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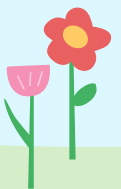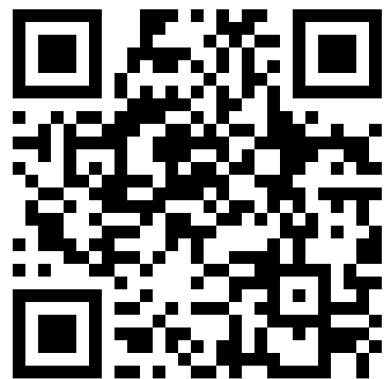
THE 7TH ANNUAL

UNDERGRADUATE SPRING SYMPOSIUM

MOUNTAINLAIR

SUNDAY, APRIL 23RD

12:30PM - 5:00 PM

Use the QR code or the link to RSVP!

Reminder: Please bring your own water bottle!

https://wvuengage.wvu.edu/event/8983780

7th Annual Undergraduate Research Symposium
West Virginia University

I. Organizing Committee

Dr. Amy Hessl, Director, Office of Undergraduate Research
Dr. Cinthia Pacheco, Assistant Director, Office of Undergraduate Research
Kevin Walden, Program Coordinator, Office of Undergraduate Research
Miranda Reed, Administrative Associate, Office of Undergraduate Research
Dr. Carinna Ferguson, Graduate Assistant, Office of Undergraduate Research

II. Sponsors

The Sixth Annual Undergraduate Spring Symposium, which enhances scholarly opportunities for undergraduate students attending West Virginia University, has been enriched by the contributions, funding or otherwise, provided by the WVU programs below. We are deeply appreciative and want to thank all our sponsors for their time, effort and support of scholarly activities at WVU. Thanks to:

- Office of Undergraduate Research (https://undergraduateresearch.wvu.edu/)
- Research Apprenticeship Program (RAP)
- Honors College (https://www.honors.wvu.edu/)
- Honors Experiential and Community Engaged Learning (EXCEL, https://www.honors.wvu.edu/academics/honors-excel-program)

III. Event Schedules

1:00 pm – 2:40 pm	Public Poser Session I	
1:00 pm 2:40 pm	Oral Presentations Session I	
2:40 pm – 3:00 pm	Coffee Break	
3:00 pm – 4:40 pm	Public Poster Session II	
3:00 pm – 4:40 pm	Oral Presentations Session II	

	Category	Time	Room
I	Biological & Biochemical Sciences - Poster	1:00 pm – 2:40 pm	MSU Ballrooms
I	Environmental & Agricultural Sciences - Poster	1:00 pm – 2:40 pm	MSU Ballrooms
I	Social & Behavioral Sciences - Poster	1:00 pm – 2:40 pm	MSU Ballrooms
I	Biological & Health Sciences - Oral	1:00 pm – 2:40 pm	Cathedral
I	Humanities and Behavioral Science - Oral	1:00 pm – 2:40 pm	Blackwater
I	Physical Sciences, Engineering & Technology - Oral	1:00 pm – 2:40 pm	Monongahela
	Coffee Break	2:40 pm - 3:00 pm	MSU Ballrooms
II	Health Sciences & Community Health - Poster	3:00 pm – 4:40 pm	MSU Ballrooms
II	Arts, Humanities & Design - Poster	3:00 pm – 4:40 pm	MSU Ballrooms
II	Physical Sciences & Engineering - Poster	3:00 pm – 4:40 pm	MSU Ballrooms
II	Biological & Health Sciences - Oral	3:00 pm – 4:40 pm	Cathedral
II	Humanities and Behavioral Science - Oral	3:00 pm – 4:40 pm	Blackwater

Session I: 1:00 pm – 2:40 pm

A.   Biological & Biochemical Sciences - Poster - MSU Ballrooms

Presenter No.	Presenter Name		Presentation Title
1	Noah	Adkins	Determining correlations between spring coralroot (Corallorhiza wisteriana) genetic diversity and fungal host genetic diversity
2	Ian	Adler	A novel role for Hox genes in the control of body size and allometry
3	Tyler	Girman	Developing methods to control huntingtin aggregation in C. elegans
4	David	Kelley	Quantification of ATPS Labeled Sialyllactose
5	Audrey	Longenecker	Effects of White-Tailed Deer Density on Species Diversity in Hampshire County, WV
6	Laiklyn	Luther	Stress during puberty produces lasting epigenetic changes in the brain
7	Daniel	Markovits	Gene therapy restores vision to an all-cone mouse model of Blue Cone Monochromacy
8	Ella	Moats	Understanding the Biosynthesis Regulation of the Anti-Malarial Compound, Artemisinin, in Artemisia annua
9	Rachel	Morris	Disruption to Discovery: Transporter Knockdown Provides Insight into Tsetse Development
10	Vanessa	Mueller	Consumption of Different Sugar Beverages Affects Gene Expression in the Hypothalamus of Growing Female Rats
11	Benjamin	Pursley	Time and sex-dependent modulatory functions of serotonin cells within the Drosophila olfactory system
12	Mouhammad	Sissoko	The effect of high-fat diet-induced obesity on middle cerebral artery dilation
13	Dana	Smith	Examining the impact of pubertal stress on placental gene expression in mice
14	Abigail	Snyder	Effect of Grainyhead-like-2 (GRHL2) Expression on Interferon Responses in Epithelial Cancer
15	Alexus	Tygrett	Dissecting the Roles of Hox Genes in Adult Stem Cell Differentiation
16	Kaitlin	Wilson	Towards a rapid DNA test for cases of poisonings with Amanita and Galerina mushrooms

B. Environmental & Agricultural Sciences - Poster - MSU Ballrooms

Presenter No.	Presenter Name		Presentation Title
17	Ronalie	Abeyratne	The Effect of Harvest Stage on Lemon Balm and Lime Basil Decoction Total Mineral Content and Antioxidant Capacity
18	Austin	Alexander	O-Methyltransferases in Anisaldehyde Biosynthesis of Strawberry Flowers
19	Andrea	Alimario	Developing an Assay for Identifying Volatile Compounds in Pork
20	Conner	Channels	Leaf Angle Phenology in Trees of Northern Wisconsin NEON Sites
21	Gianna	Chimino	Novel Bovine Oocyte-specific lncRNA is Associated with Oocyte Quality
22	Kaylin	Donley	Effects of forage supplementation on growth and development of pre-weaned Holstein calves
23	Emily	Dugan	OOSNCR1, a novel oocyte specific long-non-coding RNA in cattle, is cytoplasmic and maternally derived
24	Kiah	Hill	White-tailed Deer Doe and Fawn Population Ratios In Counties Across West Virginia
25	Damon	LeMaster	The Impact of Grazing Intensity on Soil Organic Matter and Aggregate Stability
26	Brandon	Mundy	An Overview of Phenology of Ichthyoplankton in the Ohio River Basin
27	Victoria	Nist	The Expression of Melanocortin Receptors and Attractin in the Bovine Ovary
28	Adelle	Pacyna	Mass Balance of Materials Recovered from Mealworms (Tenebrio molitor) Extracted by a pH-Shift Process
29	Kelsey	Razvillas	Effectiveness of an Inexpensive, Portable Deer Exclosure in Preventing Forest Understory Overbrowsing
30	Austin	Sharp	Bird Species Richness in Edge Habitat and Interior Habitat
31	Jordan	Stewart	West Virginia Forest Landowners‚Äô Perceptions of Forest Carbon Offset Programs
32	Nikki	Vilasuso	Measuring Leaf Angles to Further our Understanding of Trees' Response to Climate Variability
155	Hannah	Bentley	Understanding belowground processes in the Miscanthus x giganteus rhizosphere

C. Social & Behavioral Sciences - Poster - MSU Ballrooms

Presenter No.	Presenter Name		Presentation Title
33	Ayah	Aldebyan	Relations among BMI, T2D, Education and Cognition: It‚Äôs complicated.
34	Laurel	Allen	Effects of Parental Attachment on Student‚Äôs Mental Health During the Transition to College
35	Caylin	Armentrout	Short-term behavioral, physiological, and brain differences in real life and virtual reality social interactions
36	Amina	Boukhris	Effects of Initial Interaction on Preference and Reinforcing Efficacy of Attention
37	Indigo	Brock	Effects of Public Safety Budget Changes on Violent Crime Rates in West Virginia
38	Chloe	Carpenter	Workplace accessibility, unemployment, and depressive disorders
39	Brooke	Dierkes	Mental and Physical Health in Association with Heavy Drinking
40	Bianca Elena	Dominguez	Effectiveness of Parent-Child Interaction Therapy as a treatment for grandfamilies
41	Zoe	Fagan	Psychosocial Differences among American Minorities that Lead to Health Disparities
42	Nya	Feinstein	Forecasting the Russo-Ukraine Conflict through Analysis of Ukrainian News Sources
43	Kaylee	Ferrell	The Effect of Alcohol Use and Rural Residency on Suicidal Thoughts and Behaviors
44	Shakira	Ginevan	How the COVID-19 Pandemic Affected Stay-at-Home Parents‚Äô Mental Health
45	Paydon	Greathouse	Sharing Crime Online
46	Jacqueline	Heil	Reporting Correlations between West Virginia Mental Health Spending and Drug Overdose Rates by County
47	Sarah	Hollen	Effects of Commission Errors and The Fidelity of BIP Implementation
48	Brooke	Jones	TRAIN for the Opioid Crisis: Preparedness and Knowledge of Youth Camp Staff
49	Hayley	Joray	Effects of Ethanol Administration on Risky Choice in Rats
50	Gillian	Kaier	Food Cue-Reactivity in Human Sign-Trackers and Goal-Trackers
51	Melanie	Kelly	Rethink before you drink
52	Marleah	Knights	What Matters? Race and Geography as Factors of HPV Vaccine Uptake for Black Appalachians

Presenter No.	Presenter Name		Presentation Title
53	Teagan	Kuzniar	Advancing Sustainable Practices of the Mountaineer Undergraduate Research Review
54	Elizabeth	Lewis	Characterizing Electronic Cigarette Puffing Patterns Across Two Ad Libitum Bouts
55	Julia	Leyden	The Relationship Between Mental Health Spending and Suicide Rates by West Virginia Counties
56	Ty	Linthicum	Birds of Blennerhassett: Human-Avian Interaction as Cultural and Environmental Evidence
57	Brooke	Mollohan	Comorbidity of Depression and High Cholesterol
58	Olivia	Pacetti	Play Higher Behavioral Health Virtual Reality Game
59	Alexis	Pantalone	Impacts of Fidelity Data Collection on Procedural Implementation
60	Sydney	Parker	Exploration of Variables that Affect Attendance for Rural Appalachian Child Advocacy Center Therapy Clients
61	Spencer	Perkins	Comparing and Updating Multinational Military Exercise (MME) Datasets
62	Tavares	Richards	The trade dividend of mental and physical health, a racial study.
63	Kylie	Richo	Effects of Education and Income on Depression
64	Savon	Rogers	Economic Inequality in Europe and it's Effects on Access to Resources.
65	Hannah	Shuff	The Emergence of Second-hand Luxury Fashion into the Metaverse
66	Sheridan	Tolley	Combating Health Disparities One-Step at a Time: My Experience Editing Special Articles for Publishing
67	Grace	Udah	The stroke Epidemic among African Americans
68	Marissa	Venezia	Insufficient Representation of Missing Minority Children Caused by Media Bias in Major News Publications
69	Adrianna	Wood	How Corporations' Hiring Practices Create Additional Barriers for Neurodivergent Job Seekers
70	Julianne	Zajdel	Emotion Socialization and Child Abuse Potential When Caring for At-Risk Toddlers

D. Biological & Health Sciences - Oral - Cathedral Room

Presenter No.	Time	Presenter Name		Presentation Title
72	1:00-1:20 pm	Gracie	Monachello	IRRAflow is superior to EVD in the treatment of hemorrhagic stroke and cerebral infection
73	1:20-1:40 pm	Joshua	Niedermeyer	Does affective lability persist between mood episodes among individuals with early-onset bipolar spectrum disorder?
74	1:40-2:00 pm	Chaysee	Putnam	The Effect of Immunotherapy on the Cardiovascular System
75	2:00-2:20 pm	Madison	Sigler	Evaluating barriers and attitudes toward obesity and exercise in West Virginian endometrial cancer survivors

E. Humanities & Behavioral Sciences - Oral - Blackwater Room

Presenter No.	Time	Presenter Name		Presentation Title
76	1:00-1:20 pm	Emily	Budik	The Formal Elements Art Therapy Scale (FEATS) Digital Archival Project
77	1:20-1:40 pm	Emma	Fleming	Mischief, Mayhem, SOAP: The Cleansing of Reality in Fight Club
78	1:40-2:00 pm	Jordyn	Hussain	West Virginia University Unsolved Case Project
79	2:00-2:20 pm	Julia	Lopez	Let Us Walk with the Fairies: Enchantment, Community, and the Power of Place

F. Physical Sciences, Engineering & Technology - Oral - Monongahela Room

Presenter No.	Time	Presenter Name		Presentation Title
80	1:00-1:20 pm	Quinn	Dugger	Experimental Investigation of Heat-Activated Kirigami Deployment
81	1:20-1:40 pm	Jacob	Freeze	Preliminary Designs of a Diagnostic Probe for Magnetized Plasma Systems
82	1:40-2:00 pm	Evelyn	Patterson	Characterization of Superhydrophobic Polyamines/Teflon Coating on Metallic Substrates

Session II: 3:00 pm – 4:40 pm

A.   Health Sciences & Community Health - Poster - MSU Ballrooms

Presenter No.	Presenter Name		Presentation Title
84	Sami	Abdeen	The Application of Echocardiograms through Radiomics for Medical Diagnoses
85	Jennifer	Alvis	COVID-19 Vaccine Uptake Among West Virginians with Two or More Chronic Disease Comorbidities
86	Samantha	Antol	Suppression of periodontitis-induced bone erosion by haloanilide drug candidate ELP-004
87	Madison	Ayers	The Importance of Point of Connection Between Providers and People Who Use Drugs
88	Rachael	Bare	Effects of IL-27 Cytokine on Expression of Metabolism-Regulating Hormones in Neonatal Sepsis
89	Reagan	Bennett	A Course-based Mental Wellness Intervention for Undergraduate Exercise Physiology Students with Low Self-Efficacy
90	Lina	Bouhaouala	Disability and Healthy Days
91	Lauren	Campbell	The Impact of Children in the Household on Likelihood of Coronary Heart Disease
92	Hanna	Corob	The Effects of Light at Night on Neurobehavioral Deficits During Recovery from Stroke
93	Antonio	Diaz Perez	WVU Medicine Craniofacial Surgical Outcomes
94	Phillip	Essenmacher	Energy intake and sports nutrition knowledge of recreational rock climbers
95	Shaylee	Hall	How Tobacco Usage from West Virginia Compares with the Rest of the United States
96	Lindsey	Hinckley	Effects of IAP on Immune Cell Infiltration to the Brain Post Stroke
97	Grady	King	Impact of the Affordable Care Act on Heart Disease Mortality in the United States
98	Erika	Lerfald	Implementing a Narrative Medicine Curriculum to Third-Year Medical Students
99	Jayna	Michael	Shape Coding Language Therapy for Acquiring Pronouns in a Child with Apraxia of Speech
100	Allie	Miller	The Relationship Between Smoking and Poor Health Days
101	Alexandria	Moran	Tentative parallel between caffeine's neuroprotective effects in humans and in Alzheimer Disease animal model
102	Brianna	Myers	West Virginia: Almost Heaven, But Not For Mountain Mamas

Presenter No.	Presenter Name		Presentation Title
103	Bernardo	Pacheco Pereira	Loss of tissue nonspecific alkaline phosphatase results in exacerbated neurological deficits post-stroke
104	Amaira	Palmer	Improving the efficiency of identifying language disorders and evidence-based instruction using SKILL intervention
105	Louise	Pammer Leach	Reducing Adverse Childhood Events through the Utilizationof the Earned Income Tax Credit
106	Daniel	Pancake	Looking at Heart Rate Variability for the Effects of Diet on Cardiovascular Health
107	Anushka	Pathak	Craniosynostosis: Surgical Methods and Outcomes
108	Auston	Riccio	Fentanyl Test Strip (FTS) Use by People Who Inject Drugs (PWID) in Morgantown, West Virginia
109	Lienne	Russell	Documenting the Course and Branching Patterns of the Dorsomedial Cutaneous Nerve of the Hallux
110	Lillian	Shields	Effect of prolonged dosing interval of multiple sclerosis disease modifying therapy on patient satisfaction and psychological distress
111	Raafay	Uqaily	Developing an AI-Enabled ECG Algorithm to Differentiate Cardiomyopathies
112	Ateria	Walker	Manipulating Xanthine Oxidase and the Role of StressAuthors: Ateria Walker, Crystal Oudomvilay, Saina S Prabhu, Emily Burrage and Paul D Chantler School of Medicine, West Virginia University, Morgantown WV
113	Nigel	Walsh	Evaluating Transfer Patterns For Rural Pediatric Distal Radioulnar Fractures
114	Liza	Wan	Skeletal and Dental Response to Treatment of Class II Malocclusions with Carriere Motion Appliance
115	Kenneth	Wang	Multimodality Imaging Approach to Predict Antineoplastic Therapy Induced Cardiotoxicity
116	Ava	Wilson	Testing Primers for Reliability With Tick Borne Pathogens

B. Arts, Humanities & Design - Poster - MSU Ballrooms

Presenter No.	Presenter Name		Presentation Title
117	Autumn	Fitzsimmons	An Exploration of the Intersection of the East and West Analyzed in Fairy Tales

118	Wyatt	Gaines	Exploring the relationship between Agricultural spending in West Virginia and its impact on the local Agricultural Industry
119	Kieah	Hamric	Snack Lounge: A Patterned Exploration of Social Functions in Design
120	Micah	Waring	Degree of Congressional Oversight of Executive Agencies

C. Physical Sciences & Engineering - Poster - MSU Ballrooms

Presenter No.	Presenter Name		Presentation Title
121	Connor	Anderson	Flame Characteristics of Hydrocarbon Flames Made with a Linear Hencken-type Burner
122	Kaitlyn	Apgar	Utilization of cVSSI-APCI-MS for rapid identification of drugs and their metabolites in serum
123	Elias	Ball	Synthesizing Soft Robots using a Silicone-Based Polymer
124	Jada	Berg	Antibacterial Activity of Resorufin Compounds Against Neisseria Gonorrhoeae
125	Daniel	Campa	Analyzing Cell Microscopy Datasets Using Machine Learning
126	Charles	Campbell	Using Electromagnetism to Study How Microgravity Changes Cells
127	Devansh	Chauhan	Understanding Synthetic Gases using ANSYS Fluent.
128	Christina	Denison	Nerve Guides to Repair Injured Nerves and Spinal Cord
129	Joseph	Harrah	CO_2 Conversion Performance of Nickel Catalysts on Varied Supports
130	Griffin	Holbert	A Wireless Positioning System with Low-cost Hardware
131	Grace	Kerr	Current and Future Probable Maximum Precipitation (PMP) in West Virginia;
133	Logan	Marks	A Wireless Positioning System with Low-cost Hardware
134	Tyrin	Musser	Vertically-Stacked Propeller Configuration
135	McKenna.	Oaks	Application of PX-2 Fragmentation Behavior to PINACA Novel Psychoactive Substances (NPS)
136	Chelsea	Pack	Inertial Sensor Calibration Accuracy of Calculated Wrist Velocity and Position During Eye Drop Instillation
137	Alexis	Ravenscroft	Synthesis and Catalysis of Difluoroboralactonate Salts
138	Justin	Riggs	Electric Field Waves and Temperature Changes in Earth's Shock Region
139	Ricardo	Rodriguez	A Wireless Positioning System with Low-cost Hardware
140	Christopher	Smith	The dielectric characterization of breast cancer cells using human PBMCs

			Computational Analysis of Premixed Methane Combustion in Microchannels: Influence of Inlet Velocity and Diameter.
141	Brayden	Smith	
142	Ha	Tran	Mn-based A-Site High-Entropy Perovskite Oxides for Enhanced Solar Thermochemical Hydrogen Production.
143	Emily	Whalen	Evaluation of the Effectiveness of CrimePad
144	Izaak	Whetsell	Developing the Autonomy of a Small, Cable Traversing Robot
83	Ethan	Thompson	Evaluation of Complex Conductivity in Liquid Exfoliated Nanoflakes via Terahertz-Time Domain Spectroscopy

D. Biological & Health Sciences - Oral - Cathedral Room

Presenter No.	Time	Presenter Name		Presentation Title
145	3:00-3:20 pm	Nathaniel	Alvarado	The Damage Threshold of P. scribneri and P. penetrans on Cannabis sativa
146	3:20-3:40 pm	Evelyn	Bennett	The Lasting Effects of the COVID-19 Pandemic on Dancer Participation
147	3:40-4:00 pm	Ty	Landis	Environmental Exposures and Outcomes Associated with Hypersensitivity Pneumonitis in Rural Appalachia
148	4:00-4:20 pm	Rylie	ONeal	Building Access to Nursing-Led Care through Faith Community Settings

E. Humanities & Behavioral Sciences - Oral - Blackwater Room

Presenter No.	Time	Presenter Name		Presentation Title
149	3:00-3:20 pm	Kelsey	Clodfelter	Standardization of Helen Pollard's Archaeological Typology of the Patzcuaro Area Ceramic Collection
150	3:20-3:40 pm	Charles	Long	The Freedom Premium: A Cost of Health Insurance for Liberals and Conservatives
151	3:40-4:00 pm	Emily	Major	Impact of U.S. Supreme Court Cases Throughout History
71	4:00-4:20 pm	Christian	Rhen	Accessible Recordings for New Musicians

Presentation Number: 1

Determining correlations between spring coralroot (Corallorhiza wisteriana) genetic diversity and fungal host genetic diversity

Noah Adkins, Hana Thixton-Nolan, Cameron Corbett, Craig Barrett
Department of Biology

Student's Major: Biology

Corallorhiza wisteriana;is a species of parasitic orchid found in North America including around the Rocky Mountains and the eastern USA. This species is partially mycoheterotrophic, meaning it parasitizes ectomycorrhizal fungi as its primary carbon source but retains the ability to photosynthesize. C. wisteriana parasitizes members of two families that differ between the eastern and western USA, with some populations being polymorphic for both. Thus, C. wisteriana provides a system to quantify fungal host specificity and shifts within and among populations. I aim to determine if there is a correlation between orchid and host-fungal genetic diversity. I will assess the specificity of orchid-fungal associations by processing samples in West Virginia, Ohio, and Virginia. Fungal DNA from a site in WV has been sequenced to construct a phylogenetic tree. Samples processed thus far belong to five species in the genus Russula with predominance in R. pulverulenta. Orchid shoot DNA will be sequenced using modified MIG-seq protocol, generating data for phylogenetic and population analyses. Orchid and fungal phylogenetic trees will be compared to determine if each is independent of the other or if there are non-random association patterns. These fungal hosts have mutualistic relationships with trees in their community, therefore understanding the diversity of fungal networks is imperative to understanding the health of an area. Orchids are known to be great indicators of the health of a site, as they may be proxies of soil biodiversity. Furthering knowledge in this field allows for stronger conservation efforts to be taken in the future.

Presentation Number: 2

A novel role for Hox genes in the control of body size and allometry

Ian Adler, Olivia Lynch, Alejandro Sanchez Alvarado, Christopher Arnold
Department of Biology, West Virginia University

Student's Major: Biology

Proper control of allometry and scaling are key to animal regeneration and maintenance of tissue. Planaria are a species of regenerative flatworms that provide an instructive model for understanding the principles of tissue regeneration and the re-establishment of form and function in lost or damaged tissues. Despite these animals displaying an unparalleled level of growth potential, they only exist in a small range of sizes. We recently identified a novel role for Hox genes, evolutionarily transcription factors known for their roles in body planning along the axial planes, in planarian size regulation. Through the knockdown of Post2b, a posterior hox gene homolog, animals are able to grow to sizes six-fold their original scale. We set out to determine how the animal's body plan scales in a state of unrestricted growth. We used;the Fiji software to;perform length and width analysis of over 200 wild-type or Post2b RNAi animals ranging from 1 mm to 45 mm in length. Acquired data presents two conclusory ideas for the growth model of planaria. Either normal animals and Post2b RNAi-treated animals exhibit one logarithmic growth model, or they each exhibit their own distinct linear growth model. Post2b RNAi animals exhibit length-favored growth, while control animals exhibit a smaller length-width ratio. The study of planaria and their unrestricted growth can serve as an analog to cancer, allowing an even greater understanding of the underlying mechanisms of disrupted growth control and revealing novel therapeutic targets.

Program/Mechanism Supporting Research/ Creative Efforts: Other

Presentation Number: 3

Developing methods to control huntingtin aggregation in C. elegans

Tyler Girman, Kaitlyn Keith, Laiken Cook, Ephraim Ezeigbo, Chathuranga Siriwardhana, Justin Legleiter
Department of Chemistry, West Virginia University

Student's Major: Chemistry

Huntington's disease (HD) is a genetic neurodegenerative disease caused by a mutation in the huntingtin protein (htt). The mutation results in anomalous expansion in a repeat stretch of glutamine residues (polyQ) in the huntingtin protein, which triggers htt aggregation. The aggregation process proceeds through several intermediates (oligomers and fibrils) that eventually coalesce into large protein deposits, which are the hallmark of HD. Controversy remains as to the roles of different aggregates in disease. Therefore, methods are beingdeveloped to control and/or manipulate htt aggregation in a nematode worm model (C. elegans) model of HD. Two strains of C. elegans are used. The first expresses htt with a nonpathogeinc length polyQ domain (15 repeat glutamine residues, Q15); the other express htt with a pathogenic length polyQ domain (128 repeat glutamine residues, Q128). Htt aggregation in these worms result in two measurable changes. Worms with pathogenic htt are less viable andhave motor defects. To enhance aggregation, preformed htt aggregates were used to seed aggregation in the Q15 worms. Relative to control, the addition of seeds induced aggregation in worms and led to decreased viability, suggesting that promoting aggregation of a nonpathogenic htt induces toxicty. To slow aggregation, Q128 worms were treated with small molecules known to inhibit aggregation (Riluzole and EGCG). However, neither molecule was able to sufficiently inhibit aggregation in the worm model, as inclusion formation occurred before worms could be effectively dosed. As a result, alternative strategies to reduce aggregation will be explored.

