West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

THE SIXTH ANNUAL

UNDERGRADUATE SPRING SYMPOSIUM

APRIL 9, 2022 AT 10 A.M. - 4 P.M.
EVANSDALE CAMPUS

WestVirginiaUniversity.
OFFICE OF THE VICE PRESIDENT FOR RESEARCH

April 5, 2022

Dear Undergraduate Scholars

Congratulations. I hope you are proud of yourselves for the work you are presenting here today. I am guessing that most of you are what others would call "doers" – that you are happiest and most fulfilled when you are busy and productive – you rarely say "No" to opportunities that come your way. You are to be commended for your drive and passion that led you to pursue the projects you are presenting today. You have persevered through some pretty incredible times over the last few years. You likely have been working non-stop since you hit the campus (virtually at first and now hopefully in-person!); so now I am going to ask you to take a deep breath and relax for 30 seconds (so don't check your phone or email, do not get to your next appointment, do not think of your next assignment). Let your breathing slow down and just enjoy where you are today. You deserve it.

You have learned many things in your time here and are well equipped to take on the next year in school or if you are graduating – the world. Do not let others limit who you continue to become or where you go. Let WVU continue to be your home and your support. A few years back WVU ran a mental health campaign that if you were experiencing depression and felt you did not have anyone around you that you could talk to – you could talk to Us. While the campaign ended – the sentiment and offer has not. We are here to support you in all facets of your life and are excited to celebrate you in your scholarly and creative work.

To wrap it up – enjoy this day and thank you for not only undertaking your projects, but taking the time to share them with the campus and wider community. Your work is appreciated and you are certainly living the "Let's Go" motto! Congratulations again and good luck in all you do in the future.

Melanie C. Page

Melanie C. Page, PhD
Associate Vice President for Creative and Scholarly Activity, WVU Research Office
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Undergraduate Spring Symposium 2022
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
Paige Zalman, Program Coordinator, RAP and 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/)
- Department of Biology (https://biology.wvu.edu/)
- Research Apprenticeship Program (RAP)
- Office of the Provost (https://provost.wvu.edu/)
- 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

A. Approximate Schedule of Events

Saturday April 9, 2022

9:30 am –10:00 am	First Session Poster Setup – Undergraduate presenters arrive, check in to receive name tags and meal tickets, and put up posters. Presenters will have two hours to present their posters and give a judged presentation.
10:00 am – 4:00 pm	Symposium Ongoing – Presentations available from 10:00 am to 4 pm. *All welcome: parents, research mentors, graduate and undergraduate students (current and incoming), and members of the public.*
10:00 am – 4:00 pm	Presentation Judging – Judging of presentations- all categories.
11:00 am – 3:00 pm	Presenters Lunch Buffet - Student presenters will receive a ticket for the buffet at check-in. Please enjoy lunch before or after your presentation.
4:00 pm – 4:30 pm	Poster Take Down – Any posters remaining after 4:30 pm will be removed by the staff.
Monday April 11-Friday April 15, 2022	Awards Announced – Top presenters in each presentation category will be notified.

B. Session Schedule and Location for all Presentations

Session	Time	Location	Category	No. of Presenters
P1	10:00 AM - 12:00 PM	MEC (Museum Education Center)	Poster: Health Sciences	23
P1	10:00 AM - 12:00 PM	MEC (Museum Education Center)	Poster: Physical Sciences & Engineering	27
O1	10:00 AM - 12:00 PM	CAC Classroom 2140	Oral: Arts & Humanities	7
P2	12:00 PM - 2:00 PM	MEC (Museum Education Center)	Poster: Biological Sciences	24
P2	12:00 PM - 2:00 PM	MEC (Museum Education Center)	Poster: Environmental & Agricultural Sciences	22
O2	12:00 PM - 2:00 PM	CAC Classroom 2140	Oral: Social, Behavioral & Health Sciences	6
F1	1:00 PM - 3:00 PM	Falbo Theater, CAC	Performance: Performing Arts	3
P3	2:00 PM - 4:00 PM	MEC (Museum Education Center)	Poster: Arts & Humanities	13
P3	2:00 PM - 4:00 PM	MEC (Museum Education Center)	Poster: Social & Behavioral Sciences	27
O3	2:00 PM - 4:00 PM	CAC Classroom 2140	Oral: Physical, Biological Sciences & Engineering	7

C. Oral Presentation Schedule and Assignments

1. Arts & Humanities Oral Session Schedule
Creative Arts Center Classroom 2140, 10:00am-11:45am

Time	No.	Authors	Title
10:00-10:15	1	Leah Herndon*, Ching-Hsuan Wu	How Tutoring Affects a Learner's Second Language Intelligibility
10:15-10:30	2	Manar Hesino*, Manal AlNatour	Syrian Women Refugees: Challenges and Opportunities
10:30-10:45	3	Riley A. Klug* and Megan E. Leight	Examining Costa Rican Ceremonial Instruments from Winthrop University's Salazar Collection
10:45-11:00	4	Samuel Summers* and Dr. David Hoinski	Synthesizing Guilt: Analyzing a Most Challenging Piece of our Human Condition
11:00-11:15	5	Zackary Lowe*	PRT: Analysis of the Events Surrounding the Construction of the Personal Rapid Transit System
11:15-11:30	15	Valeria Lopez-Altamirano*, Amy B. Cyphert, Jena T. Martin	Social Media Company Liability for Algorithmic Amplification
11:30-11:45	22	Alexandra Bunn, Annaka Exley, Jason Lehosit, et al.	Telling Our Stories: Exploring Geographical and Cultural Connections through Virtual Maps

*Presenter

2. Social, Behavioral & Health Sciences Oral Session Schedule
Creative Arts Center Classroom 2140, 12:00pm-1:30pm

Time	No.	Authors	Title
12:00-12:15	11	Victoria A. Nist*, Heather L. Chaney, Brady M. Nicewarner, Jaelyn Z. Current, and Jianbo Yao	The Expression of Melanocortin Receptors and Attractin in the Bovine Ovary
12:15-12:30	16	Kennon Lattal*	Behavior Analysis: Social Imitation
12:30-12:45	17	Jarrett R. Childress*, Michael J. Ruppert	Targeting Plasticity in Cancer
12:45-1:00	18	Palmer, N.*, Petitte, T., Shafique, S., Young, S. & Piamjariyakul	Satisfaction with Access to Health Services in West Virginia during COVID-19
1:00-1:15	20	Carmen Camino*	Microplastics and their Effects on Humans
1:15-1:30	21	Jesica Temple*, Rebecca Stearns, Peighton Foster*, Corey Coe, Tim Boltz, and Cangliang Shen	Evaluate Triple-Wash with SaniDate-5.0 to Reduce Salmonella Typhimurium on Squashes

*Presenter

3. Physical, Biological & Engineering Oral Session Schedule
Creative Arts Center Classroom 2140, 2:00pm-3:45pm

Time	No.	Authors	Title
2:00-2:15	8	Kendra Gillo*, Dimitra Pyrialakou, Leily Kamali Farrokhvar	The Development and Evaluation of a Transit Volunteer Platform
2:15-2:30	9	Rachel King*, Blaise Veres*, Ross Jennings, Maura McLaughlin, and the NANOGrav Collaboration	A "Quicklook" at NANOGrav Pulsar Data from the Green Bank Telescope
2:30-2:45	10	Isabelle Nesbit,* Makenzie Keepers, Dr. Thorsten Wuest	The Classification of Game Elements for Manufacturing
2:45-3:00	12	Alexander Pfeffer,* Alexandra Adeoye, Glen P. Jacksona	The Development of the Expert Algorithm for Substance Identification (EASI)
3:00-3:15	13	Samantha Shornack,* Robert Gaston, Jr., Marisa Organiscak,* Nicole J. Rueb, and Gregory B. Dudley	Exploration of the Synthetic Chemistry of Illudalic Acid
3:15-3:30	14	Grace Taylor*, Sam Bowman, Shikha Sharma	Assessing the Viability of Low Temperature Enhanced Geothermal Systems in the Eastern United States
3:30-3:45	19	Jackie R. Arnold,* Jordan S. Chapman, Cerasela Zoica Dinu	Enzyme Immobilization within a Hyaluronic Acid Matrix for Biosensor Applications

*Presenter

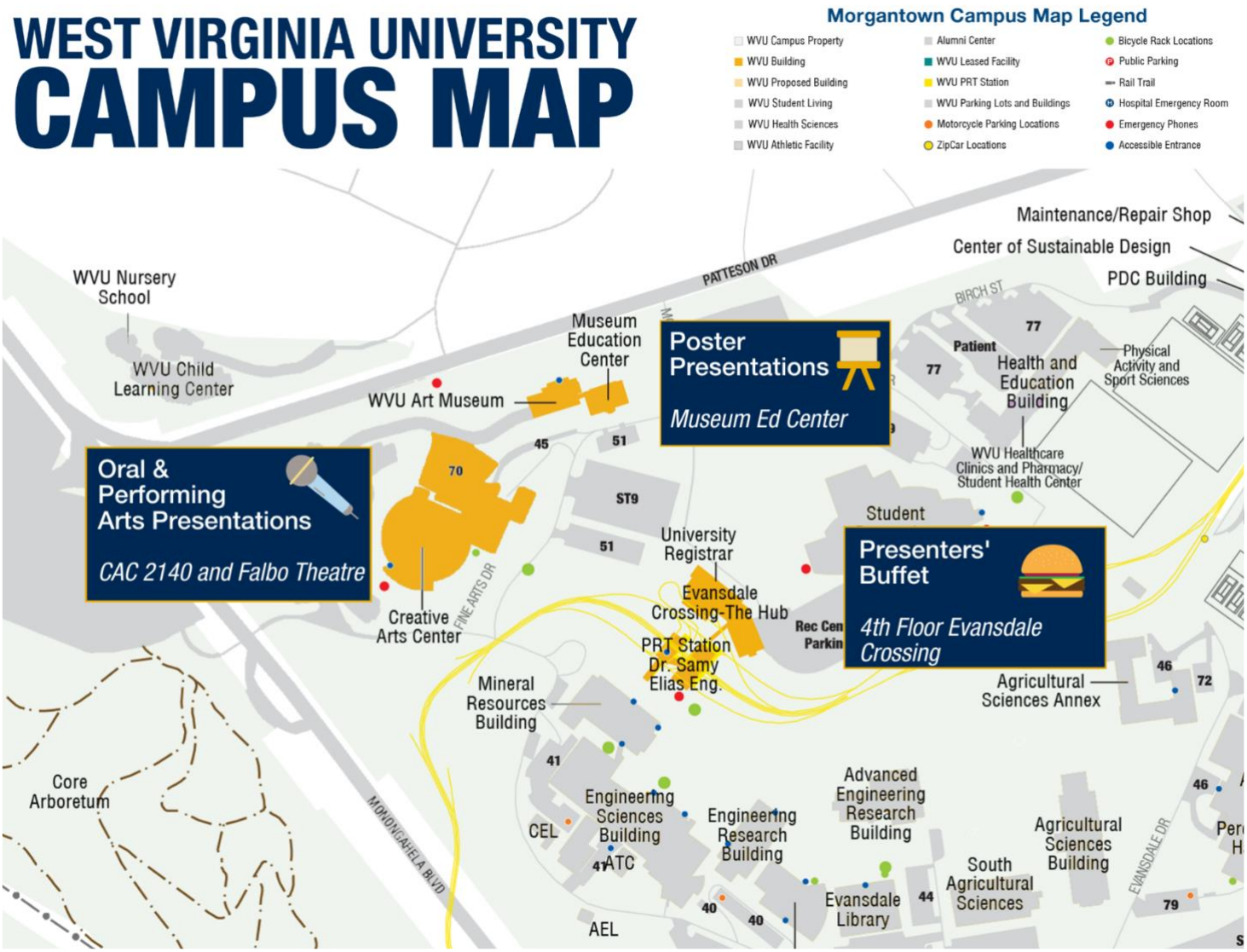
D. Performing Arts Presentation Schedule and Assignments
Creative Arts Center, Falbo Theater, 1:00pm – 1:45pm

Time	No.	Authors	Title
1:00-1:15	6	Elizabeth Rockwell*	It's a Feeling I Can't Shake: Evaluating Imposter Syndrome in Collegiate Music Students
1:15-1:30	7	Zoey Lim*, Dr. Matthew Heap, Dr. Kyle Simpson, WVU Film Score Ensemble 2021	Jinxy Jenkins & Lucky Lou: The Journey from Spark to Screen
1:30-1:45	23	Maria Elena Maddy* and Becca Hyde*	Why Don't You Smile More?

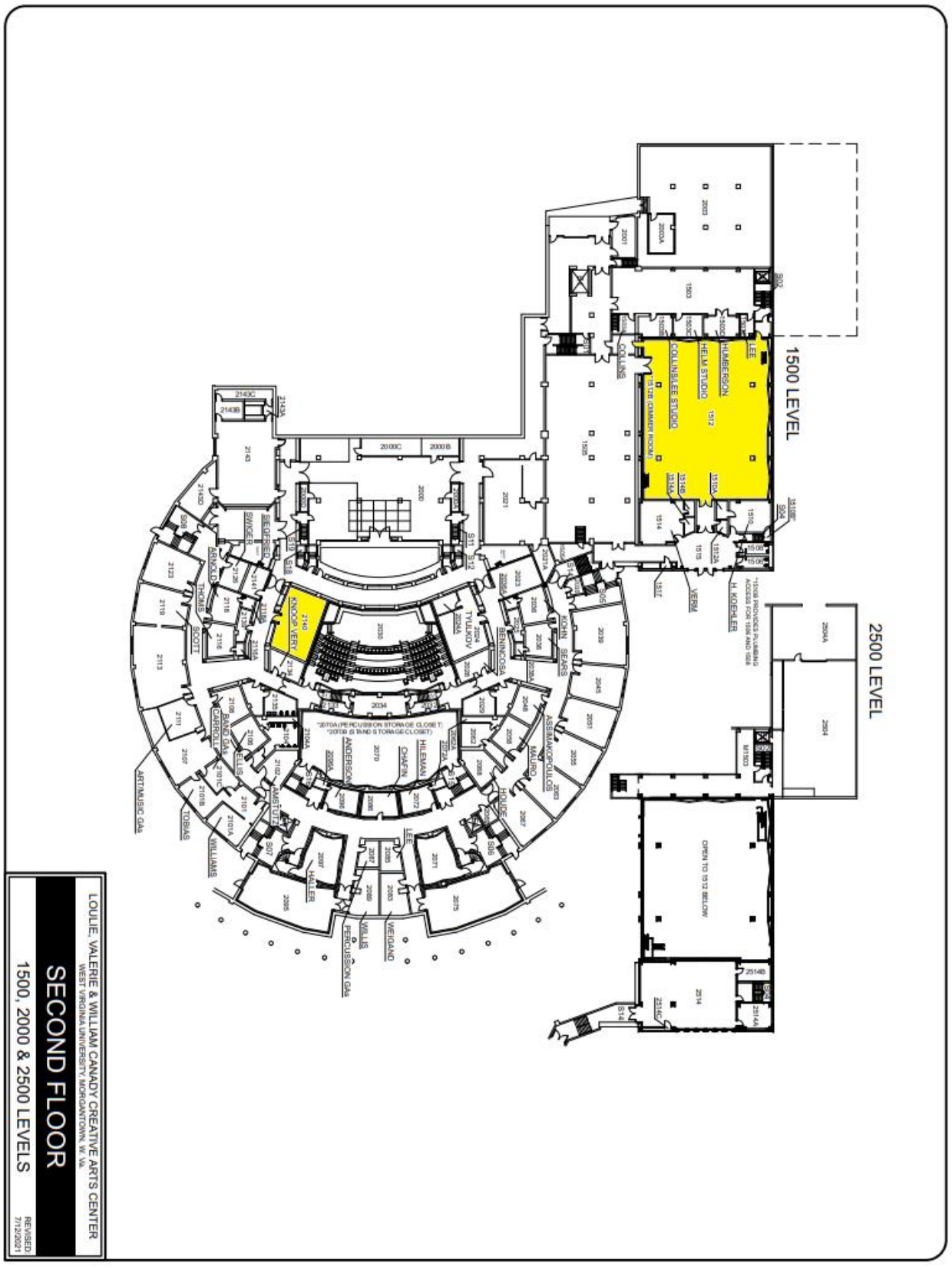
*Presenter

IV. MAPS

A. Key Campus Locations



B. Creative Arts Classroom 2140 and Falbo Theatre 1512



V. UNDERGRADUATE PRESENTERS AND FACULTY RESEARCH MENTORS

A. 10:00 AM – 12:00 PM

1. Health Sciences (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Jenna Belcher	84	Pre-Nursing	Angel Smothers	Trans Safe Zone Training Within Schools of Nursing
Laasya Chennuru	85	Biochemistry	Werner Geldenhuys	Novel Thiazolidinedione CI987 on Oxidative Stress Protection in a Caenorhabditis Elegans Alzheimer's Disease Model
Amna Haleem	86	Biomedical Engineering	Soumya Srivastava	Characterizing Single Cells Using Dielectrophoresis
Ethan Hamilton	87	Immunology and Medical Microbiology	Paul Lockman	Determining the Half Maximal Inhibitory Concentration of Paclitaxel LLC Cells via an MTS Assay
Christian Kantz	88	Biomedical Engineering	Scott Galster	Reaction Time Quadrantal Analysis in D1 Women's Soccer Athletes
Lauren Keplinger	89	Chemistry	Wes Kimble	Investigation of Glioblastoma Clustering in West Virginia Using Geospatial Modeling Techniques
Kennedi Lewellyn	90	Biology	Candice Brown	Therapeutic Evaluation of recAP for Sepsis-Associated Pathology
Gabriella Marsico	91	Exercise Physiology	Melissa Olfert	Lifestyle Intervention to Promote Healthy Lifestyles Among College-Bound Individuals in Appalachia
Jada Mullins	92	Biomedical Engineering	Valeriya Gritsenko	Functional Electrical Stimulation in the Flexor and Extensor Muscles
Madison Witmer	93	Art Therapy	Andrea Doyle	The Feasibility, Effectiveness, and Sustainability of a Suicide Risk Questionnaire in Pediatric Patients
Melanie Zanabria	94	Immunology & Medical Microbiology	Judith Feinberg	Use of Rapid Response Fentanyl Test Strips as an Opioid Overdose Prevention Strategy
Ian Bradford	95	Exercise Physiology	Brian Leary	Foot Anthropometrics and Running Economy
Phillip Essenmacher	96	Exercise Physiology	Brian Leary	Dietary Behavior of Collegiate Competitive Rock Climbers
Justin Williams	97	Exercise Physiology	Emidio Pistilli	A Comparison of Dynamic Exercises and Their Association with Sprint Speed

Nick Zator	98	Exercise Physiology	Werner Geldenhuys	Screening Novel MitoNEET Agonists as New Treatments for Post-Stroke Oxidative Stress and Mitochondrial Dysfunction
Lucie Steinmetz	99	Exercise Physiology	James Bardes	COVID -19 Pre and Post Pandemic Blood Alcohol Content in Motor Vehicle Traumas
Sofhia Elad	100	Chemistry	Werner Geldenhuys	Novel Thiazolidinedione CI987 on Learning and Memory Behavior Preservation in an Alzheimer's Disease Model
Olivia Naylor	101	Exercise Physiology	Miriam Leary	Aquatic Reduced-Exertion High-Intensity Interval Training Exercise Protocol Improves Cardiorespiratory Fitness in Young Adults
Logan Riffey	102	Psychology and Biology	Julie Patrick	Implications of Depression and Stroke on Cognition among West Virginia Adults
Sophia Silverstein	103	Communications	Julie Patrick	The Physical and Mental Health Benefits of Exercise
Kaitlyn Tajc	104	Exercise Physiology	Julie Patrick	Exercise, Sex, and Depressive Disorders in West Virginia
Heather Wyllie	105	Biology	Julie Patrick	Socioeconomic and Racial Disparities in Diabetes Prevalence
Briana Karem	106	Neuroscience	Kathleen Morrison	Impact of Limited Resources During Pregnancy on Maternal Behavior

2. Physical Sciences & Engineering (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Rohit Chivukula	107	Computer Science	Jignesh Solanki	Anomaly Detection in Power Systems Using Artificial Intelligence
Calvin Dear	108	Physics	Sarah Burke-Spolaor	Imaging of Galactic Merger J1018+3613
Davis Funk	109	Mechanical Engineering/Mathematics	Xingbo Liu	Intermediate Temperature Proton-Conducting Solid Oxide Electrolysis Cells with Improved Performance and Durability
Luke Hawranick	110	Computer Science & Mathematics	Jacob Restanio	An Empirical Analysis of Approximation Algorithms for the Unweighted Tree Augmentation Problem
Alan Hongpaisan	111	Mechanical and Aerospace Engineering	Jason Gross	Cooperative Multi Drone Navigation Using Open Source Software

Megan Jones	112	Chemistry	Lisa Holland	Mini-E Electrophoresis: A Cost-Effective Introduction to Capillary Electrophoresis
Brayden Lipscomb	113	Chemistry, Physics	Fabien Goulay	Measuring Temperature and Kinetics using Laser Spectroscopy
Riley McAllister	114	Computer Science and Computer Engineering	Yu Gu	The Design of a Wire-Traversing Robot as a Method for Studying Long-Term Robot Autonomy
Isaac Miller	115	Geology	Charlie Shobe	How Anthropogenic Perturbations to Rivers Affect Their Stability
Brooke Mitchell	116	Biochemistry	Jessica Hoover	Understanding the Mechanisms of Nickel-Catalyzed Decarbonylative Cross-Coupling Reactions
Alyssa Mize	117	Chemical Engineering	Oishi Sanyal	Membrane Technology for On-Board Inert Gas Generation Units on Aircrafts and Space Vessels
Sarth Patel	118	Computer Science	Gianfranco Doretto	A Comparative Study of the Sensitivity of Cell Segmentation Approaches to Covariate Shift
Andrew Sarver	119	Computer Science	Yenumula Reddy	Using a Raspberry-Pi as a Server for a Resident Aware Network for Intelligent Assistance
Anala Schultz	120	Biomedical Laboratory Diagnostics	Brian Popp	Boracarboxylation of Vitamin E
Ayman Seif	121	Mechanical and Aerospace Engineering	Guilherme Pereira	Development of a Prolonged Flight Drone With Autonomous Functionality for Long-Term Robotics Research
Maddux Testa	122	Mechanical and Aerospace Engineering	Kevin Bandura	Digital Signal Processing In Radio Astronomy
Noah Trimmer	123	Mechanical & Aerospace Engineering	Christopher Griffin	Aerodynamic Testing and Validation of an Experimental Unmanned Aerial System
Avery Walker	124	Chemistry	Lisa Holland	Affordable PDMS Model of Capillary Electrophoresis
Nishil Zalavadia	125	Civil Engineering	Silas Stewart	Scenario Based Approach to Strategic Planning
Mitchell Zehring	126	Mechanical Engineering	Jason Gross	Search and Rescue Drones Operating in Areas where GPS is Unavailable
Kenny Zheng	127	Chemistry	Brian Popp	Synthesis and Boracarboxylation of 3-Buten-1-Benzoate and an Indometacin Derived Compound
Jacob Smothers	128	Chemistry, Biology	Jessica Hoover	Nickel-Catalyzed Site-Selective C-H Nitration of 8-Benzamidoquinoline and its Derivatives

Vignesh Sivashankar	129	Electrical Engineering	Jeremy Dawson	Assistive Features in Running Watches to Guide Runners in Running Activities
Nathan Bonafield	130	Dual Mechanical and Aerospace Engineering	Patrick Browning	Designing a 3-D Printed Rocket Nose Cone with an Internal Pitot-Static Tube
Olga Hawranick	132	Mathematics	Charlie Shobe	Patterns of River Sinuosity in the Appalachian Valley and Ridge
Natalie Ott	133	Mechanical and aerospace engineering	Patrick Browning	Low Cost Rocket Fin Structural Anomaly Analysis
Tyler Seidel	134	Computer Engineering	Abhik Roy	Machine Learning Aided Data Analysis for Large Qualitative Data Sets

3. Arts & Humanities (Oral Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Leah Herndon	1		Ching-Hsuan Wu	How Tutoring Effects a Learner's Second Language Intelligibility
Manar Hesino	2	Psychology	Manal AlNatour	Syrian Women Refugees: Challenges and Opportunities
Riley Klug	3	Art History	Megan Leight	Examining Costa Rican Ceremonial Instruments from Winthrop University's Salazar Collection
Samuel Summers	4	Philosophy & MDS	David Hoinski	Synthesizing Guilt: Analyzing a Most Challenging Piece of our Human Condition
Zackary Lowe	5	Business	Jennifer Thornton	PRT: Analysis of the Events Surrounding the Construction of the Personal Rapid Transit System
Valeria Lopez-Altamirano	15	Political Science and Spanish	Amy Cyphert	Social Media Company Liability for Algorithmic Amplification
Alexandra Bunn	22	Interdisciplinary Studies	Maria Perez	Telling Our Stories: Exploring Geographical and Cultural Connections through Virtual Maps

B. 12:00 PM – 2:00 PM

1. Biological Sciences (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Karissa Gautier	26	Neuroscience	Kathleen Morrison	Examining the impact of pubertal stress and adult hormone exposure on the PVN transcriptom
Hazem Attal	27	Biology	Andrew Dacks	Determining the Behavioral Impact of 5-HT7R Knock-down in Drosophila Melanogaster Olfactory Neurons
Rebekah Avey	28	Biochemistry, Exercise Physiology	Aaron Robart	Using Cryo-EM to Determine Structure of Deoxyribozymes
Marion Cahill	29	Biology	WenTao Deng	Effect of Activation of the mTOR Pathway on Cone Photoreceptor Degeneration of Opn1mw-/-sw-/- Mice
Allison Carey	30	Biology	Nadia Falah	Diagnostic Utility of Genetics Testing of Connective Tissue Disorders in West Virginia
Zachary Ellis	31	Biochemistry	Justin Legleiter	Probing the Morphological and Mechanical Changes in a C. elegans Model of Huntington's Disease
Ashlee Moyer	32	Biology with Neuroscience Emphasis	Eric Horstick	How Visual Experience Affects Motor Behavior in Larval Zebrafish
Vanessa Mueller	33	Biochemistry	Janet Tou	RNA Sequencing of the Hypothalamus of Rats Drinking Differing Sugar Sweetened Beverages
Alexander Pocwierz	34	Exercise Physiology	H. Wayne Lambert	Supernumerary Branches of Dorsomedial Cutaneous Nerve of Hallux Crossing Extensor Hallucis Longus Tendon
Chyanne Reid	35	Biochemistry	Visvanathan Ramamurthy	Lipid Modification of Cone Phosphodiesterase-6 is Crucial for Color Vision
Leah Rogers	36	Biochemistry	Michael Robichaux	Using Super-Resolution Microscopy to Test the Localization of Trafficking Organelles in Rod Photoreceptor Neurons
Andrew Schoener	37	Biochemistry	Giovanni Howells	Determination of Structure of the Intermediate SNARE Complex for Rapid Vesicle Fusion
Emily Sweitzer	38	Biochemistry	Steven Frisch	Regulation of type-I interferons by the Epithelial-Mesenchymal Transition

Nathan Taylor	39	Biochemistry	Thomas Bradley	Biological and Functional Roles of Proteasomal Activators PA28y and PA200
Olivia Woodruff	40	Molecular Biology	Timothy Driscoll	An Analysis of The Immunological Components of Borrelia Burgdorferi in Arthropod Vectors
Samantha Higley	41	Neuroscience	Kathleen Morrison	The Impact of Pubertal Stress on the Developing Hypothalamus
Isiah Kratzer	42	Biology	Craig Barrett	Developing Polymorphic Microsatellite Markers in a Sensitive Appalachian Herb, Smooth Rock Skullcap (Scutellaria saxatilis:Lamiaceae)
Emily Dugan	43	Animal and Nutritional Sciences	Jianbo Yao	Two Novel Bovine Oocyte-specific Long Non-Coding RNAs as indicators of Higher Quality Oocytes
John Mendoza	44	Neuroscience	Kathleen Morrison	The Effect of Pubertal Stress on Prefrontal Cortex Related Tasks in Adult Mice
Sophie Crowder	46	Biochemistry	Michael Robichaux	Analysis of Rhodopsin Mistrafficking Caused by a Retinitis Pigmentosa Mutation in Rod Photoreceptor Synapses
Andrew Cook	47	Biochemistry	Kevin Daly	Synaptic Characterization of AHNs in a Putative Inhibitory CDC in D. melanogaster
Kathleen Summers	48	Biochemistry	Alexey Ivanov	FOXA1 Overexpression on the Suppression of Epithelial to Mesenchymal Transition in Breast Cancer Cells
Tyler Giorcelli	49	Exercise Physiology	Emidio Pistilli	Effects of Physical Activity on Tumor Induced Muscle Fatigue in PyMT Mice
Andrew Hor	164	Biomedical Engineering	Gary Marsat	Quantification of Stereotyped Behavioral Patterns During Social Interaction of Weakly Electric Fish

2. Environmental & Agricultural Sciences (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Kelsey Razvillas	63	Forest Resources Management	Kirsten Stephan	Herbaceous Layer Response to Repeatedly Harvested Strip Cuts to Obtain Woody Biomass for Energy
Noah Adkins	64	Biology	Edward Brzostek	Soil Phosphorus and Nitrogen Levels Affect Aspen Leaf Macronutrients and Plant Derived Soil Carbon

