Poster #7      **Kinza Khan**      [khan.307@wright.edu](mailto:khan.307@wright.edu)

Research advisor: Suzanne Lunsford, PhD

### **Raman Spectroscopy to Solve Poisoning Cases Caused by Alcohols**

Co-authors: Kwaku Nyarko, Noemi Andrade

This project explores the use of Raman spectroscopy as a non-invasive and efficient analytical tool to detect the presence of toxic organic chemicals. The primary focus is on developing a reliable method for identifying contamination in liquids, which can be crucial in forensic chemistry investigations. In July 2022, there were 21 teenagers that passed away in South Africa due to alcohol intoxication. The PeakSeeker on the Raman will be utilized to determine the unknown chemicals that are possible contaminants in their alcoholic beverages. Each contaminant/chemical analyzed should display unique vibrational spectra of various alcohols to hopefully assist in forensic cases.

Poster #61      **Justin Koehler**      [koehler.38@wright.edu](mailto:koehler.38@wright.edu)

Research advisor: Valerie Shalin, PhD

### **Assessing Anatomical Term Knowledge in Trauma Surgery**

Co-authors: Justin Koehler, Spencer Seals, Valerie Shalin

Traditional methods for assessing surgeon performance during training use manual coding from trained experts. While appropriate for certain types of skills like overall technique, this approach is tedious and error-prone for knowledge such as anatomical terms demonstrated multiple times over an exercise. In this work, we investigate an automated method for assessing anatomical term knowledge. Participants were trained surgeons that completed an advanced trauma surgery skills course and performed upper and lower extremity fasciotomies on cadavers. We assess knowledge of anatomical terms and characterize participants' anatomical expertise. We compare our metric to a standard rubric-based approach.

Talk #8      **Peter Krebs**      [krebs.21@wright.edu](mailto:krebs.21@wright.edu)

Research advisor: Jeffrey Peters, PhD

**Z Chromosome Divergence and Potential Inversion in the Speciation of Australian Teal (*Anas gracilis* and *Anas castanea*)**

Sex chromosomes, particularly in birds with ZW sex-determination systems often drive speciation. This study investigates elevated Z chromosome divergence between the Australian Grey Teal (*Anas gracilis*) and Chestnut Teal (*Anas castanea*), hypothesizing a chromosomal inversion as the cause. Using next-generation sequencing, we will identify structural variations and analyze candidate genes within inverted regions. If no inversion is found, we will examine Z-linked genes for adaptive mutations. Comparative analyses with Mallard genomes will assess ancestral states. Results will shed light on the role of chromosomal inversions in avian speciation and provide genomic resources for conservation and evolutionary biology.

Poster #55      **Addison Lowe**      [lowe.104@wright.edu](mailto:lowe.104@wright.edu)

Research advisor: Courtney Sulentic, PhD

**The Potential Effects of Hormonal Stressors on Human Antibody Production**

Co-authors: Addison Lowe, Maitreyee Chavan, Courtney Sulentic

The aryl hydrocarbon receptor (AhR) is known for mediating immunosuppressive effects of various environmental toxicants. 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) is a high affinity AhR ligand widely known to inhibit antibody production in B lymphocytes. Using a human B cell line, SKW 6.4, which does not endogenously express the AhR, and a variant of the cell line that has been modified to express the AhR (SKW AhR+), this project aims to further explore the role of the AhR in TCDD-induced inhibition of antibody production. The potential impact and co-influence of hormonal stressors, like hydrocortisone, will be evaluated to determine if other known signaling pathways influence the AhR signaling pathway in human antibody production.

Poster #43      **Denish Maharjan**      [maharjan.26@wright.edu](mailto:maharjan.26@wright.edu)

Research advisor: Hongmei Ren, PhD

**Therapeutic Evaluation of Lipin1 in the D2.mdx Mouse Model of Duchenne Muscular Dystrophy**

Co-author: Hongmei Ren

Duchenne muscular dystrophy (DMD) is a severe X-linked disorder caused by dystrophin loss, leading to progressive muscle degeneration, fibrosis, and early death. Current therapies have significant limitations. Lipin1, a phosphatidic acid phosphatase, is downregulated in skeletal muscle of DMD patients and mouse models. Recent studies revealed that lipin1 supports sarcolemmal integrity, and its upregulation in mdx:lipin1 mice reduced muscle pathology and improved function. To explore therapeutic potential of Lipin1, we evaluated myoAAV-mediated lipin1 gene delivery in D2-mdx mice, a

model which closely recapitulates the severe human DMD, assessing its ability to restore muscle structure and function.