Presentation Number: 4

Quantification of ATPS Labeled Sialyllactose

David Kelley
Department of Chemistry, West Virginia University

Student's Major: Immunology and Medical Microbiology

Sialic acid is important because of its role in the detection and infection of our cells by viruses. Pathogenic neuraminidase enzymes cleave sialic acids from the terminal end of oligosaccharides. It plays a large role in viral and bacterial propagation. Capillary electrophoresis can be used to qualify the Michaelis-Menten constants for these enzymes by observing rates of desialylation from sialyllated substrates. Sialyllactose is a sialic acid that specifically plays a role in viral pathology through neuraminidase and therefore is an interesting target for enzyme-substrate interaction studies. In order to detect sialyllactose it must be chemically modified to contain optical probes that are detected by their ability to absorb or emit light. Aminopyrene trisulfonic acid (APTS) is a fluorescent dye that can be conjugated to sialyllactose on the reducing end of the sugar. Since 100% labeling efficiency is necessary, the dye is added in great excess. However, to prevent matrix effects during analysis, the excess dye needs to be cleaned off. This is done using solid phase extraction. Solid phase extraction utilizes polarity of the sample and different solutions to wash off the excess dye and leave only the labeled sample remaining. Calibration methods can be employed to derive several key pieces of information regarding sialyllactose and enzyme performance. Primarily, quantification of sialyllactose is the central element to leveraging capillary electrophoresis for investigating viral enzyme activity.

Presentation Number: 5

Effects of White-Tailed Deer Density on Species Diversity in Hampshire County, WV

Audrey Longenecker, Christopher Rota, Sarah Pesi
Wildlife and Fisheries Resources

Student's Major: Wildlife and Fisheries Resources

White-tailed deer (Odocoileus virginianus) play an important ecological role. While an overabundant population can cause issues such as overbrowsing, a less abundant population can lead to a lack of prey for predators. Hampshire County, WV has seen a notable decline in the density of white-tailed deer populations as a result of Chronic Wasting Disease (CWD). CWD is a deadly prion disease affecting Cervidae populations in 29 US states. The first Cervid to test positive for CWD in West Virginia was in Hampshire County in 2005. The goal of this study is to determine the effect that a decline in deer density has had on the species diversity of Hampshire County. Species diversity is defined as the number of different species present within an ecosystem and the relative abundance of those species. Camera trap data from Jackson-Mason and Barbour-Upshur Counties was compared to that of; Hampshire County, WV. Jackson-Mason and Barbour-Upshur counties are relatively unaffected by CWD. Following data collection, the web-based application Wildlife Insights was used to identify unique species captured on cameras. Conclusions of this study will help us to identify the long-term ecological effects of an ecologically important herbivore.

Presentation Number: 6

Stress during puberty produces lasting epigenetic changes in the brain

Laiklyn Luther, Karissa Gautier, Samantha Higley, Kathleen Morrison
Department of Psychology, West Virginia University

Student's Major: Neuroscience

Experiencing adverse events during the critical developmental period of puberty puts women at risk for developing neuropsychiatric disorders in adulthood, especially if they become pregnant. Undergoing stress during puberty and later becoming pregnant alters the response of the hypothalamic-pituitary-adrenal (HPA) axis, a key player in mood disorders, during adulthood in humans and mice. Previously, we found that pubertal stress permanently alters gene expression in the brain region responsible for initiating the HPA axis "the paraventricular nucleus of the hypothalamus (PVN)" in female mice. The chromatin landscape, made up of DNA wrapped around core histone proteins, determines which genes are available for expression. We have shown that the lasting changes in gene expression are associated with alterations to the chromatin landscape, such that pregnant, pubertally-stressed females had increased openness of chromatin. Here, we aim to understand which chromatin modifications are associated with the â€˜open' chromatin in pubertally-stressed mice. Beginning at postnatal day 21, mice were exposed to 14 days of stress. Brains were collected from one cohort of mice 24h after the last stressor. In another cohort, pubertally-stressed adult mice were bred or left as nonpregnant controls. At 17.5 days post-conception, pregnant female and age-matched nonpregnant female brains were collected. The PVN was dissected, protein isolation was performed, and H3K9 acetylation was quantified. We found an association between pubertal stress exposure and H3K9 acetylation in adulthood, regardless of pregnancy.; These results further our understanding of the molecular mechanisms that contribute to risk for negative outcomes following adversity during puberty.

Presentation Number: 7

Gene therapy restores vision to an all-cone mouse model of Blue Cone Monochromacy

Daniel Markovits
Department of Biology, West Virginia University

Student's Major: Biology

Blue cone monochromacy (BCM) is an X-linked vision disorder that causes severely reduced visual acuity, and color blindness. Affected individuals have mutations in long and medium-wavelength cone opsins which severely reduce cone photoreceptor function. One of the most common causes of BCM is a point mutation, C203R, where cysteine at position 203 is mutated to arginine, resulting in a misfolding nonfunctional protein. We develop a corresponding mouse model Nrl -/- /Opn1mwC198R/Opn1sw-/- for BCM with C203R mutation. By knocking out the Nrl transcription factor we created a cone photoreceptor-dominant retina to replicate the human foveae since BCM only affects cones concentrated in the foveae. These mice were injected subretinally at one month (1M) with human L opsin under cone-specific promoter PR2.1 and packaged in rAAV8-Y733F. We used photopic electroretinograms (ERGs) to assess visual function, while retinal cross-sections were examined by immunohistochemistry with antibodies against L/M opsin, PDE6C, and GNAT2 to assess cone outer segment structure. We show that untreated mice have shortened cone outer segments and no photopic ERG response, structurally and functionally mimicking BCM foveae. Additionally, we show that treatment rescue cone function with ERG response of 156 Â± 18Î¼V at a light intensity of 120 cdâ¸s/m2. This is ~38 % of age-matched Nrl-/- control eyes and significantly higher than untreated eyes, which have flat ERG response. The structural rescue was also observed as exogenous L-opsin replenished the outer segment along with GNAT2 and cPDE6.

Presentation Number: 8

Understanding the Biosynthesis Regulation of the Anti-Malarial Compound, Artemisinin, in Artemisia annua

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Student's Major: Biology, Psychology

Progress on malaria treatment has stalled since 2015, and yearly, more people experience its deadly effects as funding, health care, and vector control remain inadequate in sub-Saharan Africa, where 98% of malaria deaths occur. One component of this treatment is the chemical artemisinin, derived from Artemisia annua. Artemisinin is a sesquiterpene lactone with a peroxide bridge, which is a difficult and expensive structure to synthesize in vitro. Its biosynthesis pathway has many branches that take carbons away from producing; the compound of interest. The goal of this research is to optimize carbon flow in the terpenoid pathway to increase the synthesis of artemisinin. It is key to understanding which genetic elements are involved in determining where carbon flows in the terpenoid pathway is key. We hypothesis that carbon will flow more strongly toward artemisinin biosynthesis by identifying and knocking out genes involved in monoterpene and other sesquiterpene. For this, a unique Artemisia annua germplasm collection at WVU will be studied by using GC-MS to quantify specific terpenoids and genomic analysis to identify elements involved in carbon flow. By identifying these genes. These results will lead us to modify the Artemisia annua genome to better suit the needs of the medical industry. We will contribute to creating affordable, accessible treatment for those struggling with the effects of malaria.

Presentation Number: 9

Disruption to Discovery: Transporter Knockdown Provides Insight into Tsetse Development

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Student's Major: Biology

Tsetse flies (Diptera: Glossinidae) are the medically and economically significant vectors of African trypanosomes which cause significant detriment to public health and economic stability in sub-Saharan Africa. As strict blood feeders, tsetse flies rely on an obligate bacterial symbiont, Wigglesworthia glossinidia, to provide crucial B-vitamins for fitness and reproduction. The removal or functional disruption of this microbial symbiosis results in tsetse fly sterility. In return for B vitamin provisioning, tsetse flies provide amino acids to their Wigglesworthia symbiont. Membrane transporters are keystone regulators of metabolic exchange at the host-symbiont interface. Therefore, the highly expressed tsetse transporter proton-coupled amino acid transporter (PAT), is believed to play a crucial role in the symbiosis. Here, we describe the use of RNA interference (RNAi), delivered in the pupal and teneral life stages, towards the knockdown of PAT expression. Successful knockdown of PAT was observed, prompting functional analyses determining phenotype outcomes towards tsetse lifespan and reproduction. Interruption of transporters (such as PAT) which underly the metabolic integration of tsetse and Wigglesworthia may provide targets for novel pesticide design, and ultimately, suppression of disease transmission.

Consumption of Different Sugar Beverages Affects Gene Expression in the Hypothalamus of Growing Female Rats

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Student's Major: Biochemistry

Background: Table sugar, sucrose, contains 50% glucose and 50% fructose while high fructose corn syrup (HFCS-55) contains 45% glucose and 55% fructose which provides 5% more fructose than sucrose. Fructose has been shown to alter brain metabolism and function, and to increase the risk of neurodegeneration. Previously our laboratory found that feeding rats a Western diet, high in sugar containing fructose, promoted brain aging. This has potential health implication since HFCS-55 has replaced sucrose as the sweetener in sugary beverages. Objective: To investigate gene interactions in the hypothalamus of female rats fed different sugar-sweetened beverages using RNA-sequencing (RNA-seq) technology.

Methods: Female Sprague-Dawley rats (age 21 days) were randomly assigned (n=7 rats/group) to consume: 1) water (control) or water sweetened with 13% w/v 2) HFCS-55, 3) sucrose, or 4) fructose for 8 weeks. RNA-seq was performed to explore different genes expressed in the hypothalamus.

Results: RNA-seq results show 8 significant gene expression differences between water and HFCS-55 beverage groups and 1 significant gene expression difference between water and sucrose beverage groups. Significantly downregulated genes included: Sycp3, Hoxb5, Fat2, Syt2, and Impg1. These genes have been reported to regulate reproduction, vision, and cognition while Prr15, significantly upregulated, has been linked to Alzheimer disease.

Conclusions: Altered gene expression show that HFCS-55 consumption increases risk of infertility, retinal photoreceptor insensitivity, attention deficit hyperactivity disorder, and neurodegeneration in adolescent female rats.Significance: Based on this pre-clinical study, HFCS-55 decreases brain function and increases the risk of neurodegeneration providing evidence for reducing HFCS-55 consumption.;

Program/Mechanism Supporting Research/ Creative Efforts: 497 (research) course in your major

Presentation Number: 11

Time and sex-dependent modulatory functions of serotonin cells within the Drosophila olfactory system

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Student's Major: Biochemistry

Sleep is required for many aspects such as memory consolidation and energy homeostasis. The importance of sleep is known, many mechanisms that regulate sleep/wake states remain unclear. Serotonin is a known neuromodulator that regulates sleep, however many mechanisms have been determined using broad genetic or pharmacological manipulations of serotonin signaling, making it difficult to determine sleep-related functions of specific serotonin networks. To address this issue, we use genetic tools in Drosophila melanogaster to manipulate identified serotonin networks in a sleep-related behavioral context. In particular, we are interested in the sleep-related function of a pair of serotonin cells called the CSDns, which are the sole source of synaptic serotonin to the olfactory network. In this study we used reporters of endogenous protein expression paired with immunocytochemistry to determine the signaling mechanisms used by the CSDns. Then, we performed RNA-interference to knockdown the expression of genes of interest within the CSDns and placed the animals in the Drosophila activity monitor to determine how they impact sleep. As we expected, the CSDns expressed genes related to serotonin signaling, like vmat, in addition to the shakB component of electrical synapses. Furthermore, animals with reduced vmat expression in the CSDns exhibited a decrease in daytime sleep, while animals with reduced shakB expression had a decrease in nighttime sleep. Interestingly, these behavioral phenotypes were only found in females, suggesting there is a sex-specific difference within CSDn signaling. The findings demonstrate that there are two separate mechanisms controlling the sleep/wake cycle at different times.

Presentation Number: 12

The effect of high-fat diet-induced obesity on middle cerebral artery dilation

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Student's Major: Exercise Physiology

High-fat diet (HFD)-induced obesity has become a topic of interest, particularly relating to the effect it has on the cerebrovasculature and its consequential impact on the brain. The purpose of this study was to examine the effect HFD-induced obesity has on middle cerebral artery (MCA) dilation. In this study, 6-7 week old male and female C57 BL6 mice were fed a diet of either normal chow or a 60% high-fat diet for 20 weeks. After 20 weeks, the mice were euthanized, and the MCAs were removed and positioned in a pressurized myobath to assess endothelium-dependent and endothelium-independent dilation. This was accomplished by exposing increasing concentrations of acetylcholine (ACh) or sodium nitroprusside (SNP) to the MCAs. The results indicated that endothelial-dependent MCA dilation due to ACh resulted in significant changes between lean controls and obese male and female mice signifying endothelial cell impairments. In addition, sex differences for endothelial-dependent MCA dilation were also observed. However, endothelial-independent MCA dilation due to SNP resulted in no significant changes between lean controls and obese male and female mice signifying no impairments in the vascular smooth muscle cells. The significance of this study is that it may push future researchers to target the endothelium/endothelial-dependent mechanisms and to consider sex differences when offsetting impairments in MCA dilation.;

Program/Mechanism Supporting Research/ Creative Efforts: 497 (research) course in your major

Presentation Number: 13

Examining the impact of pubertal stress on placental gene expression in mice

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Student's Major: Psychology

Chronic stress experienced during puberty can lead to adverse outcomes later in life. We have found that both women and female mice that experienced stress during puberty have a blunted hypothalamic-pituitary-adrenal axis (HPA) stress response in adulthood, when they are pregnant. It is known that offspring born to mothers with a disrupted HPA response are at an increased risk of adverse outcomes throughout development. Additionally, stress experienced during pregnancy has been shown to alter placental gene expression, affect the intrauterine environment, and influence offspring brain development. However, whether early life preconception stress results in detrimental outcomes for offspring is unknown. Given the placenta's role in fetal development and sensitivity to stressors applied during pregnancy, we hypothesized that preconception stress experienced during puberty would also result in lasting consequences that alter placental gene expression. Female mice underwent either 14 days of chronic variable stress or were left undisturbed during puberty, starting on postnatal day 21. At 17.5 days post conception, pregnant females underwent an acute restraint stress. Two hours after the stressor started, fetal tissues were collected. Placentas were snap frozen on dry ice and quartered prior to RNA isolation. Once RNA was isolated from placentas, complementary DNA was made and quantitative real-time polymerase chase reaction (qPCR) was performed to assess mRNA levels of three genes within the placenta that are associated with the placental response to stressors. These findings will provide insight into the potential impacts of early life stress on the development of the next generation of offspring.

Presentation Number: 14

Effect of Grainyhead-like-2 (GRHL2) Expression on Interferon Responses in Epithelial Mammary Cancer

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Student's Major: Biology

A fraction of the cells within common human tumors undergo a massive reprogramming from an epithelial to a non-epithelial/mesenchymal phenotype; this process is called EMT (epithelial-mesenchymal transition). These cells are extraordinarily metastatic and drug resistant, readily causing tumor recurrence after therapy. Our lab discovered that a novel gene called Grainyhead-like-2 (GRHL2) universally suppresses EMT. In this project, we investigated the effect of GRHL2 on the ability of cells to mount an interferon type-I response when challenged with a pathogen associated molecular pattern, double-stranded RNA. This interferon response is critical for the immune of rejection of the tumor, with or without immunotherapy. GRHL2 was required for cells to respond to dsRNA by inducing IFN-beta and IFN-lambda expression. Recently, we found that a critical transcription factor called IRF3 failed to be activated in the absence of the GRHL2 gene, most likely due to defects in the activation of an upstream kinase, TBK1 and. This work will prove significant for mechanistically understanding how EMT, and, conversely, GRHL2, regulate interferon responses and immune responses.

Presentation Number: 15

Dissecting the Roles of Hox Genes in Adult Stem Cell Differentiation

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Student's Major: Biology

Hox genes, evolutionarily conserved transcription factors with essential roles in animal development, are well known for their roles in embryogenesis. However, their contributions to adult tissues, specifically their roles in the differentiation of adult tissue stem cells (ASCs) into their respective lineages are poorly understood. Planaria, flatworms that use ASCs to perpetually grow and regenerate, are an emerging invertebrate model for in vivo ASC research. We identified a role for the planarian Hox gene Post2b in the epithelial and secretory cell lineages underlying asexual reproduction. We set out to determine how Post2b mediates ASC differentiation into the epithelial versus secretory cell lineages of the planaria. We hypothesized that Post2b partners with transcription factors Fer3l2 or Post2a to direct the ASCs fate towards the epithelia or secretory lineage. Using fluorescent in situ hybridization (FISH) we identified Post2b expression in stem, neuronal, epithelial, and secretory cells while Fer3l2 and Post2a expression was specific to secretory or epithelial cells, respectively. Using RNA-based gene interference (RNAi) in combination with (FISH), we determined the effects of inhibiting Post2b, Fer3l2, and Post2a on these cell lineages. RNAi of Post2b eliminated both cell lineages while RNAi of Post2a and Fer3l2 resulted in the loss of the epithelial or secretory populations, respectively, while also increasing Post2b in other cell types. This supports our hypothesis of how Post2b functions in ASC fate decisions. Work in this model contributes to understanding the role of Hox genes in ASC lineage commitment in more complex systems underlying human health and disease.

Presentation Number: 16

Towards a rapid DNA test for cases of poisonings with Amanita and Galerina mushrooms

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Student's Major: Forensic Biology

In the forests of the Appalachian region, there are hundreds of species of mushrooms.; Although many are edible, there are some that are highly toxic when ingested. Cases of accidental poisonings are on the rise in the United States. To date, there is no rapid test for identification of the ingested mushrooms and the process can take 1-2 days. In this time, the patient could develop serious life-long illness or may die. Amanita and Galerina mushrooms produce deadly amatoxins and phallotoxins coded for by AMA-1 and PHA-1 genes. Our goal is to develop a rapid (<2 hours) identification test by amplifying a small region within these genes using Real Time PCR. We downloaded AMA1 and PHA1 sequences for Amanita and Galerina and 5.8S ribosomal RNA gene sequences for diverse mushroom species from GenBank® and aligned them in Aliview software. We then identified published primers, but also designed primers for these sequences using Primer-BLAST. With samples obtained from mushroom collectors and edible mushrooms from grocery stores, we are performing DNA extraction, quantitation, and PCR amplification. The AMA1 and PHA1 target is expected to amplify a product of ~90 bp in Amanita and Galerina and the 5.8S target is ~150 bp across all mushroom species, serving as a positive control. Our current tests are using traditional PCR followed by agarose gel electrophoresis, but once methods are optimized, we intend to incorporate our primers within a Real Time PCR test that emergency rooms can use in suspected cases of mushroom poisonings.

Presentation Number: 17

The Effect of Harvest Stage on Lemon Balm and Lime Basil Decoction Total Mineral Content and Antioxidant Capacity

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Student's Major: Biology

Natural herbs have long been used as refreshment as well as for disease mitigation in many cultures, usually as medicinal teas. Herbal tea consumption is becoming popular among the health-conscious community due to suggestions they are rich in minerals and antioxidants. Lemon balm (Melissa officinalis) and lime basil (Ocimum americanum) are herbs in the mint family; Lamiaceae which are both flavorful and suggested to be beneficial for the prevention of various diseases, such as cancers, cardiovascular disease, and diabetes. Further, it has been suggested that compared to adults, young (micro-green) herbs are more nutritious due to their higher mineral content and antioxidant activity. To determine total mineral content, freeze-dried adult and micro-green lemon balm and lime basil were ashed in a muffle furnace at 600oC for 24 hours then weighed. Hot tea infusions were prepared for adult and micro-green samples by adding boiling (98°C) deionized distilled water over the tissue and brewing for 5 minutes. Herbal teas were prepared using a 1:100 ratio of tissue to water. Antioxidant capacity was determined by oxygen radical absorbance capacity assay and measured using a micro-plate reader. Inductively coupled plasma atomic emission spectrometry was used to determine antioxidant minerals, zinc, iron, copper, and manganese. All tests were performed in triplicate.;

Presentation Number: 18

O-Methyltransferases in Anisaldehyde Biosynthesis of Strawberry Flowers

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Student's Major: Biochemistry

Strawberry flowers have been found to emit a complex blend of volatile organic compounds (VOCs). One of these VOCs is anisaldehyde (4-methoxybenzaldehyde) which has been shown to be involved in the attraction of pollinators as well as flower visiting herbivores. While it is clear that this aromatic compound is derived from phenylalanine very little is known about its biosynthetic pathway. Our previous headspace collections and GC- MS analysis have established that the formation of anisaldehyde in strawberry flowers is tissue specific, developmentally and diurnally regulated. These results now define selection criteria for the identification of candidate genes encoding enzymes involved in the biosynthesis of anisaldehyde. Our current hypothesis is that the last step in the biosynthetic pathway is the conversion of 4-hydroxy-benzaldehyde to anisaldehyde which is catalyzed by an O-methyltransferase (OMT). OMTs are encoded by larger gene families in plants and several OMTs have been characterized from a number of plant species. We are planning to take to two different approaches for the identification of a respective OMT in strawberry flowers: 1) Using the sequences of known plant OMTs we will perform BLAST searches of the strawberry genome database to identify candidate genes. 2) Using conserved sequences from known plant OMTs we will design oligonucleotide primers and will run PCR with cDNA isolated from strawberry flowers. Obtained PCR products will be cloned and sequenced. Once candidate OMT(s) have been identified from strawberry flowers we will run RT-PCR analysis to verify tissue specificity as well as developmental and diurnal regulation of their gene expression.

Developing an Assay for Identifying Volatile Compounds in Pork

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Student's Major: Biochemistry

Meat remains a staple ingredient in a vast majority of diets across the world because of its high component of protein. Its flavor, especially after cooking, heavily influences consumer purchase. Because of its demand in the market, it is important to monitor its taste, which can, at least in part, be attributed to the volatile compounds derived from various compounds in the meat. The purpose of this study was to develop an assay for identifying the volatile compounds found in pork samples. Raw pork samples were ground and cooked in a water bath at various times ranging from 15-30 minutes at a constant temperature of 60oC. Volatiles were collected from the headspace of samples incubated and were run in apparatuses at either room temperature or 60oC for 24 hours. Samples were collected in either a desiccator connected to an air pump and collection column or in scintillation vials with a Twister apparatus. We detected a greater number of peaks with less impurities in samples collected with the Twister apparatus than samples collected in the desiccator. Samples incubated and collected at a higher temperature result in greater peak areas but also more background peaks.; Development of an assay to detect various volatile compounds will allow us to correlate the volatile profile with consumer preference in pork samples from pigs fed different diets.

Presentation Number: 20

Leaf Angle Phenology in Trees of Northern Wisconsin NEON Sites

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Student's Major: Geology

Department of Geology and Geography, West Virginia UniversityLeaf angle is an important factor that indicates the health of forests and could be affected by climate change. Previously predicted by McNeil et al and associates that tree crown architecture change to adapt to environmental variation. In this study, we examine the health of trees by measuring the mean angle at which their leaves are positioned in the crown over 2022's growing season. Weekly images were collected from two tree species (Acer saccharum, Betula papyrifera) at the National Ecological Observatory Network (NEON) sites of the University of Notre Dame Environmental Research Center (UNDE) and Tree Haven (TREE). Using the software ImageJ we are able to find the mean leaf angle of 75 leaves on each set of trees for these sites. There is a gap in knowledge around how the phenology of certain tree species in northern Wisconsin is or is not affected by environmental factors. We expected to find that the angle at which the leaves are oriented effect evaporation and rate of photosynthesis. Our findings suggest that phenology was unaffected in the species measured in this study. It was predicted by McNeil et al that Acer genus and other tree species with "dome" architecture in wetter areas would have little effect on phenology. Data analysis errors and wind may be a reason for significant variation in TREE data. These results could help to further prove that trees with many leaves at the top are affected in different ways rather than leaf angles.

Presentation Number: 21

Novel Bovine Oocyte-specific lncRNA is Associated with Oocyte Quality

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Student's Major: Biology

It is well known that the integrity of the early embryo is dependent upon the composition of the oocyte. The objective of this study was to investigate the relationship between a novel bovine oocyte-specific lncRNA, OOSNCR3, and oocyte quality. First, germinal vesicle (GV) oocytes were aspirated from small or large follicles and cultured to the MII stage. Second, oocytes were differentially stained using brilliant cresyl blue (BCB). Third, oocytes were matured in a heat-stressed environment until the MII stage. All oocytes were isolated for RT-qPCR analysis or cultured to blastocysts and a two-way ANOVA or student's t-test was performed. In single oocytes, OOSNCR3 accumulated during maturation ($P = 0.01$) and was more abundant in oocytes collected from large follicles ($P = 0.006$), specifically MII oocytes ($P = 0.007$). Data from the BCB stain showed a significant difference in gene expression in BCB- oocytes suggesting a role in growing oocytes ($P = 0.03$). Blastocyst rates for the control, BCB+, and BCB- were 31.7%, 25.5%, and 6.1% respectively. Oocytes matured in a heat-stressed environment; exhibited an increase in OOSNCR3 expression, indicating a potential role in the oocyte's stress response ($P = 0.04$). The blastocyst rates for the heat stress and standard temperature were 6.9% and 17.2% respectively. Combined, this data suggests OOSNCR3 is associated with decreased oocyte quality. Future studies aim to localize OOSNCR3 and explore functional roles in preimplantation embryos.

Presentation Number: 22

Effects of forage supplementation on growth and development of pre-weaned Holstein calves

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Student's Major: Animal Science and Nutrition

The objective of this study was to assess the effects of offering chopped grass hay in the first 10 weeks of life on feeding behavior, rumen pH, intake, and growth of calves. To test this theory, we have been performing activities to monitor their eating habits and their growth. Some of these include observing their eating behavior for two hours every other week. The weight of the calves was taken every week. We also took blood and rumen fluid samples. At the end of the study the calf's rumen development parameter were taken. At the end of the study, we found that weekly body weight and average daily gain did not differ between treatments. The weight of the digestive tracts whether they were full or empty did not change as well. We also found that the Calves offered hay spent more time ruminating than calves not offered hay. Rumen pH was higher in calves fed hay compared with those fed no hay. Blood beta-hydroxybutyrate did not differ between treatments. In conclusion, offering chopped hay to pre-weaned calves can promote total DM intake, increase time spent ruminating, resulting in increased rumen pH, without affecting BW gain.

Presentation Number: 23

OOSNCR1, a novel oocyte specific long-non-coding RNA in cattle, is cytoplasmic and maternally derived

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Student's Major: Animal and Nutritional Sciences

In mammals, proper development during early embryogenesis relies on the regulation of maternal transcripts. These transcripts undergo gradual degradation accompanied by an activation of the embryonic genome. Recently, long-non-coding RNAs (lncRNAs) have been characterized as key regulators of embryonic genome activation in humans and mice and their mechanisms in early embryogenesis remain poorly understood. The objective of this study was to determine if OOSNCR1 is maternal in origin and to localize the transcript in oocytes using fluorescence;in situ;hybridization (FISH). Ovaries were collected from a commercial abattoir, aspirated to collect cumulus-oocyte-complexes (COCs), and underwent IVF. Zygotes were randomly assigned at 12 hours-post-insemination (hpi) to either control or;a-amanitin (25ug/mL) treated culture medium. All embryos were cultured until the 4th embryonic division at 52hpi. Following collection, samples were spiked with;GFP;and underwent RNA-isolation followed by cDNA synthesis. Real Time Polymerase Chain Reaction (RT-qPCR), using GFP as an exogenous control, was performed to quantify relative expression using the standard curve method.;For localization, oocytes were fixed, hybridized to a custom probe, mounted to slides, and imaged using confocal microscopy.;A student's t-test revealed;no significant difference between transcript amount in treated (15.46+0.0074) versus control (15.60+0.0049, P= 0.34) embryos signifying a maternal origin. Control and embryos cultured in;a-amanitin revealed blastocyst rates of 0% and 50%. FISH detected OOSNCR1 throughout the cytoplasm of oocytes. These data suggest OOSNCR1 is cytoplasmic and maternally derived.;Future studies aim to elucidate the role of OOSNCR1 in oocyte maturation and early embryonic development.