Kelsey Butcher	65	Animal and Nutritional Sciences	Donald Brown	Relationships Between Life History Strategy and Conservation Status of North American Turtles
May Campbell	66	Biology	Matt Kasson	Morphological Characteristics of the Undescribed Millipede-associated Fungus Actinomortierella aff. ambigua
Erin Driehaus	67	Wildlife and Fisheries Resources	Amy Welsh	Sex Ratios of Lake Sturgeon Spawning Populations in Lake Superior
Daze French	68	Biology	Craig Barrett	Fungal Host Diversity and the Abundance of Spotted Coral Root Orchids (Corallhiza Maculata Complex)
Sabrina Gorbey	69	Animal and Nutritional Science	Joseph Moritz	Effect of Biochar on Ameliorating Chicken Litter NH3
Adam Gratton	70	Natural Resource and Environment Economics	Melissa O'Neal	3RQ Program
Koral Hickey	71	Environmental Microbiology	Loren Albert	A Literature Review of Forest Canopy Structure and Physiology in Diverse Tropical Forests
Jacob Lam	72	Wildlife and Fisheries Management	Christopher Rota	Comparing the Efficiency of Trail Cameras and Autonomous Recording Units for Detecting Wild Turkey
Kelsie Sanders	73	Animal and Nutritional Sciences (BS)	Matthew Wilson	Measuring Forage Intake of Individual Beef Cattle in Grazing System to Determine Feed Efficiency
Taylor Smith	74	Biochemistry	Joseph Lynch	Testing of a Metabolic Engineering Strategy to increase Phenylalanine Output in Plants
Adam Wetherhold	75	Immunology and Medical Microbiology	Rita Rio	Plasmid Characterization in the Tsetse Fly Obligate Symbionts
Courtney Cobb	76	Biology	Emel Kangi	Phosphorus-Limited Aspen Send More Carbon Belowground Despite Similar Arbuscular Mycorrhizal Colonization Rates
Peighton Foster	77	Human nutrition and food science	Cangliang Shen	Modeling the Anti-listeria Efficacy of SaniDate-5.0 in Bacterial Buffered Solutions
Abigail Paul	78	Chemical Engineering	Oishi Sanyal	Extraction of Rare Earth Elements using Biochar
Kaylee Walty	79	Geology	James Lamsdell	How the Pinnule Spacing of Crinoids Has Contributed to Their Ability to Survive
Gianna Chimino	80	Biology	Jianbo Yao	Oocyte-specific lncRNA, OOSNCR3, is Associated with Oocyte Quality Based on Brilliant Cresyl Blue Staining
Hayden Starcher	81	Biology	Edward Brzostek	Plant Roots Impact Climate Change by Driving both Soil Carbon Losses and Gains

Isabel Weeks	82	Biochemistry	Youyoun Moon	Far-red LED Light Increased Shoot Height and Boron Uptake in Kale (Brassica oleracea)
Abigail Jones	83	Biochemistry	Daniel Panaccione	Ergot Alkaloid-Producing Aspergillus Species with Entomopathogenic Capabilities
Meagan Walker	135	Environmental Geoscience	Amy Hessl	High Resolution 14C Spikes Found in Tree Rings Shed Light On Solar Storms

3. Social & Behavioral Sciences (Oral Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Victoria Nist	11	Animal & Nutritional Sciences and Psychology	Heather Chaney	The Expression of Melanocortin Receptors and Attractin in the Bovine Ovary
Kylie Saxton	16	Psychology	Kennon Lattal	Behavior Analysis: Social Imitation
Jarrett Childress	17	Exercise Physiology	Michael Ruppert	Targeting Plasticity in Cancer
Nathaniel Palmer	18	Nursing	Trisha Petitte	Satisfaction with Access to Health Services in West Virginia during COVID-19
Carmen Camino	20	Civil Engineering	Horng-Jyh Yang	Microplastics and their Effects on Humans
Jesica Temple	21	Human Nutrition and Food Science	Cangliang Shen	Evaluate Triple-Wash with SaniDate-5.0 to Reduce Salmonella Typhimurium on Squashes

C. 1:00 PM – 2:00 PM

1. Performing Arts (Oral/Performances)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Elizabeth Rockwell	6	Music; Women's and Gender Studies	Travis Stimeling	It's a Feeling I Can't Shake: Evaluating Imposter Syndrome in Collegiate Music Students
Zoey Lim	7	Music Composition	Matthew Heap	Jinxy Jenkins & Lucky Lou: The Journey from Spark to Screen
Maria Elena Maddy	23	BFA Musical Theatre & BA Dance	Yoav Kaddar	Why Don't You Smile More?
Juan Carlos Narvaez	24	Music Performance-Intrumental- Flute	Nina Assimakopoulos	Preparation, Recording and Performance of Modern works for Flute of Spanish Origin

D. 2:00 PM – 4:00 PM

1. Arts & Humanities (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
~~Liliana Cardoso~~	~~50~~	~~Theatre Design and Technology~~	~~Irene Alby~~	~~Researching the Social Emotional Wellness of Children in Youth Theatre~~
Taidgh Dowd	51	Political Science	Herschel Thomas	Public vs. Economic Health: The Effects of Policymaking Paradigms on Governmental Covid Response
Tara Hammack	52	Graphic design	Katie Jones	West Virginia Historical Costume Closet
Julia Lopez	53	History	Nancy Caronia	Sons of Italy: Fascism and Americanism in West Virginia
Wesley Nelson	54	Anthropology	Olivia Jones	Bioarchaeological Analysis of a Historic Infant Grave From the Brosius Site, Morgan County, WV
Leigh Osborne	55	Theater Design and Technology	Michael Vercelli	Basics of the Gyil

Nicholas Palmer	56	Accounting	Olga Bruyaka	Does Strategic Corporate Social Responsibility Satisfy? A Study of CSR Events and Media Favorability
William Turman	57	Economics	Bryan McCannon	Rank Choice Voting in Mayoral Elections: A Synthetic Control Analysis
Travis Weller	58	Political Science	Erik Herron	What is Same Day Voter Registration: What Would it Look Like in WV?
Alexandra Bunn	59	Interdisciplinary Studies	Jamie Shinn	Climate Change in the Mountain State: The Need for New Policies for West Virginia
Peyton Burford	60	Fashion, Dress, and Merchandising	Angela Uriyo	Leather & Grace
Savannah Reese	61	Geography	Maria Perez	The "Things" We Love: Learning and Sharing in the Times of COVID-19
Jordan Spears	62	Fashion Dress and Merchandising	Angela Uriyo	Ginkgo

2. Social & Behavioral Sciences (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Grant DuVall	136	Biology	Erin Winstanley	Telepsychiatry, Social Isolation & Coping Strategies among Rural Patients during COVID-19
Jamie Dotson	137	Psychology	Mariya Cherkasova	Cue Reactivity Amongst E-Cigarette Users with Sign-Tracking or Goal-Tracking Behavior
Abigail Ebert	138	Psychology	Julie Patrick	Intersecting Identities on Our Country Roads: Depression Among Diverse Adults in West Virginia
Kareem Ibrahim-Bacha	139	Biology	Julie Patrick	Place-Based Disparities: Depression and Functional Disability
Jenna Itani	140	Neuroscience and Psychology	Julie Brefczynski-Lewis	Short-Term Behavioral, Physiological, and Brain Differences in Real Life and Virtual Reality Social Interactions
Kristian Kemp	141	Psychology and Criminology	Claire St Peter	Interactions between Reinforcement Schedule and Treatment-Integrity Level on Differential Reinforcement of Alternative Behavior

Lindsay Maxwell	142	Criminology	James Nolan	How to Reduce Fatal Officer-Involved Shootings in the United States
Allison Vale	143	Psychology	Cheryl McNeil	Treatment Modalities Typically Used with Clients Affected by the Opioid Crisis
Paige Tyra	144	Biology	Erin Hudnall	The Impact of Sustainable Community Development on Reducing Crime Perceptions
Taylor Bell	145	Psychology	Olivia Harvey	Using a Structured Assessment to Determine Aversiveness of Academic Demands
Madison Mann	146	Psychology	Amy Kennedy Root	Disconnected, Distracted, and Isolated: Better Understanding How Attachment Affects Social Competence in Middle Childhood
Anthony Miesel	147	Psychology	Kennon Lattal	An Experimental Test of Cooperative Behavior in Pigeons
LeighAnn Wood	148	Psychology	Cheryl McNeil	The Impact of the COVID-19 Pandemic on Attrition in PCIT
Julianne Zajdel	149	Neuroscience/Psychology	Christopher Owen	Associations between Parent-Toddler Emotion-Focused Talk, Parent Emotion Regulation, and Toddler Emotion Regulation in PCIT-T
Makayla Anderson	150	Exercise Physiology	Julie Patrick	Hard Knock Life for Us: Poverty and Chronic Health Conditions
Jessica Benevides	151	Psychology	Claire St. Peter	Identifying Parent Responses Possibly Maintaining Challenging Behavior of Children with Prenatal Opioid Exposure
Janella Camp	152	Biology	Julie Patrick	Emotional and Physical Well-being among Asian American Women
Seneca Demoss-Jennings	153	Psychology	Julie Patrick	Health Insurance, Family Impact, and the Pathway to Mental Well-Being
Gabrielle Galuska	154	Criminology	Julie Hicks Patrick	Social Determinants Affecting Mental Health of West Virginia Individuals
Collin Lloyd	155	Computer Engineering	Julie Patrick	Age, Sex and Gender Influence Access to Healthcare in West Virginia
Nicholas McBride	156	Biomedical Engineering	Julie Patrick	Age and (Un)Employment: Predictors of Depression in West Virginia
Amina Boukhris	157	Psychology, Biology	Claire St Peter	Variations of Functional Analyses to Identify Escape as a Reinforcer
Molly Fitzmaurice	158	Criminology	Molly Fitzmaurice	The Correlation between Poor Health Days and Race

Gillian Kaier	159	Neuroscience and Psychology	Mariya Cherkasova	Effect of Audiovisual Cues on Reinforcement Learning Performance and Subjective Experience
Marissa Mangione	160	Psychology	Julie Patrick	Alcoholism in Urban Areas
Lacey Beam	161	Communication Sciences and Disorders	Kimberly Meigh	Do Jigsaw Activities Increase Graduate Student Learning and Clinical Efficiency?
Adelaide McDonald	162	Anthropology, Economics	Brad Humphreys	The Effectiveness of Community Connect Grants on Internet Access in West Virginia

3. Physical, Biological Sciences, & Engineering (Oral Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Kendra Gillo	8	Electrical Engineering	Dimitra Pyrialakou	The Development and Evaluation of a Transit Volunteer Platform
Rachel King	9	Physics and Computer Science	Maura McLaughlin	A "Quicklook" at NANOGrav Pulsar Data from the Green Bank Telescope
Isabelle Nesbit	10	Industrial Engineering	Thorsten Wuest	The Classification of Game Elements for Manufacturing
Alexander Pfeffer	12	Biochemistry	Glen Jackson	The Development of the Expert Algorithm for Substance Identification (EASI)
Samantha Shornack	13	Biochemistry	Gregory Dudley	Exploration of the Synthetic Chemistry of Illudalic Acid
Grace Taylor	14	Chemistry B.S.	Shikha Sharma	Assessing the Viability of Low Temperature Enhanced Geothermal Systems in the Eastern United States
Jackie Arnold[a]	19	Chemical Engineering	Cerasela Dinu	Enzyme Immobilization within a Hyaluronic Acid Matrix for Biosensor Applications

[a]Research stipend provided by WVU's Beckman Scholars Program with funding from the Arnold O. and Mabel Beckman Foundation.

Presentation Number: 1

How Tutoring Affects a Learner's Second Language Intelligibility

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Field (Broad Category): Linguistics & World Languages (Humanities)
Student's Major: Chinese and Anthropology

Why is pronunciation important for second language (L2) learners' oral communication?There are various methods to learning pronunciation for L2 learners such as learning in the classroom setting or immersing in the target culture. This study specifically looks at the effects of one-on-one tutoring sessions in L1 pronunciation instruction and how they impact a learner's English intelligibility. Intelligibility in this study refers to how much of a speaker's intended message could be understood (Munro & Derwing, 1995). The study followed one research participant who took part in online synchronous sessions for 36 hours. The instruction goal was to improve participant's overall English pronunciation, so that the participant's speech would be more intelligible. After the tutoring sessions had concluded, thirty raters were asked to rate the research participant's speech intelligibility based on twenty-four recordings. A one-way repeated ANOVA was conducted and showed that there was no significant difference across four measurements. The presentation will discuss the study results and share recommendations for future research and classroom English as a second language teaching.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 2

Syrian Women Refugees: Challenges and Opportunities

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Field (Broad Category): Linguistics & World Languages (Humanities)
Student's Major: Psychology

Contrary to the research that has focused on the political aspect of the Syrian refugee crisis, our project utilizes an interdisciplinary approach in order to examine the difficulties of the integration of Syrian refugees into a Kentucky community. The study is based on 25 live interviews with Syrian refugees. Our goal is to analyze the intricate ways in which the Syrian
war has influenced gendered performances and to examine the ways in which women can be active agents of change. Our main research question is asking how the urgency of becoming caretakers and breadwinners for their families has reshaped Syrian women's gender performances and restructured ideas about women's rights. In Syria, most women traditionally did not work prior to the Syrian crisis in 2011. This has changed with their new living conditions in Kentucky as refugees. This mentality is not new; it has evolved beginning with internal
displacement in Syria, followed by experiencing living as refugees in Jordan and Turkey. Drawing on various fields of scholarship—gender and feminism, political science, and resistance, this paper analyzes the strategies that Syrian women applied to contest, challenge, survive multiple struggles, and gain power over their circumstances. science, and resistance, this paper analyzes the strategies that Syrian women applied to contest, challenge, survive multiple struggles, and gain power over their circumstances.
Keywords: agents of change, Syrian refugees, gendered performances, feminism

Funding: Other
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 3

Examining Costa Rican Ceremonial Instruments from Winthrop University's Salazar Collection

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Field (Broad Category): Art History & Visual Arts (Humanities)
Student's Major: Art History

This research project investigates the musical instruments associated with the Salazar collection at Winthrop University in South Carolina. These objects, found in the 1940's and recently bequeathed to Winthrop's Pettus Archive, are representative of a diverse range of Mesoamerican objects from the Costa Rican Atlantic Watershed to the Guatemalan Highlands. The study of ceremonial instruments within Pre-Columbian Costa Rica emerged in archaeological literature in the 1960s and 70s. Inspired by these early professionals, a recent exhibition held at Winthrop in September 2021 focused on presenting a portion of the donated collection for the first time focusing on representations of animals and human figures.
This presentation considers the form and function of several of the musical vessels from the Salazar collection, including the items displayed in the Fall 2021 exhibition. It examines the cultural, symbolic, and spiritual associations with musical instruments in the Pre-Columbian past, particularly focusing on wind instruments and rattles with ceremonial contexts. Avian and feline effigies are among some of the many instruments examined in this project, as well as humanoid characters and mammiform tripod bowls. A diverse range of scholarly literature from art historians, anthropologists, and ethnomusicologists are utilized in the paper to develop an in-depth understanding of these objects and their meaning. Ethnomusicologists such as Arnd Anje Both have examined similar types of ceremonial vessels and their sounds, associating them with ceremonial action, ritual events, and celebration.

Funding: State
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 4

Synthesizing Guilt: Analyzing a Most Challenging Piece of our Human Condition

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Field (Broad Category): Philosophy, Ethics, & Religious Studies (Humanities)
Student's Major: Philosophy and MDS

Jean-Baptiste Clamence, the duplicitous narrator of Albert Camus' novel The Fall, terms himself a judge-penitent: one who judges while also confessing. He admits to his own guilt, then sees it fit to transfer such guilt onto the rest of humanity. A proper examination of the character of Jean-Baptiste Clamence, though, begs for a deeper examination of what guilt is. This is quite a contentious field. In the psychological world alone, there is an admitted dearth of understanding of the phenomenon. On the one hand, Freud viewed guilt as a type of superego anxiety stemming from extrinsic factors, particularly from fear of loss of love. On the other hand, contemporary behavioral psychology cannot quite define guilt, as guilt does not manifest as a specific, observable behavior. The world of philosophy is similarly contentious. A plurality of views on guilt abound, and some influential philosophers go so far as to hold that Jean-Baptiste Clamence should not have felt guilty at all. I aim to provide a short overview of each of these different conceptions of guilt in turn in hopes that we can reach a better understanding of this deeply important piece of our human condition.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 5

PRT: Analysis of the Events Surrounding the Construction of the Personal Rapid Transit System

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Field (Broad Category): History (Social Sciences)
Student's Major: Business

In this project, I analyze the social, political, and scientific context of the Morgantown Personal Rapid Transit System (PRT). The PRT is a 1970s experiment in group rapid transit; a concept which was originally meant to be expanded to other American Cities in order to reduce automobile use. The PRT is an example of collaboration between, university, federal, and contracted engineers. Project reports and communications between organizations show the difficulties and expenses of the project to all parties. National, local and student newspapers provide insight into the public's view of the construction of the PRT, and the disruption its construction caused to local day-to-day life. While the difficulties surrounding the PRT experiment convinced the government not to attempt to replicate it, analyzing the experiment gives insight into early attempts to reduce inner-city traffic problems. Currently celebrating its 50th year of operation, the need for the PRT continues because of the unique circumstances provided by the residents and terrain of Morgantown, WV.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 297-level course

Presentation Number: 6

It's a Feeling I Can't Shake: Evaluating Imposter Syndrome in Collegiate Music Students

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Field (Broad Category): Music/Music Therapy (Creative Arts)
Student's Major: Music and Women's & Gender Studies

Imposter syndrome is a psychological phenomenon that typically presents itself in high-achieving individuals. Those who report experiencing this phenomenon often doubt their work and achievements while favoring self-degrading thoughts that lead to burnout and low self-esteem. Research of this nature has appeared in many iterations since its emergence in the 1970s, but little is to be found specifically about the presence and impact of imposter syndrome in the performing arts, and more specifically collegiate music students. I predict that imposter syndrome runs rampantly through collegiate music students and is a major contribution to practice avoidance, burnout, and stage fright. Information gathered from intense research and a Qualtrics survey distributed to music students at WVU was used to produce a set of guidelines and best practices for individuals in the field, ranging from students to administration, who are searching for ways to mitigate the effects and consequences of imposter syndrome. Additionally, demographic information collected from survey participants was used to identify the possible correlation of imposter syndrome in marginalized identities, including those in race, gender, and sexual orientation. The central goal of this research is to use the findings to spread awareness of the negative consequences that imposter syndrome may produce. Acknowledgment of this reality will aid members of all key groups in taking the issue more seriously than is currently regarded in intense, highly-competitive learning spaces.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: Honors EXCEL

Presentation Number: 7

Jinxy Jenkins & Lucky Lou: The Journey from Spark to Screen

Zoey Lim*, Dr. Matthew Heap, Dr. Kyle Simpson, WVU Film Score Ensemble 2021
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Field (Broad Category): Music/Music Therapy (Creative Arts)
Student's Major: Music Composition

As a student composer who knew next to nothing about film scoring just last year, I never would have imagined that an idea of mine would end up being performed and recorded by a group of talented musicians. The idea was simple: to try to tell the story of two completely opposite characters with music in an animated short film. The title of the film was named after the main characters Jinxy Jenkins and Lucky Lou; Jinxy Jenkins was this gloomy, human-shaped bad luck magnet and Lucky Lou, a sunshine-and-rainbows kind of person who was as lucky as her name suggests.
The very first draft included me using computer-generated instruments as playback, it didn't sound too good. Later in the rewrite, I certainly felt like I was the real life embodiment of Jinxy Jenkins, except that I had a two-week deadline, technical hiccups, and writer's block that he did not. That said, I also met my fair share of Lucky Lous who were always there to offer insights, motivate and cheer me onwards. Throughout the process, I got to score for live musicians, tinker with recording technology, conduct an ensemble, and perform/record the score with the WVU Film Score Ensemble—things that I would have never learned or experienced otherwise. Looking back, the scoring of Jinxy Jenkins wasn't just about telling the story of two conflicting characters; it was also about the journey of a group of musicians, who overcame the hurdles and gave life to a simple idea.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU Film Score Ensemble 2021

Presentation Number: 8

The Development and Evaluation of a Transit Volunteer Platform

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Field (Broad Category): Engineering (Engineering)
Student's Major: Electrical Engineering

Rural transit agencies suffer from limited funds and, consequently, the ability to provide transportation services to all citizens. The use of volunteers can significantly decrease the strain on available resources. However, attracting and managing volunteers poses many challenges. To address this problem, we created a web platform capable of matching volunteers to available tasks. Previous studies were analyzed to determine the most essential website features. The platform will be used by both volunteers and transit agencies. In the front end, volunteers can input information regarding availability and transportation capabilities, and transit agencies can create tasks and manage volunteers. In the back-end, an optimization algorithm matches volunteers with tasks. The matching algorithm considers a volunteer's availability, starting location, vehicle accessibility and capacity, and relevant skills to determine the best assignment of tasks. The platform is currently being developed and will be pilot tested by the Mountain Line Transit Authority (MLTA), in Morgantown, West Virginia. Furthermore, the platform will be evaluated by various stakeholders across factors such as ease of use, usefulness, and quality. The creation of this platform can serve as a framework for other transit agencies who wish to utilize local volunteers to support their current system in providing transportation to all citizens.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 9

A "Quicklook" at NANOGrav Pulsar Data from the Green Bank Telescope

Rachel King*, Blaise Veres*, Ross Jennings, Maura McLaughlin, and the NANOGrav Collaboration
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Field (Broad Category): Physics & Astronomy (Sciences)
Student's Major: Physics and Computer Science

Pulsars are rapidly rotating neutron stars, a type of stellar remnant left behind after the collapse of massive stars. NANOGrav, a collaboration of astronomers, measured the arrival times of pulsars to detect gravitational waves, ripples in spacetime caused by accelerating massive objects. NANOGrav's Quicklook Program is a python Jupyter notebook that creates visual representations of data from an individual pulsar observation. Astronomers can use these graphs to detect anomalies in an observation. An anomaly could indicate an unexpected astronomical event or equipment error. This project focuses on automating the existing Quicklook Program so astronomers can review data immediately after an observation, while previously, there could be a delay of months between data collection and review. These adaptations to the Quicklook Program will allow NANOGrav scientists to detect changes in a pulsar more rapidly. This will ensure that collected data is high quality and follow-up observations of unexpected events can occur. Follow-up observations will provide more data so astronomers can better understand currently unexplainable phenomena.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 10

The Classification of Game Elements for Manufacturing

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Field (Broad Category): Engineering (Engineering)
Student's Major: Industrial Engineering

The term "game elements" is commonly used when describing an instance of gamification. In the manufacturing context, "game elements" describe the pieces of an implementation that allow the scenario to be considered gamified. In research, various publications have used differing terms to describe these "game elements," including mechanisms, components, technology, and more. Since these terms are not used universally across the field, it is important to develop a framework which describes how these terms relate to one another and how they are defined in relation to gamification. This research aims to review previously used terms and to consider additional new terms for introduction into the gamification community for describing and classifying "game elements" more discretely. The resulting framework of this research will be useful for the gamification community in i) developing a foundation of well-established language and diction used within the field to allow for clear communication and research and ii) providing context for implementing gamification across different scenarios in the manufacturing context.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 11

The Expression of Melanocortin Receptors and Attractin in the Bovine Ovary

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Field (Broad Category): Agriculture (Agriculture/Natural Resources)
Student's Major: Animal & Nutritional Sciences and Psychology

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.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 12

The Development of the Expert Algorithm for Substance Identification (EASI)

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Field (Broad Category): Forensics (Sciences)
Student's Major: Biochemistry

A mixture of n-alkanes is used in gas chromatography-electron ionization-mass spectrometry (GC-EI-MS) to calibrate the retention time and help identify unknown substances. Smaller n-alkanes are easy to differentiate because they have distinguishable molecular ions. Larger n-alkanes, like C16H34, tend not to produce molecular ions, making their fragmentation patterns almost indistinguishable. Computer algorithms can assist with spectral matching of questioned spectra to reference spectra, but most algorithms struggle to differentiate between compounds with highly similar EI-mass spectra, like larger n-alkanes. Consensus-based algorithms assume random variance at each m/z position, which results in an identification rate of ~85%. Our research aims to develop an expert algorithm for substance identification (EASI) to correctly identify substances from their mass spectra.
A database of 54 n-alkane EI-mass spectra were compiled, and the 20 most abundant ions for each substance were identified. These ion abundances were then randomly divided into training and test sets. Twenty linear models were built for each n-alkane by sequentially using the abundance of each ion as the dependent variable and the abundance of the remaining 19 as the independent variables. The models were used to predict ion abundances and were compared to the measured values in each spectrum using the mean absolute residuals. On average, EASI outperformed the consensus approach with improved residuals by a factor of 3 and an error rate of less than 3% when used as a binary classifier to identify alkanes larger than C16H34. In contrast, the consensus approach had an error rate of ~20%.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 13

Exploration of the Synthetic Chemistry of Illudalic Acid

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Field (Broad Category): Chemistry (Sciences)
Student's Major: Forensic Chemistry

Illudalic acid is a compound naturally found in toxic Jack-o-Lantern mushrooms that contains a pharmacophore which selectively inhibits human common leukocyte antigen-related protein tyrosine phosphatases (LAR-PTPs). When inhibited using a similar structure, the stimulant reward was reduced in cocaine-addicted mice. We have since established illudalic acid and associated analogs (illudalogs) as potent and selective inhibitors of the LAR-PTP family. We are interested in exploring the structure-activity relationship (SAR) of the LAR phosphatase family by synthesizing a library of illudalogs. This library will aim at advancing the pharmacological understanding of LAR-PTP inhibition by mounting the active pharmacophore onto alternative ring scaffolds. We have synthesized a variety of naphthalene-based illudalogs with variable functional groups on the new ring system. Applying tried and true synthetic methodologies, such as Sonogashira and Suzuki coupling reactions, I have synthesized four novel illudalogs aimed at linking bulky and diverse substituents on the ring. Future projects involve increasing our ability to track illudalog potency by coupling biotin, a biological probe, with illudalogs of interest.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 14

Assessing the Viability of Low Temperature Enhanced Geothermal Systems in the Eastern United States

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Field (Broad Category): Geography/Geology (Agriculture/Natural Resources)
Student's Major: Chemistry B.S.

Geothermal energy has been used for millennia, yet its application for the production of electricity is a recent development. Today, enhanced geothermal systems, which offer an alternative clean energy source, have been engineered to utilize Earth's geothermal gradient to produce heat and/or electricity. The viability of such EGS systems depend upon the underlying geology. There are two main types of geothermal systems, those that utilize high and low temperature gradients. High gradient types (>>30 ℃/km) are associated with tectonic plates and volcanoes, where sufficient heat (~ 200℃) is accessible at an economically viable depth. Low gradient types (<~30 ℃/km) are associated with sedimentary basins and temperatures in suitable EGS reservoirs are ~100 ℃. Low gradient types thus require that the EGS reservoir be at a greater depth to achieve a useful temperature. This makes them less accessible than high gradient types. While extensive research has been done on high temperature geothermal systems, low temperature systems, like those that would be available to the Appalachian Basin, are yet to be researched thoroughly. Through the process of literature review, my research begins an in depth and thorough process of discovering the viability and accessibility of geothermal energy throughout the Eastern United States, including the Appalachian Basin.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 15

Social Media Company Liability for Algorithmic Amplification

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Field (Broad Category): Law & Legal Studies (Social Sciences)
Student's Major: Political Science and Spanish

There has not been a lot of litigation against social media companies for the content that is posted to their sites by their users because of laws that provide a liability shield to these companies. Because those laws are likely to change, either through Congressional action or through judicial opinions, this Article focuses on how these companies should be regulated and how changes to that in the near future will impact the development of law. This paper investigates the potential ways Congress, or the judiciary could change Section 230 of the Communication Decency Act, which states that no provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider, and how the framework of some form of liability will look like when change does occur. My specific work is looking into what social media sites do as of right now as a form of self-regulation with information posted on their cites. Some social media companies already have their own forms of self-regulation, but they are not very transparent about how their work is done, and some even have been shown to lie regarding the self-regulation practices they do have. It is also unknown exactly how these companies moderate their content since they have a lack of resources distributing their information. The goal with the research is to provide more information on how best to regulate social media and what litigation against these companies might look like.

Funding: Other
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 16

Behavior Analysis: Social Imitation

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

If using reinforcements, will a model pigeon teach another? Pigeons are social animals, and function together as one single flock, but do they teach actions and habits amongst themselves? The hypothesis is that the observer pigeon will be taught and learn to imitate a response due to how the model pigeon responds to a color coordinated light. Depending on which light is turned on, the model pigeon will pick the coordinated chamber to step into, therefore indicating to the observer pigeon which chamber to pick. First, we shape each expected response to the birds individually, then place them together. Once placed together, a light is turned on and the responses of both, but primarily the observer pigeon, are recorded as the number of incorrect before correct response. By using observational studying, we record the number of incorrect responses in between intervals of actions that are expected. What is expected, is that once the model, then the observer pigeon both pick the correct coordinated response, will they be delivered food as reinforcement. The most important results are recorded, which are the low numbers of incorrect responses before correct responses from the observer pigeon. The conclusions that are expected are that an observer pigeon can learn and be taught by a model pigeon without any outside influence.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 17

Targeting Plasticity in Cancer

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Field (Broad Category): Other (Sciences)
Student's Major: Exercise Physiology

Cancer cell plasticity is what enables the ability of cells to shift dynamically between a differentiated state with limited tumorigenic potential and an undifferentiated (or Cancer Stem Cell) state which is responsible for long-term tumor growth. Cancer cell plasticity is promoted by cross-talk between three major embryonic stem cell (ESC)-like transcription factor networks: Core, Myc, and PRC2. These three major transcription factor networks are conserved between normal stem cells and cancer cells, suggesting a potential strategy for targeting the stem-like properties of cancer cells. These three networks are especially highly conserved in human cancer types that express strong ESC signatures such as basal-like breast cancer. When cancer cells are exposed to a variety of therapeutic agents, ranging from conventional chemotherapy to molecularly targeted small molecules, they rapidly develop resistance through a type of epigenetic reprogramming. We propose that the three conserved transcription factor networks play a critical role in this process, conferring plasticity to cancer cells and leading to tumor cell survival and recurrence. By co-targeting these three networks we will address the functional redundancy that is common in ESC signaling. We have developed a strategy to rapidly screen all possible three-drug combinations from a set of 12 agents. We anticipate that specific combinations of drugs will induce differentiation, growth arrest and/or cell death.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: Honors EXCEL Program

Presentation Number: 18

Satisfaction with Access to Health Services in West Virginia during COVID-19

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Field (Broad Category): Nursing & Public Health (Health Sciences)
Student's Major: Nursing

Introduction: A literature review of 12 articles revealed that COVID-19 impacts health services for patients with heart failure (HF). This study was conducted on participants who enrolled in a (HF) clinical trial on palliative care coaching for patients and family caregivers in rural Appalachia.
Hypothesis: COVID-19 impacts HF patients and their caregivers' (1) quality of life (QoL) and health satisfaction, and (2) access to health care and community services.
Methods: A descriptive study conducted between August 2020 to March 2021, using a structured telephone survey with open-ended questions.
Results: Thirteen participants enrolled in the study. On a scale of 1-5, patients were satisfied with their QoL (3.83 (SD=1.17), but half of caregivers reported average and poor QoL (Mean = 3.17 (SD=0.98). However, 70% of caregivers were satisfied with their health (Mean=3.71 (SD=1.25), while half the patients reported neutral satisfaction or dissatisfaction with their health (Mean=3.17 (SD=0.98).
Half the patients reported phone calls and 33% had telehealth appointments. Patients reported calling (83%) and receiving calls (67%) from doctors or nurses to discuss health issues, labs and medications issues.
A few participants (15%) used community services. About 70% of participants reported sufficient healthcare, while one-third (30%) did not and reported difficulty getting medications and rescheduling appointments.
Conclusions:
COVID-19 has an impact on QoL and health of patients with HF and their family caregivers. Families need care coordination from healthcare providers to maintain HF home care. This includes help with their prescriptions, monitoring and managing symptoms, scheduling appointments, and preventing unwarranted hospitalizations.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: Volunteering Research Hours

Presentation Number: 19

Enzyme Immobilization within a Hyaluronic Acid Matrix for Biosensor Applications

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Field (Broad Category): Engineering (Engineering)
Student's Major: Chemical Engineering

Enzymes make up an integral system in the success and efficiency of biological reactions; their specific activities have been transferred from biological to synthetic environments and applied within the chemical, environmental, and biomedical industries to increase processing efficiency. There are, however, limitations to enzyme-based technologies including fragility of the biocatalyst, lack in user-controllability of its reaction, short shelf-life, and low capacity for large-scale use. To approach such limitations, a technique involving enzyme immobilization within biocompatible and biodegradable hyaluronic acid (HA)-based hydrogels of varying pore-sizes has been explored. Hydrogels are formed upon the individual crosslinking of hydrophobic dodecylamine, hexylamine, and octadecylamine with hydrophilic HA at molar ratios of 1:10, 1:1, and 10:1 amine to HA. Upon the production of these matrices, enzymes are caught within the net-like gel samples for enablement of protection from environment-induced denaturation and degradation while maintaining substrate access to the protein active site and product release from the system, respectively. Immobilization emphasis is placed on glucose oxidase (GOx), one of the model enzymes used in biosensors and the pharmaceutical industry, before this proof-of-concept immobilization platform can be extended to other enzymes and other applications. Following user-controlled entrapment of GOx within the HA hydrogels, it is envisioned that activity, stability, and sensitivity of the enzyme can be optimized through manipulation of the platform's pore sizing., as represented through amine-HA pairing and proportion. Further, characterization and attachment of the hydrogels onto functionalized gold electrodes creates opportunity in the development of a biosensor with continuous, real-time tracking capabilities.

