

THE FOURTH ANNUAL

UNDERGRADUATE SPRING SYMPOSIUM

A VIRTUAL CONFERENCE EXPERIENCE

INTERACTIVE APRIL 1 - APRIL 30, 2020

UNDERGRADUATESPRINGSYMPOSIUM.WVU.EDU



Welcome to the 2020 Undergraduate Spring Symposium

With the worldwide spread of COVID-19, our daily routines have been temporarily disrupted and, in some cases, forever changed. However, the 2020 Undergraduate Spring Symposium still represents an opportunity for you and your fellow undergraduate students to demonstrate, display, exhibit and, most importantly, speak about what has been *your* normal for the past couple of months — research.

West Virginia University has a strong research tradition, as evidenced by our Carnegie classification as a top research (R1) institution. The R1 ranking belongs to only 131 of the nearly 4500 institutions of higher learning in the United States, denoting the highest level of research activity. You have joined a long list of undergraduate students at West Virginia University whose participation and involvement in research has contributed to our maintenance of this prestigious status. This is indeed an achievement you should be immensely proud of.

Current literature indicates that the benefits associated with participating in undergraduate research include, but are not limited to, refined communication skills, clearer organizational skills, a healthy sense of self-efficacy and competence, collaborative learning and problem solving (Ziwoya & Falconer, 2018; Salsman et al., 2013). Moreover, student researchers often report significant gains in their ability to think critically and logically, put ideas together and learn on their own (Pearson et al., 2017). All of these benefits are not only applicable to you in your specific discipline, but more importantly these are life skills which will go a long way in enabling you to become an individual who contributes to society immediately and throughout the course of your lives.

Berry Gordy Jr. once said, “Less than one percent of the people in the world reach their full potential — and the reason is they take their focus off what they are doing.” Use your undergraduate research experience to validate the fact that you can keep focused on what you are doing to reach and achieve your full potential.

Great work, and keep persisting.

Best regards,



Damien Clement, PhD
Acting Dean, WVU Honors College,
Associate Professor of Sport and Exercise Psychology and Athletic Training

Works Cited

- Pearson, R., Crandall, J., Dispennette, K., & Maples, J. (2017). Students' perceptions of an applied research experience in an undergraduate exercise science course. *International Journal of Exercise Science*, 10, 926-941.
- Salsman, N., Dulaney, C., Chinta, R., Zascavage, V., & Joshi, H. (2013). Student effort in and perceived benefits from undergraduate research. *College Student Journal*, 47, 202-211.
- Ziwoya, F., & Falconer, J. (2018). Designing mentorship: Exploring the challenges and benefits of undergraduate research. *College Student Journal*, 52, 532-538.

ORGANIZING COMMITTEE

Dr. Cinthia Pacheco, Assistant Director, Office of Undergraduate Research
Dr. Michelle Richards-Babb, Director, Office of Undergraduate Research
Kevin Walden, Program Coordinator, Office of Undergraduate Research
Paige Zalman, Program Coordinator, RAP and Office of Undergraduate Research

We want to take this opportunity to thank our undergraduate presenters. Their willingness to present and discuss their scholarly activities in virtual format is greatly appreciated.

In addition, special thanks to our faculty mentors. Scholarly activities, such as research and creative endeavors, enrich the academic training of our students by establishing mentoring relationships and promoting intellectual independence and curiosity. Our students are indebted to the faculty who mentor them in research!

SPONSORS

The *Fourth 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/>)
- Undergraduate Intercollegiate Biochemistry Program (<https://biochemistry.wvu.edu/>)
- Research Apprenticeship Program (RAP)
- Office of the Provost (<https://provost.wvu.edu/>)
- SpeakWrite (<https://speakwrite.wvu.edu/>)
- Honors College (<https://www.honors.wvu.edu/>)

ALPHABETICAL LISTING OF PRESENTERS (1ST Authors only)

Last	First	Major	Category	No.
Adams	Tanisha	Anthropology	Oral-Human Engagement	1
Adkins	Michelle	Mechanical and Aerospace Engineering	Oral-Science & Technology	21
Airing	Emily	Immunology and Medical Microbiology	Health Sciences	114
Alderman	Megan	Animal Science	Agricultural & Environmental Sciences	39
Andrews	Zachary	Forensic and Investigative Science	Physical Sciences & Engineering	158
Asad	Ismail	Biology	Biological & Biochemical Sciences	89
Bachy	Alexander	Civil Engineering	Physical Sciences & Engineering	159
Bailey	Kaitlin	Criminology	Behavioral & Social Sciences	62
Barbour	Mikaela	Biology	Biological & Biochemical Sciences	90
Barro	Mauricio	Political Science	Agricultural & Environmental Sciences	40
Bennett	Daniel	Aerospace Engineering	Physical Sciences & Engineering	160
Bogges	Jeffrey	ADPR	Behavioral & Social Sciences	63
Bohrer	Zachary	Chemical Engineer	Physical Sciences & Engineering	161
Booher	Andrew	Biology	Biological & Biochemical Sciences	91
Boucher	Reese	Physics	Oral-Science & Technology	22
Bowers	Riley	History	Human Engagement	147
Britton	Kelcie	Immunology and Medical Microbiology	Biological & Biochemical Sciences	92
Brothers	Brooke	Immunology and Medical Microbiology	Health Sciences	115
Brown	Candice	Sport and Exercise Psychology	Behavioral & Social Sciences	64
Bruce	Kevin	Computer Engineering	Physical Sciences & Engineering	162
Buchman	Talia	Anthropology	Oral-Human Engagement	2
Bustos	Jefferson	Business	Oral-Human Engagement	3
Butcher	Brooklyn	Biology	Biological & Biochemical Sciences	93
Cade	Ethan	Environmental Geoscience	Agricultural & Environmental Sciences	41
Caldwell	Blake	Political Science	Behavioral & Social Sciences	65
Cardinal Tremblay	Jacob	Physics	Physical Sciences & Engineering	163
Carpenter	Lukas	Strategic Communications - AD/PR	Oral-Human Engagement	4
Carte	Parker	Multi-Disciplinary Studies	Oral-Science & Technology	23
Cassiodoro	Angelo	Mechanical and Aerospace Engineering	Physical Sciences & Engineering	164