Poster #44      **Rangarirai Makuku**      [makuku.2@wright.edu](mailto:makuku.2@wright.edu)

Research advisor: Weiwen Long, PhD

**The E3 Ligase FBXO45 Modulates ER $\alpha$  Stability and Fulvestrant-Induced Degradation in ER+ Breast Cancer**

Estrogen receptor alpha (ER $\alpha$ ) drives proliferation and survival in estrogen receptor–positive (ER+) breast cancer. Its stability is regulated by the ubiquitin–proteasome system, affecting estrogen signaling and therapy response. Fulvestrant, a selective estrogen receptor degrader (SERD), binds the ER $\alpha$  ligand-binding domain (LBD), promoting ubiquitination and degradation. However, LBD mutations such as Y537S and D538G stabilize ER $\alpha$ , leading to endocrine resistance. Emerging evidence implicates FBXO45, an F-box protein of the SCF E3 ligase complex, in modulating ER $\alpha$  turnover. This project investigates FBXO45's role in ER $\alpha$  stability, Fulvestrant-induced degradation, and its effects on wild-type and mutant ER $\alpha$  to elucidate mechanisms of resistance in ER+ breast cancer.

Poster #2      **Neeharika Mamidishetty**      [mamidishetty.2@wright.edu](mailto:mamidishetty.2@wright.edu)

Research advisor: Eric Fossum, PhD

**Enhancing poly(ethyleneimine) capabilities: Toward safer and smarter Gene delivery systems**

Co-author: Fossum, Eric A.

Gene therapy provides a promising strategy to treat diseases by delivering functional DNA into cells. Because naked nucleic acids have poor uptake, gene delivery relies on either viral or non-viral vectors. Viral vectors are efficient, but risky, while non-viral systems such as poly(ethyleneimine) are safer, but less efficient. Inspired by studies using low molecular weight PEI modified with lipoic acid, whose disulfide bond may enable controlled release. In this project, higher molecular weight PEI was amidated with Isobutyric acid, thus reducing toxicity and providing a pH and temperature sensitive system. Work on installing the redox active moiety, lipoic acid, is ongoing.

Talk #9      **Sean Mangan**      [mangan.16@wright.edu](mailto:mangan.16@wright.edu)

Research advisor: Valerie Shalin, PhD

**Assessing Complex Relational Reasoning Performance**

Co-authors: Sean Mangan, Spencer Seals, Valerie Shalin

Traditional approaches to evaluating human reasoning often assume that there is one correct answer to a given reasoning problem and that any incorrect answer demonstrates that people are not reasoning. We investigate this problem in a controlled context in an experiment where people completed analogy

problems in the form "king is to man as \_\_\_ is to queen". Problems were designed to reflect relationships with more than one correct answer (*e.g.*, holding coffee with a cup or a mug). We designed different levels of difficulty and candidate response options. In this work, we discuss pilot results examining different response formats.

Poster #16      **Rachel Mansfield**      [mansfield.26@wright.edu](mailto:mansfield.26@wright.edu)

Research advisor: Volker Bahn, PhD

**Can you hear me now? Improving Acoustic Monitoring for Marsh Birds**

Co-authors: Volker Bahn, Brendan Shirkey

Widespread wetland loss caused declines in many wetland bird populations. Secretive Marsh Birds are challenging to monitor with traditional methods, but conservation depends on accurate population data. We will improve marsh bird detection by integrating autonomous recording units (ARUs) with human-conducted surveys, then use these inventories to understand relationships between occurrence, habitat, and wetland restoration. We deployed 95 ARUs across wetlands in Ohio and Michigan. ARUs were paired with traditional point counts to compare detection rates and evaluate monitoring design. We will use integrated datasets to estimate relative abundance which will be associated with wetland characteristics.

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Poster #45      **Caroline McLaughlin**      [mclaughlin.76@wright.edu](mailto:mclaughlin.76@wright.edu)

Research advisor: Madhavi Kadakia, PhD

**TIP60 regulation of PTEN expression and localization is correlated with resistance to cisplatin in squamous cell carcinoma**

Co-authors: Akshay Hira (PhD), Michael Craig (PhD), Jin Zhang (PhD), Zach Kronenberger, Madhavi Kadakia (PhD)

Squamous cell carcinoma (SCC) continues to rise in incidence worldwide. Effectiveness of cisplatin, a standard of care therapy for SCC, is limited. We hypothesize that TIP60, a histone acetyltransferase, promotes cisplatin resistance by suppressing the tumor suppressor PTEN's expression and altering its localization. Using SCC models, we demonstrated that PTEN protein is reduced in cisplatin-resistant cells. TIP60 knockdown increased PTEN mRNA and protein, PTEN promoter activity, and decreased p-Akt. TIP60 knockdown also increased PTEN distribution across membrane, cytoplasmic, and nuclear compartments. Together, these findings reveal a TIP60-PTEN regulatory axis that may be targeted to overcome cisplatin resistance in SCC patients.