Program/Mechanism Supporting Research/ Creative Efforts: 497 (research) course in your major

White-tailed Deer Doe and Fawn Population Ratios In Counties Across;West Virginia

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Student's Major: Animal and nutritional sciences

Here in West Virginia there seems to always be white tailed deer Odocoileus virginianus with all over at all times of the day. So this raises the question of how many are born each year. Sometimes fawns are unable to make it into adulthood due to unfortunate circumstances such as the doe or fawn being hit by a car or malnutrition based on the habitat the deer are living in. Having game cameras set up in several different locations across the state gives us the information that is needed to retrieve this data. Through using Wildlife Insights and Snapshot USA we are able to go through and look at different game camera images over the course of the main fawning season of deer to look at the ratios of does to fawns across the state. The purpose of this project is to figure out the reproduction rate of White-tailed deer in West Virginia by analyzing the doe to fawn ratio from the different counties spread across the state. While viewing the game cameras we are collecting data of not only the doe and fawn ratios but also the other animals within that ecosystem.

Presentation Number: 25

The Impact of Grazing Intensity on Soil Organic Matter and Aggregate Stability

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Student's Major: Environmental Microbiology

Healthy soils are critical for agroecosystem productivity. Soils store and cycle carbon and other nutrients between living organisms, waterways, and the atmosphere. Soil aggregate stability is an important component and indicator of overall soil health. Aggregate stability in pasture soils is determined by the strength and number of mineral charges and "sticky" substances that hold primary and secondary structures together. In pasture and grassland soils, these substances are largely of microbial and plant root origin. Pastures can be managed to improve aggregate stability and soil health by increasing plant and microbial inputs into the soil. In this experiment, a total of sixty soil samples were collected from twenty 1-acre pastures across West Virginia with a range of management intensities. Aggregate stability for each pasture was determined using the SLAKES application.Pastures with medium intensity management (equivalent to grazing two times a year) had the highest amount of organic matter and aggregate stability followed by low, high, and very high intensities. The results show that medium intensity management generally leads to healthier and more stable soil, even over low intensity, largely by increasing the amount of organic matter and bacterial and fungal biomass in the soil, i.e. "sticky" substances. These results connect medium and low grazing intensity to a more stable pasture soil which gives farmers insight into the ideal grazing practices for maintaining pastural soil health. Going forward, this preliminary data will be leveraged to determine how different levels of forage plant biodiversity combined with medium intensity grazing could optimize soil aggregate stability and therefore soil health.

Presentation Number: 26

An Overview of Phenology of Ichthyoplankton in the Ohio River Basin

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Fisheries

Student's Major: Wildlife & Fisheries Resources

The study of ichthyoplankton is a large gap in fisheries science research. Ichthyoplankton refers to fish that are in the larval and early juvenile stage of their life cycle when their movement is dependent on currents. This is also the stage when mortality is the highest due to their susceptibility to environmental factors. The sequence of events (phenology), including their appearance and relative abundance in the Ohio River has important implications for the population dynamics of fish populations. Our study is designed to assess annual variation in the seasonality of ichthyoplankton in the Ohio River. Ichthyoplankton were collected through trawl netting using a 500-micron mesh net in four Ohio River drowned river mouths between Point Pleasant, WV and Aurora, IN (covering approximately 363 river kilometers). Samples were preserved in ethanol, then sorted to family using a dichotomous key and dissecting microscope. We found four fish families that were common across sites, including Cyprinidae (minnows), Clupeidae (shad), Percidae (perches), and Centrarchidae (bass and sunfish). Ichthyoplankton were most abundant at our most upstream sites, Point Pleasant, WV. Cyprinids and Clupeids were the dominant species across all sites. Percids were the first to appear and peak in abundance in late May; whereas Cyprinids, Clupeids, and Centrarchids peaked in mid-June. We observed similar patterns of phenology over the summer and fall sampling periods across all four sites. These observed patterns provide critical baseline data to track early life responses of fish populations to climate change and subsequent population affects.

Presentation Number: 27

The Expression of Melanocortin Receptors and Attractin in the Bovine Ovary

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Agouti-signaling protein (ASIP) is involved in lipid metabolism and ASIP mRNA is highly abundant in the bovine oocyte. Previous research identified melanocortin 1, 2, 3, 4, and -5 receptors (MC1R - MC5R) and attractin (ATRN) as receptors for ASIP. The present study aimed to characterize the expression of MC1R- 5R and ATRN within the bovine ovarian follicle and oocyte via quantitative PCR (RT-qPCR). RNA was isolated from immature (GV) and mature (MII) oocytes, and follicular cells including cumulus cells surrounding GV (GV-CC) and MII (MII-CC) oocytes, granulosa cells (GC), and theca cells (TC). Ribosomal protein L19 (RPL19) expression was analyzed for normalization. Relative mRNA abundance was calculated using the standard curve method. Oocyte data was analyzed using a Student's t-test and follicular cell data was analyzed using a one-way ANOVA followed by Tukey's HSD. Both GV and MII oocytes, GV-CC, MII-CC, GC, and TC were found to express MC3R, MC4R, and ATRN and there was a significant effect of cell type for all three genes ($P < 0.0001$). Interestingly, MC3R, MC4R, and ATRN mRNA were highly abundant in GV and MII oocytes although there was not a significant difference between GV and MII expression ($P > 0.05$). Expression of both MC3R and MC4R was significantly higher in MII-CC than GC and TC ($P < 0.05$). ATRN expression was greater in CC followed by GC and then TC. Results indicate the potential involvement of MC3R, MC4R, and ATRN in folliculogenesis in cattle via ASIP signaling which future work will further investigate.

Program/Mechanism Supporting Research/ Creative Efforts: Research Apprenticeship Program (RAP)

Mass Balance of Materials Recovered from Mealworms (Tenebrio molitor) Extracted by a pH-Shift Process

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Student's Major: Biology

Insects like mealworms are a substantial source of nutrients and require fewer resources to cultivate, making them promising sources of nutrition. Protein can be separated from mealworms using a pH-shift process via isoelectric solubilization and precipitation (ISP). Protein is soluble when the pH is far from its isoelectric point, allowing lipid and insolubles to be separated. Protein can be isolated from process water when pH is shifted back to the isoelectric point due to hydrophobic interactions. This study aimed to identify where protein is present amongst fractions of the mealworm by ISP by measuring proximate composition. Proximate composition was conducted on the whole mealworm, insolubles, process water and precipitate. Crude protein was calculated using nitrogen-to-protein conversion factors of 4.76 (whole mealworm) and 5.6 (each fraction). Mealworm lipids did not form a recoverable lipid layer during ISP and, therefore, were mixed with the insoluble fraction. Proximate composition of the whole mealworm consisted of 51% crude protein, 16% lipid, and 4% ash. Of the recoverable protein, 37% was found in the insoluble, 49% in precipitate, and 14% in process water. In all the fractions, protein recovery yield was 93% and lipid recovery yield was 71%. Of the recovered lipids, 77% was found in the precipitate, 17% in insoluble, and 6% in process water. With a high percent of lipid (mainly phospholipids) in the precipitate, future research will attempt to improve the concentration of protein isolated using an organic solvent defatting procedure.

Program/Mechanism Supporting Research/ Creative Efforts: Other

Presentation Number: 29

Effectiveness of an Inexpensive, Portable Deer Exclosure in Preventing Forest Understory Overbrowsing

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Student's Major: Forest Resources Management

Excessive deer browsing in the temperate mixed hardwood forest can decrease biodiversity and reduce growth of desired woody and herbaceous species. Creating fenced areas is one of the most effective ways to reduce deer browsing, but this is often expensive and requires materials that are heavy and, thus, difficult to transport and install. We examined the efficacy of using 6-ft T-posts and 30-lb fishing line to create a fence that is low-cost and portable. Nine plot pairs, each comprising one fenced and one adjacent unfenced 6m x 6m plot, were established in the WVU research forest in Fall of 2021. Eight of these plot pairs were placed in a recent shelterwood cut, and one was installed in a treeless foot plot seeded with clover. In each plot, the leaf area of herbaceous layer categories (i.e., tree seedlings, shrubs and vines, forbs, grasses, and ferns) was non-destructively sampled in late summer of 2021 (before fence establishment) and 2022 (one year after fencing). Initial analyses indicate that the herb-layer cover of various vegetation types did not differ between fenced and unfenced plots. A longer-term study considering multiple years of fencing would be beneficial to identify if the fencing was not efficient or if more time is needed to see the benefit of deer exclusion.

Bird Species Richness in Edge Habitat and Interior Habitat

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Student's Major: Wildlife and Fisheries

Habitat plays a significant role in determining the species richness of an area. In our study, we are looking at species richness in two diverse types of habitats in the West Virginia University Core Arboretum and Prickett's Fort State Park. The two habitats that were investigated were edge habitat and interior habitat. The methods to find the number of varied species discovered in the two different habitats mist nets were set up in the different habitats. A mist net is a net about thirty feet long made of exceptionally fine mesh stretch between two poles. The birds get caught in the net and then the birds are removed. We record the species name and get measurements like weight, wing length and tail length. All the birds that are caught are also banded so if they are recaught anywhere they can be identified. All the data has not been reviewed yet but when it is finished, we should have a better understanding of the species richness in the two different habitats. This data will show what type of habitat a bird species prefers, and we can use that information to protect the habitat a species prefers if they are ever in danger of becoming endangered or extinct. This data can also help areas that lack species diversity by showing what type of habitat attracts the most species and the areas that lack species diversity can add either of the two; habitats to their management strategy.

West Virginia Forest Landowners' Perceptions of Forest Carbon Offset Programs

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Student's Major: Forest Resources Management

Several carbon offset programs have been made available to West Virginia (WV) forest landowners that allow them to manage their forests to mitigate climate change while providing an opportunity to earn extra income through carbon credits. While this market has grown rapidly, accessibility issues remain.;   This study aims to examine WV forest landowners' awareness and perceptions of forest carbon offset programs. The study utilized an online structured questionnaire to survey forest landowners currently enrolled in WV's Managed Timberland Program (MTL). Results showed that 87% of respondents find it very important to keep their land forested and 43% think that carbon offset programs will help keep their land forested.

However, a majority (57%) have no knowledge of carbon offset programs with a higher percentage (62%) not understanding the credit generation process. Less than one percent of the participants are currently enrolled in a carbon offset program. Landowners perceived early withdrawal penalty as well as legislative and price uncertainties as the top barriers to participation in these programs.

Respondents were also presented with nine hypothetical carbon offset programs varying in time commitment, harvest allowance, revenue, and early withdrawal penalties. Forest landowners would most likely enroll in a program with shorter time commitments (e.g., 1-5 years), higher revenue (e.g., $30/acre/year), no early withdrawal penalty and no harvest restrictions. The results from this study can be used in evaluating existing carbon market programs and provide inputs to carbon policy initiatives to reduce barriers to landowner participation.

Presentation Number: 32

Measuring Leaf Angles to Further our Understanding of Trees' Response to Climate Variability

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Student's Major: Environmental Geoscience

Forests play a vital role in our planet's climate stability, and monitoring trends in tree phenology is critical to better understand and conserve such an important natural resource. If the angles of the same leaves of the same tree are measured and recorded over time, then the angles could show trends in the trees' adaptations to climate variability. Through the use of the Java-based imaging processing program, ImageJ, photos taken over the span of several months of several forests in various locations across the United States were measured for their leaf angles. The angles measured are from the same leaves observed throughout the entire duration of time. This way, it is possible to observe any fluctuation in measurement value indicating possible trends that correlate leaf angle change to phenology. Preliminary results have shown that the angles observed over time do not show any significant change corresponding with climate variability. Possible explanations for these results may stem from the composition of the forests being observed, as well as the annual precipitation level of the geographic regions in question. To further investigate the hypothesis that tree leaf angles have a phenology, a longer duration of consistent measurement would be essential, as well as an increased amount and variety of forest samples to observe over the longer period of time. Monitoring forest phenology is an important technique to efficiently preserve and protect an invaluable component of our planet's climate stability that future generations depend on.

Presentation Number: 33

Relations among BMI, T2D, Education and Cognition: It's complicated.

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Student's Major: Psychology

Type 2 Diabetes (T2D) and overweight and obese Body Mass Indexes (BMI) are two public health concerns that are increasing in the United States (CDC, 2022). Each has been shown to independently contribute to cognitive difficulties across the lifespan. However, education has been found to buffer the negative effects of both T2D and obesity on cognitive decline (Lövdén et al., 2020). The purpose of the current study was to examine whether education and obesity altered the relation between T2D and cognitive difficulty. Data from 352,663 adults who completed the 2020 Behavioral Risk Factor Surveillance System interview were used for the current study. Approximately 48% were men, average age was 54.7 years (SD = 17.7). Although the adults varied in race, 76.1% were white non-Hispanic. Most (95.7%) had a high school diploma or GED, including the 39% with a 4- year college degree. Approximately 14% had T2D. BMI varied, with 2% under-weight, 30% normal BMI, 36% overweight, and 32% obese. About 10% reported some difficulty making decisions. A moderated regression analysis was conducted to assess the unique and interacting effects of BMI, T2D, and education on cognitive difficulty. The equation was significant, $X2$ (DF = 7) = 8066.2, $p < .001$. Each regressor and each 2- and 3-way interaction term emerged as a unique contributor to decision difficulty. Thus, more cognitive difficulty was reported by both underweight and obese adults without a college education. Results are discussed within a framework of education as a buffer against negative health outcomes among vulnerable adults.

Presentation Number: 34

Effects of Parental Attachment on Student's Mental Health During the Transition to College;

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Student's Major: Psychology

The transition to college is a very formative time in a young adult's life, with many students reporting increased anxiety and depression (Filipkowski et al. 2016). Previous research suggests that lower-quality mother-child relationships can increase the child's risk for mental health problems (Bullock et al. 2020). The current study examines how parental attachment impacts students' depression levels via perceptions of behavioral and psychological control. The study includes data from 491 first-time freshman University students. A series of regression analyses were conducted in a structural equation modeling framework for each mother and father relationship. A higher anxious attachment to mother was associated with higher levels of perceived behavioral and psychological control, and greater psychological control was associated with higher levels of depression. A greater avoidant to father was associated with greater perceived psychological control, and greater psychological control was associated with greater levels of depression. Psychological control played a detrimental role in mental health regardless of which parent it was coming from. These findings can be very beneficial to students and help them understand how their differential relationships with each parent can be impacting their mental health.

Short-term behavioral, physiological, and brain differences in real life and virtual reality social interactions

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Student's Major: Public Health

Virtual reality is a new technology which currently has unknown efficacy in human researchregarding social interaction. Studying Virtual Reality for both medical and psychologicalsettings in stressful situations and comparing it to face-to-face interactions while measuringthe physiological responses was the focus of this study.We predicted the null hypothesis would be supported and there would be no significant difference in physiology for stressful face-to-face interactions when compared toVirtual Reality interactions. Primary Aim 1 tested physiological responses in face-to-face and virtual reality stressful interactions. Primary Aim 2 statistically analyzedphysiological data to identify the amount of change during face-to-face versus virtual reality. "Messy room" and "group project" scenarios were selected as the stressful interactions.Actors were trained to refuse requests from participants, during which blood pressure andheart rate were measured for both the participants and the actors. Blood pressure and heartrate were measured for both groups at rest as well. The heart rate variability measure that we focused on was the root mean square of successive differences, (RMSSD), which is obtained by calculating each successive time difference between heartbeats. RMSSD reflects the beat-to-beat variance in heart rate correlated with the parasympathetic activity.;A paired sample t-test and ANOVA were used to analyze the data. The results showed no significant difference in face-to-face versus virtual reality situations.The significance of this work contributes to the body of research and a better understandingof the similarities of physiological responses of virtual reality versus face-to-face.

Program/Mechanism Supporting Research/ Creative Efforts: Other

Presentation Number: 36

Effects of Initial Interaction on Preference and Reinforcing Efficacy of Attention

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Student's Major: Psychology & Biology

Although it is possible that histories with various forms of attention may affect how subsequent praise functions as a reinforcer, this has not yet been directly evaluated. The current study examined how different qualities of attention delivered prior to academic work sessions influenced the extent to which praise for work completion functioned as a reinforcer for an elementary-aged student. We first identified which forms of attention the child preferred using a validated preference-assessment procedure. These results informed the three experimental conditions: preferred interaction, non-preferred interaction, and no interaction. A different researcher was associated with each of the conditions. Each session included an initial interaction and a subsequent period of academic-task completion. During the initial interaction, each researcher engaged in condition-specific interactions with the student. Following the initial interaction, the student was asked to complete an academic task and with praise as a consequence for work completion. After multiple exposures to these conditions, the child was asked to select between researchers. Results of this study can improve our understanding of the effects of preferred and non-preferred attention provided prior to academic work completion sessions on the amount of work completed.;;

Presentation Number: 37

Effects of Public Safety Budget Changes on Violent Crime Rates in West Virginia

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Student's Major: Political Science

There has been much headway made on the study of country and state budgets in the field of public policy in recent years. We are using these systematic approaches as the groundwork to study the effects of differentiations in public safety budgets across both time and space. The goal of this research is to gain a better understanding of how changes in public safety expenditures dynamically change things such as violent crime rates. We expect from this research to see a notable correlation between fluctuations in funding and crime rates. We are utilizing 16 years of budget data from every county in West Virginia, as well as statistical data from the department of justice. With this information we are able to see the effects that contemporaneous policy changes can have on various social factors. We hope to be able to present this information to policymakers at the state and county level to aid them in making better formed public policy decisions.

Workplace Accessibility, Unemployment, and Depressive Disorders

Chloe Carpenter
Psychology

Student's Major: Communication Sciences and Disorders

While the unemployment rate is high in the US, data show that the unemployment rate for people with disabilities is twice as high as the unemployment rate for people without disabilities. Using the BRFSS Web Enabled Analysis Tool, I tested whether unemployment predicts depression. The sample size was N=428,197 and I used employed for wages as my reference independent variable. $X2$ (DF=9, N=428,197)=30,002.4, p<.001. Depression was defined by being diagnosed with any depressive disorder. Adults who were out of work for one year are 1.81 times more likely to be diagnosed with a depressive disorder compared to adults who were employed for wages. People who are unable to work are 4.17 times more likely to be diagnosed with a depressive disorder compared to adults who were employed for wages. Although there is no way to know why these people are unable to work, disabilities play a role for the majority of these people. The significance of this study is that it addresses what problems arise when workplaces are not accessible.

Mental and Physical Health in Association with Heavy Drinking

Brooke Dierkes
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Student's Major: Integrated Studies

Alcohol is one of the most commonly used drugs in the United States today and is a popular method to hide or numb pain and thoughts in many people. Heavy drinking can cause several health issues including addiction and alcohol dependence. When looking at the factors that may cause heavy drinking, poor physical and mental health days have may relate to heavy drinking. In this study, data were collected from individuals in the United States in 2021 using the BRFSS, the information was then looked at through the Web Enabled Analysis Tool. Poor mental health days were linked to heavy drinking, with X2(DF=3, N=41670) =33013.10, p<.0001. The data show that individuals with 0 poor mental health days are 54% less likely to be heavy drinkers than those who reported 14+ days of poor mental health. In contrast, poor physical health was associated with less drinking N2(DF=3, N=43195) =33076.60, P<.0001. Those who experience 0 days of poor physical health are only 14% as likely to be heavy drinkers than individuals who experience 14+ days of reported poor physical health. Knowing if current heavy drinkers experience more poor mental or poor physical health days could be useful when improving early preventative plans for future heavy drinkers. The effects of chronic alcohol use have an impact on a large percentage of Americans and with this information, there can be better developed harm reduction and rehabilitation efforts.

Presentation Number: 40

Effectiveness of Parent-Child Interaction Therapy as a treatment for grandfamilies

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Student's Major: Psychology

Across the United States, the rate of grandparents serving as primary caregivers of their grandchildren ("grandfamilies") has increased, and parental substance use is a widely cited cause[1-2]. As children exposed to substances in-utero are twice as likely to exhibit disruptive behaviors[3], Parent-Child Interaction Therapy (PCIT), an evidence-based treatment that aims to improve positive parenting skills and child disruptive behavior[4], may be beneficial in addressing child behavior problems within grandfamilies.   The current study examines the effectiveness of PCIT for grandfamilies throughout West Virginia. Structured interviews were conducted with therapists gathering their experiences providing PCIT and treatment outcomes for 24 grandfamilies. Grandparent reports of disruptive behaviors were measured using the Eyberg Child Behavior Inventory[5], and the Dyadic Parent-Child Coding System was used to evaluate grandparent parenting skills at pre- and post-treatment[6]. Interviews were transcribed, coded, and then analyzed. Paired samples t-tests determined a statistically significant decrease in disruptive behaviors from pretreatment (M = 166.64, SD = 39.09) to posttreatment (M = 124.45, SD = 36.18), t (10) = 3.56, p = .007 (two-tailed). Negative grandparent verbalizations decreased significantly from pretreatment (M = 20.45, SD = 11.10) to posttreatment (M = 5, SD = 6.65), t (10) = 6.74, p = < .001. Positive grandparent verbalizations significantly increased from pretreatment (M = 4.18, SD = 4.19) to posttreatment (M = 27.46, SD = 15.85), t (10)= -5.25, p = < .001 (two-tailed). These outcomes indicate that PCIT is effective in improving parenting skills and disruptive behaviors within grandfamilies; however, therapists reported several challenges. Qualitative findings will be discussed.

Program/Mechanism Supporting Research/ Creative Efforts: Other

Presentation Number: 41

Psychosocial Differences among American Minorities that Lead to Health Disparities

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Student's Major: Neuroscience

Research reveals that traumatic experiences disproportionately affect minority youth. These experiences include historical/generational trauma, immigration and acculturation stressors, natural and manmade disasters, experiences of discrimination, family violence, and community violence. (Pumariega et al., 2022) These experiences affect the health of minorities in young adulthood, decreasing the likelihood for the use of preventative services. The Behavioral Risk Factor Surveillance System (BRFSS) is the nation's premier system of health related telephone surveys that collect data about U.S. residents regarding their health-related risk behaviors, chronic health conditions, and use of preventative services. (Centers for Disease Control and Prevention, Behavioral risk factor surveillance system) BRFSS will be used in this study to examine the results of minorities between the ages of 18 and 24 "in all 50 states" who reported having depression in the year 2021. Results of the analysis showed that minorities ages 18 through 24 were less likely to report depression compared to white, non-Hispanics. There was a significant difference among racial groups who reported depression ($p<0.0001$, df= 4). The data is important because although minorities have a higher incidence of trauma exposure, they are less likely to access medical and mental health care in young adulthood.

Presentation Number: 42

Forecasting Russo-Ukraine Conflicts through Analysis of Ukrainian News Sources

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Student's Major: Data Science, International Studies, Russian Studies

Widespread access to the internet allows for a constantly growing wealth of information to be available to the public with contributors and viewpoints from all over the globe. This project seeks to discover if open source and publicly accessible information can be used to predict conflict. The ability to make accurate predictions of conflict based on open source data would impact global peacekeeping efforts as strategic surprises could be minimized and damages mitigated. To test this, the recent and ongoing Russian invasion of Ukraine is explored by using word vectorization and similarity measurements on mentions of keywords to Ukrainian news sources for the previous 12 years, including before and during the 2022 invasion of Ukraine as well as the 2014 annexation of Crimea. The goal is to determine whether the conflicts took Ukraine by surprise or if the conversation shifted to topics surrounding war and Russia before the onset of the war and thus was predictable. The primary hypothesis is that the invasion was not a surprise and that tensions were escalating before the conflict in a way that would be reflected in Ukrainian news coverage. Results show that there was a sharp increase of similarity to key terms starting approximately two years before the onset of the ongoing conflict in Ukraine. On the other hand, the annexation of Crimea had fewer significant trends. Next steps in analysis of these events include investigation of other sources" especially from other regions with varying political affiliations.

Presentation Number: 43

The Effect of Alcohol Use and Rural Residency on Suicidal Thoughts and Behaviors

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Student's Major: Biology

Death by suicide is higher in rural than non-rural areas (Centers for Disease Control and Prevention, 2022). Alcohol use, a risk factor for suicide (Ledden et al., 2022), has been shown to be especially problematic in rural areas (Malek-Ahmadi & Degiorgio, 2015). There is less research, however, on suicidal ideation and non-fatal suicidal behavior in this population. This study focused on rural status and alcohol use in relation to suicidal thoughts and behaviors. We hypothesized that those living in rural areas would report higher levels of suicidal thoughts and behaviors and that alcohol could moderate this relationship. We collected data from 916 participants through an online survey. We collected data from the Suicide Behaviors Questionnaire-Revised (SBQ-R), which evaluates the history of or current suicidal thoughts or behaviors, and the Michigan Alcohol Screening Test (MAST). Rural status was defined as a population of 2,500 or less. The mean age was 56 (SD = 18). The sample consisted of 50.5% males, 48.7% females, and 0.8% other. We conducted bivariate analyses and a hierarchical linear regression controlling for age, gender, marital status, and education. Results indicated that alcohol use did not vary by rural status, $t(872) = -0.18$, $p = 0.43$, so it was not tested as a moderator. SBQ-R scores were higher in rural areas, $t(902) = -2.02$, $p = 0.02$, but this relationship was not significant when controlling for demographic variables, $t(882) = 1.35$, $p = 0.18$. These results are important in understanding suicidal thoughts and behaviors in rural areas.

Program/Mechanism Supporting Research/ Creative Efforts: Other

Presentation Number: 44

How the COVID-19 Pandemic Affected Stay-at-Home Parents' Mental Health

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Student's Major: Psychology

When the COVID-19 pandemic hit in 2020, a lot of families around the US began to struggle in many ways, including with their mental health. The goal of the current study was to determine if people who were unemployed with children were more or less likely to report frequent poor mental health days in 2020. Data were used from 383,074 individuals who completed the Behavioral Risk Factor Surveillance System interview in 2020 to see if the number of children in the household, gender, and employment status affected the number of poor mental health days recorded. Approximately half of this sample (54.3%) identified as female. A logistic regression analysis was performed to determine the influences of the variables on poor mental health days. The equation was significant (DF= 14, N = 383,074) = 28,366.00 $p < 0.0001$. After examining the Odds Ratio, we found that those identifying as women were 1.57 times more likely to report more frequent poor mental health days than those identifying as men. People with five or more children were 1.28 times more likely to report frequent poor mental health days in reference to those with no children. People who were unable to work were 3.63 times more likely to report frequent poor mental health days in reference to those who were employed for wages. Our results show that having children and being unemployed were more likely to result in more frequent poor mental health days.;

Presentation Number: 45

Sharing Crime Online

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Student's Major: Psychology

The growth of the internet and social media use in everyday life has increased the numbers of crimes "witnessed" and shared online.