Caylor	Peyton	Wildlife and Fisheries Resources	Agricultural & Environmental Sciences	42
Clairmont	Callista	Spanish	Health Sciences	116
Clemons	Skyler	Forensic Examiner	Oral-Human Engagement	5
Cohan	Erin	Chemistry	Physical Sciences & Engineering	165
Cohen	Hannah	Biomedical Engineering	Physical Sciences & Engineering	166
Colantonio	Lea	Biochemistry	Health Sciences	117
Cole	Brenna	Geology	Agricultural & Environmental Sciences	43
Coleman	Michelle	Exercise Physiology and Psychology	Health Sciences	118
Cook	Andrew	Biochemistry	Biological & Biochemical Sciences	94
Cook	Piper	Biology	Biological & Biochemical Sciences	95
Crayton	Jacey	Flute Performance	Visual & Performing Arts	35
Cumberledge	Aubrey	Biology	Biological & Biochemical Sciences	96
Dalzell	Kourtney	Forensic Chemistry	Agricultural & Environmental Sciences	44
Day	Matthew	Wildlife & Fisheries Resources	Agricultural & Environmental Sciences	45
DeLarge	Brianna	Psychology	Behavioral & Social Sciences	66
Dial	Morgan	Biology	Oral-Science & Technology	24
Donnelly	Kevin	Chemical Engineering	Physical Sciences & Engineering	167
Dorsey	Emma	Mechanical & Aerospace engineering	Physical Sciences & Engineering	168
Dubaj	Kevin	Biochemistry	Health Sciences	119
Dundon	Madelyn	Dance	Oral-Human Engagement	6
Egnor	Kaylea	Criminology	Oral-Human Engagement	7
Faber	Sarah	Neuroscience	Health Sciences	120
Fandey	Bijan	Interactive Design for Media	Visual & Performing Arts	38
Ferweda	Evan	Forensic Chemistry	Physical Sciences & Engineering	169
Fields	Seth	Agroecology	Agricultural & Environmental Sciences	46
Fisher	Megan	Dental Hygiene	Health Sciences	121
Foley	Hannah	Civil Engineering	Agricultural & Environmental Sciences	47
Forshee	Raven	Biology	Biological & Biochemical Sciences	97
Francis	Toby	Theatre Design & Technology	Oral-Human Engagement	202
Friend	Jenna	Animal and Nutritional Science	Agricultural & Environmental Sciences	49
Friend	Sydney	Animal and Nutritional Sciences	Agricultural & Environmental Sciences	48
Gadd	Rachel	Biochemistry	Health Sciences	122
Garrett	Shedrick	Psychology/Neuroscience	Behavioral & Social Sciences	67
Geczo	Jessica	Criminology	Oral-Human Engagement	8
Gemmen	Ellena	Mechanical Engineering	Physical Sciences & Engineering	170

Gilbert	Josie	Neuroscience	Health Sciences	123
Gokey	Kailee	Geology	Agricultural & Environmental Sciences	50
Gooding	Rebekah	Art History	Human Engagement	148
Groves	Allison	English and Spanish	Human Engagement	149
Gu	Wenjuan	Biochemistry	Health Sciences	124
Guidry	Jayda	Economics	Oral-Human Engagement	9
Halpern	Emily	Forensic and Investigative Science and Chemistry	Physical Sciences & Engineering	171
Hamirani	Murad	Computer Science	Physical Sciences & Engineering	172
Hartle	Sarah	History	Human Engagement	150
Hartzell	Lindsey	Wildlife & Fisheries	Oral-Science & Technology	25
Hay	Andrew	Civil Engineering	Agricultural & Environmental Sciences	51
Hays	Savannah	Biomedical Engineering	Health Sciences	125
Heller	Emily	Forensic Chemistry	Physical Sciences & Engineering	173
Helmick	Levi	Biology & Biochemistry	Biological & Biochemical Sciences	98
Hershman	Samantha	Biology	Biological & Biochemical Sciences	99
Hillman	Julia	ADPR	Oral-Human Engagement	10
Hillman	Julia	ADPR	Behavioral & Social Sciences	68
Himelstein	Anna	Geology	Agricultural & Environmental Sciences	52
Hodges	Breanna	Chemistry	Physical Sciences & Engineering	174
Hogan	Sarah	Criminology	Behavioral & Social Sciences	69
Howard	Charles	Aerospace Engineering	Physical Sciences & Engineering	175
Humphreys	Alexis	Psychology	Behavioral & Social Sciences	70
Hurley	Isabella	Biology	Biological & Biochemical Sciences	100
Jacinto	Isabelle	Engineering Track 3 - Chemical Engineering	Physical Sciences & Engineering	176
Jalso	Rowan	BA Theatre	Oral-Human Engagement	11
James	Brittany	Public Relations	Human Engagement	151
Jenkins	Anna	Exercise Physiology	Health Sciences	126
Jernigan	Amaya	Biology	Biological & Biochemical Sciences	101
Joh	Euna	Music Composition, Piano Performance	Visual & Performing Arts	36
Johnston	Madison	Psychology	Behavioral & Social Sciences	71
Justus	Mariah	Forensic Science	Behavioral & Social Sciences	72
Khan	Zoya	Biology	Biological & Biochemical Sciences	102
Kim	Hong Woo	Chemical Engineering	Physical Sciences & Engineering	177
King	Emily	Psychology	Behavioral & Social Sciences	73
Knutsen	Lydia	Industrial Engineering	Physical Sciences & Engineering	178
Koller	Jacob	Chemical Engineering	Physical Sciences & Engineering	179