Funding: Other
Program/Mechanism Supporting Research/Creative Efforts: Beckman Scholars Program

Presentation Number: 20

Microplastics and their Effects on Humans

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Student's Major: Civil Engineering

Microplastics are particles smaller than 5mm that are not biodegradable, so they stay in the environment longer than most materials. These particles absorb and concentrate toxic chemicals that otherwise would be filtered. These particles are eventually ingested or consumed by humans, increasing the levels of toxicity in the body which can lead to different conditions with varying severity. Studies in this domain have not yet been put into a final conclusion.
Materials used in construction, as well as regulations regarding water treatment, could drastically decrease the accumulation of microplastics. To address the problem, the use of environmentally friendly materials have been encouraged and new filtration systems have been applied. Many countries have released legal restrictions to reduce the discharge of microplastics into certain environments.
This paper will summarize and discuss the producing sources of microplastics, the efforts to fix the issue and mainly the different effects in humans.
Key words: microplastics, pollutants, uptake paths, plastic accumulation, vector capacity, chemical concentration.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: 347 course - individual research

Presentation Number: 21

Evaluate Triple-Wash with SaniDate-5.0 to Reduce Salmonella Typhimurium on Squashes

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Field (Broad Category): Agriculture (Agriculture/Natural Resources)
Student's Major: Human Nutrition & Food Science

West-Virginia-Small-Farm-Center suggests the use of a mixer of peroxyacetic acid-H2O2 (SD) with triple-wash to mitigate microbial growth and reduce cross-contamination of pathogens to produce. This study aims to compare the efficacy of the triple-wash with SD to reduce cell populations and prevent cross-contamination of Salmonella on squashes. Nalidixic-acid (NaL-200 ppm) resistant S. Typhimurium was dip-inoculated on 2-squash (3-untreated control) followed by triple-washing with 5-uninoculated-squahes using water + water + antimicrobial triple wash process with 0, 0.0064 and 0.25% of SD (each step 45-s). S. Typhimurium on squashes were analyzed in 400 ml of tryptic soy broth with vigorously shaking for 30-followed by using MPN-method. The turbidity of each well after incubation (35C, 24-h) was confirmed on NaL-200 ppm tryptic soy agar. MPN values of each treatment were determined by an MPN-calculator followed by statistical analyzes using ANOVA of SAS (2 repeats, P=0.05). Initial population of S. Typhimurium on inoculated squashes were 3.93-4.69 log MPN/g. Reductions ($P < 0.05$) of S. Typhimurium on squashes were 1.63-2.88 log MPN/g for 0 to 0.25% of SD. Cross-contamination of S. Typhimurium was decreased from 2.17-2.55 (0 and 0.0064% SD) to 0.75 log MPN/g when 0.25% of SD was applied. SD is a good antimicrobial for WV small growers to improve microbial safety of squashes.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: United States Department of Agriculture, the National Institute of Food and Agriculture, Food Research Initiative (AFRI), Research and Extension Experiences for Undergraduates (REEU) program 2019-05064 (Award #2020-68018-30657)

Presentation Number: 22

Telling Our Stories: Exploring Geographical and Cultural Connections through Virtual Maps

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Field (Broad Category): Geography/Geology (Humanities)
Student's Major: Interdisciplinary Studies

Geographic Information Science or GIS has revolutionized the ways people experience geography throughout the last thirty years. If you have ever used Google maps or relied on geolocation data on your phone for anything, you have experienced the power of GIS. Historically, GIS has been focused on location points in the landscape. Increasingly, however, there are creative uses of GIS tools to capture the personal meanings we attach to place. These approaches combine quantitative and qualitative geographic data in ways that are pushing the boundaries of what we previously understood from geography as a field. This presentation illustrates this power with the use of ArcGIS Storymaps that we used in a WVU Geography course in Fall of 2021. Using a novel autoethnographic approach, we are simultaneously researchers and participants in an approach to storytelling that combines geolocation data and personal experiences as a way to connect with each other during the isolating and deeply disorienting Covid pandemic. Each of us picked an object/being in our lives of great personal significance, i.e., a father's gift to his son in the form of a necklace, a beloved pet, a note that a mom left her daughter in a school backpack… Through the power of the visual representations of personal photos, maps, and stories, ArcGIS Storymaps enabled us to transcend the classroom and test the boundaries that define geographic locations and connections.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: Capstone course within my department

Presentation Number: 23

Why Don't You Smile More?

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Field (Broad Category): Dance (Creative Arts)
Student's Major: Musical Theatre and Dance

Throughout time, women have borne their children along with the brunt of society's pressures, which change with each decade's new rules, including rules that define who does and does not qualify as a woman. These rules may shift, but there is a through line of common rules that most women have encountered in their lives. My collaborator, Becca Hyde, and I want to add our voices to the researchers and dissenters of these societal rules and create a space for women to feel seen and heard, while also educating those who do not identify as women on the daily struggles women face. We contribute our findings and experiences through our own medium: dance. Why Don't You Smile More? is a choreography project that analyzes individual societal rules imposed upon women and how those rules impact their sexuality, sensuality, and sense of self using the style of modern dance. Modern is a style of dance that focuses on storytelling through organic movement and the abstraction of concepts and everyday gestures. We have chosen to tell this story through modern because the style is typically free of gendered movement and also possesses theatrical elements. Our research on gendered movement and the female narrative is intended to create a performance that will empower all women in the West Virginia University community. We acknowledge that these issues are a worldwide experience and strive to make a difference in our own community, in order to plant the seed of change.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: Honors EXCEL Program

Presentation Number: 24

Preparation, Recording and Performance of Modern works for Flute of Spanish Origin

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Field (Broad Category): Music/Music Therapy (Creative Arts)
Student's Major: Music Performance

The focus of my research is the preparation, CD recording/publication and live performances of 12 previously unrecorded works for flute by contemporary composers that draw on the diversity of musical traditions within the country of Spain resulting in compositions that are hybrids of diverse Spanish musical styles and practices associated with western art music. This repertoire requires mastery of performance practices that go beyond the conventional playing techniques of the flute, known as extended techniques, these may include singing and playing simultaneously, multiphonics, air glissandi and more. The study and preparation of these works for flute will occur in collaboration with the commissioned composers of each work. My research will investigate the connections between these works and traditional music influences of various regions of Spain. This will involve study of historical writings at archives such as the Biblioteca de Catalunya which will culminate in the writing of the CD liner notes, and program notes that will be shared during live performances of these works. My investigation culminates in live performances in Spain and the United States and the production of a CD recording produced by Mon Hills Records. This CD will be the first recorded collection of these kinds of works, providing critical documentation of current activity in the field of 21st century art music.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: My efforts were mainly voluntary.

Presentation Number: 26

Examining the impact of pubertal stress and adult hormone exposure on the PVN transcriptom

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Neuroscience

Women who undergo adverse childhood experiences are at risk for lasting biological consequences, including affective and stress dysregulation. However, the mechanisms underlying this relationship are unclear. We have shown that pubertal adversity is associated with a blunted glucocorticoid response within the hypothalamic-pituitary-adrenal (HPA) axis in both peripartum humans and mice. In mice, we examined puberty-stress reprogramming in the paraventricular nucleus (PVN) of the hypothalamus, which initiates the HPA axis response. Pubertal stress led to an upregulation of six immediate early genes (IEGs) in the PVN of adult, pregnant mice. IEGs are stimulus-dependent transcription factors with important downstream targets. Separately, we showed that the pregnancy-associated hormone allopregnanolone is necessary and sufficient to produce the blunted stress response in pubertally stressed adult mice. Here, we assessed allopregnanolone as the potential mechanism underlying pubertal stress-induced IEG upregulation. We hypothesized that allopregnanolone would increase IEG expression in the PVN of pubertally stressed mice. Male and female mice underwent 14 days of chronic variable stress beginning on postnatal day 21. In adulthood, all animals were given either allopregnanolone or vehicle via separate subcutaneous injections before brain collection. Gene expression was measured using qRT-PCR. If allopregnanolone is linked to increased IEG expression in the PVN, we expect exogenous allopregnanolone will increase IEGs only in pubertally stressed mice. These studies will further delineate the role of IEGs in the pubertal stress-associated blunted HPA axis phenotype. These results will provide novel insight into the mechanisms underlying female-relevant risk for stress dysregulation, a central endophenotype of affective disorders.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's SURE program

Presentation Number: 27

Determining the Behavioral Impact of 5-HT7R Knock-down in Drosophila Melanogaster Olfactory Neurons

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Biology

For animals to survive, they need to alter sensory processing depending on the context. For example, when an animal is starved, it must increase its ability to detect and consume food. One such mechanism to achieve this flexibility is known as neuromodulation. There are many neuromodulators present in the brain, such as serotonin, but understanding their functionality can be difficult. In Drosophila melanogaster, the olfactory system is supplied serotonin from a single cellular source, the CSDns. One of the primary targets of the CSDns is a cell type known as ventral projection neurons (vPNs). vPNs are responsible of transferring odor information to higher processing regions. It is known that vPNs express the serotonin 7 receptor however, it is unclear how this signaling pathway affects olfactory behavior. To test this, we used RNA-interference to reduce the expression of the 5HT7 receptor in a population of vPNs. We then measured the resulting flies' abilities to detect the aversive odor 1-octen-3-ol at various concentrations. Reduction of 5HT7 expression in vPNs did not significantly impact the detection of 1-octen-3-ol at any tested concentration. This result implies that either the population of vPNs we are investigating do not modulate olfactory behaviors in this context, or there could be a compensatory mechanism to account for reduced 5HT7 signaling in these cells. To address these questions in future experiments, we can test olfactory responses in flies with differing feeding-states, in addition to limiting the RNA-interference of 5HT7 expression to a specific developmental time point.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 28

Using Cryo-EM to Determine Structure of Deoxyribozymes

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biochemistry & Exercise Physiology

Deoxyribozymes (DNAzymes) are short single-stranded oligonucleotides capable of catalyzing specific chemical reactions including RNA cleavage, ligation, and thymine dimer repair. These properties enable DNAzymes to have a wide range of biochemical applications including biosensing and potential therapeutic treatments by targeting specific cellular RNAs. One major barrier preventing DNAzymes from being used in clinical settings is the lack of knowledge about their structure and mechanism. Detailed structural and mechanistic information would establish both the activity and specificity optimization necessary for safe and successful applications in vivo. Previous studies of our group have obtained the crystal structure of the RNA-cleaving 10-23 DNAzyme in the pre-catalytic state. While this structure provided valuable information about the target specificity and mechanism chemistry, the crystal packing favored a higher order structure that was not physiologically relevant. To combat this issue, this study will utilize cryogenic electron microscopy (cryo-EM) to capture the structure of the 10-23 DNAzyme. By fusing the 10-23 DNAzyme to a larger molecule we aim to create a complex that can be imaged via cryo-EM to determine the catalytically active structure of the DNAzyme. This strategy could be further employed to study the structure and mechanism of other DNAzymes allowing for their potential optimization as biotechnical or clinical tools.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 29

Effect of Activation of the mTOR Pathway on Cone Photoreceptor Degeneration of Opn1mw-/-sw-/- Mice

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biology

Cone photoreceptor cells are responsible for color vision and high illumination visual acuity. Humans have three types of cone cells, S-, M-, and L-cones, responsible for detecting short (blue), medium (green), and long-wavelength (red) lights, respectively. Blue cone monochromacy (BCM) is a vision disorder in which patients suffer severely reduced visual acuity and color sensitivity. BCM patients carry deletion mutations in the OPN1LW/OPN1MW gene cluster resulting in no expression of M-opsin and L-opsin, key components of M-cones and L-cones. We use Opn1mw-/-sw-/- double knockout (DKO) mice as a model for BCM patients. Our previous research shows that gene replacement therapy can rescue cone function when the DKO mice were treated at young ages. However, the rescue effect significantly diminished when the mice were treated at older ages. To explore the possibility of extending the treatment window in these mice, we test the hypothesis if constitutive activation of the mTORC1 (mechanistic Target Of Rapamycin Complex 1) pathway can slow cone cell degeneration. The mTOR pathway is a central regulator of mammalian metabolism and physiology. Studies have found that activation of mTOR pathway can enhance photoreceptor cell survival in various retinal diseases probably through boosting cellular metabolism. We crossed DKO mice with Cone-Cre Tsc 1fl/fl mice to activate the mTORC1 pathway in cone cells. Our results show that cone numbers are similar between Cre+ mice and their age-matched controls. However, preliminary results also show that DKO mice with activated mTOR pathway have reduced glial activity suggesting a protection effect.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 30

Diagnostic Utility of Genetics Testing of Connective Tissue Disorders in West Virginia

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Field (Broad Category): Biology (Health Sciences)
Student's Major: Biology

The clinical and genetic variability of heritable connective tissue disorders is remarkable. Next-generation sequencing (NGS) is a strong diagnostic tool that has become widely available in clinical settings, but its application in connective tissue disorders is inadequately researched.
To describe the impact of genetic testing, on individuals with a connective tissue disorder in the WVU genetic clinic.
We reviewed the clinical records of all individuals from the WVU clinic who were clinically suspected to have a hypermobility/connective tissue disorder and had genetic testing done between June 2017-December 2021. This study included results of all tests that were classified as Aortopathy and Connective Tissue Disorders by the clinical laboratory.
A total of 635 genetic tests were ordered, with 57 single gene tests and 578 multi gene panels performed on 618 patients. A pathogenic variant was found in 7% of the tests, with 4 percent representing an established diagnosis (25 patients with autosomal dominant disorders, one patient with homozygous for autosomal recessive). The most common reported diagnosis was Marfan syndrome discovered through the FBN1 pathogenic finding in 12 patients, 6 of whom were tested using a single gene test.
Only 4% of 618 patients with connective tissue disorders received a genetic diagnosis either a multi-gene NGS panel or a single gene test. This study further shows pathogenic variant in FBN1 gene is the most common finding (2%) among all tested individuals included in this study with clinical indication of a connective tissue disorder.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 31

Probing the Morphological and Mechanical Changes in a C. elegans Model of Huntington's Disease

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biochemistry

Huntington's Disease (HD) is a fatal neurodegenerative disease caused by a mutation in the huntingtin gene, in which CAG nucleotides are excessively repeated. In turn, the translated huntingtin protein (htt) contains an expanded polyglutamine tract, which triggers protein aggregation, the hallmark feature of this incurable disease. Presenting as a result of htt aggregation, several common symptoms, including loss of body weight, muscle atrophy, changes in muscle rigidity, spastic movement, and decline in neurological function, continue to worsen over time. The purpose of this study is to investigate the age-dependent changes in Caenorhabditis elegans morphology and mechanical properties with relation to the length of the polyglutamine tract. We suspect that diseased C. elegans will exhibit earlier changes in peripheral muscle tissues, such as a change in muscle rigidity, than healthy, age-matched C. elegans. Atomic force microscopy will be used to collect data and image samples. Yielding a valid hypothesis, future studies will be conducted to determine if the changes exhibited in peripheral tissues of C. elegans can be applied to a human model, and whether or not these changes may serve as a peripheral biomarker for HD. Moreover, future studies may be conducted to identify applications of this biomarker in diagnostic methods and therapeutic strategies.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 32

How Visual Experience Affects Motor Behavior in Larval Zebrafish

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Biology with Neuroscience Emphasis

Brain development is dependent upon experiences, such as visual input during early development, but how these external inputs influence neurodevelopment is incompletely understood. One hypothesis is that sensory experience leads to asymmetric patterns of activity in the brain. Many organisms have brains with symmetric structure, yet brain activity patterns are specialized and show a preference for a single brain hemisphere, producing functional asymmetry. Previous work in the lab has demonstrated that larval zebrafish have a persistent leftward or rightward motor bias, similar to human handedness, which this motor asymmetry is induced by the loss of light. Interestingly, the lab has found that asymmetric visual experience during early development determines the left or right motor bias of individual larval zebrafish, suggesting a form of sensory dependent plasticity known as critical period plasticity. What we do not know is how different patterns of visual input regulate this plasticity. Here, I will immobilize larvae to control visual experience and apply different patterns of light to either the left or right eye. I hypothesize that patterns and increased intensity visual stimulation will instruct stronger motor bias. My work will show how sensory experience shapes motor behavior. As sensory dependent changes to brain function are observed in zebrafish and humans, my research can establish how sensory experience shapes brain function and behavior, which defects in this process are associated with numerous neuropsychiatric disorders.

Funding: State
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 33

RNA Sequencing of the Hypothalamus of Rats Drinking Differing Sugar Sweetened Beverages

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Field (Broad Category): Other (Sciences)
Student's Major: Biochemistry

Background: Excessive sugar consumption is associated has negative health implication with evidence that some sugars may be worse than others. Sucrose (table sugar) contains 50% glucose and 50% fructose while high fructose corn syrup (HFCS55) contains 5% more fructose. Fructose has been suggested to change brain metabolism and to increase the risk of neurodegeneration. This is of concern since children have the highest soft drinks intake.
Objective: to investigate the effect of different sugar drinks on gene interactions in the brain.
Methods: Young (age 21 days) Sprague-Dawley rats were randomly assigned (n=7 rats/group) to consume water (control) or water sweetened with 13% w/v (sugar content in soft drinks) HFCS-55, sucrose, or fructose for 8 weeks. RNA-sequencing was performed to provide a global overview of genes expressed in the brain.
In progress Results: mRNA was purified, diluted to 1.4 - 4 µL, and shipping to Novogene (UC, Davis, CA) for gene sequencing. Bioinformatics will be performed on raw data to determine the most upregulated and downregulated gene expressed among dietary groups.
Expected Results: Feeding rats Western diets high in fructose showed downregulation of genes regulating neurotransmitters: synuclein alpha, phospholipase D family member 5, NADH dehydrogenase Fe-S protein 6, choline O-acetyltransferase, and frizzled class receptor 6. Therefore, rats drinking HFCS-55 are expected to show gene changes leading to neurodegenerative disorders.
Significance: evidence showing HFCS-55 downregulates genes involved in brain function and neurodegeneration can lead to recommendation for reducing HFCS-55 intake to improve brain health and decreased risk of Alzheimer's and Parkinson's disease.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 34

Supernumerary Branches of Dorsomedial Cutaneous Nerve of Hallux Crossing Extensor Hallucis Longus Tendon

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Field (Broad Category): Other (Health Sciences)
Student's Major: Exercise Physiology

The dorsomedial cutaneous nerve of hallux (DMCN) provides sensation to the skin of the dorsomedial hallux (big toe) and first metatarsophalangeal joint. This cutaneous nerve, a terminal branch of superficial fibular nerve, crosses the extensor hallucis longus tendon (EHL) in the dorsum of the foot. At this intersection point, the DMCN is at risk for injury during operations of the hallux and metatarsophalangeal joint. Iatrogenic injuries often result in sensory loss, debilitating causalgia, or neuroma formation. The aim of this study was to identify anatomical variations at the intersection of the DMCN and the EHL. Twenty-three feet from 12 cadavers were dissected to follow the course of the DMCN and look at its EHL intersection. Dissection resulted in damage to three DMCNs; however, 20 feet (11 left-sided; 9 right-sided) dissections resulted in excellent visualization of both DMCN and EHL. Supernumerary branches of the DMCN were identified crossing the EHL in fourteen of twenty feet (70.0%), including nine left (9/11, 81.8%) and five right (5:9, 55.6%). Of the fourteen feet with supernumerary branches, seven feet (50.0%) had two branches, four feet (28.6%) had three branches, and three feet (21.4%) had four-to-six branches of the DMCN crossing over the EHL in multiple locations. The results of this study identify the complex branching patterns of the DMCN. Surgeons should be aware of that supernumerary branches of the DMCN exist, crossing the EHL tendon in multiple locations, and use ultrasonography to lower the risk of iatrogenic injury to the DMCN during surgical procedures.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 35

Lipid Modification of Cone Phosphodiesterase-6 is Crucial for Color Vision

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biochemistry

Our vision is a vital part of our lives, but for some people that is not the case, disorders like achromatopsia cause color blindness and a lack of visual acuity. This sort of blindness happens due to defects in the cone photoreceptor cells within the retina. There are two different types of photoreceptors, cones which mediate daytime and color vision and rods which mediate low light vision. Photoreceptors are compartmentalized cells made up of an outer segment and an inner segment. The outer segment is the light sensing organelle, and the inner segment is the part of protein synthesis. My research is looking into an achromatopsia related mutation causing a loss of lipid modification in the protein cone Phosphodiesterase-6 (PDE6), involved in cone-mediated vision. Our lab created a mutant mouse model with similar mutation, to address why a defect in cone PDE6 lipid modification causes impairment in cone photoreceptors function. An electroretinography (ERG) was performed to test the mice's response to light. The ERG results showed that the cones in mutant mice were not functional. To determine if the PDE6 protein was still being expressed in the mutant, we cut the retinal section and performed immunohistochemistry. Our data suggests that the PDE6 protein is still being produced in the cones' inner segment, but it is not localized in the outer segment. These results show that the lipid modification of cone PDE6 is essential for its localization in the cones' outer segment where it is required for cone-mediated vision.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 36

Using Super-Resolution Microscopy to Test the Localization of Trafficking Organelles in Rod Photoreceptor Neurons

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biochemistry

Vision begins in the retina with a process called phototransduction, which is initiated by the absorption of photons by opsin receptor proteins. Rod and cone photoreceptors are highly specialized neurons in the retina, and the opsins are specifically expressed in the outer segment cilium of each photoreceptor. Trafficking of proteins, like opsin, to the outer segment in rods and cones is a continuous process that is essential for photoreceptor health, and genetic mutations that disrupt this process can cause retinal degeneration and blindness. In this study, we used conventional and super-resolution fluorescence microscopy techniques to examine the localization of key protein regulators of protein trafficking in rods. Using laser scanning confocal microscopy, we examined the localization of three proteins in adult mouse retinas: Rab11a, a small GTPase regulator of post-Golgi transport vesicles, its effector protein Rabin8, and cytoplasmic dynein-1, a motor protein for active transport of vesicles. We found each of these proteins within the inner segment layer of the retina, which is the biosynthetic region of rod neurons, then compared their localization to the cilium located at the distal end of the inner segment. Finally, we used a super-resolution microscopy technique known as structured illumination microscopy (SIM) to localize Rab11a-positive transport vesicles in the inner segments of single rods on a subcellular scale. Our results provide a new understanding of how protein trafficking regulators are organized in the rod inner segment and will guide future studies to discover the fundamental mechanisms underlying retinal health and vision.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 37

Determination of Structure of the Intermediate SNARE Complex for Rapid Vesicle Fusion

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Field (Broad Category): Biochemistry (Health Sciences)
Student's Major: Biochemistry

Soluble N-ethylmaleimide-sensitive factor attachment protein receptors (SNARE) are crucial in vesicle fusion and neurotransmitter release within cells. Malfunction of SNARE proteins can lead to known neurodegenerative diseases such as Alzheimer's and Parkinson's disease. Despite their importance, the underlying mechanisms of SNARE complex assembly is unknown, which is the focus of this study. The three proteins that form the SNARE complex are SNAP-25, Synaptobrevin-2, and Syntaxin-1a. Vesicle fusion is regulated by the accessory protein Munc18. The central purpose of this project is to confirm a proposed intermediate complex between Syntaxin-1a, Synaptobrevin-2, and Munc18. In order to prove this structure, we have developed through protein engineering a Syntaxin-Synaptobrevin linked construct that will associate with Munc18. Based on previous literature we also developed a Munc18 mutant (D326K) which enhances the specific binding of Synaptobrevin to Munc18. Following protein purification utilizing Ni-NTA, anion exchange, and size exclusion chromatography, we anticipate forming this intermediate complex which we can send for Cryo-EM analysis to determine to its three-dimensional structure. This structure would then validate the proposed intermediate structure between the proteins.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 38

Regulation of type-I interferons by the Epithelial-Mesenchymal Transition

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biochemistry

Epithelial-Mesenchymal Transition (EMT) is a programmatic change in gene expression that allows metastatic tumor cells to gain motility, invasiveness, anoikis-resistance. EMT also confers tumor cell resistance to immune rejection, by mechanisms that are not yet understood. Tumor cell expression of type-I interferons (IFN-I) and Interferon Stimulated Genes (ISGs) are important to anti-tumor immune responses. Previous work from the Frisch laboratory and others indicated that tumor cells that have undergone EMT fail to produce these type-I interferons. Our current project aims to investigate the mechanism by which interferon production is blocked. In this preliminary phase of the project, we observed that an inflammatory molecule called interleukin-1α (IL-1α) was expressed at high levels in pre-EMT cells but not in post-EMT cells. Thus, we hypothesized that IL-1α could be important for interferon responses in the pre-EMT cells. To test this, we used CRISPR/cas9 gene editing to knock out the IL-1α gene in human mammary epithelial cells. After editing, cell clones were generated and western blotted to identify clones with complete IL-1α knockout. These were then challenged with an interferon inducer called poly-inosine-cytidine (polyIC), a double-stranded RNA that mimics viral infection. Surprisingly, these cell clones responded heterogeneously. Additionally, three siRNAs were tested. One of them knocked down IL-1a efficiently and blunted the interferon response, suggesting a potential role for IL-1a in IFN-I induction. Further work is currently being done to characterize the effect of IL-1α knockout on interferon responses more conclusively.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 39

Biological and Functional Roles of Proteasomal Activators PA28y and PA200

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biochemistry

The proteasome is an organelle dedicated to protein regulation. It's primary function is to break down damaged or unneeded proteins. This makes it important to almost every biochemical pathway in the cell, but the proteasome is in a constant 'closed' state and requires an activator to open and allow proteins in for proteolysis. There are many different activators that serve different functions to the proteasome and what it breaks down. Specifically, the PA28y plays key roles in the cell cycle, DNA repair, chromosomal stability, and nuclear organelle organization. However, the exact mechanisms of this activator are still widely unknown. By looking at organisms lacking these activators, we can gain insight into their functions. Utilizing mutated C. elegan cultures, we can observe changes in lifespan, development, behavior and other phenotypic differences. After knocking out these activators and any homologue activators, it was found to have a decrease in fertility and egg-laying into the next generation. Future experiments to further this research includes: protein localization, heat shock, lifespan, and acute ROS stress. This research can help further understand the interactions of these biochemical pathways.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 40

An Analysis of The Immunological Components of Borrelia Burgdorferi in Arthropod Vectors

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Field (Broad Category): Biology (Sciences)
Student's Major: Molecular Biology

Lyme disease has been a topic of interest in terms of immunological testing for around 30 years. It has infected upwards of 476,000 people per year and even more animals. With infection rates increasing, it becomes a necessity to decrease the amount of people and animals infected. To do this, an understanding of the immunological make-up of arthropod-vectors is essential. In this study, an emphasis is placed on the infection of ticks and larvae. The results of the infection are expected to contaminate the given larvae with the Borrelia pathogen. After Borrelia Burgdorferi has been implemented into the ticks, the goal for the analysis is to extract the arthropod-vector's DNA and analyze it based on whether or not the subject was infected. Since the ticks would be submerged in Borrelia bathing solution, it is expected that most of the specimens will be infected. The contaminated ticks and larvae will then be analyzed based on their immunological make-up and what is predicted to be required for the survival of the Borrelia pathogen. It is expected that Borrelia needs a certain nutrient to survive from tick to host, and with this research, one can narrow down which nutrient Borrelia needs to live.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 41

The Impact of Pubertal Stress on the Developing Hypothalamus

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Neuroscience

Although stress is a common occurrence, it does not lead to lasting negative outcomes in behavior or underlying biology unless it is chronic or severe. Excessive stress experienced during development can lead to the emergence of adulthood mood disorders. Puberty is a key period when the brain is sensitive to stress. We have previously found that pubertal stress led to a dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis stress response in humans and mice. Such dysregulation is a fundamental phenotype seen in human mood disorders. Further work in mice showed that pubertal stress altered gene expression in the paraventricular nucleus of the hypothalamus (PVN), the brain region that initiates the HPA axis. We found increased expression of six immediate early genes (IEGs) in the PVN of adult pubertally stressed mice. IEGs are stimulus-responsive genes that function to initiate downstream cellular cascades. Although we have examined the adult PVN transcriptome, when and how these changes manifest after puberty is unknown. Male and female mice were exposed to chronic variable stress or not from postnatal day (PN) 21-34. On PN35, brains were collected. Gene expression was quantified in the PVN. If pubertal stress induces immediate reprogramming of the PVN transcriptome, there would be increased IEG expression in pubertally stressed mice at PN35. Lack of a pubertal stress effect would provide evidence that altered transcription is not an immediate consequence, but rather is initiated later in development. This translationally-relevant mouse model provides insight into the molecular mechanisms and developmental timing underlying stress dysregulation.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU Work Study (not associated with RAP)