This research study looks at the psychological aspects of witnesses who record, disseminate, or watch crime online. Based on news sources and survey data, the study identifies motives for three different types of witnesses: Samaritans who help others; Vigilantes who take the law into their own hands; and Voyeurs who provide the audiences that encourage Samaritans and Vigilantes.

Analysis of survey data will include a description of the crimes witnessed, responses to crime (including recording and sharing crime online), and an exploration of why witnesses respond in the ways they do. The goal of the research is to provide insights into the personas of Samaritans, Vigilantes and Voyeurs who, together, form the basis of a theoretical framework for understanding third-party participation in punishment and social control in the digital age.

Reporting Correlations between West Virginia Mental Health Spending and Drug Overdose Rates by County

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Student's Major: Philosophy

West Virginia continues to hold the highest drug overdose rate of any state in the United States, mostly due to opioids. Many West Virginians have suffered from the nationwide opioid crisis due to a combination of factors such as economic hardship, high prevalence of chronic illness, and low access to effective treatment and recovery resources. Previous research has shown that rural areas are more susceptible to higher overdose rates, where it becomes more difficult to know how much of an area's population truly requires services, such as drug treatment programs and rehabilitation (Allen et al., 2018). Currently, West Virginia policymakers have tremendous influence on what services are available to citizens; thus, it is important to study individual county budgets across the state. Through the WVU Institute for Policy Research and Public Affairs, I search for correlations between mental health budgetary spending and drug overdose outcomes in various West Virginia counties over the last 10 years. I utilize budget data from the West Virginia State Budget Office and drug overdose rate data from the Center for Disease Control and the University of Wisconsin Population Health Institute. I find that most counties with small or nonexistent mental health budgets have chronically high overdose rates. Conversely, most counties with higher mental health budgets have more stable overdose rates. WV citizens agree that mental health spending and drug overdose are closely interlinked. These results lend ideas for future research on such topics and ideas to improve the current state of West Virginia's opioid crisis.

Presentation Number: 47

Effects of Commission Errors and The Fidelity of BIP Implementation

Sarah Hollen, Olivia Harvey, Dr. Claire St Peter
Department of Psychology, West Virginia University

Student's Major: Psychology

Effects of Commission Errors and The Fidelity of BIP ImplementationAuthors: Sarah Hollen, Olivia Harvey, Dr. Claire St Peter Teachers have competing demands throughout their day, which may result in variation in how teachers implement behavior intervention plans (BIP). Variations can be measured through procedural fidelity, which is the extent to which a procedure is implemented as described. Despite research suggesting that teachers implement BIPs inconsistently, little is known about the kinds and frequencies of variations that teachers introduce into BIPs. The purpose of this study was to determine how teacher implementation of BIPs varied from the written plans. Teachers can make at least two types of variations: failing to implement a step in the BIP or adding or modifying a step not specified in the BIP. Teachers may implement strategies not listed in the BIP that are more effective than what is written in the BIP. Two teacher-student dyads participated. Data were collected on teacher-student interactions written in the BIP and not written in the BIP using checklists. Results replicated previous findings that, perhaps due to the demands of the classroom, teachers both added and omitted BIP components relative to the written plans. Identifying the types and prevalence of errors may be beneficial in informing methods for future research to evaluate impacts of BIP variations on student outcomes.

Presentation Number: 48

TRAIN for the Opioid Crisis: Preparedness and Knowledge of Youth Camp Staff

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Student's Major: Psychology

West Virginia has the highest rate of opioid overdose deaths in the United States (Warfield et al., 2019). The opioid crisis and substance use disorders (SUDs) are not just an individualized experience, but also impact families (Lander et al., 2013). Strong community programs have been highlighted as a potential avenue for prevention and intervention (Sederer & Marino, 2018), and youth camps may be one such community organization. Camps across the nation are a readily used community resource (American Camp Association, 2017). Thus, youth camp communities may be a critical intervening point in the opioid crisis through the education of camp staff about the opioid crisis and SUDs, however little is known about the preparedness and attitudes of camp staff to interact with youth who may have caregivers with a SUD. The current study aims to identify the gaps in training and preparedness of camp staff in West Virginia when working with children who have caregivers with a SUD. An anonymous online survey was completed by 117 West Virginia youth camp staff to assess their thoughts, attitudes, and feelings regarding working with children with a caregiver with a SUD. Findings suggest that camp staff may be underprepared to engage with youth whose caregivers have a SUD, highlighting a critical need for education interventions of camp staff. The findings may help guide researchers, policymakers, and camp organizations to focus on educational intervention efforts with youth camp staff who likely will interact with youth who have a caregiver with a SUD.

Presentation Number: 49

Effects of Ethanol Administration on Risky Choice in Rats

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Student's Major: Neuroscience and psychology

The current study was designed to investigate effects of acute ethanol on risky choice using eight Sprague-Dawley rats in a single-subject context. To assess risky choice, a probability-discounting procedure was used. Probability-discounting procedures involve a series of discrete-trial choices between a smaller, certain reinforcer and a larger, uncertain reinforcer. Risky choice is defined as the choice for the larger, uncertain reinforcer. In the present study, rats chose between outcomes available via two levers. A press on one lever resulted in the delivery of one food pellet with 100% certainty. A press on the other lever resulted in the delivery of two food pellets with probabilities (100, 50, 25, 12.5, and 6.25%) that decreased across five blocks of trials. Once stable baseline responding was obtained, varying doses of ethanol (0.0 - 3.0 g/kg) were administered twice a week and effects on probability discounting were recorded and compared to baseline choice. Ethanol was administered orally in strawberry-flavored gelatin tablets. Results show dose-dependent increases in risky choice following acute ethanol administration. Future work may include examining effects of other drugs, alone or in combination with ethanol, on probability discounting (risky choice). Through such controlled and systematic studies, effects of common drugs of abuse on risky choice may be better understood.

Keywords: probability discounting, ethanol, risky choice, rat

Presentation Number: 50

Food Cue-Reactivity in Human Sign-Trackers and Goal-Trackers

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Student's Major: Psychology and Neuroscience

West Virginia has the second highest rate of obesity in the nation. Rats have been found to vary in a trait-like propensity to attribute motivation value to food cues. Individuals classified as sign-trackers (ST) imbue such cues with more motivational value than those classified as goal-trackers (GT). The goal of this study was to examine the relationship between sign-tracking versus goal-tracking propensity and food cue reactivity in humans. Participants were classified as ST or GT using an index of eye gaze fixations (on reward predictive cues versus upcoming reward locations) in a Pavlovian conditioning paradigm. Food cue-reactivity was measured using both self-ratings of food craving (using three questionnaires) and event-related potentials recorded with electroencephalography (EEG) following cue exposure. During cue exposure, participants viewed images of palatable sweet and savory food items, as well as neutral control stimuli (everyday objects). We hypothesize that individuals classified as ST report stronger cue-induced food cravings and higher amplitudes of P300 and late positive potentials in response to food cues. Data collection is in progress. Preliminary results will be presented. The results of this study will provide a greater understanding of dispositions of food cue reactivity which is known to predict unhealthy eating and obesity.

Program/Mechanism Supporting Research/ Creative Efforts: Capstone

Rethink before you drink

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Student's Major: Multidisciplinary Studies

According to the CDC, alcohol use disorder affects over 14 million Americans. Depression also affects a vast number of people in the United States, 21 million. There are many factors that may affect if someone is diagnosed with depression. There are also many factors that may influence someone having an alcohol use disorder. There are biological and environmental factors that may influence depression, including alcohol use disorder. In this research, the goal was to investigate the influence of age, sex, and alcohol consumption on depression. Data from 438,693 U.S. adults who completed the 2021 Behavioral Risk Factor Surveillance System interview were used to investigate the relations among age, sex, and alcohol consumption on depression. More than half (53.7%) of the sample identified as female. We used a logistic regression to examine the alcohol consumption, age, and sex factors on depression, X2 (DF=6, N=438693)= 28700.10, p<0.001. Adults aged 18-24 were 1.21 times more likely to be diagnosed with depression than adults aged 25-44. Females were 1.98 times more likely to be diagnosed with depression than males. People who reported they do not drink were only 40% as likely to be diagnosed with depression as people who reported they do drink. These results show important influences of age, sex, and alcohol consumption on depression. Future research could investigate what demographic factors played a part, such that young women who do drink may be more likely to develop depression.

Presentation Number: 52

What Matters? Race and Geography as Factors of HPV Vaccine Uptake for Black Appalachians

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Student's Major: Biology

Since the introduction of the Human Papillomavirus (HPV) vaccine to the United States in 2006, rates of uptake have remained significantly lower than the desired 80% of the eligible US population. Notably, racial and geographic disparities exist within these rates. Black adolescents and adolescents in rural areas such as Appalachia report lower HPV vaccination series initiation and completion, and in some cases are at higher risk of associated health complications. However, few studies attempt to understand the reasons for these disparities, and fewer still examine the link between the factors of race and geography. This study sought to investigate the intersection of race and geography as factors in HPV vaccine decision-making with the intention of promoting HPV vaccine communication strategies for Black Appalachians. Previous studies of HPV vaccine decision-making were examined through the lenses of the Reasoned Action Approach and Extended Parallel Process models which outline beliefs that contribute to health decision-making, including perceived risk and benefit, perceived perception, and perceived accessibility of a given health behavior. Through this examination, we developed a new understanding of the significance of race and geography as factors in HPV vaccine uptake. We also confirmed that Black individuals in rural areas such as Appalachia experience lower vaccination rates as a result of the compounded effect of race and geography. Awareness of how race and geography impact vaccine uptake will improve health outcomes for Black Appalachians by providing key insight into the decision-making of this underrepresented group. This insight will also bolster updated recommendations for HPV vaccine communication.

Advancing Sustainable Practices of the Mountaineer Undergraduate Research Review

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Student's Major: Environmental Microbiology

The Mountaineer Undergraduate Research Review (MURR) is West Virginia University's (WVU) student-run multidisciplinary undergraduate research journal. From 2009 to 2014, MURR published discontinuously due to student turnover via graduation. In 2019, MURR was reestablished with clear goals of long-term sustainability, and since then, has maintained a steady publication schedule. However, the publication still faced issues of standardization and professionalism in the publication process. This work sought to address these issues in order to bolster the integrity and standing of MURR within the broader research community of WVU and other undergraduate research journals. To accomplish this, I sought to establish practices to increase the sustainability of the journal and expand diversity among researchers and disciplines. In order to create more sustainable publication practices, I established a more thorough process for the editorial review board (ERB), created workshops for the ERB, expanded advertising methods, and archived developmental processes. To expand the researchers and disciplines involved in the publication process, I sought to involve individuals with diverse experiences and promote work in Humanities, Arts, and Social Sciences (HASS). To promote future diversity in research, I established an exploratory board which created a high school writing contest aimed at encouraging high school students to be involved with research. By strengthening our systems and communities, the publication as a whole has also strengthened. The bolstering of MURR as an undergraduate research journal will encourage more students to deepen their involvement in research publication and contribute to the larger R1 research community of WVU.

Presentation Number: 54

Characterizing Electronic Cigarette Puffing Patterns Across Two Ad Libitum Bouts.;

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Student's Major: Psychology

Introduction: Little is known regarding electronic cigarette (E-CIG) users' puff topography, which is a measure of ECIG puffing patterns. Measures of puff topography include puff number (total number of puffs), duration (length of time per puff), and inter-puff interval (length of time between puffs). The ability to measure puff topography is crucial to understanding users' exposure to nicotine. This study aimed to characterize ECIG puffing patterns in a sample of experienced users. Methods: Following abstinence from nicotine/tobacco overnight, non-smoking ECIG users puffed on their own device ad lib across two, 5 minute puffing bouts. Puff topography was video recorded, and independent raters scored the data using predefined criteria. Puffing clusters were identified as the number of puffs with inter-puff intervals over 60 seconds and categorized as small (2-5 puffs), medium (6-10 puffs), and large clusters (>10 puffs) Results: Participants (N=10) were on average, 21.5 years of age, 50% male, and 90% White. They reported using ECIGs on 29.4 days (SD=1.6) in the past month, and over the past 2.2 (SD=1.2) years. Across the two bouts, ECIG users took, on average, 8.5 puffs (SD=4.9), of 2.8 seconds (SD=0.7) duration, with 57.4 seconds (SD=54.9) in between puffs. Additionally across bouts, 20.6% were single puffs, 31.3% were small clusters, 18.1% were medium clusters and 30% were large clusters (SD=41.0). Due to the small sample size, further research is required to fully understand the natural puffing behavior of ECIG users.

The Relationship Between Mental Health Spending and Suicide Rates by West Virginia Counties

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Student's Major: History

Suicide rates in the United States have soared recently. When combined with poor healthcare, high rates of drug abuse, and a deep-rooted culture of avoiding psychological help the rates of suicide are even worse in West Virginia. This paper explores the relationship that county budgets may have with suicide in counties in rural Appalachia.The specific aim is to determine the relationship, if any, between suicide rates by county and spending on mental health resources. County budget data from 2010 through 2019 from the State Auditor's website has been aggregated into categories and then compared to the suicide rates by county to determine if there is a relationship between the county budget allocations and their respective suicide rates. We expect to find a correlation between low spending on mental health resources and increased suicide rates, with the inverse being true as well. By examining how spending on mental health resources by county is related to the suicide rates in those counties, legislators can be better informed while making budget; decisions on mental health resources in an effort to decrease the suicide rates in West Virginia counties.

Presentation Number: 56

Birds of Blennerhassett: Human-Avian Interaction as Cultural and Environmental Evidence

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Student's Major: Anthropology

A review of relevant archaeological and zoological literature suggests that avian remains have low survival rates due to their fragile osteological composition. However, multiple archaeological sources also state that birds held important cultural significance for prehistoric peoples as observed in iconographic representations of bird motifs.Thus, this project aims to merge zooarchaeological and iconographical data to demonstrate that birds cannot only be found in archaeological contexts but they can also be used to reconstruct past people's interactions with their natural environment, foodways, and everyday life in West Virginia. Two avian remains excavated from the Blennerhassett Island will be presented as case studies using macroscopic examination. Blennerhassett Island is a significant location of both prehistoric and historic occupation. Blennerhassett Island is located in Wood County, West Virginia, in the Ohio River, and was the location of the Blennerhassett Mansion belonging to the named family as well as a prehistoric habitation site. Excavations of the Blennerhassett site have recovered artifacts that help archaeologists reconstruct everyday life in the past, such as an earspool, freshwater mussel shells from trash deposits (middens), and a piece of a sleigh bell. These case studies demonstrate complex interactions between humans and birds of prey, waterfowl birds, and poultry. This review of human-bird interactions provides thought-provoking evidence for a connection between humans and animals that changes through time.;

Comorbidity of Depression and High Cholesterol

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Student's Major: Multidisciplinary Studies

Depression and high cholesterol are both health issues that affect many Americans every year. These disorders each contribute to other life-threatening diseases and health issues such as heart disease, stroke, and suicide. There have not been many studies conducted on the comorbidity of depressive disorders and high cholesterol, so I am conducting this study to further solidify this link. I used responses from 372,730 adults from the 2021 Behavioral Risk Factor Surveillance System data to explore the association of hyperlipidemia with depressive disorders. The results of the logistic regression shown were significant $X2(DF=2, N=372730) = 24269.10, p<0.0001$. The logistic regression shows an odd ratio of 1.46, which indicates that there is a higher probability of those with high cholesterol having a depressive disorder than someone who does not have high cholesterol. This research shows a need for further research as to why this is happening, and possibly a need to screen those who are being treated for high cholesterol for depressive disorders.;

Play Higher Behavioral Health Virtual Reality Game

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Student's Major: Psychology

Behavioral health connects physical and mental health, as well as behaviors and wellbeing. The Play Higher Virtual Reality experience is a study whose purpose is to introduce and get students interested in careers in behavioral health. The goal for this study is to help us better understand the impact of this game experience on early career interests in behavioral health and social work, as well as teach students about careers in behavioral health. The issue that this study is trying to solve is the workforce shortage in behavioral health careers. Play Higher is conducted with a survey, as well as random assignments of students to the 3-D virtual reality (VR) game experience and the 2-D game experience. Our expected results are that students will display a higher rate of interest in behavioral health careers after playing the 3-D VR game rather than the 2-D game. Behavioral health is a much wider field of work than most people may think, it is important to introduce students to behavioral health because these careers largely benefit the general public.

Impacts of Fidelity Data Collection on Procedural Implementation

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Student's Major: Psychology

Training staff members to implement behavior interventions accurately (with high procedural fidelity) is crucial to client success. Our study aimed to determine if collecting procedural fidelity data from a mock therapy session improved the fidelity with which participants implemented the same therapy. We used a group design in which groups varied based on whether they collected data while watching videos of mock therapy sessions. Participants in both groups were shown video models of a resetting differential reinforcement of other behavior (DRO) implemented with varying levels of fidelity during the mock therapy sessions. After watching sets of videos, participants completed roleplays in which they implemented the same behavior intervention plan. There were observed differences in the fidelity of implementation of various intervention components. There were no significant differences in the overall fidelity between the groups; both groups showed significant improvements across the roleplays. These results indicate that exposure to video models at varying levels of fidelity may have more of an impact on the fidelity with which novice implementers implement a procedure than whether they collect fidelity data on the procedure.

Program/Mechanism Supporting Research/ Creative Efforts: 497 (research) course in your major

Presentation Number: 60

Exploration of Variables that Affect Attendance for Rural Appalachian Child Advocacy Center Therapy Clients

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Student's Major: Psychology

Low attendance is a common, and serious, issue for mental health services, including within child advocacy centers. Research suggests that there are several factors that contribute to low attendance and completion of therapy (Nix et al., 2009; Reyno & Mcgrath, 2006; Spot et al., 1999). Once specific client characteristics are determined to have a relationship with attendance, precise steps may be taken to increase attendance within the client population overall. The purpose of this study was to determine what factors have the greatest impact on attendance within the rural Child Advocacy Center (CAC) client population. Data were obtained from client records between 2016 and 2022. The factors analyzed included income, biological relation, guardian relationship status, guardian employment, open Child Protective Service (CPS) cases, open Family Court cases, and significant stress. Using correlation analysis, this study examined which of these variables has the most significant correlation with attendance rates. Due to several limitations, most importantly a small sample size, no significant relationships were found between attendance and the aforementioned independent variables. However, other potentially significant relationships were discovered that suggest further research avenues within the CAC client population. Overall, more research is needed pertaining to the CAC model to provide more effective services to clients.

Presentation Number: 61

Comparing and Updating Multinational Military Exercise (MME) Datasets

Spencer Perkins, Vito D'Orazio
Department of Data Science

Student's Major: Data Science

Multinational Military Exercises (MMEs) are key indicators of a nation's military power, development, and cohesiveness with other nations, and serve as important evidence of existing and continuing alliances between participants. MMEs are large military operations and training exercises between two or more nations that are not meant for war, but for training the nations' militaries, in both field and simulated, combat and non combat exercises. Despite their apparent wealth of information regarding participants' military capabilities, there is relatively little research that has been conducted about them. In this study, I examine two such research initiatives, being two separate datasets of MMEs created by Dr. Vito D'Orazio and Dr. Jordan Bernhardt respectively. Previously, I sampled exercises from the Bernhardt dataset to compare them to the D'Orazio dataset, determining any credible exercises to add to the latter. Now, I use R programs to model each dataset, revealing patterns in exercises over time. As both media coverage of MMEs and nations' use of military resources has been increasing in the past several years, I expected there to be a significant increase in the total number of exercises for both datasets in later years. Preliminary results of the modeling support this: basic modeling of both datasets shows an overall increase in number of exercises recorded per year. These results are a good step toward further analysisâ€"if more in depth modeling can reveal the same level of information, it can help prove the usefulness of MME data and encourage further studies.

Presentation Number: 62

The trade dividend of mental and physical health, a racial study.

Tavares Richards
Department of Psychology

Student's Major: Psychology

The topic of psychological differences between races has been difficult to quantify. While it is possible to empirically observe behavioral differences and certainly different levels of adversity, we at this study hope to find means of deducing differences within the overall health of Asian, Black, and White citizens and hopefully facilitate improving those well-beings. When using the WEAT data analysis tool we can see that White US citizens are 81% less likely to report a string of +14 bad mental health days and Asians are 61% less likely when compared to Blacks $X(DF=11,N=450,016)=33076.6$, $P<.001$. While indicators of poor mental health days can be statistically significant depending on race so can physical health poor days. BRFSS data reflects that reports of good physical health days are statistically significant as well but only when comparing differences between the Black and White racial groups (not including Asian Americans). Black citizens are 62% likely to report a good physical health day when compared to White counterparts. $X(DF=7,N=450,016)=33076.6$, $P<.001$). This not only shows a racial correlation between races and poor mental/physical health days but can also further expand previously studied ideas such as "weathering" in racially diverse communities. Ideally the research will allow better developments in how different cultures across the US respond to environmental or socioeconomic stressors. It is also possible that this study shows an issue with data collection and how different races will be less likely to report poor mental and physical health.

Effects of Education and Income on Depression

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Student's Major: Psychology

Education and income are significant frameworks in lives and careers of so many, but the impact they might have on mental health needs to be brought to light. The current study aims to see if education level and annual household income in America influence depression. Data from the 2021 Behavioral Risk Factor Surveillance System interview of 438,693 adults were used to examine the influence of age, sex, annual household income, and education levels influence on depression. The ages ranged from 18 years to 80+, and around half of the sample identified as female. The logistic regression was significant, with $X2$;(DF=20, N=438,693) = 26480, $p < .0001$. The results found women were 1.91 times more likely to be depressed than men. Emerging adults (18-24) were more likely to report depression than the other ages. The Odds Ratios also showed that relative to people with a GED or high school diploma, people with some college (1 to 3 years) were 1.32 times more likely to be diagnosed with depression. The Odds Ratios for depression also found that relative to people with a \$35,000 <= Income < \$50,000, people with \$15,000 <= Income < \$20,000 were 1.45 times more likely to be diagnosed with depression. These results show important information on education and incomes' impact on depression. Future analysts can examine further in the relationship of people with some college and their depression and see if there are ways that colleges can both help with education and mental health resources.

Economic Inequality in Europe and it's Effects on Access to Resources.

Savon Rogers
Eberly College of Arts and Sciences

Student's Major: Criminology and Political Science

We are looking to see if there is a correlation between a country's income inequality and one's access to resources, physical health, mental health, and drug use. First we acquired several databases and data libraries focused on single variables. These variables were income inequality, wealth inequality, physical health, and mental health. We will be comparing them to see if over time income inequality has gotten worse and affected other aspects of a person's life. Currently I am taking the data we found in the database and transferring them to a single document so that we can compare several countries' inequality values. We hope to find a correlation between these databases, as it would provide insight on how much income and wealth affect a person's livelihood. There are no conclusive results yet, but we hope to find that the correlation between the databases is significant enough to illuminate the need for policies that provide resources to those in low income communities or bridge the income/wealth gap.

Combating Health Disparities One-Step at a Time: My Experience Editing Special Articles for Publishing

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Student's Major: Neuroscience

The National Institute on Aging (NIA) recognizes the existence of health disparities as a global issue that becomes more evident in older adulthood. It is critical to address and combat these disparities to improve the health of aging generations. I was part of a group of editors and authors who assembled a special issue for *The International Journal of Aging and Human Development* containing articles discussing health disparities among older adults who are considered to be members of the following groups: racial and ethnic minorities, women, lesbian, gay, bisexual, trans, and rural populations. The articles included in the special issue offer ways to reduce the disparities found among various aging groups by providing future directions, including AGE-ADAR, an NIA-funded training program at WVU that encourages undergraduate minority students to pursue aging and health disparities research. As a co-editor of these articles, I was given the opportunity to understand the process that transpires to assemble articles written by experts with knowledge of how health disparities impact these groups. This experience has strengthened my ability to recognize prevalent issues across the globe and devise ways to prevent them.

The stroke Epidemic among African Americans

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Student's Major: Public health

Strokes risk factors such as high blood pressure, diabetes, and high LDL cholesterol, have been identified, but little is known about racial disparities and access to healthcare as contributors to stroke. We sought to examine the relation between stroke risk and healthcare access in the United States. Using the data from the 2021 Behavioral Risk Factor Surveillance System (BRFSS) from the Centers for Disease Control and Prevention (CDC), we conducted a logistic regression predicting stroke based on sex, race, and healthcare access. The overall model was significant X^2 (Df = 5, N = 260,452) = 96.16, p<.001. We found that compared to White Non-Hispanics, Black Non-Hispanics are 1.84 times more likely to have a stroke. The calculated variable for adults ages 18-64 with any form of health insurance showed that those with no form of health insurance were less likely to have a stroke than those with health insurance, and Men showed a higher rate of stroke than Women. Identifying these risk factors is essential to understanding how to prevent potential incidences.

Underrepresentation of Missing Minority Children Caused by Media Bias in Major News Publications

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Student's Major: Criminology

Within the media, minority children are generally underrepresented by major media news sources in comparison to the actual data for missing children in the United States. This overrepresentation of white female children is a harmful narrative created by national news that decreases awareness for missing minority children. In previous studies on this research, racial as well as gender biases were revealed in publications of major news organizations. These biases put in place by law enforcement and news reporters are believed to lead to decreased odds that missing children are brought home safely. In this study, we collected thirty news articles reporting on missing children and analyzed the differences in numbers reporting on children of color versus white children. We sampled articles under the news section of google after using the key words "missing child" and sorting the results to only articles from the timeframe 2019-2021. The results of this study will provide new insight on media representations of missing children as well as building on previous research done.

Presentation Number: 69

How Corporations' Hiring Practices Create Additional Barriers for Neurodivergent Job Seekers

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Student's Major: Sport & Exercise Psychology

While some disabilities are more apparent than others, individuals with invisible disabilities can appear healthy to onlookers, making their disability more difficult to recognize. This label can include conditions that describe differences in brain processing and function, typically known as neurodivergence, an umbrella term which includes autism, ADHD, dyslexia, Tourette syndrome, and more. This social theory explains that neurodiverse individuals experience their environments in ways that may differ from the generalized neurotypical population, but stresses that these differences are not deficits. These differences can be beneficial for workforce teams, as cognitively diverse teams see advantages, such as a higher rate of problem solving. Although much progress has been made in the development of accommodation strategies for; neurodivergent employees, standard recruitment and selection practices can unwittingly create barriers for neurodivergent applicants. As diversity becomes a hot button topic for businesses, some Fortune 500 companies have released initiatives to modify their hiring practices to be more accessible to neurodivergent individuals. Through content analysis of organizational documents, particularly those focused on neurodivergence in the workplace, this review analyzes the depth of access neurodivergent job seekers have to available accommodations from these companies. Furthermore, we investigate whether these accommodations are fluidly incorporated into the recruitment and selection process, or if candidates would have to request these additional accommodations, leading to potential bias, stereotyping, or preconceived notions of the applicant. This collection was conducted with only the material publicly available, as we hoped to mirror the experience an individual researching employment opportunities would have.