Kotula	Ahna	Forensic Science	Physical Sciences & Engineering	180
Kuberski	Sara	Forensic and Investigative Science; Chemistry	Physical Sciences & Engineering	181
Kushner	Erica	English	Oral-Human Engagement	12
Kuzniar	Teagan	Biology and Spanish	Biological & Biochemical Sciences	103
Kyathari	Saaketh	Immunology and Medical Microbiology	Health Sciences	127
Labishak	Gabrielle	Geology	Agricultural & Environmental Sciences	53
Lacek	Leslie	Mechanical Engineering	Physical Sciences & Engineering	182
Langan	Erin	Neuroscience	Health Sciences	128
Lawer-Yolar	Paul	Biochemistry	Oral-Science & Technology	26
Lewis	Cheyenne	Biochemistry	Health Sciences	129
Lewis	Vernon	Wood Science and Technology	Oral-Science & Technology	27
Lichvar	Mikhaela	biochemistry	Health Sciences	130
Linscheid	Mary	Multidisciplinary Studies	Human Engagement	152
Lipinski	Sarah	Psychology	Behavioral & Social Sciences	74
Lokant	Joseph	Biochemistry (ACS Track)	Physical Sciences & Engineering	183
Lomov	Denis	International Relations	Oral-Human Engagement	13
Loverde	Jakob	CPE/CS	Physical Sciences & Engineering	184
Luikart	Benjamin	Public Relations and Advertising and Business Administration	Oral-Human Engagement	14
MacFarland	Eva	Psychology & Biology	Behavioral & Social Sciences	75
Maley	Grace	Biochemistry	Health Sciences	131
Malkowski	Aaron	Immunology and Medical Microbiology	Oral-Science & Technology	28
Mamboleo	Egon	Mechanical Engineering	Physical Sciences & Engineering	185
Marciello	Kylee	Psychology & Criminology	Oral-Human Engagement	15
Martin	Mikalaa	Forensic and Investigative Science	Physical Sciences & Engineering	186
Mathison	Kylea	Forensic Chemistry	Physical Sciences & Engineering	187
McConahy	Kayla	Energy Land Management	Agricultural & Environmental Sciences	54
McCormick	Madison	Psychology	Behavioral & Social Sciences	76
McDill	Serenity	Nursing	Health Sciences	132
McFarland	Robert	Geology	Agricultural & Environmental Sciences	55
Means	Jordan	Immunology and Medical Microbiology	Health Sciences	133
Miller	Olivia	Biomedical Engineering	Health Sciences	134
Miller	Taylor	Strategic Communications	Behavioral & Social Sciences	77
Miller	Trenton	Chemical Engineering	Physical Sciences & Engineering	188
Milleson	Virginia	Neuroscience and Psychology	Behavioral & Social Sciences	78

Minard	Robert	Industrial Engineering	Agricultural & Environmental Sciences	56
Moore	Brandon	Exercise Physiology	Health Sciences	135
Moore	Zoe	Biomedical Engineering	Physical Sciences & Engineering	189
Moran	Hayden	Chemistry	Physical Sciences & Engineering	190
Morgado	Mary	Public Health	Oral-Science & Technology	29
Moss	Margaret	Psychology	Behavioral & Social Sciences	79
Nau	Christopher	Chemistry	Physical Sciences & Engineering	191
Naylor	Olivia	Exercise Physiology	Health Sciences	136
Nistendirik	Jordan	Political Science and History	Human Engagement	153
Norris	Jared	Biochemistry	Health Sciences	137
Norris	Jonathan	Wood Science and Technology	Oral-Science & Technology	30
O'Hara	Ross	Aerospace and Mechanical Engineering	Physical Sciences & Engineering	192
Ondeck	Megan	Anthropology and Women and Gender Studies	Behavioral & Social Sciences	80
O'Savage	Hanna	Occupational Therapy	Health Sciences	138
Pall	Alexander	Environmental, soil and water sciences	Oral-Science & Technology	31
Pampalone	Alex	Biology	Biological & Biochemical Sciences	104
Parker	Brandy	Aerospace Engineering	Physical Sciences & Engineering	193
Parker	Caitlyn	Biology	Biological & Biochemical Sciences	105
Paul	Abigail	Chemical Engineering	Agricultural & Environmental Sciences	57
Peacher	Nikoli	Neuroscience	Health Sciences	139
Pentz	William	Biochemistry and Mathematics	Health Sciences	140
Peyton	Jillian	ADPR	Behavioral & Social Sciences	81
Pinion	Kylie	Mechanical Engineering	Physical Sciences & Engineering	194
Pinti	Katelyn	Exercise Physiology	Health Sciences	141
Plante	Molly	History	Human Engagement	154
Ponton	Annika	Biology	Biological & Biochemical Sciences	106
Price	Victoria	ADPR	Behavioral & Social Sciences	82
Pulley	Jonathan	Mechanical and Aerospace Engineering	Physical Sciences & Engineering	195
Rai	Ali	Biomedical Engineering	Health Sciences	142
Redford	Shayna	Biochemistry	Agricultural & Environmental Sciences	58
Richmond	Alexandra	Neuroscience	Health Sciences	143
Ridgway	Ian	Advertising	Human Engagement	155
Robinson	Marshall	Applied and Environmental Microbiology	Agricultural & Environmental Sciences	59
Rockwell	Elizabeth	Music Performance	Visual & Performing Arts	37
Ruiz	Felipe	Civil Engineering	Oral-Science & Technology	32