Presentation Number: 42

Developing Polymorphic Microsatellite Markers in a Sensitive Appalachian Herb, Smooth Rock Skullcap (Scutellaria saxatilis:Lamiaceae)

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Field (Broad Category): Biology (Sciences)
Student's Major: Biology

Rarity and low genetic diversity, for example in endangered or sensitive species, is often a precursor for extinction. Scutellaria saxatilis, the smooth rock skullcap, is a sensitive plant species known from approximately 80 localities clustered in the eastern US and may be at risk of extinction due to small population sizes, low genetic diversity, climate change, and human-caused disturbance. Little is known about patterns of genetic diversity in this species, thus hampering efforts in its conservation. To quantify genetic diversity in this species, we used genomic sequence data from another species of Scutellaria to design primers to amplify microsatellite DNA, short repeat sequences which have a high mutation rate, as genetic markers. We designed 60 primer pairs, and tested 16 of these initially for amplification. Eight primer pairs successfully amplified single bands between 100-500 bp in length. As a follow up, we amplified DNA using two sets of these primers in multiplex (4 primer pairs each), and confirmed the presence of each band, and further demonstrated some degree of length polymorphism for most or all loci. The next steps will be to use a tailed 5' primer with fluorescent dyes, and to determine polymorphism and diversity in samples collected at different sites on the Genetic Analyzer. This research aims to better understand the genetic diversity and potential risk of Scutellaria saxitallis from becoming extinct so conservation efforts can be curated to protect this species.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU Work Study (not associated with RAP)

Presentation Number: 43

Two Novel Bovine Oocyte-specific Long Non-Coding RNAs as indicators of Higher Quality Oocytes

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Field (Broad Category): Other (Agriculture/Natural Resources)
Student's Major: Animal & Nutritional Sciences

In mammals, proper development during early embryogenesis relies heavily on the regulation of maternal transcripts. These transcripts must undergo gradual degradation accompanied by activation of the embryonic genome. Recent technological advances have discovered a new regulatory RNA and long noncoding RNAs (lncRNAs) have been functionally characterized as key regulators of embryonic genome activation in humans and mice. It is well known that the integrity of the early embryo during activation is dependent upon the composition of the oocyte. Despite advances, defining oocyte quality remains elusive. The literature presents a nontoxic stain, brilliant cresyl blue (BCB), that has been used in a variety of species to label oocytes of different developmental competencies. By utilizing the glucose-6-phosphate dehydrogenase enzyme, the BCB stain can differentially label growing oocytes (BCB-; colorless) and fully-grown oocytes (BCB+; blue). Previously our laboratory identified three lncRNAs; OOSNCR1, OOSNCR2, OOSNCR3 specific to bovine oocytes. The objective of this study was to investigate the relationship between two novel oocyte-specific lncRNAs, OOSNCR1 and OOSNCR2, and oocyte quality. Ovaries were collected from a commercial abattoir and oocytes were aspirated, denuded, stained, and classified into two groups: BCB-; colorless and BCB+; blue. Pooled oocytes (n=5) underwent RNA isolation, cDNA synthesis and RT-qPCR. RPL19 was used as a housekeeping gene and relative expression was calculated using the standard curve method. A student's t-test revealed OOSNCR1 was expressed higher in BCB+ compared to BCB- oocytes ($P < 0.05$) These data suggest OOSNCR1 is associated with oocyte quality based on BCB staining.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 497-level course

Presentation Number: 44

The Effect of Pubertal Stress on Prefrontal Cortex Related Tasks in Adult Mice

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Neuroscience

Stress is a common occurrence and individuals are generally resilient to its negative effects. This resilience can be generated by concurrent social support. However, excessive stress during puberty without social support can lead to deficits in the prefrontal cortex (PFC), as the PFC undergoes critical maturation during this timeframe. We have previously shown that pubertal stress coupled with social interaction led to improvements in a Barnes maze behavioral flexibility task. We hypothesized that pubertal stress would result in disruptions to other PFC-related behaviors, such as anxiety-like and spatial alternation behavior, that would be mitigated through social interaction. Male and female mice underwent chronic variable stress (CVS) or not between postnatal days (PN) 21-34. Mice were either singly housed for the two weeks or were allowed to return to social housing between stressors (CVS+SI). Mice underwent a battery of four tests in adulthood: the hole board, the open field, the light/dark box, and Y-maze spatial alternation. Overall, there were no significant impacts of pubertal stress on behavior. In the open field test, there was a trend for CVS male mice to spend less time in the center of the open field and CVS+SI males to spend even less time in the center. Future work will focus on complex tasks that more closely mirror previous work in the Barnes maze. Altogether, this mouse model provides the opportunity to examine both the lasting negative consequences of pubertal stress and how social interaction mitigates these consequences.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU 497-level course

Presentation Number: 46

Analysis of Rhodopsin Mistrafficking Caused by a Retinitis Pigmentosa Mutation in Rod Photoreceptor Synapses

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Field (Broad Category): Biochemistry (Health Sciences)
Student's Major: Biochemistry

Retinitis pigmentosa is an inherited eye disease that causes retinal degeneration and blindness. The mistrafficking of a protein called rhodopsin, which initiates the phototransduction visual pathway in rod photoreceptor neurons of the retina, is the main cause of the disease. Rhodopsin trafficking in rods is essential, and missense mutations to rhodopsin, such as P23H, disrupt this process. To study the P23H-rhodopsin (P23H-Rho) mutant protein in rods, we used a knockin mouse line in which P23H-Rho was tagged with a fluorescent protein marker, TagRFP-T. We used wild type (WT) mice for comparison to P23H-hRho-TagRFP-T mutant mice, and we focused on the synapses of rod photoreceptors from the mutant mice, where we observed P23H-Rho mutant protein mislocalization. Using a combination of confocal scanning microscopy and structured illumination microscopy (SIM), we visualized immunostained proteins of rod ribbon synapses from WT and P23H-Rho mouse retinas. Compared to earlier ages, in age P60 mutant retinas we found that not all synapses contained mislocalized P23H-Rho mutant protein. Mutant P60 synapses without mislocalized protein appeared normal; although we observed an overall slight decrease in synaptic protein expression. Using SIM we found that individual TagRFP-T positive synapses were disorganized. These findings show that most rods with the P23H-Rho mutation can adapt and eliminate mislocalized mutant protein from the synapse, but in certain cells the mislocalization persists and those synapses are severely disrupted, likely compromising rod function beyond repair. These findings contribute to our understanding of retinitis pigmentosa and how it may be treated in the future.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU 297-level course

Presentation Number: 47

Synaptic Characterization of AHNs in a Putative Inhibitory CDC in D. melanogaster

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Biochemistry

Animals sense a multitude of movements from their own actions (termed reafference) and external environmental forces (exafference). These are distinguished by the animal through corollary discharge circuits (CDCs), which are forward projecting neural pathways that provide information about motor commands to sensory and other motor systems thereby affecting sensory-motor function and hence sensory perception and behavioral performance. Our lab has recently identified two pairs of ascending histaminergic neurons (AHNs), a circuit that projects from motor centers in the ventral nerve cord (VNC) to several brain centers including the antennal lobe (AL) in Manduca sexta. The AHNs are intersegmental forward circuits, found across insects and are structurally consistent with a CDC. In Drosophilia melanogaster, light microscopy indicates that AHNs project to multiple sensory systems in the brain, not including the AL, but their primary upstream synaptic partners within the VNC remain unknown.
We therefore manually reconstructed the AHNs and identified synaptic input sites using a serial section electron microscopy (ssEM) dataset of a D. melanogaster female adult ventral nerve cord (FANC) to understand the circuit properties of the AHNs. Our results show that upstream synaptic partners are descending neurons, ascending neurons, local interneurons, sensory neurons, and motor neurons. Most presynaptic input comes from descending neurons, which provide wing and leg motor commands, therefore indicating the role AHNs play in coordinating walking and flight behaviors. Future work will exploit this anatomical information to confirm the AHNs role in coordinating sensory motor function.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: Capstone course within my department

Presentation Number: 48

FOXA1 Overexpression on the Suppression of Epithelial to Mesenchymal Transition in Breast Cancer Cells

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Field (Broad Category): Other (Health Sciences)
Student's Major: Biochemistry

Among women, breast cancer is a common cancer diagnosis. The leading cause of death among these patients is organ failure due to cancer metastasis. Metastatic breast cancer is a disease which can be caused by cancerous epithelial cells undergoing a program, epithelial to mesenchymal transition (EMT). Upon activation of this program, cancer epithelial cells gain mesenchymal properties, including enhanced migration, invasiveness, and increased resistance to apoptosis. Mesenchymal-to-epithelial transition (MET) is the reverse process. FOXA1 (Forkhead Box A1) is one of several specific master transcription factors involved in regulation of the MET program. ESR1 (estrogen receptor alpha) is a nuclear receptor transcription factor. The tightly coupled relationship between FOXA1 and ESR1 in response to signaling has been previously identified. To understand the mechanisms of cancer metastasis, this study focused on the suppression of EMT in response to overexpression of FOXA1, ESR1, or both FOXA1 and ESR1 (FOXA1+ESR1). Overexpression of FOXA1, ESR1, or their combination suppressed EMT, evident by downregulation of ZEB1 and Twist1, and parallel upregulation of E-cadherin. Overexpression of FOXA1 alone also resulted in upregulation of other epithelial markers ESRP1/2 and cytokeratins. Results from this study suggest that the overexpression of FOXA1, ESR1, and FOXA1+ESR1 result in downregulation of mesenchymal cell markers indicating EMT suppression.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: Biology 486 capstone

Presentation Number: 49

Effects of Physical Activity on Tumor Induced Muscle Fatigue in PyMT Mice

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Field (Broad Category): Other (Health Sciences)
Student's Major: Exercise Physiology

Introduction: The objective of this study is to explore the relationship between muscle fatigue and tumor growth. Breast cancer is shown to have multiple adverse effects on the body, but it is not yet fully confirmed how physical activity plays a role in mitigation of decreased exercise capacity. To study this relationship, PyMT mice were observed to determine if physical activity had a positive influence on exercise capacity at different stages of growth. Methodology: PyMT mice aged 4, 8, 12, and 16 weeks old were selected for this study. Mice were randomly assigned to four different experimental groups of five PyMT mice each. Each experimental group was paired with five control mice. The experimental groups of mice were all at different stages of tumor growth. Each group was trained on a treadmill for 4 weeks with performance tests at pre-training and post-training to quantify the effects of training. Results: Post-training, there was an increase in maximum speed, time to exhaustion, and distance for the control group (22.417%, 23.296%, and 49.222% respectively) and 4-week old PyMT mice group (17.697%, 25.996%, and 31.927% respectively). Some mice couldn't complete the 4-week training due to severity of tumor growth. This group on average showed a decrease in maximum speed, time to exhaustion, and distance at -28.991%, -46.651%, and -60.959 % respectively. Conclusion: In the earlier stages, there seems a positive effect of exercise on the mobility of the PyMT mice, but as the stages progressed, there was no benefit in tumor bearing mice.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU 497-level course

Presentation Number: 50

Researching the Social Emotional Wellness of Children in Youth Theatre

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Field (Broad Category): Theatre/Drama (Creative Arts)
Student's Major: Theatre Design & Technology

How can we make Youth Theatre as beneficial as possible for the growth and expression of children in elementary, middle school, and high school? The methods used to answer this question involve the close observation of the children's participation in the WVU Youth Theatre Program where we analyze the children's responses to certain activities at the meeting, how we can approach certain situations depending on different age groups, and the children's overall involvement, and social-emotional wellness. All activities involve team-building exercises so everyone feels they are needed. This research has great significance because discovering how to include children in the creative arts and making them feel that they have a place in this world is very important and can provide support for young people effectively and artistically. Additionally, it gives them an outlet to grow as a person and helps them overcome barriers such as shyness, the feeling of having no place to belong, or lack of confidence. Having teachers that encourage the children positively and direct and guide them with welcoming energy is vital. Ultimately, my goal in this research is to find the most organized and productive way to improve children's social-emotional wellness in theatre. By doing this, we can help children express themselves through acting and singing; give them a sense of community; provide knowledge useful to helping them find their passion or talent in art, and give them a chance to express themselves freely in a motivational space all while having fun.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 51

Public vs. Economic Health: The Effects of Policymaking Paradigms on Governmental Covid Response

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Field (Broad Category): Political Science (Social Sciences)
Student's Major: Political Science

The coronavirus pandemic has left an undeniable effect upon the people and systems of the United States. In response, the governmental leadership of individual states have prioritized fighting those aspects of the pandemic that they perceive to have the greatest detrimental effect. While the actions of state governments in response to COVID-19 have been studied, the impetus, targets for, and evolution of that policy have gone unexplored. The goal of this research is to identify the perceptions held by governors regarding which effects of the pandemic warrant greater scrutiny according to their policy paradigms, and therefore which subset of juxtaposed policies they support. The solutions supported at the state level are examined via content analysis of statements released by each governor. Each statement is to be analyzed to determine the importance of the primary factors of economic health versus public health, government action versus inaction, and the desire for social welfare in policy production. Recognition of disparate impacts of the pandemic based on race, gender, and occupation are also noted. These pursuits are then compared across partisan lines. The preliminary results suggest that public health policy is broadly supported by both parties, with economic concerns trailing far behind. Government action was also highly prioritized by both. Social welfare policies were supported by a slightly greater portion of democrats than republicans. The results of this research clarify how policy paradigms influence the policy pursued within the framework of a pandemic and how policy may be advocated for in similar future events.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 52

West Virginia Historical Costume Closet

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Field (Broad Category): History (Humanities)
Student's Major: Graphic design

The research in question involves a beautiful gallery of textiles, hats, shoes, coats, shirts, pants, skirts, dresses, socks, jewelry, and blankets. Every cabinet is filled to the brim with clothing and textiles that have seen lifetimes. The main purpose of this study is to analyze labels and collect data from clothing in West Virginia University's historic fashion collection, which is housed in the Fashion, Dress, and Merchandising department. Each piece of clothing acquired into this collection is researched and labeled with an identification number, donor, and brand. Then, a digital version of the same information is logged into an Excel spreadsheet with descriptions of the item and the materials used to create the item. Overall, the research in question has no strict end conclusion to it. We mainly look at the associated timeline of when these pieces were created and how they are viewed as they've aged. This is because each piece is essentially its own research project that will be recorded and placed into an archive for people to access easier in the future.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 53

Sons of Italy: Fascism and Americanism in West Virginia

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Field (Broad Category): History (Humanities)
Student's Major: History

In the early twentieth century, West Virginia saw an influx of southern Italian migrants, mainly those from the provinces of Sicily and Calabria. The lives and contributions of these immigrants within Morgantown's community can be misinterpreted and forgotten in favor of sentimental portrayals of struggle and assimilation rather than the more complex Italian immigration history that exists. These southern Italians who first came to West Virginia did not see themselves as part of Italy until World War I--they were instead connected to their paese, the land from where their families resided for generations. An examination of collections within the West Virginia Regional History Centers reveals the realities of life for Italian Americans during the 20th century and how these southern Italians became Italian American. This presentation takes an in-depth look at how Italian Americans in West Virginia became more aligned with Italy after their departure through the lens of Fascism and war in Italy, and the racialized discrimination they faced in the United States. Most important, this connection to their homeland becomes part of a nationalist narrative that has repercussions today. Noteworthy collections studied include the notable and wealthy Morgantown families such as the Pietro, Perry and Mascioli Families.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 54

Bioarchaeological Analysis of a Historic Infant Grave From the Brosius Site, Morgan County, WV

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Field (Broad Category): Anthropology & Archeology (Social Sciences)
Student's Major: Anthropology

The Brosius Site in Morgan County West Virginia is a predominately prehistoric site with 23 noted burials. Of the 23 burials, one grave was found with artifacts such as iron nails, wood fragments, and copper pins, that are roughly dated to the late 18th to early 19th century. The burials within the grave were two perinatal infants who likely died during the same mortality event. The interment of these infants in a field, rather than in a nearby cemetery, offers a unique insight into mortuary practices of early European-descendent settlers in the Eastern Panhandle of West Virginia. The archaeological data of the site and grave, such as burial orientation and associated artifacts, are combined with osteological data of the infant human remains, such as estimated age-at-death and pathology. The results are placed within the wider historical context of the western Potomac River Valley showing that infant mortality, though a common occurrence in pre-industrial societies, was no less meaningful and infants were provided a formal burial.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 55

Basics of the Gyil

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Field (Broad Category): Other (Creative Arts)
Student's Major: Theater Design & Technology

Why learn an instrument or even learn about a culture? There are many reasons to learn about a culture that people have, maybe, never heard of. My research project is a method book for the gyil, the culture behind it, and the creator. When reading and learning from this book, someone with even just a little bit of a musical background should have the capability to sit down and learn the basics of the gyil and even learn some songs. Each chapter, with the exception of the introduction, has audio clips for everything so if someone is having trouble with reading the notes, that person can listen to the clips. Personally, listening to the audio clips have helped learn how the music sounds. When working on this, making sure we have all the audio clips and re-recording the audio clips that might've not gotten recorded or got lost when inputting them into the Google Drive. This method book should be easy to read and learn from.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 56

Does Strategic Corporate Social Responsibility Satisfy? A Study of CSR Events and Media Favorability

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Field (Broad Category): Business (Business)
Student's Major: Accounting

The purpose of this paper is to investigate whether firms' strategic CSR increases favorable media coverage. Strategic orientation is a concept we develop based centrality, specificity and visibility as key dimensions of strategic CSR. Signaling theory is used as theoretical background with CSR initiatives conceptualized as individual (point) signals and CSR portfolios as collective (flow) signals being interpreted by the media. Media favorability is a valuable resource found to grow media reputation, gain stakeholder goodwill, increase Tobin's q and lower cost of capital. CSR signals are often used in the hope of positive media coverage. We tested two CSR portfolio characteristics, size and degree of strategic orientation in their interaction with an CSR event's strategic orientation in impacting media favorability. We used zero-inflated Poisson regression to test our theorizing on 511 CSR events of 11 public firms in the oil and gas industry. Our results indicate that the three dimensions, their combined profile and the CSR portfolio strategic orientation and size all have a significant effect on media favorability.

Funding: Other
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 57

Rank Choice Voting in Mayoral Elections: A Synthetic Control Analysis

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Field (Broad Category): Other (Social Sciences)
Student's Major: Economics

A large number of municipalities throughout the United States have decided to change something as fundamental as democracy itself: the voting method with which representatives are chosen. This paper researches how the implementation of Rank Choice Voting in Minneapolis, St. Paul, and Oakland has affected voter turnout in mayoral elections. Rank Choice Voting has seen increased usage in municipalities throughout the United States over recent years. Some political activists postulate that implementation of the voting method will lead to an increase in voter turnout. We theorize that the implementation of the voting method had no effect on voter turnout in the city, but increased the number of candidates running in a given election. Data was pulled from online databases and government websites to form a synthetic control. The synthetic controls were a combination of cities with characteristics similar to that of the three selected cities that did not adopt Rank Choice Voting, averaging an artificial city for each. After correlating the statistics of the three selected cities to the synthetic control cites, there was no direct effect shown by implementing the new voting method. This would signify that for voters, policymakers, and activists, that voter turnout increases should not be a consideration for the implementation of the voting method.

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Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 58

What is Same Day Voter Registration: What Would it Look Like in WV?

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Field (Broad Category): Political Science (Social Sciences)
Student's Major: Political Science

This project assesses the issues confronting the adoption of Same Day Voter Registration (SDVR) in West Virginia, and the potential consequences of its adoption. SDVRis defined as the practice of voters registering to vote on Election Day or during early voting periods. This practice has been adopted in 21 states and Washington, D.C.. This project evaluates the debates over SDVR in five states (Maine, Maryland, New Hampshire, Wisconsin, and Wyoming) and uses their experiences to understand the issues confronting West Virginia. These states were especially important in the research because they have comparisons to West Virginia such as location, government structure, time in which it was enacted, and terrain. My research shows that while SDVR legislation used to have bipartisan support, it has now become a partisan issue. Some arguments against SDVR include the lack of broadband internet in certain areas, risk of voter fraud, and heightened work for election administrators. These claims have been found to have no weight as some states adopted SDVR before broadband was created, widespread voter fraud is proven to be rare, and while it does cause more work in some instances, it can lighten the load in others. Same day voter registration can be a good way to elevate voter turnout and is the main argument in support for it.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 59

Climate Change in the Mountain State: The Need for New Policies for West Virginia

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Field (Broad Category): Environmental Science & Stustainability (Sciences)
Student's Major: Interdisciplinary Studies

We have just eight years to create new policies at international, national, and local scales to keep the global climate from warming to severely destabilizing levels. In the United States, President Biden has pledged to cut national greenhouse gas emissions by 50 to 52 percent below 2005 levels by 2030. However, it remains unclear whether the sweeping policy changes required to make these cuts will be established, especially since President Biden's climate agenda, the $150 billion clean electricity program, has encountered several roadblocks in the US House and Senate. Of note, West Virginia Senator Joe Manchin is a key player in the creation of this policy yet seems resistant to enacting sweeping policy measures. Simultaneously, rural communities in West Virginia are unequipped with the resources to recover from the damages of severe weather patterns, such as frequent floods, that will increase in intensity and severity across the state due to climate change. This poster will draw from this example to show how climate change is already affecting West Virginia to explore the implications of new policy (or lack thereof) for the state, by exploring the long-term impacts of the 2016 severe flooding event in the rural town of Rainelle, West Virginia. Over five years after this flooding event, Rainelle continues to lack full recovery – emotionally, economically, and physically. This poster will explore how the climate policies being decided in Washington, DC would help rural communities like Rainelle respond more successfully to climate events, across West Virginia and beyond.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: West Virginia University Honors EXCEL Program

Presentation Number: 60

Leather & Grace

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Field (Broad Category): Other (Media and/or Design)
Student's Major: Fashion, Dress, & Merchandising

"My advice for aspiring young artists is just two words: breathable fabrics. Pushing boundaries in terms of what [Van Halen] wore was never an ambition of ours, but it always seemed to be where we would end up," (Harper, 2019, para. 7). The purpose of this project was to create an ensemble inspired by the two exhibitions: The Met's In America: A Lexicon of Fashion and Fashion Institute of Technology's The Body: Fashion and Physique. My inspiration was drawn primarily from a word used in the description of the Met's exhibit -rebellion. This word reminded me of some of the great '70s and '80s rock and roll bands that my father loved. So, I researched the looks donned by ACDC, Aerosmith, The Rolling Stones, Queen, Van Halen, but specifically Fleetwood Mac. The outcome of this visual analysis was a play-off of Stevie Nick's Leather and Lace. This three-piece ensemble is comprised of:(1) a cropped top made from a metallic red/gray knit with exaggerated 22" long sleeves that form a train, (2) a black pleather moto jacket with sleeves that feature an exposed shoulder area and large patch pockets, and (3) black wide-legged pleather pants with exaggerated patch pockets. Chains are sewn to the top of the armhole and sleeve on the jacket to give the illusion that the chains are what keeps them attached.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: Final Project

Presentation Number: 61

The "Things" We Love: Learning and Sharing in the Times of COVID-19

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Field (Broad Category): Geography/Geology (Humanities)
Student's Major: Geography

Cultural geography is not a linear or neatly defined field. In Fall 2021, our cultural geography class explored the field by attempting to answer the question: "Why does this thing matter?" through the discussion of an array of objects that held a personal value to each of us. Objects don't have innate or objective value. Instead, they have the value that we each assign to them. Objects tell stories; they have a biography. In this presentation, we explore the concepts of community and materiality with the experience of storytelling through objects that have special significance in our lives. In our class-turned collective research process, we identified relationships between a diverse collection of objects, and even forged new connections to a "thing". In the midst of a global pandemic we revealed sentimentality in simple, everyday items that revealed not just our personal history, but also connected us to places and people in ways that had not been previously realized. This raised the question: "How do our stories connect us?" By examining the power of objects as mediums for our embodiments of connection, we showed how seemingly trivial items hold more social and cultural significance than their utilitarian purposes. The object and its biography become an extension of the storyteller, lending us personal insight into the shaping of community, relatedness, and connection in a classroom setting as we navigate the reshaping of our ideas of togetherness and learning in the wake of COVID-19.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: GEOG 492A Cultural Geography Practicum

Presentation Number: 62

Ginkgo

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Field (Broad Category): Other (Media and/or Design)
Student's Major: Fashion, Dress, & Merchandising

Ginkgo, was targeted to the Baby Boomer whose changing body and life stage called for a different approach to dress. The problem we identified was the lack of garment offerings in the marketplace that provided for her modest, yet fun and unique dress sense. Through in-depth interviews as well as a wardrobe analysis of the target consumer, we discovered that her changing body made her want to hide certain parts of it, while still showing off her personal style. The outcome of this user-centered design process was a garment that addressed her needs. We created the different patterns and panels along with the individual style lines on the dress to help to draw attention away from problem areas on her body; while the higher square neckline and the petal sleeves helped to make it more modest. The 1920s were the main source of design and historical reference for this design. Another design feature drawn from the '20s is the overall simple silhouette. The gingko leaves printed onto the dress helped lead back to the target consumer's love for Japanese culture. The pattern making process of this design was the most challenging portion of the process but provided a unique understanding of the application of pattern making theory in the design scholarship process.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: FDM 250- Apparel Design Studio 1

Presentation Number: 63

Herbaceous Layer Response to Repeatedly Harvested Strip Cuts to Obtain Woody Biomass for Energy

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Field (Broad Category): Environmental Science & Stustainability (Agriculture/Natural Resources)
Student's Major: Forest Resources Management

The repeated harvesting of wood as a source for energy biomass is a potential option to reduce fossil fuel usage. Responses of the forest ecosystem (e.g., soils, herbaceous plants) to a single cut have well documented, but effects of repeated strip cutting for woody biomass harvest are not yet well studied. In this study, herb layer cover, species richness and Shannon-Wiener diversity were compared between harvested areas (strips) of variable width (2.4 m, 3.7 m, 4.9 m), 2.4-m residual strips between the cut strips, and an uncut control. Treatment plots were cut in spring 2014 and 2020 and sampled in summer 2019 and 2020. Results show that the means of herb-layer cover, richness, and diversity were higher in cut strips (regardless of width) than in the control, but only the difference in cover was statistically significant (P=0.03). Thus, with respect to the herbaceous layer, strip cutting for woody biomass as an energy source appears to be sustainable and likely beneficial.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU's SURE program

Presentation Number: 64

Soil Phosphorus and Nitrogen Levels Affect Aspen Leaf Macronutrients and Plant Derived Soil Carbon

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Field (Broad Category): Environmental Science & Stustainability (Sciences)
Student's Major: Biology

Mycorrhizal fungi form mutualistic relationships with roots by supplying the host plant with nutrients, e.g. phosphorus (P) and nitrogen (N), in exchange for photosynthetically produced carbon (C). The most common types of mycorrhizal fungi are arbuscular mycorrhizal (AM) and ectomycorrhizal (ECM) fungi. AM fungi are thought to more efficiently acquire inorganic P, and ECM fungi are better at harvesting N. We hypothesized that ECM inoculated plants would grow larger and have higher tissue nutrient levels in low N levels, whereas AM colonized plants would perform better in low P levels. We grew dual-mycorrhizal Populus grandidentata seedlings in controlled greenhouse conditions, and inoculated them with either AM or ECM, or left them uninoculated (NM). Seedlings were fertilized with low/control N and low/control P in a fully factorial design. Leaf P levels were measured using inductively coupled plasma spectrometry, and N levels were sent for elemental analysis. Isotope analysis was used to track soil C. While plants supplied with lower P had lower leaf P, plants supplied with low N had higher leaf P. Only in AM colonized plants, plants grown with sufficient P had significantly higher leaf P levels than those grown in P deficient conditions. Plants grown in high N and plants grown in low P had higher leaf N levels. Plants grown in low P sent more C belowground than high P plants. These and future results can contribute to the wider body of knowledge about the contribution of mycorrhizal fungi on ecosystem C cycling.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 65

Relationships Between Life History Strategy and Conservation Status of North American Turtles

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Field (Broad Category): Environmental Science & Stustainability (Agriculture/Natural Resources)
Student's Major: Animal & Nutritional Sciences

Turtles are living members of an ancient class of vertebrates (Testudines) that evolved over 200 million years ago and has persisted through dramatic environmental changes over geologic time. However, turtles are currently the most globally endangered class of vertebrates, with approximately 60% of species threatened with extinction or extirpated in modern times. Life history strategies, including average age at sexual maturity, fecundity, and life span, vary widely among turtles. The goal of this study was to determine if life history parameters are associated with current conservation status of North American turtles. We hypothesized that species that mature later and produce fewer offspring were more likely to be species of conservation concern than species that mature earlier and produce more offspring. We obtained the global conservation status for nearly all North American turtle species (n = 52; excludes sea turtles) from NatureServe, and computed mean age at maturity and annual reproduction (i.e., eggs produced) for each of the species from peer-reviewed literature. We used ordinal regression to estimate the probability of a member being of the classes imperiled, vulnerable, apparently secure, and secure based on age at maturity and annual reproduction. We found that species that matured later and had lower reproductive output were more likely to be imperiled, supporting our hypothesis. Our results indicate that life history strategies that have allowed turtles to persist for millions of years may not be suitable for long-term persistence in the Anthropocene.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 66

Morphological Characteristics of the Undescribed Millipede-associated Fungus Actinomortierella aff. ambigua

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Field (Broad Category): Biology (Sciences)
Student's Major: Biology

Fungal-arthropod interactions are an explosive new area of study with over 5,670 new papers published in the past year. One such area that has been recently investigated is the relationship between fungivorous millipedes (Colobognatha) and their associated fungi. Previously, the undescribed fungus Actinomortierella aff. ambigua (formerly Mortierella aff. ambigua) was found to be part of the core culturable community of fungi recovered from the fungus feeding millipede Brachycybe lecontii. Since Actinomortierella contains few species, morphological and molecular studies of this Brachycybe-associated fungus would enhance our understanding of this early-diverging group within the Mortierellaceae. To this end, representative isolates of Actinomortierella aff. ambigua sampled across multiple states were grown on various media types to measure growth rate, observe anatomical structures, and measure temperature tolerance. For the first time since discovering this species, we have been able to induce sporulation for some isolates on CZA media, while studies on other media types are still ongoing. Detailed measurements, including spore length and width measurements as well as descriptions of sporangia characteristics and colony growth rates, have already been obtained while observations of other isolates are currently underway. This study provides insight into the diversity of fungi associated with arthropod communities and also enhances our knowledge of the diversity of early-diverging fungi.