Presentation Number: 70

Emotion Socialization and Child Abuse Potential When Caring for At-Risk Toddlers

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Student's Major: Psychology and Neuroscience

Emotion socialization is a crucial part of child development1, influencing how individuals react, adapt, and understand the emotions of others and of oneself 2. Parenting practices, such as mindfulness3, emotion validation4, and emotion coaching5 enhance both emotion regulation6 and emotion socialization, and improve relationships within dyads7. Child maltreatment can be detrimental to an individual's emotion socialization and perception8, and victims often experience mental health issues later in life9.

The present study examines pre-treatment data collected from 90 caregivers and their children aged 14 to 28 months referred to a mental health clinic in Sydney, Australia. This study investigates relationships between observed emotion-focused parenting coded using the Dyadic Emotion Coding System (DECS)10 and caregiver-reported child abuse potential measured by the Brief Child Abuse Potential Inventory (BCAP)11. Descriptive statistics and correlations were conducted across all variables. T-tests were conducted to examine differences between caregivers with higher and lower child abuse potential across adaptive and maladaptive emotion-focused parenting practices.

A small positive relationship was found between emotion identification and emotion validation statements $r(86) = .24$, $p = .03$. This indicates that caregivers who use greater emotion validation statements may also use greater emotion identification statements. No other significant correlations were found between variables. Additionally, there were no significant differences in use of emtoion-focused parenting practices between caregivers with higher and lower child abuse potential. These findings allow for a better understanding of the relationships between emotion-focused parent practices and caregiver child abuse potential and informs further research in these areas.

Presentation Number: 71

Accessible Recordings for New Musicians

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Student's Major: Composition and Jazz Studies:Trumpet

Musicians do not have equal access to the music industry. There are financial barriers that prevent artists from accessing tools for recording, marketing, and distribution that hold back artists' ability to grow and mature their craft. With the music industry's move towards the digital world, music industry tools that are necessary to make a song or album come into fruition have steadily become more accessible to a broad audience, but the standard recording process holds back new artists. Accessible Recordings for New Musicians is a project examining the entry barriers in music production and empowering new artists by investigating methods to make the recording process more accessible. The standard recording process leaves room for more efficient use of time and budgets that can allow new artists to focus more on the quality of their work and less on logistics. To achieve this, Accessible Recording for New Musicians is working primarily with two projects to produce original works starting with an unconventional demo that reduces the financial investment for preliminary work in the recording process. This demo is the basis for the entire recording process and allows for more flexibility to create a commercially viable recording suitable for release on streaming platforms. By breaking the traditional mold of the recording process, Accessible Recordings for New Musicians is standardizing efficient and cost effective methods to make professional levels of recording more obtainable for artists without the means for a large investment into entry costs in the music industry.

IRRAflow is superior to EVD in the treatment of hemorrhagic stroke and cerebral infection

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Student's Major: Neuroscience

Background: External ventricular drains (EVD) are a life saving treatment for the acute hydrocephalus that often accompanies hemorrhagic strokes and brain infections. They are also able to bypass the blood-brain barrier to deliver medication directly to the brain. Treatment with EVD has several limitations including risk of infection, occlusion, and the need to open the sterile seal of the system to interrogate malfunctions or deliver medications. Recently, a new treatment option (IRRAflow, IRRAS Inc, San Diego, CA, USA) has allowed the use of pressure-controlled active fluid exchange of cerebral spinal fluid to improve treatment of hemorrhagic stroke and cerebral infections.;Objective: Our objective was to determine whether the use of the IRRAflow improves patient outcomes for hemorrhagic stroke compared to EVD.;Methods: Using a prospectively gathered database of patients treated with IRRAflow or EVD for hemorrhagic stroke and cerebral infection, key patient parameters were reviewed and compared. Primary outcomes were Modified Rankin Score (mRS) and catheter related complications.;Results: Patients treated with IRRAflow had a significantly improved mRS at hospital discharge ($p=0.001$) and a significantly lower risk of in-hospital death (12.8% vs 27.1%, $p=0.017$). Patients treated with IRRAflow also had fewer complications (16.5% vs 41.2%, $p=0.0002$).;Conclusions: IRRAflow improves patient outcomes in hemorrhagic stroke and cerebral infections and has fewer catheter related complications in comparison to EVD.

Emotion Dysregulation in Youth with Bipolar Disorder

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Student's Major: Psychology

Aims: Affective lability is common in youth with bipolar spectrum disorders (BSD), and is associated with worse illness course and functioning. Yet, the extent to which affective lability persists between mood episodes remains unclear. We examined the relationship over time between affective lability, mood episode status (i.e., threshold, subthreshold, and remission), and demographic and clinical characteristics in youth with BSD.Methods: Data are from the longitudinal Course and Outcome of Bipolar Youth (COBY) study (n=384 youth with BSD;age 7 to 17 years at study intake). Affective lability was measured via the parent-report Behavioral Control Scale (BCS); mood episode status and psychosocial functioning via the Longitudinal Interval Follow-up Evaluation Psychiatric Status Ratings (LIFE PSR); and internalizing, externalizing and dysregulation symptoms via the Child Behavioral Checklist (CBCL). Participants were assessed a median of every 7 months over a median of 5.9 years.Results:;Affective lability (BCS) was worst during threshold mood episodes, followed by inter-episode subthreshold episodes, and full remission (all pairwise contrasts Tukey p-values < 0.0001).Youth with lower psychosocial functioning and more severe internalizing, externalizing, and dysregulation symptoms reported greater inter-episode affective lability. Youth with ADHD and earlier BSD onset had more severe affective lability overall.Conclusions: Youth with BSD experience affective lability throughout illness course, with greatest during threshold mood episodes followed by subthreshold and remission. Clinicians should carefully assess and treat affective lability during and between mood episodes to improve functioning and quality of life for youth with BSD.

Presentation Number: 74

The Effect of Immunotherapy on the Cardiovascular System

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Student's Major: Biology

Target to background ratio of large arteries is an established method to study arterial inflammation. Immunotherapy in patients with cancer is known to induce inflammatory response in the body, and potentially can be detected using target to background ratio. We reviewed and analyzed 21 positron emission tomography (PET) scans of patients with cancer, both before and after they have undergone immunotherapy. Values were obtained from four structures in the heart: ascending aorta, descending aorta, superior vena cava, and left ventricle, using a method known as radiomics. This method allows a large amount of quantitative data to be extracted from medical imaging. This study has recently concluded, and the results are currently being analyzed in order to make any further conclusions. The expected results would show stress being relieved on the heart once the cancer has been fully treated. This study will greatly influence the way physicians treat cancer patients, as well as help them understand the cardiovascular effect from immunotherapy.

Presentation Number: 75

Evaluating barriers and attitudes toward obesity and exercise in West Virginianendometrial cancer survivors;

Madison Sigler, Kristy Ward
Department of Obstetrics and Gynecology

Student's Major: Biology

Introduction: The prevalence of endometrial cancer is significantly higher in obese patients versus healthy weight individuals. A few studies have been conducted looking at attitudes and barriers to weight loss and physical activity in urban areas but not in rural areas such as West Virginia. Methods: XX number of women with a history of endometrial cancer participated in a survey that looked at attitudes and barriers to weight loss and physical activity. Participants were approached during their surveillance visit at West Virginity University Mary Babb Cancer Center and asked if they wished to participate. Participants who agreed were called by our research associate (MS) and the survey was administered over the phone. Participants were compensated with a $10 gift certificate. Demographic data was evaluated for frequencies. All survey questions were evaluated on a five point Likert scale. Statistics were performed using IBM SPSS Statistics software. Results. Participants felt that the biggest barrier to weight loss was XX. For physical activity, the biggest barrier was identified as XX. Participants also responded that XX, XX were also barriersXX was found to not be significantly associated with being a barrier. Conclusion: Overall attitudes towards weight loss and physical activity were positive and participants had a desire for medical assistance for weight loss and physical activity recommendations. Using these barriers that have been identified, programs targeted to this population can be created.

The Formal Elements Art Therapy Scale (FEATS) Digital Archival Project

Emily Budik
Art Therapy, West Virginia University

Student's Major: Psychology; Art Therapy

The Formal Elements Art Therapy Scale (FEATS) Digital Archival Project is something that I am confident will change the worlds of mental health and art therapy understanding to a point that we cannot comprehend just yet. Because art therapy is a new form of therapy, there are small amounts of research done in the field and an even smaller amount that have been repeated to see reliable results that can be replicated. Using a PPAT (Person Picking and Apple From a Tree (art diagnostic assessment)) and FEATS in combination has created outcomes that show objective outcomes within diagnoses and demographics. The FEATS scales are a way to create quantitative data out of something that was initially qualitative. This will result in a database that can be used to do further research upon, as well as added onto if external art therapists and psychologists adhere to the same guidelines for their results. There are so many things to be said about this project, and I am just excited to be able to be a part of something with people such as Dr. Linda Gantt and Dr. Anne McFarland who are pioneers in the field. To be learning under them as well as creating the database with them, it has simply confirmed the passion that I always knew I could find in a field of study. I foresee this research to be another landmark case of research in the ever growing field of art therapy.

Presentation Number: 77

Mischief, Mayhem, SOAP: The Cleansing of Reality in Fight Club

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Student's Major: English and Spanish Double Major

In spite of a highly positive public and critical reception, David Fincher's cinematographic adaptation of Chuck Palahniuk's novel, Fight Club (1999), has yet to benefit from a semiotic approach. Along with mischief and mayhem, the soap motif occupies a central role within the diegetic structure, for not only does it operate as a constant narrative function, but it also points to a pervasivecultural critique as well as denotes fundamental existential concerns. A semiotic approach based upon the interpretive close-reading of the narrative structure reveals the polysemic qualities of the soap paradigm as a unifying symbolic signifier. The concept of the fight club itself is to be interpreted as a radical cleansing from the absurdity of everyday life, hence directly addressing the existential angst generated by consumer society. Acting as a cleansing agent, Tyler Durden purifies the narrator from his alienated existence, literally becoming the soap of the narrator, for it allows the latter to be rather than simply exist in social as well as ontological terms. The semiotic analysis of the soap paradigm in Fight Club unveils a striking parallelism between narration and intentionality for, as Tyler Durden strives to cleanse his surroundings, the film itself functions as a cleansing agent to denounce the main signs of what French sociologist Guy Debord conceived as a 'society of spectacle'; in the final analysis, this narration is to be metaphorically perceived as an attempt to cleanse the receptor from the trappings of the unfulfilling and essentially empty society of spectacular consumption.

Presentation Number: 78

West Virginia University Unsolved Case Project

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Student's Major: Forensic and Investigative Science

"To the living we owe respect, to the dead we owe the truth."

-Voltaire

This quote has been a driving force for our undergraduate research team and our desire to make a difference within the forensic science community. Working conjointly with the West Virginia State Police, county sheriff's offices and local law enforcement agencies in West Virginia, unsolved case files are shared with our research team. Once the case files are obtained, our team of students will inventory and review the files, taking the time to immerse themselves in every documented detail of the case. As information is compiled and working theories are identified, students work to create a timeline of events, a geographical spatial relationship map of locations of interest, and identify members of the family tree to link possible sources for genealogical DNA sampling- all with the information contained within the case file. In addition students will digitize the case file onto an external hard drive, completely off network to ensure confidentiality and will provide that back to the submitting agency upon completion of review. Additionally, the hard drive will contain all case related working documents, suggestions of evidence resubmission based on advanced technology, working theories and possible leads to explore with current location and contact information.

"Let Us Walk with the Fairies" Enchantment, Community, and the Power of Place

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Student's Major: History

In recent years, fairy trails, wooded paths lined with fairy homes, have popped up in local parks across the U.S. These homes are crafted by and for members of the community, and the trails along which they are located serve as a gathering place and activity for all ages. This project focuses on the Mason-Dixon Historical Park and Fairy Trail in Core, West Virginia, the creators and managers of it, and the experience of 16 fairy trail visitors "including the two investigators" who gathered at the park on a Saturday in February 2023. During this experience we witnessed a variety of practices involving various forms of movement, social awareness of others, and affective, emotional, and cognitive elements of shared experiences as visitors of different backgrounds and ages interacted with the trail, its material and imaginary elements, and with each other. This project builds on the ethnographic description of that experience and follow-up interviews with some of the participants to examine the material, embodied, and social dimensions of enchanted geographies and how these dimensions are critical to the experience of movement and sharing in a physical space such as a park trail. In particular, we explore participants' ability to value mythical beings such as the fairies on this trail based on the beliefs and understandings of those involved and surrounding them. This research calls for more attention to collective experiences" such as walking out-of-doors with others, whose world views and embodied engagement with the landscape, its material and imaginary attributes are unlike our own.

Experimental Investigation of Heat-Activated Kirigami Deployment

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Student's Major: Mechanical Engineering

Kirigami was first an art form seen in Japanese culture that focused on cutting and folding paper into different structures. Recently, the idea of creating a three-dimensional structure from a flat shape has been the focus of several research projects dedicated to finding new applications in the engineering field. In robotics, a specific category of robots that require ease of transportation and versatile deployment has prompted the development of designs based on utilizing Kirigami cutting patterns. This research focuses on the creation and deployment testing of polygonal Kirigami cutting patterns manufactured by layering heat-shrinking and cardstock sheets. Cutting patterns available in the literature were adopted for this research. Multiple combinations of cardstock, heat-shrinking sheets, and adhesives were evaluated to find the best combination of materials for resisting debonding during heat exposure. The deployment of four Kirigami different polygonal patterns was tested with two configurations: mechanically restrained edges vs. unrestrained edges. The purpose of including mechanical restraints was to eliminate layer separation and achieve uniform deployments. Kirigami units were exposed to uniform heat from an oven until deployment was completed. Preliminary trials showed that a combination of thinner cardstock and heat-shrinking sheet resulted in very flexible units unable to deploy uniformly. The addition of separation between petals and the central polygon facilitated the formation of localized linear hinges that increased the final deployment angle. The implementation of mechanical restraints reduced the debonding among layers. Moreover, units with mechanically fixed edges had a more uniform deployment than units without restrained edges.

Preliminary Designs of a Diagnostic Probe for Magnetized Plasma Systems

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Student's Major: Physics

Plasma is a state of matter composed of charged particles which exhibits collective behavior. In the laboratory, plasmas are often contained within vacuum chambers. Due to their mass, electrons move at much larger speeds than ions and strike the chamber walls more often. To balance the flow of charges to the walls, a boundary between the walls and the plasma forms (a sheath). Low energy electrons are repelled by the electric potential of the sheath and ions are accelerated through the sheath and into the walls. Sheaths play important roles in tokamak divertors, plasma etching, and robustness of machinery in plasma environments. A pre-sheath region will form where ions begin the process of accelerating so that they reach the edge of the sheath at the Bohm speed. In a plasma with an applied magnetic field, an additional magnetic presheath forms, modifying the ion motion. Here we present designs of an emissive probe that will be used to measure the electric potential in the sheath, presheath, and magnetic presheath regions. The emissive probe uses a loop of heated tungsten wire that is biased negatively relative to the plasma. The current collected by the loop is plotted against the bias voltage to generate IV-curves. At a bias more negative than plasma potential, electrons will be thermionically emitted into the plasma; at a bias more positive than the plasma potential, the probe collects electrons. The transition between thermionic emission and electron collection is used to accurately measure the plasma potential.

Program/Mechanism Supporting Research/ Creative Efforts: 497 (research) course in your major

Presentation Number: 82

Characterization of Superhydrophobic Polyamines/Teflon Coating on Metallic Substrates

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Student's Major: Chemistry/Biology

The polyelectrolytes of polyallylamine hydrochloride (PAH) and polyethyleneimine (PEI) were coupled separately to the microparticles of polytetrafluoroethylene (PTFE) to deposit superhydrophobic ultrathin coatings on metals. These polyelectrolytes are water-soluble polyamines used in a highly diluted solution, while the PTFE is a 10% colloidal solution. The substrates used are stainless steel 304 mesh, carbon steel, and aluminum mesh. A bilayer is deposited starting with the polyamine to functionalize the metal surface followed by a capping layer of PTFE microparticles to obtain a corrugated surface of low surface energy. The combined effect of the metallic mesh structure, PTFE microparticles, and PTFE low surface energy leads to a superhydrophobic coating on the metal surface. Contact angles that ranged from 135° to 160° were measured and the mesh was able to hold a hydrostatic height of 40 mm. Our research has applications in the coatings industry that serves corrosion protection, filtration, aqua systems, condensers, and others.

Program/Mechanism Supporting Research/ Creative Efforts: 497 (research) course in your major

Presentation Number: 83

Evaluation of Complex Conductivity in Liquid Exfoliated Nanoflakes via Terahertz-Time Domain Spectroscopy

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Student's Major: Physics

Terahertz spectroscopy can be applied as a non-contact method to measure complex conductivities in a variety of materials. One such class of materials is nanoparticles/nanoflakes. Understanding the impact of synthesis and processing parameters on nanoflake electrical properties, such as conductivity, allows for tailoring those parameters to obtain nanoflakes with desired electrical transport characteristics. Here, graphene nanoflakes are produced via liquid phase exfoliation from graphite and characterized with respect to morphology (e.g., atomic force microscopy and scanning electron microscopy) and AC conductivity obtained through terahertz spectroscopy measurements. It is found that the application of exfoliation reduces the precursor flake dimensions, through which graphene and graphite flakes of different lengths can be obtained. Initial results indicate complex conductivity described by the Drude-Smith model (carrier back-scattering) with an increase in conductivity post-exfoliation. These results set the groundwork for similar approaches in utilizing terahertz spectroscopy as a conductivity probe for other classes of materials. In addition to the present results, future work will include experimentation on other two-dimensional materials and exploring their temperature-dependent properties.

Presentation Number: 84

The Application of Echocardiograms through Radiomics for Medical Diagnoses

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Department of Biology

Student's Major: Biology

The usage of echocardiogram images can revolutionize medical science and technology. Currently, a type of invasive surgery, known as biopsies, is one of the procedures done to diagnose a certain medical condition. However, through this project of analytical data by radiomics of an echocardiogram can help find a different way to diagnose patients. It is the goal to have echocardiograms sort of predict what condition a patient could possess without the process of biopsies. These images are obtained through an ultrasound device that is not as harming. We would find the region of interest, which is the septum of the heart, of the parasternal long axis and four chamber view. This data would then be processed through a type of radiomics application which extracts large amounts of quantitative data of images. This would then be undergone a statistical analysis to find a correlation with a medical condition that was diagnosed through an actual biopsy. The results are not obtained yet because the data analysis takes time to come back. This does not take away from the importance of this project which could have a breakthrough in the medical field. If the data shows that it can predict a medical illness without the action of a biopsy of the heart, this would be a great discovery or revelation. This project helps further the medical field in both aspects of science and society.

COVID-19 Vaccine Uptake Among West Virginians with Two or More Chronic Disease Comorbidities

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Student's Major: Exercise Physiology

COVID-19 poses a severe health risk for individuals with chronic diseases, exacerbated by additional comorbidities. Trained Health Navigators collected data from WV adults (≥18 years) with at least one chronic condition. An educational intervention (in-person & Zoom) was employed using short videos to address participants' vaccine concerns followed by a REDCap survey to assess demographics, health history, and COVID-19 vaccination status, knowledge, and beliefs. Useful educational handouts were also provided. We hypothesized that high-risk individuals (≥ 2 chronic disease comorbidities) were more likely to be vaccinated and boosted for COVID-19. Fifty-three participants (in 6 counties) participated in the educational intervention. The mean age was 47.5 ± 15.9 years. The majority were females (69.8%), < 65 years old (84.9%), and reported ≥ 2 chronic diseases (71.7%). Results showed only 39.6% had the recommended number of COVID-19 vaccines. West Virginians with ≥ 2 chronic disease comorbidities reported two times greater COVID-19 vaccine uptake with at least one booster (47.4%) compared to those with one chronic disease (20%). However, 26.3% of participants with ≥ 2 chronic disease comorbidities reported not having been vaccinated. Women and older adults reported higher vaccine uptake with at least one booster than males and individuals < 65 years of age. Our findings confirm our hypothesis that higher-risk individuals with ≥ 2 chronic diseases are more likely to be vaccinated and boosted for COVID-19. However, the results also highlight cause for concern considering that 26.3% of these individuals remain unvaccinated despite improved access and no cost for vaccination.

Program/Mechanism Supporting Research/ Creative Efforts: Other

Presentation Number: 86

Suppression of periodontitis-induced bone erosion by haloanilide drug candidate ELP-004

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Student's Major: Immunology and Medical Microbiology

Periodontitis is a bacterial-induced immuno-inflammatory disease of the tooth-supporting structures that results in periodontal ligament destruction, alveolar bone resorption, and subsequent tooth loss. Periodontitis-induced alveolar bone resorption is the result of enhanced osteoclast activity. The haloanilide drug candidate ELP-004 inhibits osteoclast differentiation via its ability to block canonical transient receptor potential (TRPC) channels. It is hypothesized that oral treatment with ELP-004 will prevent bone resorption induced in response to periodontal disease-mediated inflammation. To test this hypothesis, Db/Db diabetic mice, which spontaneously develop periodontal disease and subsequent bone loss, will be orally dosed via oral gavage daily for 8 weeks with ELP-004 or vehicle control daily beginning at 5 weeks of age to determine if ELP-004 can prevent alveolar bone resorption. Micro-CT analysis will assess changes in the distance between the cement-alveolar bone junction and the alveolar bone crest and alveolar bone density. Trap staining will be utilized to assess osteoclast differentiation in treated and untreated mice. It is anticipated that greater alveolar bone density, decreased bone resorption, and few Trap+ osteoclasts will be present in our ELP-004 treatment vs. vehicle control groups.;Approximately 50% of adults over the age of 30 exhibit symptoms of periodontal disease. By developing a therapeutic capable of preventing osteoclast activation, alveolar bone resorption induced in response to periodontal pathogens may be reduced and subsequent tooth loss prevented, thereby enhancing the quality of life of those impacted by periodontal disease.

Program/Mechanism Supporting Research/ Creative Efforts: Research Apprenticeship Program (RAP)

Presentation Number: 87

The Importance of Point of Connection Between Healthcare Providers and People Who Use Drugs

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Student's Major: Health & Well-Being

Stigma surrounding drug use causes people who use drugs (PWUD) to have a difficult time developing a trusting relationship with healthcare providers. To ensure PWUD receive adequate care, establishing a point of connection is crucial. Point of connection can be established using methods such as motivational interviewing, reliable presence, and active listening. At the Morgantown Milan Puskar Health Right clinic, these tools are used by harm reductionists and volunteer staff to engage with PWUD who visit the syringe service program (SSP). At the SSP, providers and volunteers are expected to use these techniques to assist PWUD in making informed decisions about potential changes. Each SSP participant is asked a series of questions designed to determine where they are on the Stages of Change Model. Staff provides information that can reduce harm and disease exposure, as well as offer resources that could help them advance them to the next stage. Using these tools allows providers to learn about the struggles and support the needs of PWUD. Using these methods to strengthen PWUDs' motivation for behavior change and providing a welcoming and reliable environment to explore any mixed feelings about reducing potential harms and exploring a path to recovery, is a useful strategy to establish a point of connection with PWUD. By providing PWUD a sense of community and support, trust is established that can help PWUD progress through the Stages of Change to recovery from substance use disorder.

Effects of IL-27 Cytokine on Expression of Metabolism-Regulating Molecules in Neonatal Sepsis

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Student's Major: Immunology and Medical Microbiology

The human immune system is controlled via signaling molecules, known as cytokines, which can have both suppressive and promoting effects on the immune response. One cytokine, interleukin (IL)-27, expressed at elevated levels in infants, is known to be suppressive. In a mouse model of neonatal sepsis, IL-27 release is associated with high bacterial burden. Pups that are deficient for the IL-27 receptor (IL-27R KO), and consequently cannot respond to IL-27, exhibit reduced bacterial burden in the blood and peripheral tissues. Septic neonatal mice and humans become hypoglycemic, and IL-27R-deficient pups exhibit improved maintenance of blood glucose levels compared with wild-type (WT) counterparts. From this, it is hypothesized that IL-27 plays a role in regulating glucose homeostasis and related metabolic processes. Transcriptional profiles in the liver, a tissue with roles in glucose homeostasis, of WT and IL-27R KO pups during infection support this hypothesis. This research seeks to study the effects of IL-27 on liver and pancreatic cells regulating metabolic processes. A critical first step was to identify a hepatic cell line that expresses the IL-27R, responding to IL-27 cytokine. The expression of the IL-27Ra gene on FL83-B murine and HepG2 human hepatic cells was measured by qPCR. FL83-B cells did not express this receptor gene, but human HepG2 cells should express this receptor as evidenced by literature. The expression of genes for metabolism-regulating molecules in response to IL-27 will be quantified and mapped for each cell line, displaying the relationship between IL-27 release during infection and resulting neonatal hypoglycemia.

A Course-based Mental Wellness Intervention for Undergraduate Exercise Physiology Students with Low Self-Efficacy

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Student's Major: Exercise Physiology

Self-efficacy (SE) is positively correlated with both mental wellness and academic success. This exploratory study assessed the impact of a mental wellness intervention among STEM college students with low self-efficacy.

A 7-visit mental wellness intervention was provided by trained campus clinicians in a junior-level EXPH course with a follow-up training held the consecutive semester. Pre-post surveys, administered at the start and end of the 2 semester intervention, included two validated surveys (New General Self Efficacy Scale and the Cohen Perceived Stress Scale, PSS) and a few questions related to academic stress and the intervention that were not validated. Students were grouped into tertiles based on SE scores and data was compared between low (L) and high (H) SE groups.

Low SE students had lower stress (PSS Scores) pre (Low: 14.6 ± 6.2, High: 24.3 ± 5.8, p<0.001). and post intervention (Low: 14.9 ± 8.4, High: 21.8 ± 7.2, p<0.05). Low SE students reported using the wellness strategies (Low: 88%, High: 81%) but were more likely to report academic stress (Low 100%, High 75%), lower mental wellbeing satisfaction (Low 29%, High 69%), and that mental wellbeing negatively impacted their academic performance (Low 59%, High 31%).

Low SE students used strategies from a course-based wellness intervention, but this did not improve self-reported mental wellbeing or academic success related outcomes.

Disability and Poor Health Days

Lina Bouhaouala
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Student's Major: Multidisciplinary

Recent studies in 2021; found that adults with a disability in the state of Virginia, experience more mental distress and have a higher rate of chronic disorders than othersThe lack of accessibility provided leads to a lack of mobility and physical activity and are less likely to receive preventive care.In order to examine whether disability influences perception of health, the BRFFS data; were used.; Across-tab of healthy healthy day variable is calculated as a level 3(poor)of the span of 14 days of physical and mental health that challenges individuals with a disability to do errands alone. Unhealthy days are calculated for 30 previous days, the respondent with a disability recalled their mental or physical health is worsened. Questions 2 and 3 of the survey regard the results that combine the calculated summary index of overall unhealthy days with a maximum of 30 days. 14 unhealthy days out of 30 days were specifically identified within the final records of the data sets.The challenges people with disabilities face are a lot more severe as they lack access to healthcare from high costs, placing them below the federal poverty level. A variety of disadvantages this population faces leads to extreme mental distress and lack of motivation from the demoralizing limits structured in society.The cross tabulation association came to be $X2$ (DF=2, N=9196)=192.72, p<.00).Between the two variables, 49% said yes to having 14 or more bad days whereas, 76.9% of the participants reported without a disability 0 bad mental and physical days.