Rush	Ashton	Biochemistry	Biological & Biochemical Sciences	107
Ryczek	Holly	Forensic and Investigative Science	Behavioral & Social Sciences	83
Santee	Mathilda	Biology	Biological & Biochemical Sciences	108
Saurborn	Emily	Exercise Physiology	Health Sciences	144
Sauvé	Brianna	Forensic Chemistry	Physical Sciences & Engineering	196
Schmitz	Michele	Acting	Oral-Human Engagement	16
Schmitz	Sarah	Forensic Biology	Physical Sciences & Engineering	197
Shank	Sophia	Psychology, B.S.	Behavioral & Social Sciences	84
Shaver	Trinity	Psychology and Multidisciplinary Studies	Behavioral & Social Sciences	85
Sheik	Matthew	Biology	Biological & Biochemical Sciences	109
Sigler	Marra	Communication Sciences and Disorders	Behavioral & Social Sciences	86
Smiley	Elisabeth	Biology	Biological & Biochemical Sciences	110
Smith	Nathaniel	Finance	Human Engagement	156
Sokolov	David	Biology, Mathematics	Biological & Biochemical Sciences	111
Sommer	Carolyn	Anthropology	Behavioral & Social Sciences	87
Spangler	Sophia	Political Science	Oral-Human Engagement	17
Spears	Kassidy	Biology	Biological & Biochemical Sciences	112
Spencer	Noah	Biology	Biological & Biochemical Sciences	113
Staller	Kassidy	Animal Science	Health Sciences	201
Stewart	Anastasia	Philosophy Art History	Oral-Human Engagement	18
Swart	Broghan	Public Relations	Oral-Human Engagement	19
Thom	Matthew	Mechanical/Aerospace Engineering	Physical Sciences & Engineering	198
Thompson	Adrienne	History	Human Engagement	157
Traggiai	Hanna	Biochemistry	Health Sciences	145
Vazquez	Sherley	Psychology B.S.	Behavioral & Social Sciences	88
Vito	Jenna	Chemical Engineering	Physical Sciences & Engineering	199
Wager	Bethany	Wildlife and Fisheries Resources	Oral-Science & Technology	33
Winslett	Rachel	Applied and Environmental Microbiology	Agricultural & Environmental Sciences	60
Wohlfarth	Bradley	Aerospace and Mechanical Engineering	Physical Sciences & Engineering	200
Wolfe	Amanda	Exercise Physiology	Health Sciences	146
Wright	Lillian	English & French	Oral-Human Engagement	20
Young	Lauren	Biochemistry	Agricultural & Environmental Sciences	61
Young	Olivia	Physics	Oral-Science & Technology	34

ORAL PRESENTATION INDEX

Oral-Human Engagement Category

1	Undergraduate Anthropology as White Academic Space: Perceptions and Experiences of Minority Anthropology Students at WVU	Anthropology & Archeology
2	Perception of Cancer among a College-going/College-educated Population in the Appalachian Region	Anthropology & Archeology
3	Low-Carbon ETFs v. Energy ETFs	Finance
4	Women's Incarceration: Employment	Communications/Journalism
5	Insight into the Professional Opinion of Ethics in the Field of Forensics	Forensics
6	Strolling Through the Esplanade: A Dramaturgical Approach to Paul Taylor's Iconic Work	Dance History
7	Bullying the Bullies: An Exploration of Shaming and Vigilantism in Cyberspace	Sociology
8	Plea Bargaining and Manipulation of Justice Within The "Justice" System	Criminology/Criminal Justice
9	Data Privacy: Insights from Current Legislation and Survey Responses.	Law & Legal Studies
10	Examining Diversity and Inclusion: Italy's National Airline Uses Blackface in its #WhereIsWashington Campaign	Communications/Journalism
11	Why Satire: How the Socio-Political Events of the 70s Led to the Satire Boom.	Theatre/Drama
12	Allen Ginsberg's Howl and Literature Interpretation: Intersectional Identity Contextualized within the Canon of Literature	English & Literature
13	Russia and Ukraine: The Multi-method Approach to Understand an Interstate Conflict	Political Science-International Relations
14	The Frames of Corporate Social Responsibility	Public Relations
15	Crime Deviance and Online Voyeurism	Criminology/Criminal Justice
16	How Theatre Affects Children	Theatre/Drama
17	Autism Related Barriers to Healthcare Access	Architecture & Interior Design
18	What Happens When You Write an Autobiography	Philosophy, Ethics, & Religious Studies
19	Children of Incarcerated Parents	Communications/Journalism
20	The Italian Other in 19th/20th Century Dime Novels	English & Literature
202	The Wonderful World of Wounds	Theatre/Drama