Poster #46      **Arian McNeil**      [mcneil.19@wright.edu](mailto:mcneil.19@wright.edu)

Research advisor: David Ladle, PhD

**C-Fiber Hyperexcitability After Acute Compression in Sciatic Nerve**

Co-authors: Mark Rich, David Ladle

Neuropathic pain (NP) can be a debilitating concern for patients with a variety of underlying pathologies. From post-surgical pain to diabetic and chemotherapy-induced neuropathies, to postherpetic neuralgia, NP can have a major impact on quality of life on timescales of weeks to years. Radicular pain, the pain caused by nerve stretch and compression as a result of either bulging or herniated intervertebral discs, is another subset of NP. Unlike most other sources of NP, radicular pain can have a rapid onset. Herniating disc events can lead to disabling pain within minutes, with painful symptoms typically lasting 10-12 weeks. Disappointingly, first-line drug treatments for NP, including the gabapentinoids and tricyclic antidepressants, are largely ineffective for radicular pain, suggesting important mechanistic differences from other types of NP. The rapid onset of radicular pain suggests early changes in the function of peripheral nerves—the site of the local injury in disc herniations—may be an overlooked mechanistic contributor to this kind of pain. In order to investigate the earliest changes in peripheral nerves following nerve compression, we have developed an *ex vivo* model of radicular pain that measures the response of pain fibers in the sciatic nerve to acute and controlled compression of the nerve in adult mice. We have preliminary data that shows an increase in C-fiber responses, the axons that convey signals about tissue damage and other painful events to the central nervous system through peripheral nerves like the sciatic nerve, for at least 60 minutes following a 10-minute nerve crush. We hypothesize and have preliminary data that the elevated activity in these nerves is the result of persistently active Na<sup>+</sup> currents in the nerve that drives repetitive firing at the site of damage.

Poster #10      **Grace Miller**      [miller.1830@wright.edu](mailto:miller.1830@wright.edu)

Research advisor: Kristen Buck, PhD

**Labile Dissolved Nickel in the Southern Ocean**

Co-authors: Léo Mahieu, Kristen Buck

Nickel (Ni) is an important micronutrient for phytoplankton development. In the Southern Ocean, which has a major influence on global circulation and water masses composition, Ni speciation has yet to be investigated. Profile samples for DNi speciation were collected in September and October 2016 in open ocean and coastal waters surrounding the West Antarctic Peninsula. Here, we present the results for labile DNi in depth profiles ranging from 20 m to 3500 m. Labile DNi was determined by Cathodic Stripping Voltammetry (CSV) and linear regression of peak heights. Surface DNi was found to be stable while surface labile DNi showed great variation between organic and inorganic Ni, with labile DNi ranging anywhere from 12-100% of DNi across the whole study area. A depletion of surface chlorophyll inshore and a depletion of surface phaeophytin offshore of the studied area was observed, suggesting labile DNi was sourced by the lysis of decaying phytoplankton cell. These results are the first Ni speciation depth profiles in the Southern Ocean and provide a baseline of the biogeochemistry of Ni in the West Antarctic Peninsula.

Poster #47      **Christina Minassian**      [minassian.2@wright.edu](mailto:minassian.2@wright.edu)

Research advisor: Quan Zhong, PhD

**Investigating the Enhancer Effect of Membrane Trafficking Proteins on  $\alpha$ -synuclein Toxicity**

Co-authors: Christiana Minassian, Shuzhen Chen, Yali Chi, Ishita Haider, Elliott Hayden, Shulin Ju, Quan Zhong

$\alpha$ -Synuclein is a 140-amino acid protein encoded by the SNCA gene. It is primarily expressed in presynaptic terminals, where it plays a role in the vesicular trafficking of neurotransmitters through interaction with the SNARE complex. Under pathological conditions,  $\alpha$ -synuclein forms insoluble aggregates known as Lewy bodies, leading to the development of Parkinson's disease. Through genome-wide screens, 17 human genes with known roles in membrane trafficking pathways have been identified to enhance the toxicity of  $\alpha$ -synuclein. My research aims to understand the relationship between these toxicity-enhancing genes and  $\alpha$ -synuclein as well as their effects on membrane trafficking.

Poster #48      **Shahd Mohamed**      [mohamed.74@wright.edu](mailto:mohamed.74@wright.edu)

Research advisor: Weiwen Long, PhD

**FBXL16 Depletion Activates p38-Mediated Apoptosis in Lung and Breast Cancer Cells**

Lung cancer and breast cancer account for over one-fourth of global cancer deaths. The F-box protein FBXL16 is highly expressed in various cancers and supports tumor cell survival. Our lab has found that FBXL16 upregulates DUSP4, a phosphatase that dephosphorylates and suppresses the stress kinase p38. Since p38 promotes cell death, we hypothesize that FBXL16 depletion enhances p38 phosphorylation and activity, inducing apoptosis and suppressing cell growth. Indeed, either transient silencing or stably depleting FBXL16 increased p38 phosphorylation, elevated the levels of pro-apoptotic markers, and reduced cell growth in both lung cancer and breast cancer cells.

*CoSM Research Scholars*

Poster #4      **Sonali Mohan**      [mohan.24@wright.edu](mailto:mohan.24@wright.edu)

Research advisor: Allen Hunt, PhD

**Linear Reservoir Behavior Across Large Spatial Scales**

Co-author: Allen Hunt

Linear models in recession analysis have been widely used, particularly at larger scales and longer times, to make accurate predictions of streamflow recession. However, their derivation has been somewhat impenetrable until now, since water flowing out of the soil and into streams flows out of an area  $L$  (or perimeter), but water stored in the soil is stored in a volume  $L$  (or area), with  $d$  the dimensionality. This mismatch in units requires (in Euclidean geometry) a relationship that has a length scale included and

which makes the flow a non-linear function of the volume. However, in percolation theory, there is a term in the (generalized) surface area that is proportional to the (generalized) volume as well as the term proportional to  $V$ . This term must dominate at large volumes, since its dependence on length is to a larger power than the Euclidean surface area. Thus, classification of the principal flow paths near the percolation threshold automatically concentrates flow across a boundary with the same units as the interior, making  $Q$  proportional to  $S$  and  $dQ/dt$  proportional to  $dS/dt$ . The mass conservation constraint then makes  $dS/dt$  proportional to  $-Q$  in low flow regimes without  $P$  or  $ET$ , generating the “linear” model. Results are tested against known recession constants for lowa streams.