The Impact of Children in the Household on Likelihood of Coronary Heart Disease

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Student's Major: Forensic Examiner

According to the CDC (2022), about 7% of Americans suffer from coronary heart disease (CHD). The main cause of CHD is a build-up of fat in the arteries, which causes atherosclerosis; atherosclerosis is the restriction of blood to the heart. This can be caused by a variety of lifestyle factors, such as sedentation or hypertension. This study examines CHD and the relationship with the number of children in the household, as children affect one's lifestyle through exercise, diet, and amount of stress. A logistic regression using CDC data was conducted; the sample size was comprised 415,919 people, however 148,479 were not included in the regression due to being 65 and older, as older individuals are at an increased risk due to their age, and often live in households with no children, thus skewing the data. The results of the logistic regression were $X2(DF=5)=1,381.98$, $p<0.0001$. This study found that those with no children were almost twice as likely (1.85%) to have been diagnosed with CHD. Another interesting discovery was that those with 5+ children were almost twice as likely to have been diagnosed than those with 4 children. This research suggests that larger families may possess different resources, thus causing this disparity, and warrants more study.

Presentation Number: 92

The Effects of Light at Night on Neurobehavioral Deficits During Recovery from Stroke

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Student's Major: Psychology

Exposure to artificial light at night (ALAN) is common for all of us, but especially common for night shift workers. Although night shift workers are crucial to society, exposure to ALAN disrupts circadian rhythms, internal rhythms of ~24 hours, which increases health risks. Prevalence of cardiovascular and metabolic disorders is elevated among night shift workers. For example, rotating night shift work has been associated with a 4% increased risk of ischemic stroke. The present study used a middle cerebral artery occlusion (MCAO) mouse model of stroke to test the hypothesis that exposure to ALAN disrupts circadian rhythms after ischemic stroke, impairs cognitive and functional outcomes, and increases mortality. On days 1, 3, and 7 post MCAO we used Clark's general and focal test to assess neurobehavior, performed Y-Maze/spontaneous alternation tests to assess spatial working memory, and conducted novel object recognition tests to assess recognition memory. Infarct size will be correlated with Clark's general and focal test to establish a relationship between infarct severity and behavioral deficits. Data analysis is ongoing, however, we predict that exposure to ALAN will increase infarct size, impair neurobehavioral recovery, and increase mortality rate.

WVU Medicine Craniofacial Surgical Outcomes

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Student's Major: Biochemistry

Craniosynostosis affects between 1 in 2,000-2,500 births per year and predisposes children to neurodevelopmental delays and increased intracranial pressure. Many of these children require surgery to correct these defects. In addition to the complexity of these surgeries, healthcare in the Appalachian region is inaccessible for many residents due to geographic issues, poverty, and lower degrees of social support. To address these challenges, a multi-disciplinary approach and protocols have been developed to ensure each patient receives the same level of care. An institutional review was done in the WVU hospital system during the perioperative period in patients undergoing craniosynostosis surgery. Members of the multi-disciplinary team were interviewed which included plastic surgery, neurosurgery, anesthesiology, PICU, pediatric neurology/neurodevelopment, and pediatric behavioral medicine/psychiatry. Erythropoietin is started 6 weeks prior to surgery to reduce the rate of blood transfusions with a pre-operative hemoglobin goal of 13. After surgery, patients are admitted to the pediatric intensive care unit and started on a dexmedetomidine infusion. WVU has initiated a lab schedule to reduce the amount of blood drawn which consists of CBC on arrival to the PICU, at 8 pm, and 5 am post-operative day 1. Initiation of these protocols allow for patients at WVU to experience an equalized level of care throughout the preoperative period. Outcomes in our institution are comparable to the top 5 institutions participating in the registry which includes USA, Canada, South Africa and Australia for blood management, length of stay, blood donor exposure and medications used.

Energy intake and sports nutrition knowledge of recreational rock climbers

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Student's Major: Exercise Physiology

Rock climbers need low body mass to better perform rocking climbing maneuvers and may have generally poor sports nutrition knowledge which may lead to low energy intake in an attempt to keep body mass low. Therefore, the purpose of this study was to determine the sports nutritional knowledge and energy intake of college-aged recreational rock climbers. Additionally, we sought to determine the effectiveness of a sports nutrition educational intervention on sports nutrition knowledge. Eight recreational climbers (Age: 20 ± 1 yrs Ht: 170 ± 2 cm Wt: 71.9 ± 4.2 kg) participated in this research study. Subjects completed the Abridged Nutrition for Sports Questionnaire (ANSKQ) to assess sports nutrition knowledge and the Dietary Health Questionnaire (DHQ-3) to assess energy intake prior to the educational intervention. A 60-minute sports nutrition lecture was provided which covered sports nutritional topics relevant to rock climbers.. Immediately post intervention, subjects completed the ANSKQ to assess change in sports nutrition knowledge. Climbers consumed an average of 1934.29 ± 339.03 Kcal/day, with relative intakes of protein: 1.19 ± 0.25 g/kg/day and carbohydrates: 3.14 ± 0.54 g/kg/day. There was no difference pre vs post in sports nutrition knowledge (Pre: $51 \pm 18\%$ vs Post: $54 \pm 4.8\%$, $p<0.05$). We found low energy intake and poor sports nutrition knowledge in recreational climbers. Additionally, a one hour nutrition lecture does not increase sports nutrition knowledge recreational climbers. Future research should examine potential interventions to improve energy availability in rock climbers.

Presentation Number: 95

How Tobacco Usage from West Virginia Compares with the Rest of the United States

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Student's Major: Psychology

Socioeconomic factors and race affect tobacco use examined in the United States. We examined whether current smoker status in West Virginia compared to the United States was related to race and annual income. We used the 2021 Behavioral Risk Factor Surveillance System (BRFSS) data from the Centers for Disease Control and Prevention (CDC). BRFSS studied 438,693 people from all the United States and 6,744 people from West Virginia to gather the 2021 data for the CDC. We used a logistic regression to test our data. This model was significant, X2 (DF=15) = 264.15, p<0.0001. In West Virginia those who make less than $10,000 annually are 2.67 times more likely to be smokers while those who make more than $200,000 annually are less likely to smoke (0.22 times less likely compared to the average annual income of those who make $35,000 to less than $50,000). When looking at race in West Virginia, black, non-Hispanics are 1.45 times more likely to be current smokers while compared to the entire United States, black, non-Hispanics are about as .93 times as likely as white, non-Hispanics to be current smokers. When examining the logistic regression for the entire United States, there was also a significance, X2 (DF=15)= 3,326, p<0.0001. Multiracial groups are more likely in both groups to be current smokers. These results indicate that in West Virginia, there is more racial and lower socioeconomic groups as current smokers compared to the entire United States, but in both sets of data those who make less annually and are multiracial are more likely to smoke.;

Presentation Number: 96

Effects of IAP on Immune Cell Infiltration to the Brain Post Stroke

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Student's Major: Immunology and Medical Microbiology

Stroke is the fifth leading cause of death in the United States as well as a leading cause of disability. Ischemic strokes account for 85% of all strokes and occur when there is a blockage of blood flow to a portion of the brain. During stroke there is a disruption of the blood-brain barrier that allows for the infiltration of immune cells to respond to the stroke. Past literature has shown some of these immune cells travel from the gastrointestinal tract to the brain. Disruption of the intestinal epithelial barrier releases bacteria into the bloodstream and promotes inflammation.;Intestinal alkaline phosphatase (IAP) is an enzyme present throughout the gastrointestinal tract that is known to detoxify lipopolysaccharide (LPS) and limit inflammation in the gut to maintain intestinal homeostasis. Due to the role of the gut in stroke and the role of IAP in gut homeostasis we hypothesized that loss of IAP will lead to altered immune cell response in the brain post-stroke. Akp3-/- mice lack the gene that encodes for IAP and will be utilized to test this hypothesis in the photothrombotic stroke (PTS) mode of ischemic stroke. At 72 hours post-stroke, the ipsilateral and contralateral hemispheres will be harvested for isolation of immune cell populations followed by flow cytometry. These studies will determine if the loss of IAP promotes increased infiltration of peripheral immune cells and/or increased activation of resident brain myeloid cells.

Presentation Number: 97

Impact of the Affordable Care Act on Heart Disease Mortality in the United States

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Student's Major: Computer Science

A comprehensive health care reform law was enacted in March 2010. This law, called the Affordable Care Act or "Obamacare" has resulted in providing over thirty five million people with health insurance coverage. Despite the significant changes that the Affordable Care Act made on the US healthcare system, little statistical analysis of its impact on the deadliest chronic diseases has been made. Our research investigates if there is a causal effect of the expansion of health insurance coverage on heart disease mortality. County-level data from the United States is analyzed to discover the effects of Medicaid expansion from the Affordable Care Act on preventable heart disease deaths. First, over three thousand counties are classified as low, medium and high coverage areas with respect to health insurance using data from 2006. The health insurance rates for these counties are tracked from 2006 to 2020 to see how these coverage rates changed. At the same time, the number of preventable deaths due to heart disease in these counties are also tracked over the same time period. Difference-in-difference and triple-difference regression models are utilized to isolate the effect of the Affordable Care Act on preventable deaths due to heart disease. Through this analysis and future analyses on key chronic diseases, public healthcare policy can be analyzed in order to stop preventable deaths in America.

Presentation Number: 98

Implementing a Narrative Medicine Curriculum to Third-Year Medical Students

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Student's Major: Biology

Medical professionals and trainees are increasingly experiencing burnout in the United States, resulting in depersonalization and detrimental patient outcomes. Narrative medicine – medicine practiced with a capacity to "acknowledge, absorb, and interpret the stories of illness" – combats these damaging effects of the modern healthcare environment. Healthcare and medical education programs have implemented narrative medicine curricula to varying degrees of success in improving both physician and patient well-being. Thus, this study aimed to explore how implementing a narrative medicine curriculum impacted third-year medical students. Students (n=7; 57% female; 26.43+2.64 years old) participated in three narrative medicine sessions during their internal medicine clinical rotation, and surveys were collected before and after participation. Surveys asked students to use a 5-point Likert scale to rate their experiences: a one indicated "strongly disagree" or a frequency of "never," and a five represented "strongly agree" or "always." Preliminary results suggest participation increased comfort with (Δ=+1.86) and interest in practicing narrative medicine (Δ=+0.57), increased frequency of clinical experience reflection (Δ=+0.57), increased ability to express emotions effectively (Δ=+0.43), increased identification with their cohort (Δ=+0.29), and did not change ability to share vulnerably (Δ=0.00). Overall, students expressed positive experiences and desire to engage more with narrative medicine. Should data collection progress in a similar trajectory, implementing a narrative medicine curriculum with third-year medical students may be beneficial in reducing the negative impacts of burnout in medical professional settings.

Shape Coding Language Therapy for Acquiring Pronouns in a Child with Apraxia of Speech

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Student's Major: Communication Sciences and Disorders

Children with childhood apraxia of speech (CAS) have speech production and prosody errors. These children may also have comorbid language delays and difficulty detecting associations between visual objects and their associated sound (i.e., the Bouba-kiki [BK] effect). This suggests that language therapies, such as Shape Coding, that utilize visual supports to represent specific aspects of language may not be beneficial to children with CAS. Using a single-subject multiple-baseline design, we used Shape Coding treatment with a child with CAS to help him acquire different subject and object pronouns (e.g., he, them). We hypothesized that if the participant failed the BK test, Shape Coding treatment would not improve his pronoun acquisition. Alternatively, if the participant passed the BK test, then he might benefit from the shape-language associations used in Shape Coding treatment. The participant was seen for three 15-minute sessions a week via telepractice with a licensed and certified speech-language pathologist who administered the treatment. During baseline, he passed the BK test indicating he was able to associate shapes and sounds. Following treatment, a visual analysis of his baseline, treatment, and maintenance data was conducted. Visual trends suggest Shape Coding enabled the participant to acquire all treated receptive pronoun targets. Results were mixed for expressive language targets, with object pronouns being acquired and only some subject pronouns. In summary, these results suggest that not all children with CAS have difficulty with visual-sound associations and that treatments that incorporate these association, such as Shape Coding, may be beneficial for language therapy.;

The Relationship Between Smoking and Poor Health Days

Allie Miller, Julie Patrick
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Student's Major: Criminology

In West Virginia, smoking has become a societal norm that has progressed over many years causing increased risk of health disparities across age groups. This notion implies that smoking increases levels of unhealthy days. To study the use of tobacco in 2020, we used the Behavioral Risk Factor Surveillance System data from the Centers for Disease Control and Prevention. The present study implemented a dependent variable that measured the number of Unhealthy Days, which includes the calculated variable 3 level poor physical health status. Two independent variables were included. The first was a 4-level age variable. The second was tobacco use, which calculates for 4-level smoker status: everyday/someday/former/non-smoker. A significant relation between these variables was observed with X^2 (DF = 7, N = 4591) = 873.56, p < .001. Age was not a significant predictor, but still gave some insight into the study. Middle-aged adults were 1.1 times more likely to report poorer health days. In regard to the smoker status, individuals who Never Smoke were 71% as likely as current smokers to report increased poor health days. This study can further help our understanding to be able to predict health issues relating to smoking habits across a specified lifespan.

Tentative parallel between caffeine's neuroprotective effects in humans and in Alzheimer's Disease animal model

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Department of Physiology, Pharmacology & Toxicology, West Virginia University

Student's Major: Biochemistry

Background: Modern medicine has expanded people's life span steadily in the past couple of decades. Neurodegenerative diseases, such as Alzheimer's Disease (AD), have become increasingly prevalent, especially among women. Risk factors such as obesity, diabetes and dyslipidemia are the root of the major global health issues cardiovascular diseases and also associated with AD. Studies have shown that regular coffee consumption is linked with a reduced risk of developing AD, not only by preventing many of its risk's factors, but also through caffeine's protective action on the disruption of the blood brain barrier. Objective: We aim to detect a number of polymorphic genes associated with the preventative effects of coffee consumption and the development of Alzheimer's disease in rabbits. Methods: DNA extracted from the brain of cholesterol-fed rabbits will be used for genotyping using TaqMan Real-time PCR to identify the type of polymorphic allele present and determine if a genomic parallel is found when compared to known single polymorphism associated with caffeine (coffee) consumption effects in AD in humans. Results: Our expected results should be that there are polymorphic genes in the brain of the rabbits that have developed Alzheimer's disease that are found in parallel to humans that consume caffeinated coffee regularly. Conclusions: DNA extraction from formalin-fixed animal tissue and gene species-specific amplified regions, can be challenging even when using small context sequences. The techniques used may need some adjustments, further investigation will be needed for troubleshooting.

Presentation Number: 102

West Virginia: Almost Heaven, But Not For Mountain Mamas

Brianna Myers
Department of Psychology, West Virginia University

Student's Major: Forensic Chemistry and Psychology

According to the CDC (2021), West Virginia has the highest rate of depression in the United States. Within West Virginia, women are 2.15 times more likely to be diagnosed with depression than men. To examine whether this disparity is stable, I compared rates of poor mental health days for women in West Virginia from 2011 and 2021. Data from 11,800 West Virginians who completed the 2021 and 2011 Behavioral Risk Factor Surveillance System Interview were used to examine differences in sex across the decade. I used logistic regression to examine the influences of sex and year on adults who reported frequent poor mental health days. The equation was significant with $x2$ (DF=3) =2464.45, $p< .001$. Upon inspection of the odds ratio, I found that women were 1.68 times more likely than men to report frequent poor mental health days. Additionally, those surveyed in 2021 were also 1.34 times more likely to report frequent poor mental health days. To examine 2021 in more depth, I ran a logistic regression of those who reported poor mental health in comparison with those who did not, with the results being that they were 4.07 times more likely to need access to a doctor, but could not afford it. My results show that not only is the rate of West Virginians who report frequent mental health days increasing, but women are being disproportionately affected when it comes to poor mental health in West Virginia and there is often little they can do to combat it.

Presentation Number: 103

Loss of tissue nonspecific alkaline phosphatase results in exacerbated neurological deficits post-stroke

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Department of Neuroscience, West Virginia University

Student's Major: Neuroscience and Psychology

Tissue nonspecific alkaline phosphatase (TNAP) is an ectoenzyme present in almost every cell type and is especially abundant in brain endothelial cells. Through previous studies in our laboratory it was found that TNAP is associated with loss of vascular integrity. When there is a block in blood vessels to the brain, referred to as an ischemic stroke, loss of TNAP activity has been observed, although results from this loss are unclear. The goal of the study was to identify the effects that endothelial cell (EC) TNAP has on post-stroke functional outcomes. Our hypothesis is that absence of EC TNAP will worsen post-stroke sensorimotor deficits. Our methods included the use of 6-month old mice, male and female, with a conditional endothelial cell deletion of alpl, the gene that codes for TNAP. The mice also received a photothrombotic ischemic stroke or a sham surgery. All mice went through daily neurological assessments (Clark's test) and multiple comprehensive locomotive tests over a seven-day period post stroke. Laser speckle was used to measure changes in cortical blood flow following stroke ($p<0.0001$). Clark's test shows increased neurological deficits following stroke ($p=0.0036$), and increased scores in knockouts compared to littermate controls ($p=0.0394$). Open field testing showed higher levels of movement in PTS littermate controls when compared to PTS knockouts ($p=0.0164$). Cresyl violet imaging showed no increase in stroke volume in the knockout mice ($p=0.1106$). These results may lead to new therapeutic targets for ischemic strokes.

Improving the efficiency of identifying language disorders and evidence-based instruction using SKILL intervention

Amaira Palmer, Michelle Moore, Megan Israelson
Communication Sciences and Disorders

Student's Major: Immunology & Medical Microbiology

Receiving proper aid and instruction when you need help can make the world of difference in facing those issues and overcoming them. In an academic atmosphere, this can look like having a qualified and experienced teacher, a clear and concise textbook, and an evidence-based curriculum to follow and learn by. The research study I am working on examines the effectiveness of;Supporting Knowledge in Language and Literacy (SKILL), a narrative language instructional program, using whole-class instruction for first and second-graders in a rural county in West Virginia. A pretest/posttest design was used to test this curriculum, involving administering a battery of speech, cognitive-linguistic, and reading tasks individually to each student before and after the group intervention with SKILL. After the intervention, we expect students to have more elaborate storytelling abilities, a greater vocabulary, fewer grammatical errors, and increased complexity in their language structure when telling the stories. We also expect that improvement may differ between typically developing children and children with a language disorder. These results may help identify which kids have a disorder versus those who show typical growth patterns with the SKILL intervention. Testing the SKILL curriculum can also ensure the students are receiving evidence-based instruction that aids in advancing their education to a higher level.

Reducing Adverse Childhood Events through the Utilizationof the Earned Income Tax Credit;

Louise Pammer Leach, Lindsay Morris Neuberger
Health and Risk Communications

Student's Major: Advertising and Public Relations

This project aims to reduce adverse childhood experiences by lowering the poverty rate in Florida. Adverse childhood experiences are â€œpotentially traumatic events that occur in childhood (0-17 years). For example experiencing violence, abuse, or neglect. witnessing violence in the home or community (www.cdc.org). Our research has shown that one way to reduce the risk of these adverse experiences is to avoid household poverty. To reduce poverty in the Orlando area, project SCORES attempts to build awareness of the earned income tax credit to households with an annual income of 10,000 or less. The earned income tax credit (EITC) is "a refundable tax credit for low- to moderate-income working individuals and couples, particularly those with children. The amount of EITC benefit depends on a recipient's income and number of children (www.irs.com)." We conduct our community outreach via targeted surveys, posting info flyers, creating interactive links, creating incentives via gift cards, and personalized email blasts. Project Scores is funded by the U.S. Department of Health and Human Services via the Orlando Health Foundation.

Presentation Number: 106

Looking at Heart Rate Variability for the Effects of Diet on Cardiovascular Health;

Daniel Pancake, Alexis Thrower, Joshua Paley, Abdullah Alansare
Epidemiology and Biostatistics, WVU School of Public Health

Student's Major: Biology

Introduction: Research has shown a diet high in omega-3 fatty acids can increase cardiovascular health and excessive intake of sugary beverages decreases cardiovascular health. However, little data has investigated how specific food groups contribute to these associations. Heart rate variability (HRV), the fluctuation of time between heartbeats, is a biomarker for overall cardiac health, with potential application to see an association between dietary habits and cardiac health. Hypothesis: Participants who have a higher consumption of fruits and vegetables and a lower consumption of discretionary sweets, sugary beverages, and processed meat will have a higher HRV. Methods: This study will use baseline data from a trial conducted on 150 desk workers who did not regularly exercise. Data was collected on the individuals' typical diet over the past thirty days through a dietary questionnaire. HRV was measured for 5 minutes while participants were in a supine position. HRV will be compared across high and low groups for each dietary habit. Results: It is expected to see a correlation between desk workers with higher consumption of fruits and vegetables and lower consumption of discretionary sweets, sugary beverages, and processed meat and higher (healthier) HRV. Conclusion: This experiment will inform dietary habits that relate to healthier heart rate variability, a powerful biomarker of cardiovascular health.

Presentation Number: 107

Craniosynostosis: Surgical Methods and Outcomes

Anushka Pathak, Antonio Perez
West Virginia University

Student's Major: Biology

Craniosynostosis is a birth defect when an infant's skull forms and fusses together before the complete development and growth of the brain. This defect predisposes infants to neurodevelopmental delays and increased intracranial pressure at a young age. To correct these defects, multiple intricate surgeries are required which need careful coordination between the surgeons/doctors. To understand the surgical process in finer detail, members from multidisciplinary teams were interviewed to discuss their role and specific concerns for these patients. Using this information, we were able to understand the details for the whole surgical procedure. With this data, we can standardize surgical procedures to provide patients at WVU with equalized healthcare and allow for a smooth coordination between different departments. Erythropoietin and Dexmedetomidine were administered preoperatively to see if they cause improvements postoperatively. After analyzing our data, it was found that providing patients with Erythropoietin 6 weeks prior to surgery showed a reduced number of patients needing blood transfusions and reduced the volume of blood needed for each transfusion. Immediately following surgery patients are admitted to the pediatric intensive care unit and are started on a dexmedetomidine infusion for sedation and pain control. Dexmedetomidine did not have a difference in postoperative opioid administration. It did, however, lower doses of medication required to treat nausea and vomiting. Future directions include studying effects of the erythropoietin on rates of transfusion at WVU and collecting data on the effect of dexmedetomidine infusions post-operatively to decrease opioid use and nausea/vomiting.

Fentanyl Test Strip (FTS) Use by People Who Inject Drugs (PWID) in Morgantown, West Virginia

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Student's Major: Biology

The opioid epidemic has resulted in West Virginia having the highest overdose rate in the U.S. for over a decade. FTS can help PWID identify the presence of fentanyl, which is deadlier than heroin or prescription opioids. This study aimed is to determine how the availability of FTS affects drug-using behaviors of PWID who obtain FTS and injection supplies from the syringe services program (SSP) in Morgantown, WV. PWID enrolled in the Dogwood Study complete a quantitative survey at baseline, 6 and 12 months to identify any changes over time. A subset (n=25) will complete a qualitative semi-structured interview after the 12-month survey. 176 participants enrolled; 25 have been lost to follow-up. 83 participants returned for the 6-month survey. Baseline demographics identified participants as primarily white, heterosexual males that were homeless. Methamphetamine was the most frequently injected drug at both baseline and 6-months. There was a 9% decrease in FTS usage from baseline to 6 months. The main reason reported for lack of FTS use was "I already know it's fentanyl." The decrease in FTS use is likely;due to the near-ubiquitous presence of fentanyl in the illicit drug supply. Additionally, methamphetamine appears to be replacing opioids as the most injected drug in Morgantown, West Virginia.

Program/Mechanism Supporting Research/ Creative Efforts: Research Apprenticeship Program (RAP)

Documenting the course and branching patterns of the dorsomedial cutaneous nerve of the hallux: An update.

Lienne Russell, Alexander Pocwierz, Zachary Gumble, Allison Ralston, Matthew Zdilla, H. Wayne Lambert
Department of Pathology, Anatomy, and Laboratory Medicine; West Virginia University

Student's Major: Biomedical Laboratory Diagnostics

The dorsomedial cutaneous nerve of the hallux (DMCN) is a terminal branch of the superficial fibular nerve. The DMCN provides sensory innervation to the great toe and the first metatarsophalangeal joint. The course and branching pattern of the DMCN is clinically relevant due to documented iatrogenic injury to this nerve during operative procedures involving the extensor hallucis longus (EHL) tendon, which it traverses superficially (Figure 1). The DMCN damage has resulted during EHL tendon transfer, hallux valgus or hallux rigidus corrections, bunionectomy, and cheilectomy surgical procedures. Intractable pain occurs following intraoperative injury to the DMCN, and surgical intervention to repair the damaged cutaneous nerve is necessary. Therefore, understanding anatomical variation, course, and branching patterns of the DMCN is clinically relevant. Previous foot and leg dissections have been performed in this longitudinal study. This study focused on the DMCN in 24 limbs dissected in fall semester of 2022 to identify morphological variations in branching patterns and course of this nerve.

Presentation Number: 110

Effect of prolonged dosing interval of multiple sclerosis disease modifying therapy on patient satisfaction and psychological distress

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Student's Major: Immunology and Medical Microbiology

Autoimmune diseases carry a heavy weight on the shoulders of patients. That weight brings down mental health and can cause a worsening of psychological symptoms the patient's experiences about their disease. The study's main purpose was to research if patients taking either ocrelizumab or ofatumumab had improved medical satisfaction and reduced psychological distress compared to patients taking other forms of drugs. Ocrelizumab is an infusion therapy administered every six months while ofatumumab is a monthly self-injection. Methods: To address this question, we broke eligible patients into four disease modifying therapy (DMT) groups: ocrelizumab, ofatumumab, daily oral therapy, and frequent self-infection therapy. To address this question, we used two different surveys, the Treatment Satisfaction Questionnaire for Medication and the Hospital Anxiety and Depression Scale on each of the groups. We asked additional questions related to how frequently the patients think deeply about their disease. We administered the surveys over the telephone, collected and were analyzed for clinical significance relating to the various DMT groups. The expected results are the patients taking ocrelizumab and ofatumumab will score with less anxiety and depression as well as an increase in satisfaction with their medication. Those results will support the hypothesis and show that taking the medication less frequently and having less invasive therapies improved the patient's psychological distress about their disease. These results also show that those patients spend less time thinking about their disease, and thus have a better psychological state. Drug treatments for Multiple Sclerosis that have high efficacy and long durations between treatments have higher patient-reported satisfaction and reduced psychological distress over the disease.