Oral-Science & Technology Category

21	Implementation of Active Learning in Calculus Instruction	Mathematics
22	Bayesian Calibration Assisted by Markov Chain Monte Carlo in DFT+U for Iron Compounds	Physics & Astronomy
23	Opioid Use Disorder: A Multifaceted Approach	Neuroscience
24	Ecological Comparison of <i>Sholopax</i> minor in the United States Through Time	Biology

25	West Virginia Trout Stocking Survey: Catch Expectations vs. Reality Considering Angler Effort	Environmental Science & Sustainability-Wildlife & Fisheries
26	The Function of Engrailed and Invected in Horned Beetle Development	Biology
27	Net Zero with Hardwood Mass Timber	Environmental Science & Sustainability
28	Characterizing Monoclonal Antibodies as a Novel Therapeutic for Pseudomonas aeruginosa Infections.	Medical Sciences
29	Seeking A Framing Effect: Millennials and a Sugary Beverage Tax	Nursing & Public Health
30	All Wood Mass Timber – Developing a Prototype for Hardwood Species	Wood Science
31	The Effects of Acid Mine Drainage in Kanawha County, West Virginia	Environmental Science & Sustainability
32	Recycle Plastic Beads Utilized in Concrete Mix Design	Engineering
33	Using sex ratios of Brook Trout to identify population resilience and spawning adult size	Natural Resources/Wood Science/Plant Science
34	Data Simulation to Constrain Fast Radio Burst (FRB) Periodicity Search Techniques	Physics & Astronomy

VISUAL & PERFORMING ARTS PRESENTATION INDEX

35	Preparation, Performance, and Recording of 12 Memorized and Choreographed Works for Four Flutes	Music/Music Therapy
36	The Exploration of Sounds and Techniques in String Quartet, Love Languages, by Euna Joh	Music/Music Therapy
37	A Study of the Relationships Between American, Swiss, and French Rudimental Drumming	Music/Music Therapy
38	Basilisk Breakout, A Virtual Reality Experience	Media and/or Design

POSTER PRESENTATION INDEX

Agricultural & Environmental Sciences Category

39	Assessment of a Novel Pelleting Throughput Aid, AZOMITE®, a Hydrated Sodium Calcium Aluminosilicate	Agriculture
40	Long-term Soil Moisture Data Among Three Forested Watersheds Reveal Increasing Soil Moisture Decade	Biology
41	What is the Proper Amount of Rings Needed for Accurate Dating of Trees?	Geography/Geology
42	Are Invasive Spotted Wing Drosophila Affecting Eastern Songbird Diets?	Wildlife and Fisheries Resources
43	How Did We Get Here? Insights from Local Mantle-Derived Kimberlites and Pyroxenites	Geography/Geology
44	Electrochemical Detection of Lead and Cadmium in Drinking Waters Using Screen-Printed Carbon Electrodes	Forensic Chemistry
45	Surveying Depredation of Livestock in the State of West Virginia by Eastern Coyotes	Natural Resources/Wood Science/Plant Science
46	Does Adding Manure Improve Soil Health in an Organic Grassland System?	Agriculture

47	Changes in Water Demand in West Virginia	Environmental Science & Sustainability-Civil Engineering
48	Sex Determination Genes Intersex and Transformer-2's Role in the Development of <i>Onthophagus taurus</i> Horns	Biology
49	The Effect of Varying Steam Conditioning on Enzyme Products in a Pelleted Broiler Diet	Agriculture
50	Structural Analysis of Tensile Fracture Sets in The Medicine Lake Dacite Lava, California	Geography/Geology
51	West Virginia Lake Budget	Engineering
52	GIS Mapping of Volcanic Landform Age Distribution in Lago de Patzcuaro Region, Michoacan, Mexico	Geography/Geology
53	Constructing Digital Rocks	Geography/Geology
54	Water Consumption Related to Unconventional Drilling in West Virginia and Pennsylvania	Environmental Science & Sustainability-Energy Management
55	Did a 600 Year Old Volcanic Eruption Knock Down The Surrounding Forest	Geography/Geology
56	Life Cycle Cost Model for Transit Buses	Engineering
57	The Use of Bioremediation as a Potential Treatment for Produced Water	Environmental Science & Sustainability-Environmental Microbiology
58	Exploring the Influence of Soil Amendments on Fungal to Bacterial Ratios in Bioenergy Agroecosystems	Environmental Microbiology
59	Analysis of Fungal Communities in Agricultural Soils Under Varying Methods of Cultivation	Environmental Science & Sustainability
60	Measuring Carbon Storage on Soil Mineral Surfaces by Microbes Under Increased Nitrogen Deposition	Microbial Soil Ecology
61	Investigating the Genetic Compatibility of <i>Cryphonectria Parasitica</i> and Effects in Relation to <i>Castanea Dentata</i>	Biology
Behavioral & Social Sciences Category		
62	The Pressure to Plead	Criminology/Criminal Justice
63	Identifying How and Where to Deliver Sports News Digital Content to Fans	Communications/Journalism
64	Study Abroad in Sport and Exercise Psychology: A Cross-Cultural Experience in Scandinavia	Sports Management/Sport Exercise Psychology
65	Childcare Affordability in West Virginia	Public Administration
66	Memory for Actions in Twins and Friends	Psychology
67	Frequent Baseline Reinforcement Reduces Treatment Efficacy	Psychology
68	Analyzing Social Media Interactivity and Emerging Sports Leagues	Communications/Journalism
69	Problem Solving, Depopulation and Vacant Land in a Pittsburgh Neighborhood	Criminology/Criminal Justice
70	Preference for Quantitative and Qualitative Forms of Performance Feedback	Psychology
71	Parental Attachment and Mental Health in College Students: The Moderating Role of Self-Control	Psychology
72	Social Capital and Homicide: Are They Related?	Sociology