Funding: Private
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 67

Sex Ratios of Lake Sturgeon Spawning Populations in Lake Superior

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Field (Broad Category): Other (Agriculture/Natural Resources)
Student's Major: Wildlife & Fisheries Resources

Sex ratios of a population inform researchers and managers about the breeding habits of a population. They also allow for effective management of the population as agencies can use ratios to estimate overall population size, as well as the number of breeders in the population. The main purposes of our study were to determine the sex ratios of spawning populations in Lake Superior, look at how ratios may change over time, and compare the accuracy of ratios obtained using field methods with our results. Previously, sex ratios were primarily determined using field techniques like gamete expression and ultrasounds, which are limited by the reproductive state of a fish and can result in individuals of unknown sex. The procedure used in this study is a newly developed molecular method that can determine sex regardless of reproductive state. We extracted DNA from 9 Lake Superior spawning populations (n=375), amplified the AllWSex2 marker using PCR, and visualized bands of DNA using gel electrophoresis to determine a fish's sex. 375 samples ranging from the years 2001-2010 were tested, yielding a broad picture of spawning population dynamics and historical sex ratio trends. Preliminary results suggest some variance in ratios between spawning sites and a high level of similarity between field and molecular ratios. Ratios also fluctuated largely in Bad River samples taken over the years. This study reveals more about the breeding habits of the Lake Sturgeon populations in Lake Superior and allows managers to make informed decisions to effectively manage the lake sturgeon populations.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 68

Fungal Host Diversity and the Abundance of Spotted Coral Root Orchids (Corallhiza Maculata Complex)

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Field (Broad Category): Biology (Sciences)
Student's Major: Biology

Mycoheterotrophs are specialized plant parasites that utilize fungi for most to all of their nutrition, often displaying extreme host specificity. Thus, the availability and compatibility of their fungal host may determine the geographic range and abundance of these plants, with the intention of broadening the understanding of the extent of fungal host specificity across a broad geographic range. We are using the widespread spotted coralroot orchid (Corallorhiza maculata complex). These orchids are found across North America, and utilize Russulaceae (Basidomycota). Previous work using ITS-RFLP has identified at least 22 putative species of russulaceous hosts based on plant and fungal genotypes despite limited sampling. However, the full extent and genomic breath of these hosts are poorly understood. We hypothesize that C. maculata utilizes specific clades of fungal genotypes based on their geographic origin, and this may vary among populations across the geographic range. To address these questions, we are amplifying fungal DNA from rhizome tissue and targeting fungal ITS regions by utilizing a modified 2-step PCR protocol and paired-end Illumina sequencing. Sequences will be analyzed through a data analysis pipeline (UNITE database). These results will provide a powerful insight into the overall diversity of fungal hosts utilized by the C. maculata complex, and this will serve as a model system to be applied to other rare or endangered orchid species.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 69

Effect of Biochar on Ameliorating Chicken Litter NH3

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Field (Broad Category): Agriculture (Agriculture/Natural Resources)
Student's Major: Animal & Nutritional Science

As the global protein demand has increased in recent years, the poultry industry has also expanded as it is the most consumed animal product both in the US and the world. However, as the poultry industry has expanded, the amount of poultry litter produced has grown as well. Ammonia naturally occurs in litter as a result of high levels of bacteria and nutrients being excreted because of high food and water consumption in chickens. These high levels of ammonia that are produced can be harmful to poultry welfare and performance. One potential solution that has been found for this issue is the addition of biochar into poultry litter. Biochar is a carbon compound that comes from the pyrolysis of organic material. This substance has the ability to bind NH3 so that it can not be released from the litter. A preliminary study was first conducted to see if an accurate measurement could be taken of NH3 production from litter. Biochar was added to litter in the levels of 0%, 10%, 20%, and 30%. This litter was assessed using a ToxiRAE Pro Personal NH3 Reader in an enclosed space with 20 replications. The amount of time was recorded for each sample environment to reach 25 ppm NH3. The results for this study were 19± 2.4, 28± 6.5, 34± 2.1, and 29± 2.6. These results indicated that this measurement could be used for ammonia levels and showed that biochar can improve chicken litter NH3.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 70

3RQ Program

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Field (Broad Category): Natural Resources/Wood Science/Plant Science (Agriculture/Natural Resources)
Student's Major: Natural Resource & Environment Economics

With the development of America, there has always been a challenge with keeping our water sources clean. In West Virginia and many other states, the mining industry has been a common water polluter for decades. In 2008, growing levels of TDS (total dissolved solids) led to widespread concern. These growing concerns led to the creation of the 3RQ (Three Rivers Quest) program. Under this program, local watersheds and rivers are monitored routinely in order to make sure that the levels of certain contaminants are safe. In addition to routine monitoring of more than 40 sites, several targeted sites determine the effects of mining on these water sources and how, if at all, they could be the cause of contamination. The 3RQ program makes sure that mining companies continue to follow regulations and any new pollution comes from an ever developing mining industry. The routine monitoring also creates a safe environment in which any reading out of the ordinary, can help lead to unsafe situations.

Funding: Private Foundation
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 71

A Literature Review of Forest Canopy Structure and Physiology in Diverse Tropical Forests

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Field (Broad Category): Biology (Sciences)
Student's Major: Environmental Microbiology

Forests are all very diverse and each forest has its own unique structure and habitat. Models such as the SCOPE 2.0 (Soil Canopy Observation of Photochemistry and Energy fluxes model) can be used by inputting parameters informing forest structure and physiology in order to simulate forest reflectance and carbon uptake. It is important to understand the forests and these processes, so in order to obtain the necessary information for this to happen a literary review of primary articles was conducted of four locations: Pasoh, Barro Colorado Island, Manaus, and Lambir. The database "Web Of Science" and the website "Forest.GEO" was used to gather the information. Articles that displayed potential data were collected and put into a spreadsheet along with a link for a pdf, the location of interest that it is related to, the first author, the year it was published, the perimeters of data, and the title. After collection, the articles will be looked through more closely in order to document the related data. Using this information an understanding the amount data that the SCOPE 2.0 model can use. For this presentation the canopy height relating to these four location was dissected and shown in detail.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 72

Comparing the Efficiency of Trail Cameras and Autonomous Recording Units for Detecting Wild Turkey

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Field (Broad Category): Biology (Agriculture/Natural Resources)
Student's Major: Wildlife & Fisheries Management

Abstract Tools to detect the presence and abundance of wildlife are necessary to understand population dynamics of species. Unfortunately, many techniques to detect wildlife are expensive or time consuming. To make this process more efficient, we will compare the detection rates of wild turkey with two methods: game cameras and autonomous recording units (ARUs). Cameras and ARUs were set in wildlife openings over the course of three springs to collect images and audio recordings of wild turkeys. These units were set at the same location in each opening, and data were collected continuously10-14 days. Data were analyzed in two artificial intelligence softwares: eMammal and RavenPro. Analysis is still underway, so there are no results to be reported. We predict trail cameras will prove a more efficient method of detection than ARUs due to the time required to listen to acoustic. The results of this study will inform wildlife managers how to spend time and money more effectively on detection tools and personnel.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 73

Measuring Forage Intake of Individual Beef Cattle in Grazing System to Determine Feed Efficiency

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Field (Broad Category): Agriculture (Agriculture/Natural Resources)
Student's Major: Animal & Nutritional Sciences

Feed accounts for over 40% percent of production costs in beef cattle operations. Selecting for metabolic efficiency would lessen production costs for an already struggling agricultural economy. Previous studies have been limited to dry lot/confined settings, but this overlooks that 85% of U.S. beef cattle aren't raised in confinement settings. The objective of the study was to measure grazing performance by comparing herbage mass, botanical composition, and forage disappearance of pasture grazed by steers. The experiment was conducted at Reymann Memorial Farm in Hardy County, WV. Thirty-two steers, split into groups of eight, grazed 1 paddock/day for an interval of seven days, using a rotational grazing system. In each paddock, pre-grazing and post-grazing, five paired samples were clipped to the soil surface and collected. After the seven-day grazing interval, steers returned to a reservoir pasture to allow forage regrowth within the paddocks. Sample collection occurred over four different seven-day intervals June to November 2021. Collected samples were stored until processed for botanical composition and nutritive analyses. For botanical composition, herbage samples were hand sorted before being dried in a forced-draft oven. Samples were then ground and processed for nutritive analyses. An equation using the data of all samples will determine herbage mass and forage disappearance. This grazing performance data will be used to differentiate most metabolically efficient steers. Overall, this model will allow the measurement of grazing feed efficiency to be compared with data collected in confinement, which will allow for phenotyping of individual cattle on pasture.

Funding: State
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 74

Testing of a Metabolic Engineering Strategy to increase Phenylalanine Output in Plants

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biochemistry

Phenylalanine, an amino acid present in all living organisms, serves as a building block for thousands of other key molecules. Plants use these phenylalanine-derived molecules to synthesize lignin, diminish genetic damage from UV radiation, and complete several other vital processes. Some of these molecules would be useful in creating biofuels, medicines, and other products to improve quality of life. The phenylalanine metabolic pathway, however, is not fully understood due to the dual nature of it. In phenylalanine synthesis, there are two separate pathways that exist: the plastidial and cytosolic pathway. The purpose of this study is to determine if the cytosolic pathway could be engineered in order to manipulate the output of phenylalanine in the cytosol. A previous attempt to increase cytosolic production led to unintentional feedback inhibition of the plastid pathway, resulting in a lower net production of phenylalanine. Here we describe a modified strategy to avoid such inhibition. Plasmids carrying expression cassettes with different gene combinations were modified in E. coli bacteria. Agrobacterium-mediated transformation was used to genetically modify both Arabidopsis and petunia plants. It is expected that in both species, the metabolic changes will increase the net production of phenylalanine. These observable changes would support the conclusion that the cytosolic pathway is a viable target for manipulating phenylalanine production.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 75

Plasmid Characterization in the Tsetse Fly Obligate Symbionts

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Field (Broad Category): Biology (Sciences)
Student's Major: Immunology & Medical Microbiology

Symbiosis enables the habitation of specialized niches, including living on a limited diet. For example, tsetse flies, the medically significant vector of African trypanosomes, live on blood only through essential nutritional supplementation by the bacterial mutualist Wigglesworthia glossinidia. The Wigglesworthia genome has evolved towards a small size but with high coding density to accommodate its nutritional role. Despite an ancient symbiosis with tsetse, all Wigglesworthia sequenced to date contain a cryptic plasmid which supports significance towards the bacterium, and likely the symbiosis. Plasmids, extrachromosomal circular DNA, are cryptic when their function is unknown. In distinct Wigglesworthia isolates, plasmid genes are differentially expressed, likely due to environmental changes. Here, the Wigglesworthia glossinidia 'palpalis' plasmid was sequenced using a combination of Illumina and Sanger technology and annotated. Additionally, we determine plasmid abundance across tsetse development with quantitative PCR. The main result of this research project is characterization of the 5.3 kb Wigglesworthia plasmid which contains identical genes as other isolate plasmids. Further, abundance of the plasmid varies between Wigglesworthia isolates and across tsetse development suggesting responses due to these changes. This information may be used to further investigate the impact of the environment on plasmid gene content and abundance while providing a novel means for the genetic manipulation of an obligate symbiont.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 76

Phosphorus-Limited Aspen Send More Carbon Belowground Despite Similar Arbuscular Mycorrhizal Colonization Rates

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Field (Broad Category): Environmental Science & Stustainability (Sciences)
Student's Major: Biology

Globally, essential plant macronutrients nitrogen (N) and phosphorus (P) are in limited supply. To combat this, many terrestrial plants form mutualistic relationships with mycorrhizal fungi, which provide plants with nutrients in exchange for photosynthetically-produced carbon (C). The two main types of mycorrhizae are arbuscular mycorrhizal fungi (AMF) and ectomycorrhizal fungi (EMF). Populus grandidentata seedlings were inoculated by either Rhizophagus intraradices (AMF) or Laccaria bicolor (EMF) or left as non-mycorrhizal (NM) controls. The seedlings were grown in low/control P and low/control N conditions in a fully-factorial design. At harvest, mycorrhizal colonization was quantified using the grid-intersect method. Plant-derived soil C was measured using isotope analysis. Results showed that the total dry biomass of plants was mainly affected by P levels ($p < .0001$), but it was generally higher in plants grown with sufficient N and P. Although changes in AM colonization rates were not statistically significant with different N and P levels, plants exposed to low P levels generally sent more C belowground. Next, we will investigate if EMF colonization has been affected by different N and P levels. This study will contribute to the greater body of knowledge about the differences in nutrient acquisition between AMF and EMF.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: First2 Scholars

Presentation Number: 77

Modeling the Anti-listeria Efficacy of SaniDate-5.0 in Bacterial Buffered Solutions

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Field (Broad Category): Agriculture (Agriculture/Natural Resources)
Student's Major: Human Nutrition & Food Science

West-Virginia-Small-Farm-Center suggest the use of a mixer of peroxyacetic acid-H2O2 (SaniDate-5.0) during post-harvest processing of produce. This study aims to evaluate the efficacy of SaniDate-5.0 to reduce Listeria monocytogenes in 0.1% buffered peptone water (BPW). Nalidixic-acid-resistant (NaL) L. monocytogenes were used in this study. Aliquots of 1.0-ml SaniDate 5.0 solutions (0.25 and 0.50%) prepared in 0.1% of BPW were added to the first three wells of 8-strip deep-well microplates. Then, the 0.1 ml of 10-fold dilution bacterial culture was added the wells and mixed immediately with a multichannel pipette. After exposure for 0, 5, 15, 30, 45, 60, 70, 90, or 120 s, the 1 ml of 2× D/E neutralized solution was added to terminate the reaction. The survival of bacterial cells was determined by spread plating 0.1 ml of 10-fold serial diluted solution onto TSA plus 200 ppm of NaL and incubated at 35 C for 48 h. Microbial data and inactivation kinetic parameters (n=6) were analyzed using the Global-Fit and USDA-Integrated-Predictive-Modeling-Program software. Exposing 0.25% and 0.5% of SaniDate-5.0 reduced ($P < 0.05$) L. monocytogenes from 8.11 to 0.48 log CFU/ml and to <0.3 log CFU/ml after 90 and 120 s reaction time, respectively. Survival of the pathogen fit the classic linear (RMSE=0.5311-0.8273; R2=0.9052-0.9494) and Weibull models (RMSE=0.5584-0.7666; R2=0.9322-0.9521). Inactivation parameters Kmax (linear) and Delta (Weibull) increased from 0.12 to 0.17 and 24.70 to 30.25 when SaniDate-5.0 increased from 0.25 to 0.50%. Future studies are needed to test more concentrations of SaniDate-5.0 and in various food systems.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: United States Department of Agriculture, the National Institute of Food and Agriculture, Food Research Initiative (AFRI), Research and Extension Experiences for Undergraduates (REEU) program 2019-05064 (Award #2020-68018-30657)

Presentation Number: 78

Extraction of Rare Earth Elements using Biochar

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Field (Broad Category): Engineering (Engineering)
Student's Major: Chemical Engineering

Rare Earth Elements (REEs) are the elements located in the lanthanides section on the periodic table. The demand for REEs is ever increasing due to the use of these elements in many modern technologies such as magnets, electronics, electric vehicles, catalytic converters in automobiles, and industrial uses. Currently, US domestic production of REE is limited and current methods of REE extraction remain expensive and are resource intensive. Fortunately, REEs can be found in some industrial wastewaters and more importantly, acid mine drainage which is prevalent in West Virginia. The goal of this project is to find an inexpensive method to extract REEs from acid mine drainage. One potential method is the use of biochar. Biochar is a fine particle that is created through the pyrolysis of biomass and is relatively inexpensive. The Rare Earth element that is of interest is Lanthanum(III) to first determine the functionality of the biochar. Solutions of La(III) were in contact with biochar for times ranging from 10 minutes to 24 hours to determine the effect of time on La(III) removal. The effect of pH on La(III) removal was also determined for pHs ranging from 3 to 9. Preliminary data shows that a contact time of 60 minutes gives the highest La(III) removal with 94% of the La(III) removed. It was also found that at a pH of 5, 95.3% of the La(III) was removed. Future work is to determine the biochar's selectivity with respect to other REEs and its sensitivity to low-concentration REE feed solutions.

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

Presentation Number: 79

How the Pinnule Spacing of Crinoids Has Contributed to Their Ability to Survive

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Field (Broad Category): Geography/Geology (Sciences)
Student's Major: Geology

Crinoids are a marine dwelling animal that have been on this Earth for hundreds of millions of years. They first appeared around 510 million years ago, in the middle of the Cambrian Period. As a form of early life, their evolution could have gone many different ways. They have persisted through five mass extinctions and continue to thrive in the ocean today. This study aims to answer the question as to why they have survived this long. Their pinnule spacing should offer insight into their diets. Pinnules are the fibers extending from the arms of the animal, serving as a filter feeding body part. They capture food and move the food towards the mouth. The variability of prey size is likely a contributing factor to crinoid's ability to survive. This requires images of specimens and a digital measuring software, ImageJ. By measuring the spacing of the pinnules, the study was able to determine the average pinnule spacing for each specimen, and from there, the size range of prey consumed by each specimen. The specimens used are from the Paleozoic Era, giving a look into early crinoid development. Research is still ongoing, but the working hypothesis is that the prey sizes are highly variable, supporting a wide range diet, allowing the crinoid to eat whatever it can to survive. Therefore, due to a wide range in prey size, the crinoid would be able to survive any mass extinction, because it can eat whatever is available to no penalty to its health.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: Honors EXCEL

Presentation Number: 80

Oocyte-specific lncRNA, OOSNCR3, is Associated with Oocyte Quality Based on Brilliant Cresyl Blue Staining

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Field (Broad Category): Agriculture (Agriculture/Natural Resources)
Student's Major: Biology

To achieve reproductive success, the oocyte must be able to display developmental competence. Meaning, the oocyte must have the ability to resume meiosis, cleave upon fertilization and sustain embryonic development (namely to activate its genome). Recently, long noncoding RNAs (lncRNAs) have been functionally characterized as key regulators of embryonic genome activation in humans and mice. It is well known that the integrity of the early embryo is dependent upon the composition of the oocyte. The literature presents a nontoxic stain, brilliant cresyl blue (BCB). It has been used to label oocytes of different developmental competencies in a wide variety of species. The BCB stain is a substrate of the glucose-6-phosphate dehydrogenase enzyme that converts BCB from blue to colorless based on activity level. Growing oocytes that have high enzymatic activity appeared clear (BCB-). Fully grown oocytes that have low enzymatic activity appeared blue (BCB+). The objective of this study was to investigate the relationship between a novel bovine oocyte-specific lncRNA, OOSNCR3, and oocyte quality. Oocytes were aspirated from ovaries collected from a commercial abattoir. The pooled oocytes (n=5) were stained and divided into two groups: BCB- and BCB+. Samples were subjected to RNA isolation and cDNA synthesis followed by quantification using RT-qPCR. A housekeeping gene, RPL-19, was used to calculate relative gene expression using the standard curve method. A Student's t-test was performed and revealed OOSCNR3 has greater relative expression in BCB+ oocytes ($P < 0.05$). These data suggest OOSNCR3 is associated with oocyte quality based on BCB staining.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: My efforts were mainly voluntary.

Presentation Number: 81

Plant Roots Impact Climate Change by Driving both Soil Carbon Losses and Gains

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Field (Broad Category): Biology (Agriculture/Natural Resources)
Student's Major: Biology

Soils can influence climate by locking away carbon (C) or by releasing carbon dioxide through microbial decomposition and respiration. Plant roots and their symbiotic fungi are critical players in soil C storage that appear to both increase and decrease soil C. When alive, they release easy to eat C which drives microbial growth and respiration losses but upon death add harder to decompose soil C that can persist. Considering these opposing roles, the degree to which roots and symbiotic fungi impact the release or storage of soil C remains an important question.
To answer this question, we performed an isotope tracing experiment in an agricultural field to determine the effects of plant roots and symbiotic fungi on soil C. In order to isolate the effects of roots and fungi, we measured the respiration of isotopically labeled litter in soil cores that were either open to roots and fungi, excluded roots, or excluded both. Because the litter was enriched in 13C, we could calculate the amount of litter respired or remaining in the soil by measuring total soil respiration and the fraction of carbon dioxide released that had 13C. We found that cores with roots had greater respiration losses of the added litter than those with fungi or total exclusion. Overall, these results indicate that roots did not build new soil C from added litter. However, roots may still enhance soil C because the input of dead roots outweighed the litter losses we observed.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: My efforts were mainly voluntary.

Presentation Number: 82

Far-red LED Light Increased Shoot Height and Boron Uptake in Kale (Brassica oleracea)

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Field (Broad Category): Agriculture (Agriculture/Natural Resources)
Student's Major: Biochemistry

The use of light-emitting diodes (LEDs) in agriculture is a fast-growing field. LEDs allow for high specificity in the light treatments plants receive, which in turn allows researchers and growers to customize the light spectra for their crops. LEDs provide the full photospecturm from far-red light to near-UV light; however, there is a lack of research on how these two extremes of the spectrum affect crop production. In this study, we treated kale (Brassica oleracea 'Scarlet') with four different light treatments over five weeks. LED modules (far-red, F; red, R; green, G; blue, B; and near UV, U) were used. The four treatments were UBGRF, UBGR, BGRF, and BGR. No significant difference was observed in harvest weight between the treatments. However, exposure to far-red light resulted in increased average shoot height. Preliminary ICP results showed that exposure to far-red light increased the uptake of boron while exposure to near UV light increased manganese uptake. Further analysis of total phenolic and anthocyanin content will help us understand the effect of far-red and near-UV light on antioxidant biosynthesis.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: Capstone course within my department

Presentation Number: 83

Ergot Alkaloid-Producing Aspergillus Species with Entomopathogenic Capabilities

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Field (Broad Category): Biochemistry (Sciences)
Student's Major: Biochemistry

Ergot alkaloids such as lysergic acid alpha-hydroxyethylamide (LAH) produced by certain fungi are important ecologically and used in the production of pharmaceuticals. We recently discovered three species of Aspergillus that produce LAH. Since the same alkaloid also accumulates in the insect pathogenic fungus Metarhizium brunneum, we tested if the Aspergillus species were capable of infecting insects. Spores of Aspergillus leporis, A. hancockii, and A. homomorphus were injected into larvae of the model insect Galleria mellonella. Aspergillus leporis and A. hancockii killed nearly all injected larvae within the first five days while larvae injected with A. homomorphus did not differ from the non-injected control group. Aspergillus leporis and A. hancockii emerged from infected insects and sporulated on them after death. Aspergillus hancockii also produced sclerotia (long-term storage structures) on insects. These observations indicate that these fungi can complete their life cycles on an insect host. Aspergillus leporis and A. hancockii also infected insects that were placed on sporulating cultures, but the rate of infection was lower and more variable than in injection assays. The data indicate A. leporis and A. hancockii have the ability to act as insect pathogens but that A. homomorphus does not. To test if the ergot alkaloid LAH is necessary for pathogenesis, the early-pathway gene easD was knocked out in A. leporis using CRISPR technology and LAH was eliminated. The effects of this mutation on fungal virulence will be tested in assays of mutant and wild-type strains with larvae of G. mellonella.

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Presentation Number: 84

Trans Safe Zone Training Within Schools of Nursing

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Field (Broad Category): Nursing & Public Health (Health Sciences)
Student's Major: Pre-Nursing

Purpose: The purpose of this study is to educate staff and students on the care-related needs of the LGBTQIA+ community and investigate the importance of implementing knowledge of how to care for LGBTQIA+ individuals into the curriculum for nursing schools.
Method: After IRB approval, WVU School of Nursing faculty and staff from all campuses were invited to complete a live training session by Zoom titled: Trans Safe Zone Training. Both faculty and staff were invited to complete a pretest assessment of knowledge and again a posttest assessment after the training. The training is based on a national curriculum and takes 2 hours to complete live. Pre and post-test assessment data were collected using the qualtrics survey system.
Findings: Preliminary findings suggest that completing Trans Safe Zone Training results in a better understanding of the health-related needs of the LGBTQIA+ community and gives a better sense on how we as nurses can care for them. Implementing this training into the nursing curriculum, both at the undergraduate and graduate level, would allow nurses to be better prepared to care for LGBTQIA+ individuals and allow LGBTQIA+ individuals to trust and feel comfortable around their healthcare providers.
Discussion: LGBTQIA+ individuals often feel socially isolated and lack connectedness with healthcare providers. By educating staff, faculty, and future nurses on the health-related needs of LGBTQIA+ individuals, they will feel a sense of trust and connectedness with their nurse which ultimately results in overall better care for all individuals.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 85

Novel Thiazolidinedione CI987 on Oxidative Stress Protection in a Caenorhabditis Elegans Alzheimer's Disease Model

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Field (Broad Category): Pharmaceutical Sciences (Health Sciences)
Student's Major: Biochemistry

Alzheimer's Disease (AD) is a progressive neurodegenerative disease characterized by the accumulation of extraneuronal amyloid plaques composed of aggregated amyloid-β42(Aβ42) protein and intraneuronal neurofibrillary tangles composed of aggregated tau microtubule protein, and the loss of total brain tissue volume. Both of these pathologies contribute to increased formation of reactive oxygen species (ROS), which can lead to oxidative stress and precipitate the death of neurons. MitoNEET is an outer mitochondrial membrane protein that has shown to be a target for thiazolidinediones (TZD)-class drugs including the type-2 diabetes drug pioglitazone. While pioglitazone is a mitoNEET agonist and has shown to combat oxidative stress in models of AD, mitoNEET is not the main target of pioglitazone. Therefore, the purpose of this study is to determine if mitoNEET can be utilized as a drug target in alternative treatments for AD. We aim to observe the role of mitoNEET on oxidative stress levels among transgenic Caenorhabditis elegans (C. elegans) nematode models of AD that express Aβ42 by treating them with the mitoNEET agonist CI987. Based on preliminary results, we expect that treatment with CI987 will protect against oxidative stress in AD. To evaluate the relationship between mitoNEET and AD, we will assess changes in ROS production and antioxidant defense mechanisms as an indication of neurodegeneration. Our findings will provide insight into how mitoNEET contributes to the progression of AD and help develop novel therapeutics to aid in the field of aging research.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 86

Characterizing Single Cells Using Dielectrophoresis

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Field (Broad Category): Engineering (Engineering)
Student's Major: Biomedical Engineering

This study will focus on detecting the early stage of carcinoma cancer cells by using animal blood samples. Carcinoma cancer starts in the skin or in the tissues that cover the internal organs. It divides abnormally without control, but most of them stay where they start in the cells. This study mainly focuses on one of the types of carcinoma cancers, invasive ductal carcinoma (IDC). In IDC the abnormal cells form in the milk duct, but they spread to the other parts of breast tissue. The goal of this study is to detect the early stage of cancer via liquid biopsy samples by making this a rapid and non-invasive detection tool. Cancerous cells will be electrophoretically separated in the microfluidic device platform in a label-free way. The dielectrophoretic force depends on the dielectric properties of the cells and these properties change based on the state of the cell, i.e., healthy vs. cancerous in this research. The pH and conductivity will be maintained to match the human body conditions. Comparison of dielectric properties will be made based on the early, late, and metastases stages of cancer with the goal of developing a point-of-care detection platform to diagnose ductal adenocarcinoma.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 87

Determining the Half Maximal Inhibitory Concentration of Paclitaxel LLC Cells via an MTS Assay

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Field (Broad Category): Pharmaceutical Sciences (Health Sciences)
Student's Major: Immunology & Medical Microbiology

Chemotherapeutics are one of the first-lines of treatment for lung cancer, which commonly metastasizes to the brain. Lung cancer brain metastases often result in poor prognosis. The blood brain barrier (BBB) is one obstacle that prohibits the passage of foriegn macromolecules, such as chemotherapies, into the brain. Treatment combinations of radiation along with chemotherapy results in an overall better prognosis for the patient. The radiation used in this combined treatment option permeates the BBB, allowing chemotherapies to enter. Paclitaxel is a chemotherapeutic which targets actin cytoskeleton filaments and triggers apoptosis. The purpose of this study is to determine the half maximal inhibitory concentration (IC50) of Paclitaxel on lewis lung carcinoma (LLC) cells. Paclitaxel was diluted at varying concentrations (1pM-100 uM) and added to a 96-well plate with LLC cells. Cells were then incubated with Paclitaxel for 72 hours at 37°C. MTS reagent was added to wells and incubated for another 3 hours, then was read on a plate reader at 570 nm. With this given information, overall cell viability was calculated. We hypothesize that at 100 mM of Pactilatxal concentration, we will have 10% cell viability, while at .001 Mm we will have 85% cell viability. These results will be used in future in vitro studies with paclitaxel and the metastatic LLC line.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 88

Reaction Time Quadrantal Analysis in D1 Women's Soccer Athletes

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Field (Broad Category): Exercise Science & Nutrition (Sport Science/Psychology)
Student's Major: Biomedical Engineering

There has been a limited amount of studies to show if the position and distance of the light affects athletes in reaction time (RT) studies. Using Dynavision, a light board measuring RT, can be used in athletes to get a measure of RT performance. For this study, it was necessary to determine quadrants on the light board and the distance between the lights to see if there is any significance on the effect of RT. The participants included three, Division I women's soccer athletes. Each participant completed four proactive trials over multiple weeks. The proactive test lasts four minutes, while Dynavision randomizes which lights are selected. Once the trials were complete, each data point from the light board was accumulated into one file. Using ANOVAs with multi-comparison tables the data showed significance between the mean RT of the down quadrant against the means of the other three quadrants. It also showed significance between RT and distance. RT for soccer players is the highest in the down quadrant. This could be due to the field of vision that soccer players use.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 89

Investigation of Glioblastoma Clustering in West Virginia Using Geospatial Modeling Techniques

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Field (Broad Category): Medical Sciences (Health Sciences)
Student's Major: Chemistry

Glioblastoma is a malignant WHO grade IV tumor that aggressively affects the brain [3]. Approximately 14,000 patients are diagnosed in the United States annually, and survival rates are extremely low – 5.6% at five years [2]. West Virginia has a higher cancer mortality of 223.9 per 100,000, compared to the United States median of 190 per 100,000 [4]. There is currently no cure, but there are various treatments that may ease symptoms. The typical treatment is surgery, followed by a combination of radiation and chemotherapy [3], and research has shown that maximal safe surgery followed by standard radiotherapy with concomitant and adjuvant TMZ chemotherapy can improve overall survival and prognostic factors for glioblastoma patients in rural areas [1]. The goal of this retrospective case-control study was to investigate the potential geographic clustering of glioblastoma, using a novel geospatial modeling method. Data was collected for high-grade glioma patients (cases) and all other brain cancer patients (control), using ICD9 and ICD10 coding systems for disease-specific tumors. A control:case ratio of approximately 5:1 was established. Clustering is being assessed between cases and controls, with a notal n = 8,000.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 90

Therapeutic Evaluation of recAP for Sepsis-Associated Pathology

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Field (Broad Category): Medical Sciences (Health Sciences)
Student's Major: Biology

Sepsis is a severe systemic immune response that is a reaction to infection in the body. Multi-organ failure associated with this response contributes to a high morbidity and mortality among sepsis patients. Currently, there are no FDA-approved therapeutics to treat sepsis other than supportive therapies. Since alkaline phosphatase (AP) is present throughout the body and is known to have anti-inflammatory properties, this enzyme has been proposed as potential therapeutic treatment. Recombinant alkaline phosphatase (recAP, AM-Pharma) is a drug that is currently in Phase III clinical trials and has been shown to reduce mortality by over 40% in sepsis-associated acute kidney injury (SA-AKI). The goal of this pilot study is to test the efficacy of recAP on survival, bacterial load, and inflammation in a cecal ligation and puncture (CLP) model of sepsis, which mimics peritonitis and is considered as the gold-standard model in the field. CLP was induced in female C57BL/6 mice followed by intraperitoneal injection with recAP (1.6mg/kg) or vehicle beginning at 3 hours post-surgery and followed by daily injections for four days post-surgery. The modified murine sepsis score (MMSS) was recorded daily to assess morbidity and mortality. Mice were euthanized at seven-day post CLP to evaluate bacterial load and inflammatory markers in blood, brain, small intestine, lung, and liver. Preliminary findings suggest that recAP may increase survival and alter the bacterial load. Additional experiments are ongoing to increase the statistical power needed to reach rigorous and reproducible conclusions.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 91

Lifestyle Intervention to Promote Healthy Lifestyles Among College-Bound Individuals in Appalachia

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Field (Broad Category): Exercise Science & Nutrition (Agriculture/Natural Resources)
Student's Major: Exercise Physiology

Culture of Health was a healthy lifestyle intervention pilot study in Appalachia to engage college bound students in a one-day event to promote and educate on a healthy lifestyle in college with the primary purpose to understand perceptions among college-bound students and to encourage them to partake in a healthy lifestyle in college. This study was conducted during 2018-2019 and utilized the Get Fruved educational toolkit for ideas, events and materials. Once the the event was implemented, the research team administered a post survey to assess overall perceptions of health after participation in the study. The overwhelming majority of participants (90%) found Culture of Health an enjoyable event. Post intervention scores displayed the majority of participants strongly agreed that they could be healthy at college (77.8%); the importance of a healthy lifestyle at a young age (77.8%) and physical activity (55.65); that nutrition is important to health (77.8%); and sleep is essential to health (66.67%). Furthermore, 90% participants reported that being involved in health programs in college can improve overall health. The majority of participants responded about the importance of maintaining a healthy lifestyle; participants acknowledged that this is not always easy or accessible as a college student. Some participants felt Appalachian universities did not provide stress management or well-being services; however, the majority responded with their determination to live a healthy and active lifestyle in college regardless of available services. Participants reported that being involved in the Culture of Health programs would encourage them to live healthier lifestyles.