Poster #5      **Marilyn Morupisi**      [morupisi.2@wright.edu](mailto:morupisi.2@wright.edu)

Research advisor: Steve Higgins, PhD

**Experimental investigations of fluorite ( $CaF_2$ ) nucleation using potentiometric precipitation titrations: Exposing a flaw in a 75-year-old theory**

Co-authors: Marilyn O. Morupisi, Abigail A. S. Asare, H. Daniel Young and Steven R. Higgins

Nucleation of solids from supersaturated solutions has been intensely studied for the last few decades in a variety of systems including metals, semiconductors and ionic materials. In this work, we focus on the nucleation of fluorite (crystalline  $CaF_2$ ) through potentiometric precipitation titrations. Results will demonstrate that the scientific understanding of the 1950 Lamer theory, which has been cited over 3000 times in the literature, is incorrect and can in turn lead to misinterpretations of titration results. Initial results will also be presented that call into question the very design of precipitation titrations.

Poster #6      **Pusetso Mosesane**      [mosesane.2@wright.edu](mailto:mosesane.2@wright.edu)

Research advisor: Steve Higgins, PhD

**Investigating the pre-nucleation and post-nucleation regions of the LaMer diagram using fluoride ion selective electrode potentiometric precipitation titrations**

Co-authors: Pusetso Mosesane, H. Daniel Young and Steven R. Higgins

Classical nucleation theory has been used to interpret nucleation studies for nearly a century, however, one more recent non-classical approach towards the explanation of phase change and crystal growth suggests that there is formation of thermodynamically stable pre-nucleation clusters in both undersaturated and supersaturated conditions. In this work, we explore the nucleation process of fluorite ( $CaF_2$ ) with potentiometric titrations and based on the ion-pair formation constant, stopped-flow experiments and pH measurements there is evidence that a flaw exists in the LaMer diagram with far-reaching implications for studies of nucleation phenomena.

Poster #49      **Yashoda Omkaresha**      [o.3@wright.edu](mailto:o.3@wright.edu)

Research advisor: Ashot Kozak, PhD

**Optimization of Jurkat T cell growth and proliferation using culture media with non-serum supplements**

We compared the effect of different culture formulations on human leukemic Jurkat T-cell proliferation. Cells were grown in RPMI with 10% FBS, Advanced RPMI with 5% FBS, 10% calf serum or 2% SimPL SHOT serum-free supplement. Cell counts were taken at multiple time points up to 72 hours. The highest proliferation rate was observed in Advanced RPMI with 5% FBS, whereas growth in 2% SimPL was somewhat slower and 10% calf serum media was unsuitable, resulting in cell death. These findings indicate that although fetal bovine serum remains the most effective, SimPL porcine platelet lysate at 2% can support Jurkat T-cell growth and proliferation.

Poster #12      **Ahmed Ogidan**      [ogidan.3@wright.edu](mailto:ogidan.3@wright.edu)

Research advisor: Yvonne Vadeboncoeur, PhD

**Measuring Benthic Contributions to Whole Lake Primary Productivity in Lake Michigan**

Co-authors: Yvonne Vadeboncoeur

We are quantifying benthic photosynthesis in Lake Michigan to evaluate benthic contributions to whole-lake primary productivity in the Laurentian Great Lakes. Using a noninvasive chamber method and Pulse Amplitude Modulated (PAM) fluorometry, we measured photosynthetic rates and photosynthetic efficiency of benthic algal communities across depth gradients and substrate during the 2025 EPA's Cooperative Science and Monitoring Initiative (CSMI) on Lake Michigan. We sampled sediment and mussel substrates at multiple sites up to 40 meters deep. Preliminary analyses reveal depth dependent variation in benthic photosynthesis, providing new quantitative data for estimating benthic contributions to whole-lake primary production in large lake systems

*WestRock Scholars*

62      **Alyssa Ova**      [ova.2@wright.edu](mailto:ova.2@wright.edu)

Research advisor: Valerie Shalin, PhD

**Visual Development Implications for Computational Cognitive Models**

Co-authors: Alyssa Ova, Spencer Seals, Valerie Shalin

Cognitive models are a powerful computational tool for modeling human perceptual and cognitive processes. However, traditional approaches to cognitive modeling often fail to characterize how developmental processes may contribute to the perceptual and cognitive abilities of adults. In this work, we examine visual development. Human infants have visual abilities that are very different than those of older children and adults. These visual abilities change and develop over the course of childhood and

early adolescence, reaching adult-like status in adolescence. In this work, we examine the timeline of visual development from birth to adolescence and discuss implications for developing cognitive models.