73	Demographic and Self-Control Levels as Predictors of College Drop-out and Performance	Psychology
74	Exploring the Impact of Wait Time on Child Behavior in a Pediatric Dental Setting	Psychology
	Deconstructing the Tin-Foil Hat: The Role of Conspiratorial Beliefs and Disgust in Anti-Vaccination Attitudes	Psychology
76	Analyzing the Relationship between Delay Discounting and Obsessive-Compulsive Symptomatology through Mindfulness	Psychology
77	Trauma-Informed Care for Children of Incarcerated Mothers in West Virginia	Communications/Journalism
78	Minocycline Ineffective in Treatment of Impulsivity and Attention Impairment Resulting from Traumatic Brain Injury	Neuroscience
79	Interactions Between Religion and Science Among Graduate Students in Sciences	Sociology
80	A Child in Distress: The Effects of Workplace Raids on Families and Children	Geography/Geology
81	Questioning Authority: The Diffusion of Misinformation Among the Scientific Community	Communications/Journalism
82	The McClatchy Company Sports Pass: Effects of Game Outcome on Digital Sport Subscription	Communications/Journalism
83	Community Dynamics and Crime in Rural Areas	Sociology
84	Child Compliance with Oral Health Providers and Caregivers in the Dental Setting	Psychology
	The Effects of 'Jackpot' Stimuli on Suboptimal Decision-Making after Traumatic Brain Injury	Psychology
86	Students Perception and Effectiveness of Homework in Higher Education	Physical/Occupational Therapy, Speech Language Pathology & Audiology
87	The Development of a Visual Catalogue Comprised of Ceramic Potsherds from the Tarascan State	Anthropology & Archeology
88	Impulsivity Levels Predict Risky Sexual Behaviors During the Transition to College	Psychology

Biological & Biochemical Sciences Category

89	Comparing Salt and Drought Effects on Gene Expression in a Populus Tree Hybrid	Biology
	Tissue-Nonspecific Alkaline Phosphatase Maintains the Intestinal Microenvironment in Mouse Experimental Sepsis	Medical Sciences
91	Behavioral Differences Between the Wildtype and Genomic Screen Homeobox 1 Mutant Zebrafish	Biology
92	Functional Analysis of an Esterase Gene Involved in Synthesis of Ergot Alkaloids	Biochemistry
93	Novel Bacterial Isolates that Antagonize Human Pathogens and Could Lead to New Probiotics	Biology
94	Activating MsAHns in a Putative Inhibitory CDC in <i>D. melanogaster</i> and Associated Behavioral Responses	Biology
95	Effects of Intraoperative CT Scanning on Stereotactic Accuracy of Deep Brain Stimulation Surgery	Neuroscience
96	Phylogenetic Relationships in New Caledonian Palms (<i>Arecaceae</i>) with a Focus on <i>Archontophoeniceae</i> and <i>Chambeyronia</i>	Biology
97	It Runs in the Family: Optimizing Paratransgenesis for Vector Control of African Trypanosomes	Biology
98	The Connectivity of a Serotonin Releasing Neuron within a Fruit Fly Sensory Network	Neuroscience