Funding: Private
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 92

Functional Electrical Stimulation in the Flexor and Extensor Muscles

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Field (Broad Category): Physical/Occupational Therapy, Speech Language Pathology & Audiology (Health Sciences)
Student's Major: Biomedical Engineering

The study of Functional Electrical Stimulation (FES) is a rich subject with a long history. FES is a method that sends low-level electrical impulses to muscles and nerves using electrodes to improve and restore muscle function after stroke and spinal cord injuries. In our research, we aim to assess what placement and parameters are best for producing the most force when the flexor and extensor muscles are activated. Based on previous research, we decided to focus on FES parameters such as amplitude, pulse width, current, frequency, and current ramp on. We also explored the placement of the electrodes, including distance between electrodes (3, 5, 7, and 10 mm), orientation of electrodes in respect to the muscle fibers (horizontally, vertically, or obliquely), and electrode sizes. We plan to stimulate flexor and extensor muscles with stimulating electrodes with different variations of parameters and measure the force produced. Using these force values exerted by muscles, we are going to estimate the optimal parameters for FES of distal arm muscles. In discovering the most productive way to perform FES on the distal arm muscles, we hope that this research can be used to help post-stroke survivors with muscle rehabilitation in the most effective way possible.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 93

The Feasibility, Effectiveness, and Sustainability of a Suicide Risk Questionnaire in Pediatric Patients

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Field (Broad Category): Other (Health Sciences)
Student's Major: Art Therapy

Background: Suicide is the second leading cause of death in youth, yet outpatient rural behavioral health outpatient clinics lack routine and standardized suicide screening. The Ask Suicide-Questions Toolkit (ASQ) is a short survey for healthcare providers to screen for suicide risks which has increased detection of suicide risk in primary care, emergency room, and inpatient settings. However, it has not been implemented in rural outpatient behavioral health.
Objective: The purpose of this study is to examine the feasibility, acceptability and effectiveness of a routine suicide risk screening in rural outpatient behavioral health.
Methods: We conducted a training on suicide risk assessment using the ASQ in a pediatric outpatient rural behavioral health clinic. Providers were instructed to administer the ASQ to youth, followed by the Brief Suicide Safety Assessment (BSSA) if a youth tests positive. To evaluate whether providers used the ASQ-BSSA measures post training, we are conducting a chart review of medical records for pediatric intakes ages 8-18. Data will be extracted pre-post training and will include demographic information, whether they were screened for suicide risk, results of the screening, and related disposition plans. Providers will also be asked to rate the feasibility and acceptability of the screening toolkit.
Results (Anticipated): We expect increased use of standardized suicide risk screening at pediatric intake assessment and for the ASQ-BSSA to be acceptable and feasible for all stakeholders. Providing routine and standardized suicide screening has the potential to increase suicide risk detection and decrease suicide deaths in this high-risk population.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 94

Use of Rapid Response Fentanyl Test Strips as an Opioid Overdose Prevention Strategy

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Field (Broad Category): Medical Sciences (Health Sciences)
Student's Major: Immunology & Medical Microbiology

In 2021, over 100,000 individuals died from drug overdose in the U.S. Syringe service programs (SSPs) have an important role in alleviating this problem, providing people who inject drugs (PWID) with overdose prevention education and naloxone to prevent fatalities. Fentanyl, a very potent opioid that has increased the death rate, can be detected by fentanyl test strips (FTS) There is little research on how PWID use FTS and whether it helps prevent overdose deaths. This study will longitudinally investigate how FTS use influences changes in drug use behavior through a mixed methods approach. A total of 300 participants will be recruited at each site's (rural WV & NC) SSP. Six hundred participants take a survey at baseline, 6 and 12 months to look for changes over time; these results are quantified. A subset of 100 (50/site) will purposively be selected for a semi-structured qualitative interview at 12 months. Monthly check-ins are used to maintain contact with participants. Participants receive modest remuneration for their time and effort. Preliminary findings revealed that: 1) positive FTS results were more likely to report safer drug use behaviors, 2) although the SSPs routinely distributed FTS, PWID do not always use them for various reasons, 3) methamphetamine was the most commonly used drug at both sites which signifies the "fourth wave" of the drug epidemic, edging out opioids. At the conclusion of the study, we expect to provide valuable information on the effects of FTS on drug use behaviors.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 95

Foot Anthropometrics and Running Economy

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Field (Broad Category): Exercise Science & Nutrition (Sport Science/Psychology)
Student's Major: Exercise Physiology

Purpose: Running economy is an important predictor of an endurance athlete's performance. To determine the relationship between foot length, arch stiffness, and running economy.
Methods: Sixteen trained endurance athletes had their foot anthropometrics and running economy measured. Subjects completed a maximal oxygen consumption (VO2max) test and running economy (RE) assessment. RE was measured as the oxygen consumption during running at velocities of 9.9 km/h and 11.9 km/h at 1% grade. Foot anthropometrics including Foot Length (FL), Arch Stiffness Index (ASI), and Achilles Tendon Moment Arm Length (ATML) were assessed prior to running trials. Data are reported as Mean ± SE, and the relationship between foot anthropometrics and running economy was assessed with linear regression (α=0.05).
Results: Study included 16 subjects with an age of 20.5 ± 0.4, height 172 ± 1.8 cm and weight 68.53 ± 2.40 kg, with an absolute and relative VO2max of 3.68 ± 0.19 L/min and 52.96 ± 1.51 mL/kg/min. ASI was 1513 ± 174.27 A.U. with a standing foot length of 25.41 ± 0.4 cm. Subject oxygen consumption at 9.9 km/h and 11.9 km/h was 34.9 ± 0.80 mL/kg/min and 41.02 ± 0.82 mL/kg/min, respectively. There was no correlation between ASI, FL, AHI, and RE ($p>0.05$).
Conclusions: This data suggests that foot length and arch stiffness do not determine running economy. Therefore, running economy may be impacted by other physiological and biomechanical factors.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: Honors EXCEL Program

Presentation Number: 96

Dietary Behavior of Collegiate Competitive Rock Climbers

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Field (Broad Category): Exercise Science & Nutrition (Sport Science/Psychology)
Student's Major: Exercise Physiology

Purpose: The purpose of this study was to assess the dietary behaviors of competitive rock climbers at the collegiate level.
Methods: A total of 11 subjects were recruited for this study. Subjects were assessed for risk of low energy availability and training history. Additionally, subject's nutritional intake was assessed with the DHQ3 (Dietary Health Questionnaire 3) which determined eating habits and nutrient intake over a one-month period. Climbing skill and training history were determined from the surveys. Nutritional intakes were calculated and reported in absolute and relative quantities for macronutrients; additionally, data was analyzed to calculate total servings of meat, fruits, and vegetables. All data are reported as Mean ± SE.
Results: Subjects were 20 ± 0.5 years old with 2.18 ± 0.36 years of climbing experience and self-reported intermediate climbing skill (V4). Subjects' height and weight was 175.26 ± 2.22 cm and 70.12 ± 1.99 kg, respectively. Subjects reported exercising 11.18 ± 1.83 hours per week. Climber consumed a total of 1947.99 ± 314.37 kcal/day and 28.08 ± 4.39 kcals/kg/day. Reported relative protein, carbohydrate and fat intake was 1.17 ± 0.26 g/kg/day, 3.55 ± 0.53 g/kg/day, and 1.00 ± 0.16 g/kg/day, respectively. Subjects reported water consumptions was 3053.93 ± 452.71 mL/day and consumed 0.77 ± 0.20 cups/day of fruit and 0.93 ± 0.32 cups/day of vegetables.
Discussion: Climbers are self-reporting eating less than the recommended caloric intake based on size and activity level, and increasing carbohydrate and protein consumption may help meet the recommended caloric and macronutrient needs.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 497-level course

Presentation Number: 97

A Comparison of Dynamic Exercises and Their Association with Sprint Speed

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Student's Major: Exercise Physiology

The purpose of this study was to assess the relationship between sprint speed and four lower-body dynamic exercises in an elite sample of Division I women's soccer players. 30 athletes completed 4 trials each of unloaded countermovement jumps (UCMJ), 20 kg loaded countermovement jumps (LCMJ), unloaded squat jumps (USJ), and 20 kg loaded squat jumps (LSJ) performed atop a force plate. Trials included practice trials at 50% and 75% of maximal effort and two trials at maximal effort. Jump height (JH), peak power (PP), peak power scaled to body mass (PP.BM-1), and concentric impulse (CI) were averaged across the two maximal trials for each of the four jump types. Each athlete also completed four trials of maximal sprints; completion times were averaged across trials at 5, 10, and 20yd intervals. Sprint times were correlated with dynamic jump performance using Pearson's R. The strongest correlations existed between sprint time and LSJ performance. The dynamic jump variable that demonstrated the strongest association with sprint performance was PP, with the strongest existing between LSJ PP and 20yd sprint time ($r=-0.7970$, $p<0.0001$). The weakest correlations with 20yd sprint time were with JH; CI followed similar associations, with the exception of the LSJ ($r=-0.7629$, $p<0.0001$). Findings suggest the isolation of the concentric phase during the SJ and the addition of a load best represent the neuromuscular demands of a sprint. These associations indicate that the strongest athletes aren't necessarily the fastest but are rather among the most powerful.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 497-level course

Presentation Number: 98

Screening Novel MitoNEET Agonists as New Treatments for Post-Stroke Oxidative Stress and Mitochondrial Dysfunction

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Field (Broad Category): Pharmaceutical Sciences (Health Sciences)
Student's Major: Exercise Physiology

Stroke, one of the leading causes of death in the United States, can broadly be defined as the lack of oxygen and nutrients to the brain. Ischemic stroke accounts for 85% of the cases in the U.S. The lack of oxygen during these events can lead to mitochondrial dysfunction, accumulation of reactive oxygen species (ROS), and ultimately neuronal death leading to the loss of cerebral tissue and volume. MitoNEET is an outer mitochondrial membrane protein that has been shown to mediate ROS and oxidative stress; and when interacting with thiazolidinedione (TZD)-class drugs, such as the type-2 diabetes drug pioglitazone, ROS levels, and oxidative stress were shown to be mediated. Post-stroke oxidative stress and mitochondrial dysfunction have been shown to contribute to the severity of the neurocognitive decline in recovering patients. In this study we aim to use mitoNEET knockout mouse models to 1) understand the role of mitoNEET and 2) evaluate potential protective benefits novel mitoNEET agonists, CI-987 and NL-1, may provide in ischemic stroke. Although the risks of stroke increase with age, a stroke can happen to anyone regardless of age. Therefore, we aim to induce ischemic strokes using photothrombotic stroke models at different ages throughout the lifespan, administer CI-987 or NL-1 post-stroke, and assess oxidative stress, mitochondrial dysfunction, and neurodegeneration. We expect that these novel compounds will help protect against post-stroke oxidative stress development and the findings from this study can be used to provide insight into new pharmaceutics post-stroke.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU 497-level course

Presentation Number: 99

COVID -19 Pre and Post Pandemic Blood Alcohol Content in Motor Vehicle Traumas

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Field (Broad Category): Medical Sciences (Health Sciences)
Student's Major: Exercise Physiology

The Covid-19 pandemic began in December of 2019 and is still going on into 2022, but the lockdown of the world drastically impacted millions of people's lives. Both the consumption and selling of alcohol drastically increased, which is possibly related to mental health, financial instability or isolation from family and friends. I will be investigating pre and post hospital records from Ruby Memorial Hospital Emergency Department, located in Morgantown, West Virginia, to see if there is a major difference in blood alcohol or drug content in patients that come into the emergency department from motor vehicle related accidents. We will be using the hospital's database called Epic, which contains comprehensive and detailed information about every patient that came into the emergency department pre and post pandemic. Along with reviewing patients records, we want to evaluate where the patient was located in the car and how that impacted their injuries. Once the data is collected, we predict that those in motor vehicle related accidents will have a higher blood alcohol content and possible drug use post pandemic compared to before the pandemic. Our study will help understand the impact of the Covid-19 pandemic and inform us on how to move forward keeping our roads clear of those who are under the influence of alcohol and drugs.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 297-level course

Presentation Number: 100

Novel Thiazolidinedione CI987 on Learning and Memory Behavior Preservation in an Alzheimer's Disease Model

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Field (Broad Category): Pharmaceutical Sciences (Health Sciences)
Student's Major: Chemistry

Alzheimer's Disease (AD) is a progressive, neurodegenerative disease and is the most common form of dementia. AD is characterized by the loss of overall brain tissue presence of extracellular amyloid plaques composed of the amyloid-β42 (Aβ42) protein, and intraneuronal neurofibrillary tangles composed of the aggregated hyperphosphorylated tau microtubule protein. Both pathologies contribute to reactive oxygen species (ROS) production leading to oxidative stress, mitochondrial dysfunction, and ultimately neuronal death. MitoNEET (CISD1) is an iron-sulfur [Fe-S] cluster protein located on the outer mitochondrial membrane. These clusters, having been involved with redox reactions, neutralize ROS and mediate mitochondrial function. Furthermore, thiazolidinedione (TZD)-class drugs, in particular the type-2 diabetes drug pioglitazone, are mitoNEET agonists. Additionally, studies have shown that pioglitazone protects against oxidative stress and learning and memory behaviors in AD pre-clinical models but are short-lived in patient studies.Though pioglitazone has agonistic properties for mitoNEET, mitoNEET is not the main target and could explain why these protective results are not prolonged in patient studies. This study proposes to evaluate a novel TZD, CI987, which has a high affinity for mitoNEET and its effects on learning and memory behaviors in an AD model. We hypothesize that CI987 will preserve learning and memory behaviors in age-synchronized wild-type and transgenic Caenorhabditis elegans models of AD which express the hallmark Aβ42 pathology. The data from this study will help to understand mitoNEET as a new approach for developing novel compounds in the field of AD treatments.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU INBRE

Presentation Number: 101

Aquatic Reduced-Exertion High-Intensity Interval Training Exercise Protocol Improves Cardiorespiratory Fitness in Young Adults

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Field (Broad Category): Exercise Science & Nutrition (Health Sciences)
Student's Major: Exercise Physiology

Reduced exertion high-intensity interval training (REHIIT) requires the lowest amount of exercise volume that produces benefits in health and overall performance similar to steady-state exercise. Aquatic exercise has been recommended to many populations, however, REHIIT has not been studied in the aquatic setting. This randomized control trial compared a land-based REHIIT protocol (LAND) to an aquatic-based REHIIT exercise protocol (AQUA). Participants completed pre-assessments, an 8-week training protocol consisting of 3 day/wk training of 4 x 30sec all-out sprints (LAND) or jumps (AQUA), and post-assessments. Assessments include height, weight, Body Mass Index (BMI), fasting blood glucose (FBG), resting blood pressure (BP), and resting heart rate (RHR). Primary outcomes included maximal oxygen consumption (VO2max) as assessed by the Bruce treadmill protocol as well as maximal power production assessed by the Wingate test. Changes over time were compared between groups. There were no significant changes in height, weight, BMI, FBG, BP, or RHR. VO2max did not change in the LAND group (33±6.9 mL/kg/min vs 35±6.1 mL/kg/min, $p>0.05$) but increased in the AQUA group (37±7.7 mL/kg/min vs 44±8.8 mL/kg/min, $p<0.05$). Maximal power increased in the LAND group (635±211 W vs 794±208 W, $p<0.05$) but not the AQUA group (634±173 W vs 684±159 W, $p>0.05$). Aquatic REHIIT program may improve cardiorespiratory fitness in young adults compared with land REHIIT; however, land REHIIT may be better for improving maximal anaerobic power.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: Honor's EXCEL Program

Presentation Number: 102

Implications of Depression and Stroke on Cognition among West Virginia Adults

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Field (Broad Category): Other (Health Sciences)
Student's Major: Psychology and Biology

West Virginia has the second highest rate of mental illness in the nation among adults over the age of 26, according to SAMHSA. The implications of being diagnosed with depression or a neurological disorder, such as stroke, on adults in rural areas is concerning. This study aims to address implications on cognitive difficulties among adults in West Virginia. Data were provided by the 2020 CDC Behavioral Risk Factor Surveillance System. Depression, stroke, and cognitive difficulty data for adults over the age of 45 were analyzed using a logistic regression. The logistic regression model was statistically significant, $\chi 2$ (df = 3) = 551.06, $p < .001$, correctly classifying 86%. Adults who reported having been told they have had a stroke were 2.2 times more likely to report cognitive difficulties compared to those who have not experienced stroke (OR = 2.167, 95% CI [1.6, 2.9]). However, adults who have depression were 7.9 times more likely to report they experience cognitive difficulties (OR = 7.923, 95% CI [6.5, 9.6]) relative to those without depression. Although West Virginia faces several areas of health care shortages, adults who have been told they have depression were nearly 8 times more likely to also experience cognitive dysfunction. A healthy state must address both mental health challenges like depression and health/neurologic challenges like stroke if it is to attract people to live, work, and raise a family. WVU IRB number 2107363352 is on file.

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

Presentation Number: 103

The Physical and Mental Health Benefits of Exercise

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Field (Broad Category): Psychology (Sport Science/Psychology)
Student's Major: Communications

Physical activity is a powerful tool that can be used to maintain and strengthen physical and mental health. There is a link between physical activity and the reported number of poor-health days in a month. Unfortunately, fewer than twenty-five percent of Americans receive proper physical activity. I used data from 196,012 Americans who completed the 2020 BRFSS survey to further examine the relationship between age, physical activity, and the number of poor-health days reported in a month. Approximately 73% of Americans reported engaging in some form of physical activity in the past month. Research indicates that young adults who did not exercise reported a mean of 6.34 poor health days. This is a larger number of unhealthy days than those who engaged in physical activity. Those who engaged in physical activity reported a mean of 3.44 poor health days. Among older adults, research indicates that there is a mean of 5.55 poor health days per month for adults who engage in frequent physical activity, versus adults who do not engage in physical activity report 8.78 poor health days per month. Young adults report fewer poor health days than older adults, and older adults report fewer poor health days than middle-aged folks. There is an exercise status difference, with $F(1, 196011) = 10935.49$, $p < .001$, But more importantly, there is an interaction between age and exercise status. The current study is an important starting point in understanding how we can overcome physical and mental illnesses with exercise.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: Psych 393

Presentation Number: 104

Exercise, Sex, and Depressive Disorders in West Virginia

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Field (Broad Category): Medical Sciences (Health Sciences)
Student's Major: Exercise Physiology

Purpose: Identifying non-pharmacological treatments for depression is important, especially in states with high rates of substance abuse and depression, such as West Virginia. Individuals who exercise show a 30% decrease in depressive symptoms as compared to those who do not participate in exercise (Mather, 2002). This research examines the association between physical activity, age, sex, and depressive disorders among adults in West Virginia.
Methods: We used data from 5,880 West Virginia adults who completed the CDC's 2020 Behavioral Risk Factor Surveillance System (BRFSS) to examine the association between exercise, sex, age, and depressive disorders. A logistic regression was conducted to examine whether depressive disorders could be predicted by age, sex, and exercise.
Results: The omnibus test was significant, $X2(3), 5880 = 306.77$, $p < .0001$. Women were 1.8 times more likely to report having depressive disorders than men. Adults 65 years of age were half as likely to report having depressive disorders when compared to younger and middle-aged adults. Those who did not exercise were 2.0 times more likely to report having depressive disorders than those who did exercise.

Discussion/Conclusion: Increasing exercise for adults across the lifespan is an important public health service for West Virginia. This work can help to improve the mental well-being of older adults in West Virginia by encouraging exercise.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: AGE-ADAR Scholar's Program

Presentation Number: 105

Socioeconomic and Racial Disparities in Diabetes Prevalence

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Field (Broad Category): Psychology (Sciences)
Student's Major: Biology

Type 2 Diabetes is often seen as a preventable disease caused by poor diet or lack of exercise, but this focus neglects the influence of demographic factors such as race and income. This study uses data from the 2020 CDC Behavioral Risk Factor Surveillance System (BRFSS) to examine disparities in diabetes prevalence based on income, healthcare coverage, and race. The study uses data from 208,364 participants from across the US. Chi-square analysis of the data using the CDC Web Enabled Analysis Tool (WEAT) shows that both income and race have a significant effect on diabetes prevalence. Diabetes was significantly more common in participants identifying as African American and Hispanic (chi-square value of 149.02), and this significant difference was still present for the African American group even when excluding participants with a BMI under 25 (chi-square value of 57.18). There were also significant differences between income groups, with individuals reporting a household income under $35,000 having higher rates of diabetes than would be expected (chi-square value of 808.86). This study suggests the presence of racial and class inequalities that may contribute to poorer health outcomes for minority and low-income Americans.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: PSYC393A Course

Presentation Number: 106

Impact of Limited Resources During Pregnancy on Maternal Behavior

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Neuroscience

Early life stress is associated with adulthood stress dysregulation and dysfunctional parental behaviors in humans. We have previously shown that stress during puberty resulted in an altered hypothalamic-pituitary-adrenal (HPA) stress axis in adult humans and mice. This adverse stress response was only observed during peripartum and produced limited impacts on maternal behavior. Other research has shown that limiting resources during pregnancy negatively impacts maternal behavior. We hypothesized that the combination of stress during puberty and a subthreshold exposure to limited resources during pregnancy would have a negative impact on maternal behavior, offspring health outcomes, and the underlying molecular and endocrine systems within the brain. However, what qualifies as 'subthreshold' limited resources has not been well defined. We conducted a pilot study to determine the level of limited nesting that would impact HPA responsiveness and maternal behavior. Pregnant mice were exposed to limited nesting and bedding material (LNM) until 17.5 days post conception (dpc). We varied the amount of corncob bedding and nesting material provided. On 17.5 dpc, all females were exposed to 15 minute restraint stress, during which we collected blood for corticosterone measurement. On postnatal day 7, we measured maternal behavior during a separation task. Standard corncob and one half of the standard nesting material was sufficient to create a mild blunting of the stress response while preserving maternal behavior. We will use these findings to examine the impact of the combination of stress during puberty and LNM during pregnancy on peripartum stress response and maternal behavior.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: My efforts were mainly voluntary.

Presentation Number: 107

Anomaly Detection in Power Systems Using Artificial Intelligence

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Field (Broad Category): Computer Science (Engineering)
Student's Major: Computer Science

Certain anomalies in the components of power grids can lead to power outages. The primary cause of a power outage is a manual process and tedious to pinpoint. The power system controller, a component that maintains the voltage and power in a power grid, is one such component that could malfunction and lead to equipment failure and measurement abnormalities. To address these disturbances, a Convolutional Neural Network (CNN) model is being developed and optimized to replicate the functioning of a 9-bus power system to detect anomalies using artificial intelligence (AI). The CNN model, a class of AI neural network models, learns and trains from data obtained from MATPOWER (a power systems simulator and optimizer). The training data obtained includes 8760 instances of the power system, each instance representing the data collected for each hour in a year. The CNN model is being optimized, particularly for loads (power and reactive power) of the power system, using preexisting AI libraries. To emulate the behavior of natural calamities in power systems, the simulated data is tweaked to add disturbances to the 9-bus power system. The CNN model is being optimized to distinguish between a working power system and the data with disturbances. The CNN model is expected to have at least 90% accuracy, according to industry standards, in detecting anomalies in the simulated power system. Successful implementation of the CNN model will aid in identifying anomalies in larger power systems, which could eventually be utilized for detecting disturbances in power grids.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 108

Imaging of Galactic Merger J1018+3613

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Field (Broad Category): Physics & Astronomy (Sciences)
Student's Major: Physics

Galactic mergers are cosmic events in which two galaxies become gravitationally bound and merge with each other, becoming a singular galaxy. The active galactic nucleus (AGN) of each of these galaxies can also merge together, resulting in two supermassive black holes becoming one. When this happens, large amounts of gravitational waves, or ripples in spacetime, are sent through the cosmos – these waves can result in the black hole being pushed out from center, a phenomenon known as recoiling. The goal of this research is to calibrate and image data of galactic merger J1018+3613 from a store of observations (BS237) for the purpose of measuring properties of this AGN. By measuring properties such as flux and position as functions of time, it can be determined how long ago this merger took place, whether it is currently recoiling, and other aspects related to its life cycle. These measurements are taken by first calibrating data through a software called AIPS (Astronomical Image Processing System), then imaging the data through a software known as CASA (Common Astronomy Software Applications). After this, multiple observations of the target can be compared and overlaid to measure differences over time. Currently, we are working to automate this data extraction process to achieve a higher number of observations for comparison. By identifying important characteristics of J1018+3613, we can learn more about the life cycle of galaxies, merging black holes, and the phenomenon of recoiling.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 109

Intermediate Temperature Proton-Conducting Solid Oxide Electrolysis Cells with Improved Performance and Durability

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Field (Broad Category): Engineering (Engineering)
Student's Major: Mechanical Engineering and Mathematics

The search for reliable clean energy sources is one of the most critical technological pursuits ever. Many promising technologies offer up potential solutions to our reliance on fossil fuels. One such technology is the Solid Oxide Electrolyte Cell (SOEC). These cells do not produce energy directly but indirectly support the development of clean energy. When a SOEC receives an electric current, it is able to perform the electrolysis of water and other compounds. Major areas of application include the production of clean fuels like hydrogen and the recycling of carbon dioxide. However this promising technology faces many challenges, including the high electrical resistance that forms at the anode of these cells, and hampers the cells performance. The goal of this project is to identify and develop anode compounds that produce a lower electrical resistance. In order to begin the research process, cell samples were constructed for testing, and a scaffold layering was then applied to these cells. Then, multiple initial ideas for infiltration solutions were created. These solutions would be applied to the scaffold, in order to allow chemical compounds to infiltrate into the scaffold and produce the desired anode composition. This is the point I have hit right now, but in the future these cells will be tested in the furnace. The results of this testing will guide which anode solutions will be further developed and tested with down the line. The end goal is to find an anode who's composition minimizes the resistance that occurs at the anode.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 110

An Empirical Analysis of Approximation Algorithms for the Unweighted Tree Augmentation Problem

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Field (Broad Category): Computer Science (Mathematics)
Student's Major: Computer Science and Mathematics

In the Tree Augmentation Problem, an undirected tree T = ⟨V, E⟩ is given, where V denotes a set of vertices and E denotes the set of edges. A disjoint set of edges E' ⊆ V x V is also given. A solution to this problem is a minimum edge set J ⊆ E' that is appended to the tree T to transform it into a two-edge connected graph. A number of approximation algorithms have been devised to yield solutions with a guaranteed factor of correctness from the optimal solution. Six of these algorithms are profiled, as well as a naïve greedy algorithm, using six distinct input classes, and an integer program that determines optimal solutions for each case. Additionally, each one's space usage, elapsed time, and solution quality are analyzed. The hypothesis is that, after this analysis, each algorithm's use of space, elapsed time, and solution quality will vary indirectly with their error bound. We expect this trend to hold, especially for larger and more complex trees.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 111

Cooperative Multi Drone Navigation Using Open Source Software

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Field (Broad Category): Engineering (Engineering)
Student's Major: Mechanical & Aerospace Engineering

In collaboration with the U.S. Air Force 563rd Rescue Group and Kinnami software company, the aim of this joint project is to develop Unmanned Aerial Vehicles (UAVs) that are able to effectively communicate with other drones and rescue assets to support Combat Search and Rescue (CSAR) operations in GPS-degraded/denied areas. Using Robot Operating System (ROS), an open source robotics middleware and the PX-4 autopilot system that is also an open source software to develop algorithms and communication between the UAVs in order to easily control multiple drones at the same time with one pilot and communicate data to other drones and search and rescue personnel. Using Tarot 650 drone kits, modified with microcomputers, cameras, and additional sensors in order to test the ROS nodes in the drones that will test the communication nodes between the drone while flying autonomously. In the future, more drones of the same model will be flown with the original communication nodes in order to see if the software is able to have drones communicating sensory data to each other.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 112