Presentation Number: 111

Developing an AI-Enabled ECG Algorithm to Differentiate Cardiomyopathies

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Student's Major: Biomedical Engineering

The use of artificial intelligence (AI) in healthcare has become a topic of growing interest within the scientific community. Consequently, several studies have been published showing the superior capabilities of machine learning models as compared to traditional diagnostic tests. Currently, echocardiograms are conducted for the diagnosis of cardiomyopathy. However, through this project, we intend to develop an AI-enabled electrocardiogram (ECG) algorithm that can differentiate different forms of cardiomyopathy. Cardiomyopathy is a disease of the heart muscle that makes it harder for the heart to pump blood to the rest of the body and is an important cause of heart failure. There are three main types of cardiomyopathy: dilated, hypertrophic, and restrictive, with as many as 1 in 500 people suffering from the disease as a whole. For this project, retrospective ECG, echocardiogram, and coronary angiogram data for over 9100 patients from electronic medical records was collected and analyzed. The significance of this project is that it utilizes recent discoveries at the intersection of data science and cardiovascular care in order to facilitate future diagnostic decision making by healthcare providers without requiring additional invasive and costly cardiac testing.

Presentation Number: 112

Manipulating Xanthine Oxidase and the Role of StressAuthors: Ateria Walker, Crystal Oudomvilay, Saina S Prabhu, Emily Burrage and Paul D Chantler School of Medicine, West Virginia University, Morgantown WV

Ateria Walker
Department of Exercise Physiology, West Virginia University and Department of Nursing, West Virginia University

Student's Major: Nursing

Chronic psychosocial stress is a risk factor associated with cerebrovascular dysfunction. Xanthine oxidoreductase (XOR) is an enzyme that generates xanthine oxidase (XO) and xanthine dehydrogenase (XDH). Under stress conditions, XOR produces excessive amounts of hydrogen peroxide and superoxides leading to vascular dysfunction. XDH is found predominantly in liver and is elevated during stress increasing the risk of hyperuricemia and liver dysfunction. XOR in chronic stress is not well understood. C57BL/6 mice showed hydrogen peroxide levels are significantly elevated in mice that underwent an unpredictable chronic mild stress protocol (UCMS). XO protein expression was higher in UCMS mice compared to control mice. In this study, hepatic xanthine oxidase knockout (HXO) mice model was generated to understand the role of XOR under stress. Wild type and HXO mice 18 weeks old were exposed to UCMS for 7 hours/day and 5 days/week and then euthanized at 26 weeks of age for tissue collection. Liver tissue lysates were homogenized with TBS and HALT-protease/phosphatase cocktail. Total protein quantification was performed using western blot analysis. XOR protein was quantified and normalized to GAPDH. In WT mice, non-significant increase in liver XOR expression noted in UCMS compared to non-UCMS group. XOR protein expression significantly reduced in the HXO vs. WT mice, and UCMS did not increase XOR protein expression. These data and published work suggest, in part, that HXO is altered with stress. We are now exploring XOR activity, and oxidative stress production in the HXO to further understand the role of liver XO on stress outcomes.

Program/Mechanism Supporting Research/ Creative Efforts: Experiential and Community Engaged Learning (EXCEL) Program

Evaluating Transfer Patterns For Rural Pediatric Distal Radioulnar Fractures

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Student's Major: Biochemistry

Due to the dispersal of hospitals and the rural nature of West Virginia's healthcare network, there are known disparities in the availability of care in the state. With this, patients are often transferred elsewhere out of the region where they are forced to travel long distances to receive care. This paper focuses on the transfer patterns of pediatric distal radioulnar fractures and their relation to the emergency room training of the provider. So, if we look at the rate of transfers for pediatric comminuted displaced radioulnar fractures and compare the rate of transfer to that of the emergency room training, then we will see that decreased emergency room training will lead to an increased rate of transfer. Pediatric distal radioulnar fractures are the most common type of fracture in children and new literature has shown that they are overtreated resulting in transfers out of the emergency room. Data will be collected through an IRB protocol, which allows us to see trends in the transfer rates.

Skeletal and Dental Response to Treatment of Class II Malocclusions with Carriere Motion Appliance

Liza Wan, Peter Ngan, Khaled Alsharif, Jun Xiang
Eberly College of Arts and Sciences

Student's Major: Biology

Objective: To analyze the skeletal and dental response to treatment of class II malocclusions with the Carriere® Motion 3D™ appliance (CMA). Methods: This retrospective study will include a sample size of 25 subjects diagnosed with class II malocclusion and excess overjet. The selection criteria will include post-pubertal patients with a skeletal maturation of CVM > 5. All were treated with the Carriere® Motion 3D™ Appliance followed by treatment with fixed orthodontic appliances or full mouth braces. Lateral cephalometric radiographs at various stages of the treatment process will be gathered. Three time points will be analyzed: T1 (pre-treatment), T2 (after removal of CMA appliance), and T3 (after fixed appliance treatment). Cephalometric measurements will be made, followed by superimposition of the radiographs, to calculate the change in overjet. Predicted Results: There will be a significant decrease in overjet after treatment with CMA and fixed appliances. There will be no significant changes observed in the cephalometric variables SNA, SNB, ANB, and SNL-ML. Predicted Conclusions: Patients with class II malocclusion and excess overjet can be corrected by CMA and fixed orthodontic appliances. The main treatment effects of CMA observed were dentoalveolar. Minimal skeletal changes were observed in the maxillary sagittal position.

Multimodality Imaging Approach to Predict Antineoplastic Therapy Induced Cardiotoxicity

Kenneth Wang, Brijesh Patel
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Student's Major: Biomedical Engineering and Biochemistry

Cardiotoxicity, which is heart damage arising from chemotherapeutic cancer treatment, is the second leading cause of death in cancer-surviving patients. Typical cancer patients undergo a series of tests throughout cancer treatment and beyond. Integrating available biomarkers in routine testing can be cost-effective and prognostically important without burdening patients with additional testing. This project attempts to develop an artificial intelligence model that can predict cardiotoxicity risk in cancer patients from existing CT scans to reduce the testing burden on patients while maximizing the utility of existing imaging data. Using PyRadiomics and image analysis techniques, the aortic wall image is isolated by eliminating the background images that are outside the wall as well as inside the wall. This image isolation procedure is automated so that a clean image of the aortic wall can be obtained rapidly from CT scans of several thousand patients. Image analysis of biomarkers in the aortic wall can provide an indication of cardiotoxicity. Future research will focus on developing an artificial intelligence tool for detecting these biomarkers on the aortic wall that can be used to assist the cardiologist in detecting cardiotoxicity indicators.

Testing Primers for Reliability With Tick Borne Pathogens

Ava Wilson
Department of Biology, West Virginia University

Student's Major: Biology

Ticks with tick borne pathogens can be found on forest animals, pets, and even people. The prevalence of ticks in West Virginia is extremely high. Since most of the state is covered with trails and forests, tick borne pathogens are a health concern among the people who live in the state. To test for specific tick borne pathogens, the lab needs primers that recognize those specific tick borne pathogens. Primers are short pieces of single-stranded DNA that are complementary to the target sequence. The target sequence would be the tick borne pathogens that the lab is studying. By using literature related to the specific tick borne pathogens (Borrelia, Babesiosis, Ehrlichiosis, and Rocky Mountain Spotted Fever). We identified the primers by using Polymerase Chain Reactions (PCR) to make multiple copies of the DNA sequence for tick borne pathogens. The primers were tested to see if they bind to the DNA. The results from the primers used and the DNA used is that only one primer did not bind to the DNA. The primer for Babesiosis did not bind, but the primers for Borrelia, Ehrlichiosis, and Rocky Mountain Spotted Fever bound to the DNA.

An Exploration of the Intersection of the East and West Analyzed in Fairy Tales

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Student's Major: English

This project looks at the shared vices and virtues that have been promoted in different cultures throughout the world through the telling of fairy tales, looking specifically at China and Taiwan in the Eastern Hemisphere and well known traditions in the Western Hemisphere. By looking at these popular stories, for example Beauty and the Beast and Cinderella, I examine what makes them so culturally significant that they are promoted across the world. I have identified different virtues that the protagonists of each story develop, while the antagonists persist in vices and wrongdoing that eventually cause their downfall. It is through the structure of the story that we can see the promotion of prescriptions for human behavior. By punishing those who break the common ideals of right and wrong held deep within ourselves and society, known as Natural Law, or rewarding those who mature in virtue, the audience is left with a clear and entertaining understanding of their place within the story and within the culture they are in as a whole. By looking at these stories, the goal is to promote the idea of shared cultural and human experiences across the world through entertainment in order to combat isolating division.

Comparing WV Agriculture Spending To Agricultural Development

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Student's Major: International Studies

Due to the limitations of its geography, economic opportunities to be found within West Virginia have been limited for most of its history, however, one industry that has continuously thrived within the state is Agriculture. According to the U.S. Department of Agriculture's 2012 Agricultural Census, 21,480 farms were operating in West Virginia. This number is further appreciated when considering that most West Virginian farms are family owned and make less than $350,000 in gross cash farm income, classifying them as small farms by the USDA. Furthermore, the agricultural makeup of West Virginia is unique to the state, with the USDA listing it as one of four states with the highest concentrations of family farms in 2012. This largely independent, family-owned agricultural sector of the West Virginian economy remains incredibly salient to the economic well-being of many families within the state and impacts areas such as food security, environmental conservation, and sustainable farming practices. Through the WVU Institute for Policy Research and Public Affairs, the relationship between government spending on agriculture and its potential impacts on the development of West Virginia's agricultural sector was examined. A comparison between the USDA's agricultural census data for the number of operational farms for 2012 and 2017 in each county and the budget data for agricultural spending in those years was collected for each of West Virginia's 55 counties. The results of this study further the understanding of how local spending on agriculture has impacted the growth of that industry in West Virginia.

Snack Lounge: A Patterned Exploration of Social Functions in Design

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Student's Major: Graphic Design

The purpose of my piece was to explore social functions of a space and how a viewer interacts with the visual stimulus in a room. This design employed in this work leans into the purpose of this room by creating three pieces comprised of snacks typically found in a vending machine. This design takes these snack elements and creates a tasteful pattern that is repeated throughout all three works. As a graphic design student, I learn and talk a lot about composition layout and color so I decided to focus on these elements while creating my piece. The repetition seen in the works creates a sense of unity amongst the three works while the colors create differentiation that make the works stand on their own and become three distinctive works culminating into this wall display. These designs use many colors that create a retro 1970s vibe which correspond with the vending machines in the sense that during this time period these machines were extremely popular. The purpose of these pieces is to create a fun space where people can sit and enjoy a snack.

Presentation Number: 120

Degree of Congressional Oversight of Executive Agencies

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Student's Major: Political Science

In the United States Constitution, congress is tasked with two major things. First, to pass laws, and second, to act as a check on the executive and judicial branches. The way that congress does this is by conducting non-legislative hearings to oversee the executive branch. Previous research has examined the number of non-legislative congressional subcommittee hearings over the past few decades, and it is clear that this number has declined. The purpose of this research is to examine exactly what degree of scrutiny congress is subjecting executive agencies to, and what is taking place during these hearings. The end goal is to be able to judge how effective congress is at overseeing the executive branch. By taking samples of non-legislative hearings from congressional sessions over the last few decades and reading the opening statement of the chairman, we have been able to develop a coding system to determine what the main purpose of each hearing is. We then took note of every witness who testified during a non legislative hearing for select subcommittees. We are currently working on determining whether these witnesses represent businesses, trade and professional associations, or other groups. The goal right now is to be able to show significant inter-coder reliability for the coding criteria. In the end, we suspect we will find that congress is not performing its duty to oversee the bureaucracy as well as it could.

Flame Characteristics of Hydrocarbon Flames Made with a Linear Hencken-type Burner

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Student's Major: Aerospace and Mechanical Engineering

The linear Hencken-type burner can be a useful tool in the transportation industry as it improves analyzing the combustion characteristics of gaseous fuels. This study was performed to investigate the useable ranges and geometric properties of various natural gas, premixed flames using the linear Hencken-type burner. Also, the emissions of hydroxyl radicals were observed across various fuels, energy flow rates, and equivalence ratios. Previous experiments conducted with this burner included purely diffusion flames and were performed with hydrogen, ethylene, acetylene, and methane; whereas this experiment focused on natural gases that can be found in natural gas lines throughout the United States: methane, ethane, and propane. Each ignited gas was photographed through a range of equivalence ratios with the lowest obtainable ratio for methane, ethane, and propane being 1.2, 0.94, and 1.1 respectively. The lift-off heights of the flames produced by methane and propane were observed to be the highest of the three fuels at 2-2.7mm and 2-2.6mm respectively and the height of ethane was found to be between about 1mm and 1.8mm. In addition, it is expected that the amount of hydroxyl radicals observed with a 300-325nm filter should increase from methane to ethane to propane, as was seen during preliminary studies. Known behavior of premixed natural gas fuels with the linear Hencken-type burner can increase efficiency of optical experiments. Lastly, expected trends of hydroxyl radical emissions produced by these natural gas flames can provide insight into hydroxyl emissions from burning natural gas at lower equivalence ratios expected inside engines.

Presentation Number: 122

Utilization of cVSSI-APCI-MS for rapid identification of drugs and their metabolites in serum

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C. Eugene Bennett Department of Chemistry, West Virginia University

Student's Major: Forensic Chemistry

Capillary vibrating sharp-edge spray ionization coupled with atmospheric pressure chemical ionization mass spectrometry (cVSSI-APCI-MS) demonstrated effectiveness for complex mixture analysis, such as analysis of drugs and their metabolites in human serum. This analysis typically requires lengthy sample preparation and separations to overcome ion suppression. cVSSI-APCI-MS does not require that and minimizes ion suppression. The analytes selected were drugs that pose a significant threat to the public (fentanyl), drugs fentanyl may be mixed with (cocaine and heroin), and drugs with ion suppression using conventional techniques (heroin). Internal standard calibration curves were made for heroin, 6-acetylmorphine (6-am), morphine, cocaine, benzoylecgonine, ecgonine methyl ester, fentanyl, and norfentanyl, with each deuterated analog used as the internal standard. This was added post-crash out for percent recovery but pre-crash out for physiological concentration studies. The analytes were spiked into serum, underwent a protein crash with cold methanol, and centrifuged at 10000X G for 25 minutes. cVSSI-APCI showed a 2- to 20-fold enhancement compared to HESI when analyzing lower ionizing drugs in the presence of higher ionizing drugs. Calibration curves were made for physiological studies. The limits of detection and quantification were determined for 5 analytes: heroin, 6-am, morphine, fentanyl, and norfentanyl. LODs and LOQs could not be determined for the remaining analytes due to linear graphs. The HESI metabolite curves were not linear from the lowest two points, showing LOD and LOQ are higher. This study shows an approach that analyzes and quantifies drugs in spiked serum samples using minimal sample preparation and no separation.

Synthesizing Soft Robots using a Silicone-Based Polymer

Elias Ball, Edward Sabolsky, Emrah Demirkal
Department of Chemistry, West Virginia University

Student's Major: Chemistry

My research group is funded by NASA EPSCOR, and we are currently working with other groups to design robots that will sample environmental factors such as temperature and wind speed. My team is specifically working to design a UV-curable, silicone-based polymer that can survive extreme conditions such as the vacuum of space and extreme temperatures. We are currently designing these polymers with a mixture of modified mercaptan-functionalized poly-siloxane (MMPS), vinyl-terminated poly-(dimethylsiloxane) (VPS), and a photoinitiator that allows the polymers to be cured in a UV-crosslinker. Once we have made this mixture, it is placed into a mold and left inside a vacuum chamber to remove as much air as possible to ensure the best structure possible. Once all the air has been removed, the polymers are placed into the aforementioned crosslinker and cured. We anticipate that we will be able to 3D print the polymers as opposed to casting and curing them so that the robots may be assembled quickly and efficiently. Once we find a way to effectively 3D print the polymers, we will be able to place electronics inside the polymer to allow the robot to gather vital environmental information and relay it back to Earth in an efficient manner.

Antibacterial Activity of Resorufin Compounds Against Neisseria Gonorrhoeae

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Department of Chemistry, West Virginia University

Student's Major: Forensic Chemistry

Gonorrhea, a sexually transmitted disease, is caused by the bacterium Neisseria Gonorrhoeae and is the second most common sexually transmitted bacterial infection. The research being conducted emerges from concerns about increasing bacterial resistance to known antibiotics, as we are creating new compounds that can become antibiotics for the STD gonorrhea. This would help find alternative medications for people that have contracted gonorrhea while also providing a new antibiotic to fight bacteria, which could help address antibiotic resistance. The purpose of this research is to synthesize a compound that could become an antibiotic treatment for gonorrhea. New compounds are designed and being made on the resorufin/resazurin, which is a known indicator of bacterial activity. New compounds will be made by chemical synthesis, characterized by nuclear magnetic resonance (NMR) spectroscopy and other tools, and analyzed in bacterial assays for potential antibiotic activity. The expected results of this experiment is; that we will be able to synthesize resorufin compounds, such as resorufin methyl ether, that will hopefully become an antibiotic for gonorrhea. The risk and public health threat of gonorrhea increases as it becomes harder to treat because of its current antibiotic resistance. If the research is successful, we will be able to help provide an additional antibiotic for gonorrhea which will help decrease the spread of the bacterial infection.

Presentation Number: 125

A Comparative Study of Cell Segmentation Approaches Applied to Large Datasets

Daniel Campa, Gianfranco Doretto, Ram Zaveri
Lane Department of Computer Science and Electrical Engineering

Student's Major: Computer Science & Data Science

Biological quantification from image data is common practice. For decades, biologists manually inspected images for observations, measurements or counting instances such as cells, membranes, and organelles. Current imaging techniques now enable large data collections and hold the promise for pushing the fronters of scientific investigation. However, such potential cannot be fully realized by applying the same manual quantification techniques that do not scale with the size of current datasets. Therefore, automated image analysis tools are now necessary. We focus on the problem of segmenting and counting cell instances in microscopy image data. We consider the two largest benchmark datasets publicly available for cell segmentation, namely LIVECell and TissueNet, and we compare the performance of two state of the art approaches like CellPose and CellTranspose, which was developed in house, under different conditions. In particular, given the large size of the datasets, we analyze the imbalance properties of the datasets in terms of the cell size metrics, and how this affects the performance of the approaches. This is important because greater imbalance leads to less accurate quantifications. Our findings show that the ability of CellTranspose to be adaptable to the data leads to an increased robustness against imbalance in comparison with methods such as CellPose that are not adaptable.

Presentation Number: 126

Electrokinetic characterization of cell behavior under microgravity

Charles Campbell, Soumya Srivastava, Sai Deepika Reddy
Department of Chemical and Biomedical Engineering, West Virginia University

Student's Major: Biomedical Engineering

As humanity increases its presence in space, it is imperative that technology is developed to maintain the physiological health and well-being of living organisms. To design such technologies, an understanding of how microgravity affects cellular mechanisms is required. It is known that microgravity exposure disrupts cells' gene expression, cytoskeletal structure, and other cellular functions, thus altering the internal structure and chemical composition of microgravity-exposed cells. This research uses a device known as a clinostat to simulate microgravity exposure by rotating a sample of yeast cells for a set amount of time. To determine whether or not the yeast cells' internal structure and chemical composition were altered by microgravity, a technique known as dielectrophoresis (DEP) was used to analyze the cells before clinostat treatment, after 1 hour of clinostat treatment, and after 5 hours of clinostat treatment. The experiment is still a work in progress; the cells show different dielectric characteristics at each time interval after exposing to microgravity conditions. If these results are found to be significant, DEP will likely be a viable candidate for the analysis of living organisms exposed to the extreme and harsh environment: outer space.

Presentation Number: 127

Validation of Computational Fluid Dynamics for Micro-Scale Combustion: Optimal Velocity and Equivalence Ratios

Devansh Chauhan
Center for innovation in gas research and utilization, West Virginia University

Student's Major: Aerospace Engineering

The need for more efficient methods of propulsion and energy production has been greatly accelerated by the rapid advancements in the roles and implementations of micro-manufacturing. Currently, the leading method of research in this field involves the use of Computational Fluid Dynamics (CFD) to conserve resources. However, the validity of CFD results when compared tophysical demonstrations has been subject to scrutiny. In this work, we aim to validate the implementation of CFD and produce actionable results on the characteristics of micro-scale combustion. We will use prior data collected from experimental combustion of premixed methane in a microreactor with a diameter of 2.3mm and length of 107.5mm, as well as the CFD program, ANSYS Fluent, to simulate the experiments. We varied the inlet velocities from 0.1 m/s to 0.6 m/s to observe their impacts on flame stability. Additionally, we observed the effects of equivalence ratios by sampling lean, rich, and stoichiometric values at inlet velocities of 0.2 m/s and 0.4 m/s. Results showed that stable flame conditions were exhibited at inlet velocities over 0.25 m/s and very unstable flames below this threshold. Likewise, experimentation withequivalence ratios showcased ideal stable flames with an equivalence ratio of 1 and increasingly unstable flames as the values differed from this ratio. These findings provide optimal and minimum thresholds for proper flame propagation, which can be used in future propulsion design or aid in the setup of future experimentation.

Nerve Guides to Repair Injured Nerves and Spinal Cord

Christina Denison, Lizzie Santiago
Department of Chemical and Biomedical Engineering and Department of Forensic and Investigative Sciences, West Virginia University

Student's Major: Chemical Engineering and Forensic Chemistry

Did you know that within the spinal cord and the peripheral nervous system, injured nerves cannot heal themselves, leaving a small gap at the sight of an injury? Did you also know that there are just under 18,000 spinal cord injuries each year in the United States? The purpose of this study is to create a functioning nerve guide to help promote the regeneration of axons across an injury in the nervous system. Currently, in the peripheral nervous system, it is only possible to stitch the ends of axons together over distances less than a centimeter. When there is a gap in the nerve, it is not possible for signals to be sent along the nerve to the brain. The main question of the research was if it is possible to create a functioning nerve guide, using additive manufacturing technology, to promote the growth of axons and repair the injury across longer distances. To address this question, nerve guides were designed in Inventor, section using the CURA Software, and 3D printed using an Ultimaker3. This allowed for multiple designs to be created and analyzed. The 3D-printed designs were hollow tubes with different inserts that were designed to promote regeneration. At this point, we were able to generate different designs. The next step is to move from a non-degradable polymer (such as PLA) to a degradable polymer (PCL) to create guides able to biodegrade during the regeneration and healing process.

CO2 Conversion Performance of Nickel Catalysts on Varied Supports

Joseph Harrah, Majed Alam Abir, Rachel Phillips, Ray Gerner, Madelyn Ball
Department of Chemical and Biomedical Engineering, West Virginia University

Student's Major: Chemical Engineering

An important part of mitigating climate change is reducing atmospheric carbon dioxide (CO_2) and converting it to useful products. An example of this conversion is CO_2 hydrogenation, which uses heterogeneous catalysts and hydrogen to convert CO_2 into valuable fuels and chemicals. Our goal is to design an effective catalyst that facilitates this reaction and investigate the role of the catalyst support on catalyst performance. We investigated how the chemical identity, surface area, and reducibility of supports influence the performance of a catalyst. We conducted this by investigating the CO_2 adsorption capacity of various oxide supports using thermogravimetric analysis (TGA) and studying catalyst performance in a flow reactor for the Sabatier reaction, $CO_2 + 4H_2 \rightarrow CH_4 + 2H_2O$. From TGA, we determined that CeO_2 adsorbs the most CO_2 (2.5 μmol CO_2/m2 support). At 300 °C with a CO_2:H_2 ratio of 1:4, Ni/CeO_2 was the most active catalyst with a turnover frequency (TOF) of 0.11- s-1 These results indicate that CO_2 adsorption is an important factor that influences performance. To further improve our understanding of the role of catalyst supports, our next steps will target oxide supports with consistent physical properties, specifically surface area and pore size. This approach will allow us to understand the specific impact of each catalyst property. To do this, I will synthesize a series of novel overcoated oxide supports, deposit nickel on both commercial and overcoated supports to form catalysts, and finally compare catalytic performance of these supported Ni catalysts.

Presentation Number: 130

A Wireless Positioning System with Low-cost Hardware

Griffin Holbert, Logan Marks, Ricardo Rodriguez, Charan Litchfield, Mingyu Lu
Department of Computer Science and Electrical Engineering, West Virginia University Institute of Technology

Student's Major: Electrical Engineering

The technology of wireless positioning has a wide range of applications. For instance, the GPS navigation in our everyday life is based on wireless positioning. This project aims to build an experimental wireless positioning system using low-cost hardware, that is, with a cost much lower than the GPS system. The system includes a network of low-cost stationary wireless nodes (which resemble the satellites of the GPS system) and multiple mobile wireless nodes (which resemble the GPS receivers to be localized). The wireless nodes communicate among one another in the phase of data acquisition, and then based on the data collected, positioning algorithms are executed to find the location of mobile wireless nodes in real time. The development of the low-cost wireless positioning system involves many technical issues. In the data acquisition phase of the project, for example, the wireless nodes are required to communicate with each other efficiently given a low power constraint. In the phase of data processing, various channel uncertainties must be accounted in order to yield robust outcome of positioning. In addition, a GUI needs to be created for a user to visualize the outcome of positioning. This project started in early 2023. We have built and tested a small wireless network. Our preliminary results and ongoing efforts will be presented at the symposium.

Program/Mechanism Supporting Research/ Creative Efforts: Other

Presentation Number: 131

Current and Future Probable Maximum Precipitation (PMP) in West Virginia;

Grace Kerr, Levi Cyphers, Leslie Hopkinson
Department of Civil and Environmental Engineering, West Virginia University

Student's Major: Civil Engineering

Probable maximum precipitation (PMP) is essential dam design criteria. Understanding of PMP is important for the inspection, operation, maintenance, and repairs of these facilities. West Virginia Department of Environmental Protection Dam Safety utilizes the 6-hr, 26-km2 (10 mi2) PMP established by Hydrometeorological Report (HMR) 51 based on the analysis of extreme rainfall. These PMP are outdated because there have been unaccounted for extreme rainfall events that have occurred since 1978. In addition, a zone of uncertainty around the Appalachian Mountains exists, including West Virginia, because of the orographic effects of Appalachia. The objective of this research is to determine the PMP throughout West Virginia by studying the area of uncertainty and consider rising dew points to predict future PMP. This study will create an updated PMP map of West Virginia, focusing on the maximization of the 1942 Smethport, PA storm. A watershed-specific analysis will be conducted at all dams in the state with an approximate watershed area of 26-km2 (10 mi2). Current PMP estimations and projections to 2100 will be determined. Iso-lines will be determined to develop a new updated PMP map for West Virginia that displays current and future PMP estimations. The updated PMP map will be a resource for those involved in dam inspection, repair, design, and modification.