Poster #9      **Parth Rameshbhai Panara**      [panara.2@wright.edu](mailto:panara.2@wright.edu)

Research advisor: Kuppuswamy Arumugam, PhD

#### **Redox-active Gold Complexes as Next Generation Cancer Therapeutics**

Co-authors: Nimashi Herath, Dharika Arora, Margaret Marie Mann

Building on our recent development of dual-targeting gold(I) complexes incorporating both naphthoquinone and ferrocene moieties for potential therapeutic applications, we are now expanding this platform to include alkyne-functionalized derivatives. As part of our ongoing structure–activity relationship (SAR) studies, these new gold complexes are being strategically designed to support modular conjugation with a variety of tumor-targeting ligands, enabling precise cancer cell localization. Central to this design is the incorporation of redox-active N-heterocyclic carbenes (NHCs), which are anticipated to enhance both the redox properties and cytotoxic potential of the complexes through electronic fine-tuning and targeted delivery mechanisms. Herein, we present a schematic representation of the proposed synthetic strategy, and current efforts are focused on the synthesis, full characterization, and biological evaluation of these multifunctional gold(I) complexes in relevant cancer cell lines.

Poster #50      **Kaylee Pham**      [pham.57@wright.edu](mailto:pham.57@wright.edu)

Research advisor: Andrew Voss, PhD

#### **Verapamil Inhibits Sodium Currents in Mature Mouse Muscle Fibers**

Co-authors: Nick Hall, Xueyong Wang, Mark M. Rich, Andrew A. Voss

Myotonia, involuntary muscle stiffness, is due to nonfunctional CIC-1 channels and treated by sodium channel blockers. Recently, a study claimed verapamil, a calcium channel blocker, mitigates myotonia. We hypothesized that verapamil mitigates myotonia by inhibiting sodium channels, independent calcium channels. To test this, we measured action potential peak amplitudes (current clamp) and directly measured sodium currents (voltage clamp) in mature mammalian muscle fibers that were untreated and treated with nifedipine (calcium channel blocker), mexiletine (sodium channel blocker), and verapamil. The significant decreases in action potential amplitude and sodium currents indicate that verapamil does indeed mitigate myotonia by blocking sodium channels.

*Considine Scholars*

Poster #51      **Matthew Pickrell**      [pickrell.7@wright.edu](mailto:pickrell.7@wright.edu)

Research advisor: Ashot Kozak, PhD

**The role of extracellular magnesium in T cell proliferation and store-operated calcium entry**

Co-authors: J. Ashot Kozak

Jurkat T cells, an immortalized cancer line of human T lymphocytes, serves as a model to study ion signaling and its effects on immune cell function. A key player in this process is transient receptor potential Melastatin 7 (TRPM7), the only dual protein kinase/ ion channel in the human genome, capable of conducting  $Mg^{2+}$  and phosphotransferase activity. This project investigates how the extracellular  $Mg^{2+}$  concentration regulates TRPM7 channel and kinase activities, as well as how its manipulation influences Orai/STIM store-operated  $Ca^{2+}$  channels. By systematic  $Mg^{2+}$  changes, we aim to determine how TRPM7 participates in Orai/STIM1 channel activity and cellular proliferation.

Talk #11      **Dipinkumar P U**      [pu.5@wright.edu](mailto:pu.5@wright.edu)

Research advisor: Ravi P Sahu, PhD

**Exploring the Potential of Repurposing Rupatadine, Diphenhydramine & Loratadine in Non-Small Cell Lung Cancer (NSCLC)**

Co-authors: Dr. Anita Thyagarajan, Dr. Ravi P Sahu

Non-small cell lung cancer (NSCLC) remains the major cause of lung cancer-related mortality in the world. As NSCLC often develops resistance to most standard therapies, repurposed drugs are being explored as a promising approach to enhance the efficacy of cancer therapy. The current studies evaluated the effects of repurposing antihistaminergic drugs (Rupatadine, Loratadine, and Diphenhydramine) alone or in combination with tyrosine kinase inhibitors (Gefitinib, Erlotinib) on A549 and H1299 lung adenocarcinoma cell lines. The data demonstrated enhanced cytotoxicity of combination treatment over monotherapy, suggesting that repurposing antihistaminergic drugs with existing therapies may offer a promising strategy for NSCLC management.

Talk #12      **Riya Rawal**      [rawal.9@wright.edu](mailto:rawal.9@wright.edu)

Research advisor: Ravi P Sahu, PhD

**Unmasking the Role of Polycyclic Aromatic Hydrocarbon Compounds in Lung Cancer**

Co-authors: Dr. Anita Thyagarajan, Dr. Ravi P Sahu

Exposure to polycyclic aromatic hydrocarbon (e.g., benzo[a]pyrene [BaP]) is associated with adverse effects. We hypothesized the involvement of platelet-activating factor-receptor (PAFR) signaling in impacting BaP and targeted therapy responses in non-small cell lung cancer (NSCLC) models. Our studies demonstrated that BaP promotes cell survival, migration, and colony formation; however, does not affect targeted therapy responses. As PAFR activation induces the release of microvesicle particles

(MVPs), we observed that BaP augments PAFR-induced MVP release, which is blocked by PAFR antagonists and inhibitors of MVP release. These findings indicate the involvement of PAFR and MVPs in mediating BaP-induced cellular effects in NSCLC.