Mini-E Electrophoresis: A Cost-Effective Introduction to Capillary Electrophoresis

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Field (Broad Category): Chemistry (Sciences)
Student's Major: Chemistry

Mini-E electrophoresis was created to give students a cheap and simple introductory experience to the concept of capillary electrophoresis. The purpose of the device is to separate two dyes of the same charge but different sizes. This dye solution is injected into a Mini-E previously filled with a vinegar background electrolyte and the two dyes separate due to electrophoresis. This type of separation is usually performed on a large and expensive machine, but with the Mini-E we are able to have a sub $10 price tag and use food-safe components instead of lab-grade materials. Weak electrodes using earrings were also used to minimize cost and keep the lab as safe as possible. This device was tested in a graduate-level instrumental class with no assistance from the researchers so that the lab could be improved in the future based on these results. Through the use of the Mini-E device in combination with the given materials, students will be able to connect what is happening in the Mini-E device to what happens in more advanced electrophoresis-performing machinery.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 113

Measuring Temperature and Kinetics using Laser Spectroscopy

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Field (Broad Category): Chemistry (Sciences)
Student's Major: Chemistry and Physics

Laser spectroscopy is the study of interaction of molecules and atoms with electromagnetic radiation upon stimulation by a laser. A laser has three main components: an energy source, an amplifier, and a mirror cavity. The present study specifically uses pulse lasers, which fire ten times a second for a period of ten nanoseconds. Through laser spectroscopy, this study focuses on measuring gas temperatures and the reaction of conjugated hydrocarbons (propargyl and allyl) with hydroxyl radical (OH). The reactions take place in a stainless-steel cell, which allows for temperature control and gas-laser interaction. By measuring the intensity of the light emitted by the hydroxyl radicals versus time, this study can measure the decay rate of OH and thus the rate of the reaction occurring within the reaction cell. The temperature is determined through fitting the OH spectra using the PGopher software. PGopher will find the fit for the peaks associated with each wavelength measured and do the necessary calculations to measure the temperature at the time the wavelengths were measured. The study is soon to begin experimentation as lasers have been aligned to yield optimal power output.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 114

The Design of a Wire-Traversing Robot as a Method for Studying Long-Term Robot Autonomy

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Field (Broad Category): Other (Engineering)
Student's Major: Computer Science and Computer Engineering

In the field of robotics, robot autonomy has been, and continues to be, a necessity for applications in which a robot may encounter uncertain conditions. Autonomous robots can collect information from their environment and use this information to modify their behavior, which makes them well-suited for use in environments that are unknown or may change with time. The goal of this work is to study robot autonomy through the lens of a simple autonomous robot. A microcontroller-based robot prototype (programmed using Arduino C++ code) has been constructed and is able to traverse along a thin steel cable, collecting data such as light levels and positional data using onboard sensors. Once the design reaches maturity, the robot is intended to traverse the cable and observe its local environment, all while using solar power as its sole energy source. The main goal of the project is to develop a control algorithm that balances effective area surveillance, efficient energy consumption, and optimal sun exposure to ensure that the robot functions as intended while making effective use of its energy resources. The motivation for creating this robust control algorithm is to produce a robot that can function efficiently for days or even weeks at a time without human intervention. Continuous observation of the robot's behavior will be used to iteratively improve the control algorithm. At the conclusion of this project, the improvement process is expected to provide insights into the design of autonomous robots that could potentially be applied to larger, more complex systems.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 115

How Anthropogenic Perturbations to Rivers Affect Their Stability

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Field (Broad Category): Geography/Geology (Sciences)
Student's Major: Geology

In the study of geomorphology, it is well established how rivers erode and change the landscape they run through over long periods of time, but what is less known is how rivers respond to major changes caused by human activity. My research is devoted to studying how a river reach that was dredged and straightened for flood control alters its channel shape over time. Studying this will not only give us insight into how the banks of streams change, but also by examining the amount of sediment being eroded into the stream we can get a good understanding of the stability of its ecosystem. The stream reaches that we study is a section of Deckers Creek near Reedsville, WV, USA that was redirected from a more sinuous slow-flowing path into a straight, narrow, ~ two-meter deep trench in the 1960s for flood control. This stream reach is a useful natural experiment because we have good knowledge on its post-engineering channel shape. To study stream channel change over time, we use laser total station surveys of several cross-sections on a biweekly basis and then compare them against each other to quantify how stream cross-section geometry changes over time. Though data collection is ongoing, preliminary results suggest that channel change is driven by bank erosion through small-scale bank failure, which if continuous over time could lead to substantial channel widening, sediment impairment, and aquatic habitat degradation.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 116

Understanding the Mechanisms of Nickel-Catalyzed Decarbonylative Cross-Coupling Reactions

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Field (Broad Category): Chemistry (Sciences)
Student's Major: Biochemistry

Transition-metal mediated decarbonylative cross-coupling reactions have recently found popularity in the synthesis of new drug compounds in medicinal chemistry. Traditional methods for forming new C-C bonds required expensive reagents and generated hazardous and unwanted byproducts. In contrast, under decarbonylative cross-coupling conditions, new C-C bonds are formed from more readily available and affordable carbonyl compounds while carbon monoxide is the only major byproduct. In the past, our group has studied nickel-catalyzed cross-coupling reactions of N-phenyl phthalimide with various boronic acids. It was noticed that these reactions are able to undergo stoichiometric transformations efficiently, but catalytic reactions have been unsuccessful. To better understand the inhibition in these decarbonylative cross-coupling reactions of N-phenyl phthalimides under nickel-catalyzed conditions, we have altered the electronics and sterics on the aryl ring of the N-phenyl phthalimide and probed their reactivity with both catalytic and stoichiometric amounts of nickel. The 3-fluoro-N-phenyl phthalimides have been successfully synthesized and current work is focused on exploring their reactivity under Ni-catalyzed conditions.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 117

Membrane Technology for On-Board Inert Gas Generation Units on Aircrafts and Space Vessels

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Field (Broad Category): Chemistry (Engineering)
Student's Major: Chemical Engineering

Membranes allow precise- size-based separation between similarly sized molecules in a mixture and have found applications in both liquid (e.g., water treatment/desalination) and gas separation (e.g., carbon capture, natural gas upgrading). Compared to traditional thermal-based separation processes, membranes provide an energy-efficient solution to O2/N2 separation, and the design of appropriate membrane materials and processes could lead to the development of continuous, modular systems. Carbon molecular sieve (CMS) membranes are a promising class of membrane materials, however, there exists opportunities to further improve the productiveness of these membranes. My proposed research will focus on developing a completely new strategy to fabricate CMS membranes using microwave irradiation with the goal of increasing the O2 productivity of the membranes, while still retaining attractive O2/N2 selectivity. This research is focused on the development of advanced membranes for modular on-board inert gas generation (OBIGGS) units on aircrafts/spaceships, which is of interest to NASA for flammability reduction. This is a current ongoing research project, and this project branches from the continuing research within the molecular transport and separations lab focusing on the novel strategy of microwave-assisted decomposition, targeted for the very important O2/N2 separation.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 118

A Comparative Study of the Sensitivity of Cell Segmentation Approaches to Covariate Shift

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Field (Broad Category): Computer Science (Engineering)
Student's Major: Computer Science

Image quantification tools are fundamental in computational biology applications to enable various types of analysis, comparisons, and the formulation of new research hypothesis questions. They are often applied to microscopy images, which are subject to a very high statistical variability due to different factors, such as the specific microscope used and its settings, the tissue being imaged, or the treatment applied to the tissue. Therefore, image analysis algorithms such as those for cell segmentation must constantly be re-trained on the new data under examination. This is a laborious operation that requires technical expertise that biologists do not have. In this work, we present a comparative study between some of the established cell segmentation approaches, like StarDist, CellPose, and Mesmer, and use the most up to date dataset benchmarks to quantify the degradation of each of the approaches, when they are used on data with increasing covariate shift from the data that the original approach was being trained on. We found that the loss of segmentation accuracy can become significant even when the new data to operate on has small differences, even when those are added artificially, by controlling the noise injected into the data.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 119

Using a Raspberry-Pi as a Server for a Resident Aware Network for Intelligent Assistance

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Field (Broad Category): Computer Science (Engineering)
Student's Major: Computer Science

In order for the RANIA smart home to function, there needs to be a central server that handles data. Common implementations of smart home devices involve a remote server handled by another company that controls the devices. For the RANIA smart home, a local server is needed. A Raspberry Pi is a relatively low-cost Linux-based computer that is commonly turned into personal home servers. In order to test the effectiveness of the Raspberry Pi as a server, several tests were conducted. A web server and database were created on the Pi. Both were run and randomly accessed over the course of a week with no issue. Alongside the website stress tests, RANIA devices were also allowed to connect and access data from the Pi. It was run over the course of a week with no issue. Being reliable as well as capable makes the Pi an ideal server for a smart home such as RANIA, where failure could impact the residents' day-to-day activities and compromise important health-monitoring systems.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 120

Boracarboxylation of Vitamin E

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Field (Broad Category): Chemistry (Sciences)
Student's Major: Biomedical Laboratory Diagnostics

Carboxylic acids are important building blocks for the manufacturing of agrochemicals, fine chemicals, and pharmaceuticals. Current methods utilized to access multifunctionalized carboxylic acid derivatives in a single synthetic transformation are limited. Boracarboxylation is a methodology where borylated carboxylic acids can be accessed directly from the 1,2-difunctionalization of alkene; however, the scope of the transformation is limited to activated vinyl arene substrates. Building on recent efforts in our laboratory to generalize the method, an unactivated alkene tethered to the natural product Vitamin E via an ether linkage was prepared to examine the generality of the boracarboxylation method. Williamson ether synethesis was used to prepare the alkene-bearing substrates by reaction of D-□-tocopherol (Vitamin E), potassium carbonate, 4-bromo-1-butene in acetonitrile. The desired ether product was observed via 1H NMR spectroscopy after initial aqueous workup; however, product isolation was problematic due to low yield. The reaction conditions were altered by switching to sodium hydride, a stronger base than potassium carbonate, and THF as the solvent. The reaction proceeded moderately better, allowing the product to be isolated in low yield. The synthesis of the alkene-bearing derivative of Vitamin E will be futher optimized, and it will be subjected to copper-catalyzed boracarboxylation to afford a novel Vitamin E derivative featuring synthetically useful carboxylic acid and boronic ester functional groups.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 121

Development of a Prolonged Flight Drone With Autonomous Functionality for Long-Term Robotics Research

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Field (Broad Category): Engineering (Engineering)
Student's Major: Mechanical & Aerospace Engineering

Small drones equipped with cameras can be used to access constricted spaces, survey areas for threats, conduct surveillance, gather image data, and carry out various other tasks. Small drones of today are useful, but are limited by how long they can fly due to limitations in battery technology. Supplying power through a cable mitigates the battery limitations and thus prolongs flight time. Prolonged flight time allows the user to assign more engaging and time-consuming tasks to the drone. In our research, we created a power tether system for the Ryze/DJI Tello, which is a versatile consumer drone with a high-definition camera that can be programmed to autonomously carry out tasks using python. The Tello's battery life does not allow for ideal flight time, so a tether is needed. Variables such as the current and voltage needed for the drone to fly were measured. A power interface was created with a battery management system (BMS) board, and a cable was attached to the BMS board. The drone receives the voltage and current required to fly from a power supply system made from the cable and BMS board, a DC to DC converter, and a power supply unit. In the current state of the project, the drone can fly and carry out autonomous tasks for a prolonged period of time. To study the behavior of the drone for long periods of time, it will be displayed in a zoo-like enclosure where people will be able to interact with-and control-the drone.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 122

Digital Signal Processing In Radio Astronomy

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Student's Major: Mechanical & Aerospace Engineering

Utilizing the radio signals of Neutral Hydrogen atoms can help display the presence of the Milky Way galaxy all around the Earth. Access to efficient and effective instrumentation to detect these patterns is relatively out of reach for the average high-school, college, or hobby level enthusiast. The Digital Signal Processing in Radio Astronomy (DSPIRA) telescope design offers an accessible solution to this dilemma. The research at hand was conducted to ensure that an individual with novice experience in Radio Astronomy could feasibly construct the instrument. Materials were collected and sorted accordingly, and a loose instruction template was followed in construction of the DSPIRA telescope. Certain materials were included in lower amounts as to force pragmatic solutions to construction problems which amateur astronomers would face. Necessary material improvisations and substitutions were effectively made. Assembly of the Low Noise Amplifier (LNA) and installation of necessary software followed. Initial tests yielded failure in the functionality of the LNA. Appropriate calibration methods were utilized using a pre-constructed alternative LNA and the Telescope successfully collected preliminary data, demonstrating DSPIRA's relative accessibility.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 123

Aerodynamic Testing and Validation of an Experimental Unmanned Aerial System

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Field (Broad Category): Engineering (Engineering)
Student's Major: Mechanical & Aerospace Engineering

Within the field of modern military combat, staying updated and tracking the behavior of enemy activities is critical to mission success. Because of this, the U.S. military routinely performs Intelligence, Surveillance, and Reconnaissance (ISR) missions to always make informed decisions regarding action against an enemy. Within the modern battlefield, ISR missions are generally carried out with remotely piloted fixed wing surveillance vehicles – which are expensive and unable to be deployed within a moment's notice. This study explores the capability of small and efficient Unmanned Aerial Systems (UAS) to conduct ISR missions. The test vehicle developed by the team consists of a quadcopter featuring an array of sensors and image recognition systems that perform automated surveillance and threat assessment. Utilizing an environmental wind tunnel equipped with motion capture cameras, the flight characteristics and control responsiveness will be recorded for later incorporation into the system's programming architecture. This will allow the UAS to adapt to changing environmental factors that would otherwise lead to mission failure. While the research is ongoing, the feasibility of longer flight duration and autonomous charging will be explored. The goal of the project is for the UAS to effectively conduct ISR missions while maintaining a small form factor and a diverse sensor payload.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 124

Affordable PDMS Model of Capillary Electrophoresis

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Field (Broad Category): Chemistry (Sciences)
Student's Major: Chemistry

Electrophoresis mobility is the solutes response to the applied electrical field, and its movement according to the cation and anion. This process can be recorded using a miniature cheap model of capillary electrophoresis, so anyone can understand the fundamentals of electrophoresis mobility without using an actual instrument. For a new instrument capillary electrophoresis ranges from $15,000-$150,000. This model can show more detailed information about identifying fragments and separating them. The miniature model teaches the fundamentals of capillary electrophoresis. The experiment was conducted on a chemical separation's class, results found a need to work on separation methods.
The model costs approximately $7.00 and when it is to its satisfactory point it will be simpler to understand than the original machine. The chemicals used are all food grade or found easily at home, this model only takes about two hours to make, and the main point is to effectively be able to teach capillary electrophoresis concepts to anyone, even someone with no knowledge sitting at home.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 125

Scenario Based Approach to Strategic Planning

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WVU

Field (Broad Category): Engineering (Engineering)
Student's Major: Civil Engineering

For 20 years the conflict between the planning school and the process school of strategy has shaped the debate on strategy creation. In our paper, we argue that a scenario-based approach to strategic planning can serve as a management innovation in the field, thus having the potential to overcome the discrepancies between the two opposing schools of strategy. The scenario-based approach to strategic planning builds on the strengths of traditional scenario planning, i.e. its open and creative approach that considers multiple strategy options and takes multiple perspectives into account. Simultaneously, it overcomes the weaknesses of traditional scenario planning by offering a systematic process to scenario creation that is build on specific management tools and thus easy to implement. The outcome of this approach is a core strategy which is complemented by several strategic options that are derived from different scenarios. We illustrate the benefits of this management innovation on the basis of experiences collected in a consulting project in the German photovoltaic industry.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 126

Search and Rescue Drones Operating in Areas where GPS is Unavailable

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Field (Broad Category): Engineering (Engineering)
Student's Major: Mechanical Engineering

In the ever changing world, the need to develop a more effective search and rescue tool has grown drastically. There must be a way that drones can be put out into the field to search and assist ground efforts in the best way possible. In rural areas where GPS can be degraded or unavailable, a system of drones can hopefully still be used to search an area autonomously. The research consists of developing a system of drones to work off of each other and assist in search and rescue Missions. A crucial part of this project is the hardware on the drones. Such as mounts for computers, cameras, and various other sensors. Currently, the project is in the developmental phase. Two drones are being worked on to make sure there is a proof of concept and there will also be test flights in the future. We hope to see results in the future as more testing and simulations will be done further.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 127

Synthesis and Boracarboxylation of 3-Buten-1-Benzoate and an Indometacin Derived Compound

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Field (Broad Category): Chemistry (Sciences)
Student's Major: Chemistry

Organic chemistry plays a critical role in the synthesis of natural products and drug targets. The boracarboxylation of ester containing unactivated alkenes seeks to develop new organic compounds that likely have important applications in the fields of medicinal chemistry and pharmaceutical development. The purpose of this study is to synthesize and boracarboxylate two esters: 3-Buten-1-benzoate and a compound derived from Indometacin. The synthesis of both esters was achieved through esterification. The 3-Buten-1- benzoate was synthesized in high yield through a reaction with benzoyl chloride and 3-Buten-1-ol. The synthesis of the compound derived from indometacin was achieved through a reaction between indometacin and 3-Buten-1-ol. The synthesis of pure product was achieved in both reactions. The boracarboxylation of 3-Buten-1-benzoate was successful and a decent yield was observed. Further testing regarding the boracarboxylation of the Indometacin derivative is underway. These novel boracarboxylated compounds have important implications for the development of a new class of NSAID analogues. Additional research into the boracarboxylation of other organic compounds is in progress.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 128

Nickel-Catalyzed Site-Selective C-H Nitration of 8-Benzamidoquinoline and its Derivatives

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Field (Broad Category): Chemistry (Sciences)
Student's Major: Chemistry and Biology

C-H functionalization reactions have applications in pharmaceutical engineering and materials science. C-H nitration is a type of C-H functionalization, and in recent years, much focus has been placed on the development of C-H nitration pathways using transition metal catalysis. One such transition metal is nickel which has been identified as a strong candidate for catalyzing a number of C-H functionalizations. Nickel is of particular interest because it is inexpensive compared to other metals, especially the noble metals: rhodium, ruthenium, palladium, etc. The purpose of this project is to explore how nickel is able to catalyze the selective C-H nitration of 8-benzamidoquinoline as a model for related site-selective C-H functionalization reactions. To this end, a set of experiments were performed that identified the conditions that both provided the highest yield of nitrated product (91%) as well as strong selectivity for one C-H bond over all others (3.5:1). In addition, a number of molecules related to 8-benzamidoquinoline will be examined for their ability to undergo C-H nitration via nickel catalysis. From this, a greater understanding of how nickel catalyzes selective C-H functionalization reactions will be achieved. In turn, this improved understanding will allow for the development of many nickel-catalyzed C-H functionalizations with applications in pharmaceuticals, materials science, and agriculture, among others.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: Honors EXCEL

Presentation Number: 129

Assistive Features in Running Watches to Guide Runners in Running Activities

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Field (Broad Category): Engineering (Technology)
Student's Major: Electrical Engineering

GPS running watches aid runners by monitoring and displaying their instantaneous running and physiological metrics like pace, distance, heart rate, and cadence. The knowledge of these metrics keeps the runners informed of how they are performing currently and how their current performance compares to their previous activities. Adding an extra layer to this feature that can communicate to the runner how they can be performing better by maximizing their efforts and minimizing injury would be more beneficial to the runner. This project aims to do so by conceptualizing a virtual coach feature that would guide the running watch's user through a running activity. A particular example that this project addresses is the training intensity distribution workout which improves endurance running. The workout requires the user to progressively advance between different heart rate zones in a particular fashion. While it may be difficult to judge these transitions as one runs, the task becomes easier when using technology such as a watch. The virtual coach prototype consists of wearable inertial and heart rate sensors, and a microcontroller. Its algorithm operates on the recent historical running performance of the user, the instantaneous running performance and the subjective feedback from the user. The presence of this feature on running watches will provide real-time assistance to the user that parallels the supervision of a coach. With minor modifications, this feature can find applications in all sports and in healthcare and physical therapy settings.

Funding: Institutional
Program/Mechanism Supporting Research/Creative Efforts: Honors EXCEL Program

Presentation Number: 130

Designing a 3-D Printed Rocket Nose Cone with an Internal Pitot-Static Tube

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Field (Broad Category): Engineering (Engineering)
Student's Major: Mechanical & Aerospace Engineering

A Pitot-static tube can be used to calculate the velocity of air flow through using measured values of stagnation pressure, static pressure, and Bernoulli's Principle. The velocity of air flow at any point in time is an essential variable that needs to be known when working in the aerospace industry. Every square inch of space is valuable when building a model rocket, and most kits have injection printed nose cones whose internals cannot be customized and take up valuable internal space. A rocket nose cone with an internal pitot-static tube can allow for data collection of velocity flow without taking up valuable space in the electronics bay. Using velocity flow, you can calculate the acceleration, position, and jerk the rocket experiences over time. This research plans to design and test a 3-D printed rocket nose cone with an internal pitot-static tube. The nose cone was modeled off the Hyperloc 835 nose cone and designed using SOLIDWORKS. It was printed using PETG filament for its greater strength at a thinner print then when compared to common PLA filament. The electronics for data collection were coded in C++, while the data refining was coded using MATLAB. The nose cone's data collection electronics was calibrated for high speeds in a WVU wind tunnel, and additional experimental data was collected during two separate rocket launches.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: My efforts were mainly voluntary.

Presentation Number: 132

Patterns of River Sinuosity in the Appalachian Valley and Ridge

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Field (Broad Category): Geography/Geology (Sciences)
Student's Major: Mathematics

River planform shape is thought to reflect external variables like water quantity and underlying rock type. However, there have not been systematic large-scale studies that attempt to isolate other possible effects and constrain the effect of rock type alone. We conducted a study of river channel shape in the Potomac River Basin to answer the questions: 1) what are the patterns of river shape observed in the Potomac Basin? and 2) are there consistent relationships between rock type and river channel shape? Using geospatial data from the United States Geological Survey and QGIS Software, we analyzed the sinuosity (extent of deviation from a straight course) of all streams in the Potomac river basin. River sinuosity was calculated using the National Hydrographic Dataset (NHD); sinuosity was determined for every NHD river segment. The stream data reflects segments where flow accumulation negatively affects the sinuosity of rivers. Our findings within our data allows us to model comparisons between variables and notice individual trends within our 28,833 total sampled points. We found the average sinuosity to be 1.102 with a standard deviation of 0.17679. The average lengths of the sampled streams had a mean length of 640.085 m, standard deviation of 736.761 m. Comparisons between other variables such as length, maximum flow accumulation, slope, and total drainage area were all within reasonable trends. Next steps includes studying the percentages of our sample area underlain by each rock type. Work is ongoing to compare rock type against sinuosity to determine if a correlation exists.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: My efforts were mainly voluntary.

Presentation Number: 133

Low Cost Rocket Fin Structural Anomaly Analysis

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Field (Broad Category): Engineering (Engineering)
Student's Major: Mechanical & Aerospace Engineering

A major problem plaguing the high powered rocketry community involves not being able to accurately determine the internal damage of rockets between flights. In 2018, West Virginia University's Experimental Rocketry Club faced catastrophic failure due to fin delamination, more generically known as structural anomalies, during the New Mexico Intercollegiate Competition; Spaceport America. The rocket, Free Bird, had successfully flown prior that year, however upon landing undertook interior damage which was unidentifiable with the resources the team had at the time. In industry, companies utilize x-ray machines to access damage levels of their instruments, however this is not a technology WVU Experimental Rocketry has the funding to pursue. Experimental Rocketry member, Natalie Ott, set out to utilize sparkfun openlog artemis accelerometers to extensively catalog damage levels by the booster's current natural frequency. Vibration test results showed trends of vibration magnitude accurately reflecting the damage levels of the rockets. Trends were analyzed to predict fin delaminations and create a standard for determining when a rocket is no longer structurally safe enough for additional flights.

Funding: State
Program/Mechanism Supporting Research/Creative Efforts: My efforts were mainly voluntary.

Presentation Number: 134

Machine Learning Aided Data Analysis for Large Qualitative Data Sets

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Field (Broad Category): Education (Social Sciences)
Student's Major: Computer Engineering

Sentiment analysis is a form of text analysis that aims to determine the emotional meaning of text through the usage of supervised machine learning algorithms. Traditionally, large volumes of text are analyzed using qualitative data analysis techniques, which requires a significant amount of time and specific subsets of skills to complete. Sentiment analysis algorithms serve as helpful tools for streamlining the process of analyzing large text-based datasets as they enable the user to assess large amounts of data quickly and can provide users with a set of responses to cross-reference their own analysis with. For this study, we analyzed five years of student focus group transcripts from a program evaluation of an NSF-funded project titled GAUSSI (Generating, Analyzing, and Understanding Sensory and Sequencing Information). The purpose of the focus group was to assess five primary goals of the program linked to student engagement and growth: faculty/mentorship, interdisciplinary collaboration, professional development, scientific communication, and the efficacy of training modules. After preprocessing, we used the lexicons BING, AFINN, and NRC to assess sentiments associated with the graduate students' responses using the statistical software R, namely in RStudio. Text data were analyzed by year, in aggregate, and across the five primary purposes noted earlier. The results of our study will be presented in two formats. First, we will outline sentiments expressed by graduate students about the features of the program. Finally, we will broaden our discussion to the steps needed to complete a sentiment analysis on large quantities of text.

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Presentation Number: 135

High Resolution 14C Spikes Found in Tree Rings Shed Light On Solar Storms

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Field (Broad Category): Geography/Geology (Sciences)
Student's Major: Environmental Geoscience

Radiocarbon (14C) dating has been used to date carbon-rich objects in Earth sciences, archeology, and history since the 1940's. However, the recent discovery of spikes in atmospheric 14C concentration recorded in tree rings can potentially improve geologic and archeological dating significantly, and reconstruct harmful, past atmospheric events.
Developing a history of spikes, likely caused by solar weather or other cosmic rays, may improve forecasting solar storms hazardous to our technological infrastructure. Technology exists to obtain quantitative results of these atmospheric measurements back to the 1960s. To better understand the size/frequency of solar storms, a longer history of spikes in 14C is needed. Trees absorb 14C concentrations and store it in their rings making it possible to reconstruct past SPEs dating back to the beginning of the Holocene.
Our research used 92 live King Billy pine cores and ~500 cross sections from dead trees dating back to -42 BCE to analyze radiocarbon concentrations. Core samples with adequate dating were sectioned using a microtome and underwent isolation of holocellulose to obtain the 14C concentration. Prepared pure cellulose samples were sent to an accelerator mass spectrometry at NOSAMS Institution for radiocarbon calculations. Data was used to compare 11-year patterns to existing series developed in other geographic locations that show the 774/775 CE spike in 14C. Our data of the tree ring C14:C12 series was like those observed in other parts of the world in timing which allowed us to confirm the tree ring chronology, contributing to the global record of 14C variability.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: Capstone course within my department

Presentation Number: 136

Telepsychiatry, Social Isolation & Coping Strategies among Rural Patients during COVID-19

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Biology

Patients with behavioral health (BH) disorders are more vulnerable to the negative consequences associated with social isolation and recent preliminary data suggests that drug use and overdoses have increased during the COVID-19 pandemic. There is very limited empirical data on telepsychiatry in rural Appalachia. Telepsychiatry, during the pandemic, may mitigate negative coping strategies and social isolation. The purpose of this study is to assess use and satisfaction with telepsychiatry, coping strategies and social isolation during the pandemic. An anonymous web-based survey was sent electronically using Epic's MyChart® application. The survey included questions on sociodemographic characteristics; access to web-enabled devices and Internet; use, satisfaction, concerns regarding telepsychiatry, coping strategies, and the Social Network Index. Preliminary survey results (n=375) found that 95% had a cell phone, 88% used telepsychiatry during the pandemic and prior to the pandemic only 22% had ever used telehealth services. The majority (91.2%) reported that their telepsychiatry care was good or excellent, 90.6% reported that telepsychiatry helped them deal more effectively with their problems and 37% said they preferred in-person visits. Few reported using negative coping strategies during the pandemic or recent use of mutual support groups, but majority reported feeling isolated. Telepsychiatry is critical to helping patients maintain their recovery during the COVID-19 pandemic and to expanding access to behavioral health services in rural areas. Prospective research is needed to determine whether continued engagement in telepsychiatry helps patients cope with social isolation.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's SURE program

Presentation Number: 137

Cue Reactivity Amongst E-Cigarette Users with Sign-Tracking or Goal-Tracking Behavior

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

Addictive behavior is a field of intense interest, but research has not yet determined how the mind works to create these behaviors. Cue-reactivity has been identified as one of the psychological mechanisms that maintains addictive behavior, such as drug seeking, and can bring about relapse. The current study aims to better understand individual differences in cue reactivity by relating certain behavioral patterns predictive of addiction in rodent models to cue-reactivity in dependent e-cigarette users. We assess these behavioral patterns, known as sign-tracking or goal-tracking, using a reward learning task accompanied by eye-tracking. We can quantify sign-tracking (engaging with a reward-predictive cue) and goal- tracking (orienting towards expected rewards) by examining the participants' eye movements during the completion of this task. Participants also complete another task where they are exposed to 3 different cue types: e-cigarette related, smoking related, and neutral images. After completing the cue exposures, participants will experience a 15-minute break to use an e-cigarette. Based on the prior literature in rodent models of addiction, we hypothesize that relative to goal-trackers, sign-trackers will show more cue-reactivity in the form of cue-induced cravings and mood changes, cue-induced decision biases, and intensified puffing behavior on their device. Understanding individual differences in cue-reactivity could aid the development of personalized treatment approaches for those with nicotine dependencies and those suffering from addiction more generally.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 138

Intersecting Identities on Our Country Roads: Depression Among Diverse Adults in West Virginia

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

The LGBTQ community has shown in previous statistical analysis of being more prone to receive the diagnosis of a depressive disorder. Noting the rare acceptance of the LGBTQ community in West Virginia, Dr. Julie Patrick PhD, Aradhita Yadava, Laura Bernstein BA, and I looked at the interactions between gender, age, race, and sexual orientation and depression. Using the Behavioral Risk Factor Surveillance System, a sample of 5,415 adult from West Virginia was collected. The participants were diverse in age, race, gender, and sexual orientation. After looking for significance the Analysis of Variance (ANOVA) test, results showed that depression is significantly affected by age, gender, and sexual orientation. In addition, two-way interactions were found between race and sex and age and sex that influence depression in West Viginia. Consequently, Dr. Julie Patrick PhD, Laura Bernstein BA, Aradhita Yadava, and I concluded that it is important to consider the influence of race, gender, and age when looking at the influences of depression in West Virginia.