99	Investigating Expression of Genes Associated with Oculomotor Dysfunction Using Zebrafish	Biology
	Patient's Expectation of Medication for Dental Pain	Medical Sciences
101	Stem Cell Therapy that Allows Cartilage Regeneration	Biology
102	An Evaluation of a Weight Sensitivity Training for Clinicians	Nursing & Public Health
103	Assessing the Impacts of Hydraulic Fracturing on Stream Health using Biofilm Diversity	Environmental Science & Sustainability
104	Comparison of Nutrition Knowledge, Confidence and Attitudes Across Four Health Professional Programs at WVU	Education
105	Investigating the Role of Gsx2 In the Development of the Zebrafish Hypothalamus	Biology
106	Comparison of Diets in Predatory Vertebrates	Biology
107	Understanding Microbial Trait Responses to Increased Sea Level Rise Along a Coastal Forest Boundary	Biology
108	Integrative Species Delimitation in Californian Striped Coralroot Orchids	Biology
109	West Virginia University Herbarium Digitization Projects	Biology-Plant Taxonomy
	Proteasome Regulation Through Activators and Inhibitors	Biochemistry
111	More Than Meets the Eye: Roles of NAD-synthase NMNAT1 in Retinal Development and Metabolism	Biology
112	Determining the Role of Monocytes in Dextran Sulfate Sodium (DSS)-Induced Colitis	Medical Sciences
113	Plasmid DNA Sequence Analysis Elucidates Evolution of Species-Specific Tsetse Fly Symbiotic Bacteria	Biology
Health Sciences Category		
114	Evaluation of Anti-pertussis IgG Serum Titers Over Time in a Murine Model	Medical Sciences-Immunology
	Effects of miR-34a Promoter Regulation on PD-L1 Expression in Lung Cancer Cell Lines.	Medical Sciences
116	Association of Stroke Health Literacy with Stroke Risk Factors and Post- Stroke Depression	Neuroscience
117	Glutamate Levels in Post Stroke Depression	Medical Sciences
118	Functional Connectivity Differences in Individuals with Autism Spectrum Disorder	Neuroscience
119	Evaluation of Pupillometry as a Method of mTBI Diagnosis	Medical Sciences
120	How mitoNEET Functionally Affects Learning and Memory in C Elegans	Neuroscience
121	Effects of Mouthrinses on Salivary pH After Acidic Drink Consumption	Dental Hygiene
122	Identifying Cancer Inhibitory Drugs that Can Penetrate the Blood-Brain Barrier	Pharmaceutical Sciences
123	Cognitive Behavioral Therapy Affects Function of the Immune System	Neuroscience
124	Effects of Aldosterone on the Ion Channels in the Colon	Biochemistry
	Association Between Social Behavior and Face Responsiveness in Autistic and Healthy Brains	Neuroscience
126	Pilot Testing for Reduced Exertion High-Intensity Interval Training in and Aquatic Setting	Exercise Science & Nutrition
127	Assessing the Toxicity of DNI (3,4-Dichloro-N-isobutyramide) in a Human T-cell Cell Line	Medical Sciences
128	The Autonomic Nervous System and its Relationship to Human Performance and Recovery	Neuroscience
129	Berberine: An Advancement in Effective Drugs to Treat Diabetes?	Biochemistry
130	Cellular Toxicity of Various Zinc Particles	Biology

131	The Role of Intestinal Alkaline Phosphatase in Ischemic Stroke	Neuroscience-Microbiology
132	Coaching Palliative Home Care for Family Caregivers of Heart Failure Patients	Nursing & Public Health
133	Isolation of Mouse Macrophages and Differentiation to M1 and M2 Phenotypes	Medical Sciences
134	Tumor Progression Induces Alterations to Extracellular Vesicle Populations and Neutrophil Extracellular Trap-Supporting Functionality	Engineering
136	Investigation of Novel Therapeutic for Physiological Deficits in a Post-Stroke Model	Neuroscience
136	Implementing Sleep Hygiene and Stress Management Curriculum in a Physical Therapy Wellness Course	Medical Sciences
137	The mitoNEET Ligand NL-1 Increased Adiponectin Levels in Mice Via Bioenergetic Changes	Pharmaceutical Sciences
138	Evaluating the Accuracy of Wearable Sensors to Measure Heart Rate Variability	Occupational Therapy
139	Effect of Novel Phosphodiesterase 4 (PDE4) Inhibitors on Ethanol Consumption in Mice	Neuroscience
140	Evaluating the Radiosensitivities of Chemo-Radiation Treatments for Brain Metastatic Breast Cancer.	Pharmaceutical Sciences
141	Interstitial Mitochondria Localize to Cellular Membrane Following Transplantation in HL-1 Cardiomyocytes	Biology
142	Usage of LPS to Combat Effects of Stroke	Biology-Immunology
143	Dim Light at Night Exposure Induces Cold Hyperalgesia and Mechanical Allodynia in Male Mice	Neuroscience
144	Vaping Behaviors are Associated with Other Health Behaviors in College Students	Human Nutrition and Foods
146	Cooperation of ZEB1 and SNAI1 Transcription Factors in Induction of Epithelial to Mesenchymal Transition	Biochemistry - Cancer/Cell/Molecular Biology
146	Influence of Adherence Packaging on a Hypertensive Population's Medication Adherence Habits and Blood Pressure	Pharmaceutical Sciences
201	Maternal-fetal Consequences of E-Cigarette Vapor Exposure on Cerebral Microvessel Density in Rats	Neuroscience

Human Engagement Category

147	The "Wild West" Goes East: Finding Missing Pieces in a Portrait of 1900s America	Native American Studies
148	Welfenschatz: Treasures of the House of Welf	Art History & Visual Arts
149	The Italian Other in 19th/20th Century Dime Novels	English & Literature
150	The Beginnings and Rebirth of Helvetia: The Swiss in West Virginia	History
151	Out of Prison, Out of Work: The Employment of Formerly Incarcerated Women in West Virginia	Communications/Journalism
152	A Survey of Religious Music in West Virginia	Music/Music Therapy
153	Perspectives on the Gay Community in Weimar Berlin	History
154	A Yellow Star Rising: The Role of Children's Art in the Theresienstadt Ghetto	History
156	Theatre - The Unsinkable	Film/Photography Studies
156	The Structure of State Oversight of K-12 Education Oversight and Regulatory Capture	Economics
157	Preserving the Legacy of West Virginia's Historic African American Schools	Public History