Poster #13      **Tyler Retherford**      [retherford.12@wright.edu](mailto:retherford.12@wright.edu)

Research advisor: Katie Hossler, PhD

#### **Wet Sieving Methods to Evaluate Water Stable Aggregates**

Co-author: Katie Hossler

Soil aggregates are clumps of silt, clay and sand that are held together by organic matter and microbial activity, which add soil structure, increases water retention and improves nutrient cycling. Wet sieving is used for evaluating soil aggregates by the percentage of water stable to unstable aggregates. The multi-sieve method requires dry sieving the soil sample into four aggregate sizes then wet sieving using 2mm, 1mm, 0.5mm and 0.25mm for each sample. The single sieve uses aggregates 1-2mm in size and wet sieved on a 0.25 mm sieve. The single sieve should be quicker and as accurate as the multi-sieve.

Talk #13      **Bahar Rezaei**      [rezaei.4@wright.edu](mailto:rezaei.4@wright.edu)

Research advisor: Andrew A. Voss

#### **The Effects of Systemic Gene Therapy with AAV-Lipin1 on Model Duchenne Muscular Dystrophy Skeletal Muscle**

Co-authors: Pooneh Hajmirza Mohammadi Kamalabadi, Hongmei Ren, and Andrew Alvin Voss

Duchenne muscular dystrophy (DMD) is a genetic disorder caused by loss of dystrophin, leading to progressive muscle degeneration. Gene therapy to restore dystrophin is limited by the gene's large size. Lipin1, critical for muscle health, is reduced in DMD. Restoring Lipin1 in transgenic models of DMD improved symptoms. Here, we tested a gene therapy approach by administering MyoAAV3-Lipin1 to mdx mice. Treated mice showed improved tissue morphology and improved resistance to eccentric contraction-induced injury under in situ and ex vivo conditions. Overall, Lipin1 therapy reduces fibrosis and improves muscle function, making it a promising therapy.

*CoSM Research Scholars*

Talk #10      **Maia Rohmer**      [mcdaniel.117@wright.edu](mailto:mcdaniel.117@wright.edu)

Research advisor: Scott Watamaniuk, PhD

#### **Moderating Role of Training between Task Complexity and Performance in Aviation Tasks**

Co-authors: Sruthi Bommareddy, Chloe Bell

The current study underscores how training moderates the relationship between task complexity and performance in aviation tasks. System-based training, which facilitates mental models and knowledge-based reasoning, is expected to enhance accuracy, decision speed, and reaction time under complex, dynamic conditions compared to procedural training. Findings aim to inform training in aviation programs and other complex, dynamic environments, guiding the development of effective operator training.

Poster #24      **Lindsay Rowland**      [rowland.85@wright.edu](mailto:rowland.85@wright.edu)

Research advisor: Don Cipollini, PhD

**Effects of honeysuckle leaf blight on the competitive ability of *Lonicera maackii***

Co-authors: Don Cipollini

Amur honeysuckle (*Lonicera maackii*) is an invasive shrub that displaces native plants, degrades habitats, and resists removal efforts across the Midwest. Honeysuckle leaf blight is a fungal disease that causes necrosis in the leaves of the honeysuckle shrubs it infects. We plan to examine whether blight reduces growth and competitive ability of *L. maackii* relative to the native northern spicebush and how interactions with light availability alter these effects. This study will help clarify whether honeysuckle leaf blight can reduce the invasiveness of *L. maackii* and contribute to the restoration of native plant communities.

Poster #8      **Riley Rush**      [rush.45@wright.edu](mailto:rush.45@wright.edu)

Research advisor: Suzanne Lunsford, PhD

**Green Nanoparticle Enhanced Detection of Arsenic in Neutral Solution**

Arsenic is extremely toxic and can have significant effects if in public water supply. Electrochemistry can be utilized to detect heavy metals in water, but bare electrodes can become fouled from other ions interfering with the arsenic signal. Optimizing detection of arsenic, green-synthesized nanoparticles have been used to increase the catalytic ability and enhance the detection of arsenic levels in acidic conditions. For more accurate conditions to water, a phosphate buffer can be added to set the pH to 7. Copper nanoparticles were synthesized by green technology. This method will be illustrated by Square Wave Anodic Stripping Voltammetry.

Talk #14      **Diksha Singh Saini**      [saini.71@wright.edu](mailto:saini.71@wright.edu)

Research advisor: Clintoria Williams, PhD

**Does Zinc Deficiency Promote Renal Inflammation?**

Co-authors: Hannah Barrett

Renal inflammation is a key factor in Chronic Kidney Disease (CKD), causing kidney damage. People with CKD often have low serum zinc (Zn) levels. Our preclinical models showed that Zn deficiency causes kidney damage. This project investigates if Zn deficiency promotes renal inflammation. Adult mice were fed a Zn-adequate or Zn-deficient diet for six weeks. Kidney damage and renal inflammation were assessed. Zn deficiency caused glomerular damage and dysfunction, with markers of kidney injury and inflammation elevated. These data suggest that Zn deficiency-induced renal damage is accompanied by renal inflammation, which may contribute to the progressive kidney damage and dysfunction associated with CKD.