Presentation Number: 133

A Wireless Positioning System with Low-cost Hardware

Logan Marks, Giffin Holbert, Ricardo Rodriguez
Department of Electrical and Computer Engineering, West Virginia University Institute of Technology

Student's Major: Electrical Engineering and Computer Engineering

The technology of wireless positioning has a wide range of applications. For instance, the GPS navigation in our everyday life is based on wireless positioning. This project aims to build an experimental wireless positioning system using low-cost hardware, that is, with a cost much lower than the GPS system. The system includes a network of low-cost stationary wireless nodes (which resemble the satellites of the GPS system) and multiple mobile wireless nodes (which resemble the GPS receivers to be localized). The wireless nodes communicate among one another in the phase of data acquisition, and then based on the data collected, positioning algorithms are executed to find the location of mobile wireless nodes in real time. The development of the low-cost wireless positioning system involves many technical issues. In the data acquisition phase of the project, for example, the wireless nodes are required to communicate with each other efficiently given a low power constraint. In the phase of data processing, various channel uncertainties must be accounted in order to yield robust outcome of positioning. In addition, a GUI needs to be created for a user to visualize the outcome of positioning. This project started in early 2023. We have built and tested a small wireless network. Our preliminary results and ongoing efforts will be presented at the symposium.

Presentation Number: 134

Vertically-Stacked Propeller Configuration

Tyrin Musser
Mechanical Engineering Department

Student's Major: Electrical Engineering

The purpose of this research is to change the way drones are designed by rearranging the overall swept area of the propeller on a shaft. Traditional quad-propellor drones have four two-blade propellors arranged in an 'x' shape and positioned at an equal distance away from each other. Another thrust design is known as the coaxial propeller mechanism. This design works by stacking two propellers through two shafts (one shaft rotates one direction and the other shaft rotates the other direction) its purpose is to provide more thrust without increasing a vehicle's footprint nor battery voltage. The thrust of these designs are dependent on the RPM of the motor and the propeller type. The research of this project works only with the propeller type and configuration to design a propulsion system that can enable drones to be made into a smaller size and yet still maintain a high thrust level. Imagine a drone that can lift 500 pounds but actually able to fit in a doorway. This design consists of four smaller propellers lined up in a duct on a single shaft while using a single motor. This idea allows the propellers to spin together as if they were one larger propeller creating larger thrust.

Application of PX-2 Fragmentation Behavior to PINACA Novel Psychoactive Substances (NPS)

McKenna R. Oaks, Christopher Poulos, Glen P. Jackson
Department of Forensic and Investigative Science, West Virginia University

Student's Major: Forensic Chemistry

Synthetic cannabinoids are modeled after cannabis, which is a Schedule I drug that has recreational and medicinal uses. Cannabis, or marijuana, is a drug derived from the cannabis sativa plant that originates from Central and South Asia. Synthetic cannabinoids have recently been identified as novel psychoactive substances (NPS), meaning that certain new analogs have not yet been scheduled or controlled under United States federal law. Forensic chemists usually use a technique called mass spectrometry to help elucidate the chemical structures of NPSs. In mass spectrometry, drug molecules are fragmented during analysis, and the fragment ion masses and abundances are read out in the form of a mass spectrum. PINACAs are a class of synthetic cannabinoids that are named for their pentyl side chain, indazole core, and carboxamide linker group. Several fragments involve structural changes in the molecule that analysts have not been able to explain. The purpose of this research is to apply the fragmentation behavior of PX-2, also known as 5F-APP-PINACA, to more PINACA compounds and thereby help analysts predict the structures of future analogs from their spectra. In addition to helping drug analysts identify novel cannabinoids in seized drugs, this project could also help forensic toxicologists identify emerging synthetic cannabinoids in the emergency room or during autopsies.

Presentation Number: 136

Inertial Sensor Calibration Accuracy of Calculated Wrist Velocity and Position During Eye Drop Instillation

Chelsea Pack, Daniel Duque Urrego, Stephen Cain
Department of Chemical and Biomedical Engineering, West Virginia University

Student's Major: Biomedical Engineering

In the biomechanics field, inertial measurement units (IMUs), are increasingly used to quantify the human body's movements through linear acceleration and angular velocity measurements. IMUs must be calibrated, either by the manufacturer or the user, to provide accurate measurements of linear acceleration and angular velocity that can be used to calculate linear velocity, linear displacement, and angular displacement (orientation). If IMUs are not properly calibrated, small errors can accumulate during integration yielding large errors in calculations of velocity and position. The purpose of this study was to determine if the factory calibration provided with common commercially available IMUs (e.g., Movella DOT) is sufficient or if further calibration is required to obtain accurate calculations. The first step was to develop a calibration tool for the IMUs. This consists of a calibration case (an orthogonal box in which the IMUs can be placed) and a flat surface with a reference edge. Next, we used the tool to obtain calibration matrices for a commercially available IMU. After calibration, we used the IMU and a synchronized optical motion capture system (Vicon) to capture wrist motion during eye drop installation. Velocity and displacement of the wrist were calculated from calibrated and uncalibrated IMU data and compared to measurements of position and velocity from the Vicon system to quantify the effect of calibration on calculation accuracy. This study is significant because it is necessary to understand if time consuming IMU calibration is critical when using IMUs to quantify real-world human movement.

Program/Mechanism Supporting Research/ Creative Efforts: 497 (research) course in your major

Presentation Number: 137

Synthesis and Catalysis of Difluoroboralactonate Salts

Alexis Ravenscroft, Randika Abeysinghe, Brian Popp
Department of Chemistry, West Virginia University

Student's Major: Chemistry

Organotrifluoroborate and difluoroborate salts are well known and commonly utilized for the preparation of more complex molecules and applications inas a dye or monitor chemical environments. Organoboron compounds are often used in synthetic organic chemistry and catalysis, especially for Nobel-prize winning, palladium-catalyzed Suzuki-Miyaura cross-coupling, which is used heavily in the preparation of drug-like molecules. Organotrifluoroborate salts represent a highly successful class of substrates for these cross-coupling reactions due in part to their stability to ambient conditions and reduced propensity to decompose through breaking of the Carbon-Boron bond. Previous research by the Popp group showed that copper-catalyzed 1,2-difunctionalization of styrene, using CO_2 and a diboron reductant, yields an organoboron ester that could be transformed under mild conditions to a novel difluoroborate salt. This new class of fluoroborate salt, difluoroboralactonates, were synthesized by reacting KHF_2 and a boracarboxylated substrate in a polar solvent such as ethanol or acetonitrile. These salts were found to have excellent stability in neutral aqueous and mildly acidic/basic environments. Initial catalytic studies using the difluoroboralactonate salts and aryl bromide in the Suzuki-Miyaura cross-coupling were unsuccessful under standard weakly basic reaction conditions possibly due to increased stability of the boron-fluoride bond to hydrolysis. However, catalysis proceeds smoothly under strongly basic conditions in which stability studies showed that boron-fluorine bond hydrolysis occurred rapidly. Future investigations of these salts as substrates in synthesis and catalysis will focus on ways to better control reactivity.

Presentation Number: 138

Electric Field Waves and Temperature Changes in Earth's Foreshock

Justin Riggs, Katherine Goodrich, Justin Bowman, Dylan Conner
Department of Physics and Astronomy , West Virginia University

Student's Major: Physics

The terrestrial foreshock is the region of disturbed plasma located directly outside of the Earth's bow shock boundary, which lies between the supersonic solar wind and the much slower moving plasma within Earth's magnetosphere. This shock converts the kinetic energy of the solar wind particles into thermal energy, allowing the plasma flow to become subsonic and enter the magnetosphere. This energy conversion within the shock region is not very well understood in terms of the small-scale (electron-scale) processes occurring, an example of which is the oscillations in the electric field (electrostatic waves) due to the nature of charged particles in plasma. We present observations of electrostatic waves in conjunction with measurements of electron temperature during localized fluctuations, using the Magnetospheric Multiscale Mission (MMS) satellites. With these satellites, the electric field can be measured on a time cadence small enough to characterize these short wavelength waves, and analysis can be done to measure the correlation between the existence of electrostatic waves and higher temperature. Correlation between these measurements could show insight into if electrostatic waves are a method of electron heating of the electron particles in the foreshock region, and therefore have a connection to the macroscopic changes of the plasma flow as it travels into the Earth's magnetosphere.

A Wireless Positioning System with Low-cost Hardware

Ricardo Rodriguez, Logan Marks, Griffin Holbert, Mingyu Lu, Charan Litchfield
Department of Electrical and Computer Engineering, West Virginia University Institute of Technology

Student's Major: Electrical Engineering

The technology of wireless positioning has a wide range of applications. For instance, the GPS navigation in our everyday life is based on wireless positioning. This project aims to build an experimental wireless positioning system using low-cost hardware, that is, with a cost much lower than the GPS system. The system includes a network of low-cost stationary wireless nodes (which resemble the satellites of the GPS system) and multiple mobile wireless nodes (which resemble the GPS receivers to be localized). The wireless nodes communicate among one another in the phase of data acquisition, and then based on the data collected, positioning algorithms are executed to find the location of mobile wireless nodes in real time. The development of the low-cost wireless positioning system involves many technical issues. In the data acquisition phase of the project, for example, the wireless nodes are required to communicate with each other efficiently given a low power constraint. In the phase of data processing, various channel uncertainties must be accounted for in order to yield a robust outcome of positioning. In addition, a GUI needs to be created for a user to visualize the outcome of positioning. This project started in early 2023. We have built and tested a small wireless network. Our preliminary results and ongoing efforts will be presented at the symposium.

Presentation Number: 140

Dielectric Characterization of Breast Cancer Cells using human PBMC

Christopher Smith, Soumya Srivastava, Raphael Oladokun
Department of Chemical and Biomedical Engineering

Student's Major: Biomedical Engineering

Breast cancer is a significant health issue affecting millions of people worldwide, and early detection is critical in improving patient outcomes. In this study, we aimed to develop a noninvasive and efficient technique for early detection of breast cancer by characterizing the dielectric properties of human peripheral blood mononuclear cells (PBMCs) and breast cancer cells. We hypothesized that changes in the cell properties of infected PBMCs, such as the cell membrane, cytoplasm, and ECM, would lead to differences in their dielectric properties compared to normal PBMCs. To achieve this, microchips were fabricated, and buffer was prepared at different concentrations to obtain the values of crossover frequencies for normal PBMC cells. We observed the cells' response to non-uniform electric fields at varying frequencies to determine the crossover frequencies. The results revealed a distinct difference in the crossover frequency between healthy PBMC cells and infected cells, with infected cells having a higher crossover frequency. This abstract discusses the crossover frequencies found for healthy PBMC cells and infected cells. These findings will enable the separation of infected and healthy cells on a single microchip, providing a new method for the early detection of breast cancer.

Funding: LSAMP
Program/Mechanism Supporting Research/ Creative Efforts: Other

Presentation Number: 141

Computational Analysis of Premixed Methane Combustion in Microchannels: Influence of Inlet Velocity and Diameter.

Brayden Smith, Vyacheslav Akkerman, Lei Li, Almoutazbellah Kutkut
Department of Mechanical and Aerospace Engineering, West Virginia University

Student's Major: Mechanical and Aerospace Engineering

Rapid advancements in the functionalities and implementations of micro-manufacturing devices have significantly accelerated the need and development for more-efficient applications of propulsion and energy production. The current growing method of research in this field involves the use of Computational Fluid Dynamics (CFD) to conserve time and resources. However, such methods are subjected to scrutiny in their abilities to produce results with validity when compared to experimental demonstrations. The present work attempts to both validate the implementation of CFD, as well as further explain the characteristics of micro-scale combustion. The work utilized prior experimental data of the combustion of premixed methane within a microreactor of diameter 2.3 mm and length 107.5 mm and a CFD software, ANSYS Fluent, to simulate the experiments. The goal is to observe the influence of boundary conditions and channel size on flame propagation, flame stability modes, and ignition characteristics. Inlet velocities were varied from 0.2 m/s to 0.5 m/s and three channel diameters were selected, namely: 1.6mm, 1.8mm, and 2.3 mm. Results obtained from varying inlet velocities were found to exhibit stable flame conditions over 0.25 m/s and an unstable flame mode, known as FREI (flames with repetitive extinctions and ignitions) below this threshold. Anticipated results from the geometry's dependency should indicate a direct relation, with lower diameters resulting in decreased stability thresholds. The findings of this research signify both optimal and minimum thresholds for proper flame propagation which can be implemented into future propulsion design or aid in the setup of future experimentation.

Mn-based A-Site High-Entropy Perovskite Oxides for Enhanced Solar Thermochemical Hydrogen Production.

Ha Tran
Department of Chemical Engineering, West Virginia University

Student's Major: Chemical Engineering

One of the formidable challenges is to reduce the reliance on fossil fuels and greenhouse effect. Therefore, the development of storable and transportable chemical fuels by employing the renewable energy sources is the key. Solar energy can be used to drive high temperature thermochemical processes to split water into hydrogen and oxygen in a chemical looping way. Two-step solar thermochemical hydrogen (STCH) is an ideal and promising means to produce hydrogen and oxygen from water in a decoupled way using concentrated solar radiation, avoiding the recombination and downstream H2 purification. Compared to the photovoltaic cell and photocatalysis, STCH can utilize full solar spectrum energy with great potential for high solar-to-H2 efficiency. The two-step STCH process mediated by redox non-stoichiometric oxides involves an endothermic reduction step at a high temperature ($\geq 1200\ ^\circ C$) under low oxygen partial pressure with a suitable non-stoichiometric metal oxide to release oxygen and a subsequent oxidation step via flowing steam to the reduced oxide at a relatively lower temperature ($\sim 800\text{-}1100\ ^\circ C$). Co-based perovskites have been widely investigated for STCH, however, the expensive critical metal Co restricts its viability and cost effectiveness. Herein, Mn-based perovskites have been developed for STCH. This perovskites family is doped with lanthanoids family in A site to increase the reduction extent of Mn and STCH stability. Among various investigated compositions, $(La_{1/6}Pr_{1/6}Gd_{1/6}Nd_{1/6}Ba_{1/6}Sr_{1/6})MnO_3$ is a promising redox material, which showed a high H2 production and cycling stability under the conditions of reduction at 1350 oC and oxidative water splitting at 1100 oC.

Presentation Number: 143

Evaluation of the Effectiveness of CrimePad

Emily Whalen
Honors EXCEL, West Virginia University

Student's Major: Forensic Chemistry

Forensic science is a rapidly advancing field that is continuously working to improve practices and standardize procedures. Within the sub-discipline of crime scene investigation, the traditional method of documenting a crime scene involves handwritten documentation. With the emergence of technology, agencies are beginning to search for ways to digitalize their investigative data. One method to accomplish this is to utilize of CrimePad, which is an application-based scene documentation software that can be run on tablets (iPad) or desktops. The purpose of this study was to evaluate the effectiveness of CrimePad in relation to traditional handwritten documentation. Qualitative data were collected in the form of a survey to access user preferences and experiences. Mock crime scenes were documented by crime scene investigators from the Baltimore Police Department using both methods. Quantitative data were collected in the form of audit log records from CrimePadâ and recorded times from handwritten forms. This data was analyzed using statistical analysis to compare time efficiency between methods. System issues (ex. connectivity, lag time), functionality in various environmental conditions, and limited sketch functions were identified as disadvantages of CrimePad. Note-taking, evidence collection, technique data entry, report writing, and real-time scene communication were reported to be advantages of the CrimePad. CrimePad showed promising results as a standalone method for crime scene documentation and the future of digitalizing data. It is expected that more agencies will adopt CrimePad as their main documentation method moving forward. Future research is needed to evaluate additional task features and the back-end functionality of CrimePad including evidence labeling and report writing.

Developing the Autonomy of a Small, Cable Traversing Robot

Izaak Whetsell, Riley McAllister, Yu Gu
Lane Department of Computer Science and Electrical Engineering, West Virginia University

Student's Major: Computer Science and Computer Engineering

Over the past century, robotics has increasingly become a focal point for the expansion of human knowledge. Robots, big or small, are being used to study the world around us, from our own bodies to the vast expanses of outer space. The main goal of this study is to design a program that will guide the robot to making its own decisions that prolongs the robot's battery and effectiveness in a natural environment. Over the past two semesters, a small robot capable of traversing linearly across a cable has been constructed as a tool to help study the effects of autonomous decision-making on robotics. The robot houses three light sensors to measure light levels, a servo motor that controls movement and measures velocity, time, and position, microcontroller, and various other control systems. With the data collected from these sensors, the robot will base its movement in the most self-sufficient way possible limiting exertion and maximizing absorption of the solar energy. Further work in developing the robot's movement will be done through a process called reinforcement learning. In this process, the robot will begin to associate actions that benefit its long-term sustainability with positive values. By applying learning strategies similar to how humans naturally develop, robots will become increasingly self-sufficient at learning new tasks or environments. This will greatly improve the viability of robotics in non-laboratory settings and further facilitate the expanse of our knowledge on the development of robotics.

Presentation Number: 145

The Damage Threshold of Pratylenchus scribneri and Pratylenchus penetrans on Cannabis sativa

Nathaniel Alvarado, James Kotcon
Plant and Soil Sciences

Student's Major: Horticulture

Hemp (Cannabis sativa) is a valuable and ancient crop. It has a wide arrange of uses and is historically one of the most important crops. Cultivation of hemp was prohibited in the United States by the Marijuana Tax Act of 1937. Due to this prohibition, research on this non-psychoactive varieties of hemp have been very limited until the recent passing of the 2018 Farm Bill. The current study examines the damage threshold of the root lesion nematode, Pratylenchus, on seven cultivars of Cannabis sativa. No previous studies on this topic have been published in the US. The nematodes used were isolated from infected corn roots and were extracted using the Baermann technique. Roots were incubated at room temperature in a funnel filled with water. Since nematodes are motile and denser than water, they sink to the bottom of the funnel for extraction. After extraction, a 40-ml solution that contained roughly 1200 Pratylenchus nematodes was left for inoculation. With the number of nematodes extracted, there was only enough for 40 nematodes per cultivar of sativa and a soybean plant to act as a positive control. Pratylenchus scribneri was recovered from roots of all varieties tested in 2022, but differences among varieties were not statistically significant. We are repeating the experiment this semester to verify and expand on these results with P. penetrans. The first experiment only used P. scribneri, so the repetition of that experiment this semester, plus adding P. penetrans, will make for very interesting results.

The Lasting Effects of the COVID-19 Pandemic on Dancer Participation

Evelyn Bennett
Department of Human Performance, West Virginia University

Student's Major: Exercise Physiology

The COVID-19 global pandemic resulted in the cancelation of a majority of in-person sports practices, competitions, and performances. Once these activities returned to a state of normalcy a number of athletes decided not to return to sport. Sports have positive impact on adolescents by creating an outlet to express emotion and the opportunity to learn skills such as perseverance and responsibility if athletes are coached in a positive manner. Dancers are a specific population of athletes who experienced the cancelation of in-person activities during COVID-19. Dancers are often not included in studies about sports. This study hopes to explore why dancers decided to not return to dance, and why other dancers decided to return when practices and performances returned to a state of normalcy. This study is important because it will help coaches and teachers understand what steps they can take to encourage athletes to come back to their sport and how to support athletes that are still actively participating. The inclusion criteria for being a participant in the study were current or past dancers between the ages of 15-23 who were active members of their studio before the cancelation of in-person activities. An active member is defined as those who attended 40 or more dance practices throughout their season for 2 or more years. Participants were recruited for the study by requesting contact information for those who met the criteria from dance studios. After receiving their contact information dancers were sent an online survey to complete.

Presentation Number: 147

Environmental Exposures and Outcomes Associated with Hypersensitivity Pneumonitis in Rural Appalachia

Ty Landis, Vishal Deepak, Bhanusowmya Buragamadagu, Rachel Salyer, Bathmapriya Balakrishnan
Eberly College of Arts and Sciences, Department of Biology, West Virginia University

Student's Major: Biology

Hypersensitivity pneumonitis (HP), a type of interstitial lung disease (ILD), occurs after inhalational exposure to a certain antigen. Rural populations are exposed to different environments as compared to urban, as such, types of inciting antigens for HP may also differ. We conducted a retrospective, observational, cross-sectional study in a rural Appalachian hospital system to highlight the differences in exposures related to HP in rural versus urban areas. A total of 26 patients diagnosed with HP were identified between January 2017 and June 2022. Of those, 7 met the inclusion criteria for this study. A majority of this cohort was female (71%) and ever smokers (57%) with a mean age of 66.14;+;11.19. The most common symptom of the group was dyspnea with exertion (100%) and cough (71%). Exposure to birds (29%) and mold (29%) were the most prevalent inciting antigens. Overall, 14% patients were compliant to exposure elimination, 43% presented with late fibrotic stage and 29% died during the study period. In our study of rural Appalachian population, frequency of exposures related to HP were similar to studies done within the urban areas of Unites States, but vastly different from those done in urban areas of other countries. Mortality in our study was worse compared to other studies. Likely due to higher smoking rates, disease presentation at late fibrotic stage and poor compliance to exposure elimination in our cohort.

Building Access to Nursing-Led Care through Faith Community Settings

Rylie ONeal, Angel Smothers
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Student's Major: Pre-Nursing

People living in rural areas have a background of facing very distinct health related challenges. Some of these challenges include fewer employment opportunities with less access to local healthcare services, and food deserts in combination with transportation barriers and infrastructure inferiority lead to poor health outcomes in residents of these rural areas. Access to proper care for people in this setting combined with the other issues of lack of transportation and finances has very negative effects on their health. Health literacy and lack of education also play a huge role in overall poor health of residents, which is unfortunately common in rural areas of West Virginia. Specifically Mingo County, which is one of the most rural areas in the state of West Virginia has a disproportionately high rate of chronic illnesses. The purpose of this project, nicknamed "The Mingo County Project," is to address these health disparities and lack of health literacy in low income rural areas. The methods the project will implicate include seeking out nurses that live and work in Mingo County to be trained with the National Foundations of Faith and Community Nursing curriculum and will support them in making access to care points in faith communities throughout Mingo County. The objective is to provide health education and resource support for residents. In conclusion, the overall goal of the project is for residents to receive better access to health care and become more knowledgeable in terms of health literacy and resources available to them.

Standardization of Helen Pollard's Archaeological Typology of the Patzcuaro Area Ceramic Collection

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Archaeological classification is an essential method of interpreting the historical imprints of past peoples. Classification procedures can vary by discipline, though all involve the processing of field-acquired artifacts from excavation sites. In this project, the collection includes ceramic sherds obtained from various sites in the Patzcuaro basin, in Michoacan, Mexico. The collection was originally processed by archaeologist Helen Pollard over nine excavation seasons in the 1970s. Pollard's classification is known for identification via paste, rather than surface details and characteristics. This approach, however, can be difficult to understand years later due to its unconventional focus. This project intends to analyze, re-process, and conceptualize Helen Pollard's existing work through a visual catalog, highlighting the ceramic typology of the collection. We use a variety of data collection and photography techniques, in addition to Helen Pollard's previous information, to accurately process each artifact from the collection. Specific to this typology, Dinolite microscopic photographs of the fresh breaks on each artifact allow for an accurate look into the paste composition of each artifact. The paste of a ceramic is comprised of the original clay, with additional materials, that make up the pot. The variations in materials within the paste can then be used to indicate cultural, behavioral, or economic patterns. Thus far, the database includes a wide variety of ceramic types from the basin including representation of the Sipiho Grey, Sanabria Red, Ichupio Coarse, and Querenda White sherds, amongst others.

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The Freedom Premium: A Cost of Health Insurance for Liberals and Conservatives

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While there seems to be an ever more polarizing debate over healthcare reform in America, this debate is still grounded in a common value of freedom. Conservatives believe in a negative rights approach that views government staying out of the healthcare system as freedom. Liberals, on the other hand, believe in a positive rights approach that views federal healthcare programs that ensure equal access as freedom. Politicians have been debating health reform using these concepts of freedom for decades, yet the debate is far from concluded. Is there any way that, using this shared value of freedom, the American healthcare system could meaningfully progress? This project identifies a shared view of freedom to inform a way forward for health reform using rhetoric, polling data, scholarship, and philosophical works that support a larger project about healthcare's effect on social freedoms. Though often used to support various policies, rhetoric invoking personal freedom and satisfaction reveals that most Americans prioritize healthcare options that create satisfying work and family lives over those that emphasize economic freedoms. This desire could be a third view of freedom, which could be fulfilled through a single-payer healthcare system of access and freedom of choice. Such an option is not reflected in more market-oriented laws, which tend to hamper personal freedoms and reflect the lack of political discourse surrounding these freedoms. Through this reform, barriers to satisfying lives could be lifted, as people would not have to worry about getting the care they deserve when they need it.

Impact of U.S. Supreme Court Cases Throughout History

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U.S. Supreme Court Cases throughout history have continuously made an impact on Americans, whether it be good or bad. Landmark Supreme Court Cases have changed the lives of every single American and yet Americans are marginally unsure about the history behind these landmark cases and why they've changed American history is such large ways. In this research project I hope to assess past landmark U.S. Supreme Court Cases. For example, some cases I have researched are Roe v Wade, Brown v. BOE, NYT v. Sullivan, Kiobel v. Royal Dutch Petroleum, Tinker v. Des Moines, Texas v. Johnson, and U.S. v. Nixon, and many more. I will assess the history of these landmark U.S. Supreme Court Cases. Researching abundantly, analyzing, and comprehending many different journals, books, articles regarding the history of these cases and analyzing the cause and effects to have a clear complete idea of why these cases are so important in U.S. History. I asked similar questions for each case, "Who were the people involved?", "What was the purpose/argument of the case?", "When was the case?", "What was the political climate like at the time?" and "Where did this happen?", etc. Almost all U.S. Supreme Court Cases set the precedent for others to be argued, as there is always an issue at hand that can be interpreted through the Constitution in many different ways. This leaves our lives constantly up to change, and to truly understand the real impact of each case you must also understand why the case came to light in the first place. In conclusion, law making, altering amendments, and deciding the constitutionality of cases is a huge job with a huge impact. These cases themselves are important but what is more important is the cause and the aftermath. In this research project I will make these connections to give my audience background on the landmark supreme court cases that dictate our daily lives.

Understanding belowground processes in the Miscanthus x giganteus rhizosphere

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Greater Appalachia has an abundance of land unviable for traditional row crops due to anthropogenic disturbances like mineral extraction. These lands represent an opportunity for bioenergy production, but efforts require robust plants due to soil disturbance. Miscanthus x giganteus is a highly productive perennial crop, with high water and nutrient use efficiency. Miscanthus can be productive on disturbed soils, possibly due to microbial partnerships. Though these belowground interactions are not well understood, we sought to explore nitrogen cycling and abundance of fine roots to gain a better understanding of plant-microbe interactions. We hypothesize that Miscanthus may promote nitrogen cycling to improve establishment and productivity on disturbed soils. We further predict that as Miscanthus stands age, plant-microbe interactions will become more evident. To test the hypotheses, eight Miscanthus stands were selected and soil samples were taken from both Miscanthus and adjacent grasses. Free-living nitrogen fixation was measured using a stable isotope incubation technique. Roots were collected from Miscanthus stands and washed to estimate belowground biomass. While data analysis is still in progress, we expect to see higher rates of free living nitrogen fixation in the Miscanthus soils compared to adjacent grass soils due to plant investments altering ammonia production in Miscanthus soils. Furthermore, we expect to see increased belowground root biomass at longer established sites due to the perennial nature of Miscanthus. This research may yield a greater understanding of plant-microbe interactions and nitrogen cycling which could reduce reliance on inorganic fertilization in agricultural systems including bioenergy crop production.