Funding: First2 Network
Program/Mechanism Supporting Research/Creative Efforts:

Presentation Number: 139

Place-Based Disparities: Depression and Functional Disability

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Biology

Older adults are more susceptible to chronic health conditions, leading to increases in depression and function disabilities (Chapman & Perry, 2008). People in these areas face place-based disparities, which contribute to inadequate funding and/or lack of educational opportunities, which may also have direct effects on disability rates. The National Long Term Care Surveys found that males and females with higher education maintained better functioning at later ages than those with low education (Manton et. al). For the study, place-based disparities affecting middle-aged and older adult West Virginia Residents were observed and recorded using the CDC's 2019 Behavioral Risk Factor Surveillance System. It was hypothesized that age, gender, the number of chronic health issues, the level of education attained, and depression would all contribute to increased rates of functional disability. Participants (n=3794) were residents of West Virginia and over age 50 years. Among the adults, 57.2% were women. The mean age was 63.6 (SD = 8.9, range 50 to 80+). Results suggested a good fit of the model, χ 2 (DF = 16) = 381.7, $p < .001$, with CFI = .90 and RMSEA < .08. Specific associations were also significant, including three direct links with functional disability for: depression ($\beta = .25$), number of chronic health conditions ($\beta = .40$), and education ($\beta = -.14$). These findings suggest that researchers should focus more attention on decreasing chronic health conditions, depression, as well as increasing accessibility to higher education to combat disability among middle-aged and older adults in West Virginia.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 140

Short-Term Behavioral, Physiological, and Brain Differences in Real Life and Virtual Reality Social Interactions

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Neuroscience and Psychology

With the advancements and wide public use of virtual reality (VR), we are able to manipulate unique immersive environments in a lab setting, making it a useful tool in research. In this study, we sought to understand if real-life stressful social interactions induce the same stress responses in VR social interactions, hypothesizing that there is no difference in biological and physiological responses between the two. Participants experienced two randomized stress-inducing conversations with a confederate in which the participant had to confront a messy roommate and a lazy group project partner (n=52). Diastolic (DBP) and systolic blood pressures (SBP) were measured at 4 stages; initially with 10 minutes at rest (R1), the first social event (E1), a second rest (R2), and the second social event (E2). Heart rate was monitored throughout the process and compared between each scenario of E1-R1, R2-R1, E2-R1, and E2-R2. Our results showed that there was no statistical significance between VR and live conditions; participants displayed similar stress responses in the two environments. We are currently working on a study to explore how a compassion intervention mitigates stress in VR environments. We plan to use these findings along with our developed mobile AM-PET scanner. Typical brain imagers restrict any upright or natural movement, but with the use of AM-PET, we will be able to observe brain structures during social interactions in VR.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 141

Interactions between Reinforcement Schedule and Treatment-Integrity Level on Differential Reinforcement of Alternative Behavior

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology and Criminology

Differential reinforcement of alternative behavior (DRA) is a commonly used behavioral intervention to decrease challenging behavior and replace that behavior with a more appropriate alternative response. Although previous studies have suggested that effects of DRA persist even when implementation errors (termed treatment-integrity errors) occur, those studies have evaluated effects primarily when each alternative response should be followed by a reinforcer. In clinical use of DRA, however, reinforcement schedules are often thinned such that alternative responding only intermittently produces a reinforcer. Effects of integrity errors on DRA with thinned schedules remain unknown. Therefore, the purpose of this study was to examine how integrity errors affected response rates during DRA with various densities of programmed reinforcement for alternative behavior. Seven undergraduate students participated in a 2-hr human operant computer task. Participants clicked on two different colored circles that moved around the computer screen to earn points (reinforcers). The reinforcement schedule values increased (i.e., 1, 5, 10, 20) across phases in a single-case reversal design. For each schedule value, intervention effects were assessed at 100% and 80% integrity. Reduced integrity phases involved participants receiving a point when they were not supposed to or not receiving an earned point. The programmed reinforcement schedule affected response rates at both 100% integrity and 80% integrity. During the phases with 80% integrity, target behavior increased when compared to similar schedules of reinforcement at 100% integrity. Researchers must consider both the programmed reinforcement rates and the likelihood of integrity failures when predicting outcomes of DRA

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 142

How to Reduce Fatal Officer-Involved Shootings in the United States

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Field (Broad Category): Criminology/Criminal Justice (Social Sciences)
Student's Major: Criminology

Our research looked at fatal officer-involved shootings (OIS) in eight major U.S. cities. Five cities had the highest rates of OIS while the other three had significantly lower rates. Cases were randomly selected from each city, then compared and contrasted against one another. The results of this study suggest that implementing several changes in police departments can greatly reduce the number of OIS. This could be accomplished by equipping officers with body-worn cameras and tasers, along with using new training procedures for mental health calls and other unusual circumstances. This will enable police to be more prepared and have more options available when facing an uncooperative suspect. Furthermore, these tactics will create a more transparent police force that holds officers accountable and will ultimately decrease the rates of OIS. The five cities with the higher rates of OIS also had an extremely high rate of racial disparity among the victims. This issue has become a hot topic in the mainstream culture recently, with nation-wide protests over the brutality African Americans and other minority groups face from law enforcement. Lowering the rate of OIS will, in addition to the preserving life, have many benefits such as increasing trust in law enforcement, cooperation from the public, and saving billions of taxpayer dollars currently being used on wrongful death settlements.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 143

Treatment Modalities Typically Used with Clients Affected by the Opioid Crisis

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

West Virginia has the highest rate of opioid-related overdoses in the country with a rate of 42.2 opioid-related deaths per every 100,000 people compared to the national average of 20.7 per 100,000 (Bowden et al., 2019; National Institute on Drug Abuse, 2020). High rates of opioid use throughout West Virginia suggest a critical need for evidence-based treatments for those affected by the opioid crisis as evidence-based treatments merge research, empirical data, clinical practices, and patient differences (American Psychological Association, 2006). Children impacted by the opioid crisis frequently display aggressive and defiant behaviors, attachment difficulties, trauma symptoms, and hyperactivity (Nygaard et al., 2016). Knowing which treatments are used to treat those affected by the opioid epidemic is important to establish whether evidence-based treatments are used with this population. As part of a Substance Abuse and Mental Health Services Administration (SAMHSA)-funded Statewide Opioid Response (SOR) grant, therapists in West Virginia were trained in parent-child interaction therapy (PCIT) and were asked about treatments they provide to clients who have been impacted by the opioid epidemic. Responses were aggregated and analyzed. Multiple evidence-based therapies were mentioned, with cognitive-behavioral therapy as the most common, followed by PCIT, dialectical behavioral therapy, and motivational interviewing. About a fifth of the treatment modalities mentioned were non-evidence-based treatments. In order to better benefit those who have been affected by the opioid crisis here in West Virginia, increasing the use of evidence-based treatments is important to provide personalized and effective therapies to clients.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Presentation Number: 144

The Impact of Sustainable Community Development on Reducing Crime Perceptions

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Field (Broad Category): Sociology (Social Sciences)
Student's Major: Biology

Many community development programs do not consider crime reduction, or the reduction of crime-related stigma, as a relevant outcome of development efforts. For many communities, development attempts lack the sustainability that allows residents to reap long-lasting benefits, including crime prevention. While there are studies that consider how sustainable community development programs can impact the social environment and safety of communities, few address community development programs success through in-depth longitudinal studies. These ideas are considered through thematic coding of secondary data from field observations and semi-structured interviews with volunteers in a team-based community development program. Specifically, this study considers social capital as the leading form of capital generated during community development work, and its role in the collective efficacy. Results showed that community development programs may give communities tools and symbolic resources typically associated with increases in social capital that help volunteers reduce the crime-related stigma associated with their communities. These results also give insight into how empirical studies relating to community engagement and crime prevention should be structured.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU Work Study (not associated with RAP)

Presentation Number: 145

Using a Structured Assessment to Determine Aversiveness of Academic Demands

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Field (Broad Category): Psychology (Sport Science/Psychology)
Student's Major: Psychology

Preference assessments are a well-known method of determining which items and tasks a person prefers. A variation of a preference assessment that detects relative preference for tasks has been developed in recent years. Demand assessments have resulted in clear identification of preferences that relate to the evocation of challenging behavior; demands that were chosen less frequently evoked higher rates of challenging behavior than demands that were chosen more frequently. The purpose of the current study was to replicate a recently published demand assessment (the Paired-Stimulus Demand Assessment) with children who were at risk for emotional and behavioral disorders. Sessions were conducted at an alternative education center. The PSDA involves presenting tasks in pairs and collecting data on which activities are picked most frequently across trials. During the PSDA, the researcher utilized guided exposure to show the stimuli related to each task and then administered one trial of each task. Subsequently, the researcher presented a choice of two tasks at the start of each trial and asked the student to select a task. After the student chose a task, the researcher removed the non-preferred task and instructed the student to complete the task. Like the previously published study on the PSDA, the procedure resulted in differentiated hierarchies even when conducted with a new population in a different setting than the original study. The PSDA provides researchers with an assessment tool for selecting tasks that can be included in the negative reinforcement test conditions of a functional analysis without eliciting challenging behavior.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 497-level course

Presentation Number: 146

Disconnected, Distracted, and Isolated: Better Understanding How Attachment Affects Social Competence in Middle Childhood

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Field (Broad Category): Social Work & Human Services (Social Sciences)
Student's Major: Psychology

During the first years of life, infants develop an attachment style towards their primary caregiver. Responsiveness and availability of the caregiver are determinants for the attachment style that will develop between parent and child (Cassidy, 2018). Attachment security impact the child's social competence, emotional regulation, and other behaviors throughout their life (Kerns & Brumariu, 2018). However, it's less known how attachment may affect children's behavior that are associated with maladaptive forms of solitude during the middle childhood years. To examine the effects of attachment styles further, data were gathered from children aged 7- to 11-years. Researchers first measured the attachment styles of the children via the Kerns Security Scale. Children's maladaptive daydreaming, distractibility, and social skills were also measured by parents and children. The data will be analyzed to examine how attachment security affects socially reticent behaviors. It is hypothesized that children who have an insecure attachment towards their caregiver would have higher levels in maladaptive daydreaming and distractibility. It was predicted these children would have lower levels in social skills.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 497-level course

Presentation Number: 147

An Experimental Test of Cooperative Behavior in Pigeons

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

This experiment aims to replicate and expand upon previous research demonstrating cooperative behavior in pigeons. The behavioral patterns of all organisms are presumed to be governed by the same principles, permitting extrapolation to human behavior. Two male White Carneau pigeons will be used. They are maintained at 80% of their full body weight and deprived of food for 24 hours before each session. To train cooperative behavior in the pigeons, they will be placed on a table that has a food dispenser and two platforms. For food to be made available, one pigeon must stand on its platform, thereby activating the feeder and allowing the other to feed. After a time, the pigeons must switch positions so that the one initially on the platform can also feed. Initially, a light will be used as a discriminative stimulus, indicating whether each pigeon should be on the platform or feeding. This light will be phased out over time. Organisms, when placed in a situation that requires cooperation, will not cooperate unassisted. Some reinforcement contingencies or prior conditioning must be in place for the organisms to exhibit cooperation. This experiment attempts to uncover what circumstances best foster cooperative behavior. Such circumstances have applications in many places where humans are required to coordinate, such as classrooms and workplaces among many others. By using the patterns of reinforcement that foster cooperation, outcomes like learning capacity, efficiency, profits, and virtually any outcome resulting from human coordination can be improved.

Funding: Other
Program/Mechanism Supporting Research/Creative Efforts: WVU 297-level course

Presentation Number: 148

The Impact of the COVID-19 Pandemic on Attrition in PCIT

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

During the COVID-19 pandemic, stress levels of families increased drastically. Families faced clinics closing, unemployment, and lockdown procedures. Parent-Child Interaction Therapy (PCIT) is an interaction-based therapy for children ages 2-7 with behavioral issues. Parents, especially with children who have behavioral difficulties, faced an unprecedented amount of stress during lockdown. PCIT is known for having a high dropout rate, but how did stressors of the COVID-19 pandemic affect the current caseload of therapists? The proposed study aims to examine the impact of the COVID-19 pandemic on the families receiving PCIT and on their attrition, or discontinuation, in treatment. Therapists were interviewed about their PCIT cases via Zoom between July and November of 2021. Interview responses will be transcribed and coded by trained undergraduate researchers. The questions include overall rating of training, confidence in virtual and in-person therapy sessions, amount of dropped cases, family stressors per case, and if the family was directly impacted by the pandemic. Descriptive statistics and correlational analyses will be conducted on the percent of families who reported significant stress and those who reported stress directly related to COVID. Implications of the findings and recommendations for supporting PCIT families during the COVID-19 pandemic and further disasters will be discussed.
Funding: State Opioid Response Grant

Funding: State
Program/Mechanism Supporting Research/Creative Efforts: WVU 297-level course

Presentation Number: 149

Associations between Parent-Toddler Emotion-Focused Talk, Parent Emotion Regulation, and Toddler Emotion Regulation in PCIT-T

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Field (Broad Category): Psychology (Sport Science/Psychology)
Student's Major: Neuroscience and Psychology

Emotion regulation, according to Girard et al. (2018), is how individuals express and experience emotions when they have them and which emotions they have. Parents' emotion regulation skills have been associated with child emotion regulation skills; moreover, parental emotion-focused responding has been shown to be significantly associated with child emotion regulation across multiple studies as reported by Zinsser et al. (2021). The DECS, or Dyadic Emotion Coding System, is a behavioral observation measure created to capture a variety of parent-child emotion-focused practices and emotional content in PCIT with Toddlers. The frustration task, during PCIT, is when the toys are taken away from the child after already playing with them for approximately 4-5 minutes. Parent emotion regulation will be measured using the Difficulties in Emotion Regulation Scale (DERS; Gratz et al., 2004). Child emotion regulation will be measured using the The Devereux Early Childhood Assessment (DECA; LeBuffe et al., 2009; Powell et al., 2007) or CBCL (Achenbach & Rescorla, 2001). The aim of this project is to explore the descriptive statistics of DECS codes before and after the frustrations task as well as in individual tasks. We hypothesize that certain DECS codes will be associated with parent emotion regulation and child emotion regulation. For instance, analyses will look into the frequency of emotion dismissing codes in the DECS coding system. This will also provide evidence on the relationship between parent emotion-focused skills, parent emotion regulation, and child emotion regulation.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 297-level course

Presentation Number: 150

Hard Knock Life for Us: Poverty and Chronic Health Conditions

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Field (Broad Category): Medical Sciences (Sciences)
Student's Major: Exercise Physiology

Purpose: West Virginians face many challenges to their health and wellbeing, including low income. Poor health relating to low income is believed to play a role in developing chronic health conditions (CHCs). This study examines whether adults in WV experiencing financial hardship have a higher prevalence of developing CHCs, and whether facing these challenges affects mental health.
Methods: A moderated regression analysis was conducted using 2020 BRFSS data. This study examined whether age and income influence the relationship between the number of CHCs and physical wellbeing, which were indexed by the number of unhealthy days per month. This study consisted of 5,880 WV adults, where 24% were ages 18 to 44, 37% were ages 44 to 64, and 39% were ages 65+.
Results: Income was found to buffer the effects of CHCs on physical well-being, but less so for older adults. The overall regression model was found to be significant,
$F(7, 4701) = 172.65$, $p<0.001$; ?2 = 0.205. Future studies will direct additional support to younger and middle-aged West Virginians with CHCs.

Funding: State
Program/Mechanism Supporting Research/Creative Efforts: AGE-ADAR Scholars Program

Presentation Number: 151

Identifying Parent Responses Possibly Maintaining Challenging Behavior of Children with Prenatal Opioid Exposure

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

Although the recent opioid epidemic has resulted in a dramatic increase in the number of children born with opioid dependency (resulting in a diagnosis of neonatal abstinence syndrome or NAS), little is known about how to effectively intervene with this population. Most known interventions target infants, leaving a gap for preschool and school-aged children. Yet, emerging research suggests that children who were born with NAS are more likely to experience behavioral deficits relative to their same-age peers. Research in the field of behavior analysis has demonstrated that behavioral deficits can be addressed through adaptations to the environment, but these findings have not yet been fully extended to children with a history of NAS. The purpose of the current study was to identify environmental variables possibly influencing challenging behavior of 5 children ages 3-4 with previous diagnoses of NAS. We recorded interactions between parents and children in their homes, using the Zoom platform. We then coded computerized data to quantify the interactions. Data were analyzed to determine how likely parents were to provide three reinforcers commonly identified as reactions that maintain child challenging behavior, and we compared these values to how likely the parent was to provide these reinforcers independently of child responding. We were able to identify one or more potentially influential parent responses for the participating children, suggesting that behavioral interventions may be a valuable tool in the treatment of behavior for children with a history of NAS.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: hourly data collector

Presentation Number: 152

Emotional and Physical Well-being among Asian American Women

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Field (Broad Category): Psychology (Sport Science/Psychology)
Student's Major: Biology

Asian Americans are among the fastest growing ethnic minority groups in the U.S (Pew Research Center) with the most understudied women's healthcare. These minoritized individuals show persistent health disparities in the US may make Asian women especially vulnerable due to the underuse of healthcare services. To examine this imbalance, we use a nationally representative sample (n =211963 US Women) from the 2020 Behavioral Risk Factor Surveillance System (BRFSS) data from the CDC to explore whether Asian women are obtaining important prescreen and diagnostic tests relative to other American women. Results of a series of t-tests showed that Asian women were less likely to have had a mammogram (Mean= 57.5% Asian, 77.8% non-Asian), less likely to receive a pap smear (Mean = 74.9% Asian, 93.2% non-Asian), and less likely to have been tested for HPV (Mean = 34.3% Asian, 43.6% non-Asian). Additional examination using ANOVAs proved these differences to be consistent for Asian women across age groups. Further studies are needed to determine whether these lower prescreens and diagnostic tests are due to acculturation, finances, or underrepresentation of Asian American clinicians.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: PSYC 393A

Presentation Number: 153

Health Insurance, Family Impact, and the Pathway to Mental Well-Being

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

Examining frequencies among a sample of individuals in West Virginia, it is evident that there are two significant predictors that impact classification of depression. Depression is common among West Virginian adults (Muntaner & Barnett, 2000). Although there are many correlates and predictors of depression, we sought to understand the role of access to healthcare among West Virginians with children specifically. The current study used data from the 2020 Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS) to examine associations of depression among 7500+ West Virginia residents. Overall, 26% of adults in our sample reported depression. Using logistic regression, our analysis showed that living with children and healthcare access correctly classified 73.8% of adults, $X2$ ($DF = 2$; $N = 5760$) = 65.41, $p < .001$. Odds Ratios showed that adults living with children are 1.1 times more likely to be diagnosed with depression compared to those without children. Adults with healthcare access were 1.7 times more likely to be diagnosed with depression. Our results suggest that personal factors that affect families, such as number of children in the home, may increase depression risk. However, individuals who have adequate health care are more likely to be diagnosed and seek treatment.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: WVU 393-level course

Presentation Number: 154

Social Determinants Affecting Mental Health of West Virginia Individuals

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Field (Broad Category): Sociology (Social Sciences)
Student's Major: Criminology

Models of social determinants of health often include the categories of age, sex and race. West Virginia, in particular, is characterized by place-based health disparities. Considering these factors, I used the 2020 Behavioral Risk Factor Surveillance System (BRFSS) data from the Centers for Disease Control (CDC) to examine three known predictors of mental health disparities experienced by individuals living in West Virginia. Participants were 5,855 adults. Results of the binary logistic regression are significant with the chi square model. The chi-square value is: $X2$ (DF = 3; N = 5855) = 173.06, $p < .001$. The Wald value is: Wald (DF = 1) = 66.1, $p < .001$. Results of the survey show that non-white people living in West Virginia are 1.1 times more likely to be depressed, women living in West Virginia are 1.9 times more likely to be depressed and younger people living in West Virginia are more likely to be depressed. This study is important because from it we can identify place-based disparities which can lead to increased funding and programs to support mental health challenges.

Funding: Not funded
Program/Mechanism Supporting Research/Creative Efforts: PSYC 393A

Presentation Number: 155

Age, Sex and Gender Influence Access to Healthcare in West Virginia

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Field (Broad Category): Psychology (Sport Science/Psychology)
Student's Major: Computer Engineering

According to the Appalachian Regional Commission (ARC, 2019), the supply of mental health providers in Appalachia is 45% lower than the national average and specialty physician access is 21% lower than the national average. With the region getting progressively older and the state leading in several mortality categories, reliable access to healthcare is a necessity. Multiple factors such as sex, age and race influence Healthcare access.
We used the 2020 data from the CDC's Behavioral Risk Factor Surveillance System that included 5,880 adults ages 18+ in West Virginia, and examined three age groups: "Younger"(ages 18 to 44 years), "Midlife"(ages 45 to 64 years) and "Older adults" (ages 65+ years). The majority (94.4%) were White, NonHispanic.
Results of Age by Sex by Race Analysis of variance test revealed a significant age by sex interaction, ($F(2,5653) = 3.75$, $p < .05$. Younger men in WV reported less access to healthcare than women or older WV residents. Future studies should continue to examine access to healthcare with more diverse populations. The definition of "access to healthcare" should be more expanded, and may need to focus on additional barriers, such as the impact of not having transportation.

Funding: Federal
Program/Mechanism Supporting Research/Creative Efforts: AGE-ADAR

Presentation Number: 156

Age and (Un)Employment: Predictors of Depression in West Virginia

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Field (Broad Category): Psychology (Sport Science/Psychology)
Student's Major: Biomedical Engineering

West Virginia continues to have higher depression rates than the national average (CDC, 2020), while also having a significantly lower labor force participation rate (U.S. Bureau of Labor Statistics). This study examines age, employment status, and depression in West Virginia. Using the 2020 Behavioral Risk Factor Surveillance System (BRFSS) data, presence of depression was compared across different employment statuses among younger adults (n=1183, ages 18-44 yrs), middle-aged adults (n = 2025, ages 45-64 yrs) and older adults in WV (n=2105, ages 65+ yrs). There was an overall effect, $X2$ ($DF = 4$) = 432.66, $p < .001$. Post hoc tests showed that across unemployment, younger adults reported higher depression; across age groups, those who were not employed reported higher depression, and the age by employment status interaction emerged as significant. The results suggest that not working is associated with poorer mental health, especially for younger adults. Further research could investigate whether young adults with mental health issues are not working or if unemployment exacerbates mental health problems.

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Presentation Number: 157

Variations of Functional Analyses to Identify Escape as a Reinforcer

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology and Biology

A functional analysis (FA) is a behavioral assessment that identifies the functional relations between behavior and environment, with an emphasis on reinforcers likely to maintain challenging behavior. Although considerable research exists on FA methodologies generally, most studies have been conducted with individuals with cognitive disabilities and have not examined the role of the stimulus removal for the identification of negative reinforcement. Therefore, the purpose of this study was to replicate studies suggesting the utility of FA methods for individuals without cognitive disabilities and to evaluate the extent to which removing work materials increased the likelihood of identifying a negative reinforcement (escape) function relative to a condition in which work materials remained and a preferred-task control. Participants were elementary-aged students enrolled in a public alternative education program. A preference assessment was conducted to establish preferred and nonpreferred tasks. The most preferred task was used during the control condition of the FA; the least preferred task was used during the test conditions. One test phase included removal of materials. An additional play control condition, in which no work was presented, was implemented to aid in discrimination of the conditions. Results suggest that seemingly modest procedural variations can affect the likelihood of identifying escape as a reinforcer during an FA.

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The Correlation between Poor Health Days and Race

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Field (Broad Category): Psychology (Health Sciences)
Student's Major: Criminology

According to CDC data, racial and ethnic minority groups experience higher rates of illness and death when compared to white counterparts. There are numerous factors that account for poor health such as sex, age, and number of chronic health conditions. To examine if race is a significant factor in poor health days, we use a nationally representative sample (n=375,516) from the 2020 Behavioral Risk Factor Surveillance System provided by the CDC to determine if the addition of race as a factor, along with the three other factors, makes a significant change. Using a two step hierarchical linear regression to predict the number of poor health days per month, age, sex, and other health conditions were entered. These factors accounted for 11.8% in variance health days. Race was then added to see if the addition of this variable would cause a significant change, but only accounted for a very small variance ($p<.001$). This shows that each of the four factors do contribute to number of poor health days, however race is not the most prominent factor in regard to number of poor health days per month.

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Presentation Number: 159

Effect of Audiovisual Cues on Reinforcement Learning Performance and Subjective Experience

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Field (Broad Category): Psychology (Sciences)
Student's Major: Neuroscience and Psychology

Reward cues, such as the bells and whistles in slot machines, can have important motivational effects and encourage risky behavior. However, it is currently unknown if such cues also influence learning through experience about which actions yield rewards: reinforcement learning. Previous work suggests that gamblers learn reward probabilities more slowly, and the biasing of reinforcement learning by audiovisual cues during slot machine play could further compound these learning deficits. We examined whether casino-inspired audiovisual cues affect reinforcement learning. Volunteers performed an online task in which they made choices between two options that earned them points with varying probabilities, which they needed to gauge based on the outcomes of their previous choices. In one version of the task, the point rewards were accompanied by audiovisual reward cues. The results of computational modeling to estimate learning rates and probability perception parameters will be reported elsewhere. Here, we examined the effect of cues on: a) the total number of points earned as a proxy of reinforcement learning performance; b) subjective experience of performing the task in the presence versus the absence of the audiovisual cues. We did not find a significant effect of cues on the total number of points earned or on subjective experience of the task. Subjective experience of the task correlated significantly with the points earned. These preliminary results suggest that the effects of cues on reinforcement learning performance, if present, may be subtle and require sophisticated computational modeling techniques to detect.

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Presentation Number: 160

Alcoholism in Urban Areas

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Field (Broad Category): Psychology (Social Sciences)
Student's Major: Psychology

A person struggling with addiction is defined as an individual who depends on a substance to get through their daily activities. Addiction is a disease. It is a life-threatening issue that is looked down upon when they are the people who need the same amount of help and compassion as someone who is struggling with another disease. Some environments may facilitate a more toxic persona causing an individual to experiment with alcohol. In order to examine whether age and urban/rural status influence alcohol misuse, we used national data from the 2020 Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS). Measures included whether someone had had a drink in the past 30 days, whether they engaged in binge drinkers and whether they were heavy drinkers. Using a series of cross tab analyses, results showed 86.5% of people who had ANY alcohol in the past month live in urban counties, $X2\ (1) = 768.30$, $p < .001$. Binge drinkers were more likely to live in urban areas, $X2\ (1) = 53.79$, $p < .001$. However, there was no significant relation a=between urban/rural and heavy-drinker status, $X2\ (1) = 3.06$, $p = .08$. Follow-up analyses examined whether age moderated these relations. Results showed that middle-aged and older adults' drinking was not different across urban and rural counties. The effect was wholly due to younger adults. These results suggest that more programs and policies are needed to support younger drinkers.

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Presentation Number: 161

Do Jigsaw Activities Increase Graduate Student Learning and Clinical Efficiency?

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Field (Broad Category): Physical/Occupational Therapy, Speech Language Pathology & Audiology (Sciences)
Student's Major: Communication Sciences & Disorders

Purpose: The purpose of this study is to investigate how jigsaw activities impact speech-language pathology students' learning when diagnosing voice disorders. Jigsaw activities are cooperative learning experiences that provide students opportunities to learn from one another. We will evaluate how jigsaw activities affect task speed, student accuracy, clinician confidence, and student professional behaviors.
Method: Thirty-five graduate students in Advanced Voice Disorders will participate in a jigsaw activity set up like medical rounds. The cohort will be set up into two groups: presenters and clinicians. On the first medical rounds day, groups of presenters will present a voice disorder case to groups of clinicians. On the second medical rounds day, the students who were presenters on the first day will become the clinicians. Every student will have the chance to diagnose multiple voice disorder cases. Later in the semester, the students will use their skills learned from the jigsaw activity with a standardized patient in the WVU STEPS simulation lab, which provides a simulated real-life clinical experience.
Results: Data collection was finished in December, with analyzed results ready by late March.
Conclusion: We are hypothesizing that the jigsaw activities will improve task speed, student accuracy, and clinician confidence. We are also hypothesizing that using jigsaw activities may impact student professional behaviors during standardized patient encounters. It is unclear if students' professional behaviors will decrease as their efficiency increases or if students will be able to maintain efficiency while still maintaining professional behaviors.

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Program/Mechanism Supporting Research/Creative Efforts: Capstone course within my department

Presentation Number: 162

The Effectiveness of Community Connect Grants on Internet Access in West Virginia

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Field (Broad Category): Business (Social Sciences)
Student's Major: Anthropology and Economics

This research study investigates the effectiveness of Community Connect Grants on Internet Access in West Virginia. Community Connect Grants are awarded by the United States Department of Agriculture to communities with low-quality internet access or lack access to the internet entirely. Currently, many rural and low-income areas in the United States lack access to the internet, including areas in West Virginia. Three West Virginia Counties received Community Connect Grants in 2016, and these counties were used as the treatment variables of two differences in differences estimations. The first differences in differences regression estimated the effects of the grants on broadband internet, while the second estimated the effects of the grants on high-speed internet. The coefficient on the treatment counties was not statistically significant, supporting the conclusion that the grants were not effective in providing internet access in West Virginia. A barrier to internet subscribership in counties that received the expansion of the internet could have been the high cost of internet service.

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Program/Mechanism Supporting Research/Creative Efforts: Capstone course within my department

Presentation Number: 164

Quantification of Stereotyped Behavioral Patterns During Social Interaction of Weakly Electric Fish

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Field (Broad Category): Neuroscience (Sciences)
Student's Major: Biomedical Engineering

Sensory systems are used to interpret the surroundings of a species to localize and adjust its behavior. In nature, localization is vital in adjusting the behavior of an animal successfully. Localization is the ability to identify the origin of a detected signal such as another animal and adapt accordingly. Studies have shown that the mechanisms revolving around the sensory system are accurate in localization from signals including weak signals. Gymnotid fish use very weak electric signals from the electro sensory system to localize their surroundings. By using these fish, we aim to better understand spatial processing through social interaction by characterizing these signals. To achieve this in the lab environment, the fish have been placed in a black room and with the use of infrared lighting, their interactions have been recorded. To identify a variety of behaviors, the fish were placed in varied locations within the environment. A computational algorithm will be applied to the data to identify the complex behaviors seen in social interactions. The algorithm would potentially identify stereotypical patterns from multiple social exchanges. The creation of artificial stimuli provides an understanding of the neural mechanism of localization in the electro sensory system. In conclusion, the study of Gymnotid fish behaviors is in its final stage of data collection and provides information to further the understanding of the electro sensory system.

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