Poster #52      **Lauren Scott**      [scott.520@wright.edu](mailto:scott.520@wright.edu)

Research advisor: Quan Zhong, PhD

**Investigating Genetic Mechanisms of  $\alpha$ -Synuclein Toxicity: The Role of Mitochondrial Membrane Proteins**

Co-authors: Lauren Scott, Yasmeen Razi, Shuzhen Chen, Yali Chi, Ishita Haider, Elliott Hayden, Shulin Ju, Quan Zhong

Parkinson's Disease (PD) is the second most common neurodegenerative disease and is characterized by Lewy bodies. These structures are cytoplasmic inclusions comprised of misfolded proteins such as  $\alpha$ -synuclein. Past research suggests a link between mitochondria and PD. Using genetic screening, we discovered ten mitochondrial membrane proteins that, when overexpressed, enhance the toxicity of  $\alpha$ -synuclein. We have individually validated the enhancer effect on cell growth and survival. Ongoing research is investigating the mechanism underlying the increased toxicity, specifically looking at protein localization, mitochondrial dynamics, and reactive oxygen species accumulation.

Talk #15      **Mariah Slaughter**      [slaughter.31@wright.edu](mailto:slaughter.31@wright.edu)

Research advisor: Megan Rúa, PhD

**Assessing seasonal variation in mycorrhizal colonization between AM and EcM associated trees**

Co-authors: Mariah Slaughter, Shania Barnett, Madeline Greene, Jared DeForest, Megan Rúa

Trees form associations with two types of mycorrhizal fungi to increase nutrient uptake. Arbuscular mycorrhizal fungi (AM) only uptake inorganic nutrients while ectomycorrhizal fungi (EcM) produce enzymes to break down organic nutrients. Thus, EcM trees will rely more on their fungal partners than AM trees. To test this, I measured mycorrhizal colonization of both tree types across three seasons. Compared to the spring, AM colonization rates decreased by 46% in the fall ( $p < 0.001$ ) while EcM colonization rates increased by 22% ( $p < 0.001$ ). These results showcase tradeoffs in seasonal reliance on mycorrhizal partners, altering tree nutrient uptake strategies.

*WestRock Scholars*

Poster #53      **Raegan Steele**      [steele.136@wright.edu](mailto:steele.136@wright.edu)

Research advisor: Zubair Khan

**Biomarker-Guided De-escalation in HPV-Related Head and Neck Cancer: The MINIMA Trial**

Co-authors: Zubair Khan

The MINIMA phase II clinical trial evaluated whether early biomarker response could guide treatment de-escalation in HPV16-positive oropharyngeal cancer. Patients received neoadjuvant cemiplimab, an anti-PD-1 immunotherapy, with optional carboplatin and paclitaxel. Imaging, clinical exams, and circulating HPV cfDNA determined eligibility for reduced-intensity local therapy—transoral robotic surgery or 42 Gy radiation without chemotherapy. Non-responders received standard chemoradiation. Primary endpoints include two-year progression-free survival and patient-reported quality of life. MINIMA aimed to preserve cure rates while minimizing toxicity, representing a personalized, biomarker-driven approach to treating HPV-related head and neck cancer.

Poster #23      **Lauren Stetz**      [stetz.4@wright.edu](mailto:stetz.4@wright.edu)

Research advisor: John Stireman, PhD

**Determining the existence of enemy-free space for caterpillars on invasive plants**

One factor to invasive plant success is enemy release, in which native herbivores cannot recognize the invasive plant or cannot feed on it. However, if herbivores can overcome these barriers, they may gain a degree of enemy release since the plants lack cues that enemies use to locate the herbivores. We compared caterpillar parasitism rates between caterpillars found on the invasive plants *Lonicera maackii* and *Elaeagnus umbellata* and on native plants. In contrast to predictions, caterpillar parasitism was higher on invasive plants than native plants, especially for Geometridae. These results suggest that parasitoid pressure may slow colonization of invasive plants.

Talk #16      **Andrew Tangeman**      [tangeman.34@wright.edu](mailto:tangeman.34@wright.edu)

Research advisor: Debra Steele-Johnson, PhD

**Turnover Intention: A Three-factor Model**

Co-authors: Steele-Johnson, D., Ellis, E., & Bommareddy, S.

We examined turnover intention (TI) through the lens of the Theory of Planned Behavior, conceptualizing TI as comprised of attitudinal, volitional, and behavioral components. Among animal welfare workers (N = 132), TI components predicted guilt, shame, life satisfaction, workload, disengagement, and exhaustion. Results showed differential effects of TI components on outcomes, depending on the alignment of components with the conceptual content of the outcomes. Our results supported the value of both global and facet level TI measures to better capture the complexity of withdrawal processes.

Poster #25      **Amelia Whorton**      [whorton.10@wright.edu](mailto:whorton.10@wright.edu)

Research advisors: Tanvi Banerjee and William Romine

**Predicting Mental Fatigue and Cognitive Flow with Machine Learning**

Co-authors: Amelia Whorton, Dr. Tanvi Banerjee, Dr. William Romine, Dr. Tiffany Myers, Dr. Christopher Stevens, Dr. Megan Morris, Dr. James D'Amour, Joseph Behr, and Timothy Fauley

Cognitive flow—deep task engagement—supports learning and recall in high-stakes settings, including “combat flow.” Detecting it via non-invasive signals (*e.g.*, heart-rate variability) may improve training and performance, while fatigue impedes concentration. A Garmin app captured heart rate, oxygen saturation, stress, and subjective flow/fatigue across 64 sedentary tasks. Flow used the Flow State Scale; fatigue used Samn-Perelli. Ensemble models outperformed logistic regression. Heart rate, oxygen saturation, stress, and flow scores predicted fatigue (AUC≈0.81) and flow (AUC≈0.96–1.00). Heart rate consistently topped decision-tree splits. Wearables can track fatigue and flow, helping enhance engagement, optimize training, and sustain readiness.

Poster #17      **Sky Williams**      [williams.1842@wright.edu](mailto:williams.1842@wright.edu)

Research advisor: Volker Bahn, PhD

**The effects of habitat clutter on bat call detection**

Acoustic monitoring of bats is a common way of keeping track of ecosystem health. habitat clutter, such as tree trunks, branches, and leaves, can block or reflect sound waves and affect how well detectors record bat calls. This project tested how clutter influences detection using six song meter sm4bat fs units. Three units were placed in different habitats: one at the edge of the woods, one by a creek, and one in the interior of the woods. Each of these stations was paired with another unit covering the same area but obstructed by clutter. This design compared open and cluttered recording conditions to see how clutter might impact the number and quality of calls detected. Although results varied by location, they all showed a pattern where areas with more hard clutter, like tree trunks, showed fewer recorded calls and areas with soft clutter, like branches and leaves, had around the same calls as control units. Comparison of the species identification confidence values from the kaleidoscope analysis will also help show how clutter affects the accuracy of call classification between cluttered and open units. This project will prove useful in future monitoring by identifying the limits of recorder performance, helping improve placement strategies, and by developing a correction factor to be used in future data analysis.

Poster #63      **Joshua Wong**      [wong.34@wright.edu](mailto:wong.34@wright.edu)

Research advisor: Ion Juvina, PhD

**Peer-Assisted Learning in a Divergent Thinking Game**

Co-authors: Ion Juvina, Preston Menke, Jarean Carson, Afra Moharrami Nasirabadi

While learning in a peer-assisted environment has been documented as a successful strategy in various non-experimental research paradigms (Topping, 2005), this experimental study aimed to shed light on whether a form of peer-assisted learning (PAL) can benefit individuals in a task environment where the solution space is open-ended. The purpose of this research was to assess potential advantages and drawbacks of PAL by using an open-ended divergent-thinking task (Olson *et al.*, 2021) and comparing a peer-assisted learning condition with an individual-learning condition, including assessing the roles of cognitive and relational mechanisms of interactive learning, such as trust and group diversity.

Talk #17      **Cheri Wright**      [wright.704@wright.edu](mailto:wright.704@wright.edu)

Research advisor: Valerie Shalin, PhD

### **Challenges and Opportunities in Combat Medic Training**

Co-authors: Cheri Wright, Spencer Seals, Valerie Shalin

Military medics are often required to deliver emergency medical care in austere, resource-limited environments without the support of broader medical teams. Unlike civilian counterparts, deployed medics face complex and unpredictable conditions that demand a wide range of rarely practiced skills. This study examines the gap between training and the operational realities faced by Air Force medics, emphasizing the lack of adequate tools, resources, and ongoing skill reinforcement necessary to perform a full scope of emergency care. Findings from a cognitive task analysis reveal critical training deficiencies and highlight opportunities to enhance preparedness for deployment medical challenges.

Poster #54      **Sonu Yadav**      [yadav.60@wright.edu](mailto:yadav.60@wright.edu)

Research advisor: Quan Zhong, PhD

### **Endo-lysosomal genetic modifiers of alpha-synuclein toxicity**

Co-authors: Sonu Yadav, Ishita Haider, Shuzhen Chen, Yali Chi, Elliott Hayden, Shulin Ju, Quan Zhong

Parkinson's disease (PD) is an age-related disorder with 90% of cases occurring sporadically. Alpha-synuclein, a protein genetically associated with PD, misfolds and accumulates in the brains of affected individuals. Elevated alpha-synuclein disrupts cellular homeostasis, with growing evidence implicating endo-lysosomal dysfunction as a key contributor. In a genome-wide screen, our lab has identified genes that enhance alpha-synuclein toxicity even at normally non-toxic levels. Many such enhancers function in the endo-lysosomal pathway. We are currently developing models with a tiered increase of alpha-synuclein copy numbers to dissect how enhancer proteins and alpha-synuclein dosage drive endo-lysosomal disruption.