Physical Sciences & Engineering Category

	Forensic Investigations of Vehicle-Related Crimes: Is it Elemental?	Forensics
159	Mini/modular Roundabout: Practicing Survey	Engineering
	Characterization of Mass-Flux Based Erosive Burning of a Solid Rocket Propellant	Engineering
161	Heterogenous Chemistry and Atmospheric Reactions of Organic Aerosols	Chemistry
	Tethered Robots for the Exploration and Mapping of Unknown Environments	Engineering
163	An Analysis of the Sensitivity of the Arecibo Drift Scan Survey Statistical Methods for Model Building Coupled with the MOOSE Framework	Physics & Astronomy Material Science
165	Combining Viral Rhodopsin and Retinal Rhodopsin for MD Simulations	Biophysics
	Center of Mass Displacement in Young Adults While Experiencing External Disturbances During Sit-to-Stand Motion	Biomechanics/Kinesiology
167	Subsurface Modelling of Deep Direct-Use (DDU) Geothermal on the West Virginia University Campus	Engineering
	Experimental Investigation of Custom Composite Rocket Body Tubes	Engineering
169	Simulating Weathering of Ignitable Liquids to Understand the Effect of Mole Fraction on Weathering	Forensics
	Comparison of CaCoO _x and BiCaCoO _x Thermoelectric Materials	Engineering
171	Efficiency Comparison of Collection Methods for Organic and Inorganic Analytes in Gunshot Residue	Forensics
	Improving Data Collection for Increased Manufacturing Efficiency	Engineering
173	Analysis of Inorganic GSR Microparticles Using Laser Induced Breakdown Spectroscopy (LIBS)	Forensics
	The Impact of Intracellular Environmental Factors on htt Aggregation	Chemistry
175	Replicating Characteristics of Magnesium Based Rocket Propellant with Aluminum Based Propellant	Engineering
	Smart Soft Robotics	Engineering
177	Production of Methane from Natural Mixed Gas Hydrates	Engineering
	Ohio River Valley Supply Chain and Scenario Analyses	Engineering
179	Agglomeration and Removal of Microplastics from Water	Engineering
	The Effects of Substrates and Elevated Temperatures on the Weathering of Ignitable Liquids	Forensics
181	Electrochemical Analysis of Buprenorphine and Naltrexone as Potential Tools to Tackle the Opioid Epidemic	Forensics
	Intake Air Treatment for Use in a Traditional Diesel Engine and Optical Engine	Engineering
183	Nickel-Catalyzed C(sp ²)-H Trifluoromethylation and Nitration of 8-Aminoquinoline Derivatives	Chemistry
	Control for a Low-Powered Optoelectronic Characterizer for CubeSat: LOCC and III-V Nitride Based LEDs	Electrical Engineering
185	Comparative Study of Segmentation Programs on the Human Cranio-Maxillary Structure	Medical Sciences
	The Importance of Blind Quality Control Samples in the Field of Forensic Fingerprinting	Forensics
187	LC-MS/MS Analysis of 30+ Fentanyl Analogs in Human Liver to Support Medicolegal Death Investigations	Forensics

	Production of Styrene from Ethylbenzene	Chemical Engineering
189	Center of Mass in Response to Walking Perturbations Scales with Perturbation Difficulty	Engineering
	Rovibronic Spectroscopy of the CN Radical	Chemistry
191	Exploring Chemical Reaction Mechanisms using <i>in situ</i> Infrared Spectroscopy	Chemistry
	Extending the Applications of a Vicon Motion Capture System	Engineering
193	Trajectory Tracking of Unmanned Aerial Vehicles Under Adverse Conditions	Engineering
	Investigating the Biomechanics of the Eye as a Treatment to Glaucoma	Medical Sciences
195	Integration of Antennas onto Rockets Made out of Carbon Fiber	Engineering
	Using New Ligands for Palladium Catalyzed Reductive Cyclization to Give Indoles Under Mild Conditions	Chemistry
197	The Bioinformatic Analysis of Hand Bacteria for Forensic Identification using QIIME 2	Forensics-Bioinformatics
	Losses in Linear Engines	Engineering
199	Varying Oleylamine: Dibenzyl Ether Ratio for Fine-Tuning Manganese Oxide Nanoparticle Diameter and Controlled Release	Engineering
200	Analysis of Rocket Propulsion Nozzle Efficiency and Effectiveness	Physics & Astronomy

Oral #1

Undergraduate Anthropology as White Academic Space: Perceptions and Experiences of Minority Anthropology Students at WVU

Tanisha Adams*

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Anthropology & Archeology (Oral-Human Engagement)

Student's Major: Anthropology

Helping to establish scientific racism and reinforce eugenics, the foundation of American anthropology was built on colonialistic and eurocentric ideology. By focusing on discourse rather than action, decades of effort to diversify the discipline has led to graduate students and practicing anthropologists of color to continuously express marginalization within the field. Although there are studies regarding minority graduate student experiences, there is little research that focuses on undergraduate anthropology minority students. In 2011 the American Anthropological Association Commission on Race and Racism in Anthropology (CRRRA) conducted a survey to examine the experiences and status of minorities within the field of anthropology. The survey focused on the graduate students and those in academic positions. The results of this survey demonstrate racial and ethnic marginalization within the field of anthropology. What the CRRRA study does not include is the undergraduate experience. This ethnographic study explores the experiences and status of undergraduate students in anthropology (and related fields) at West Virginia University using an interview script adapted from the CRRRA survey questions.

Funding: Eberly College of Arts and Sciences

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #2

Perception of Cancer among a College-going/College-educated Population in the Appalachian Region

Talia Buchman*, Susanna Donaldson and Ann Morris

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Anthropology & Archeology (Oral-Human Engagement)

Student's Major: Anthropology

West Virginians experience suboptimal health outcomes, including above average cancer rates. Previous studies suggest that cultural factors may explain this phenomenon in low-income, uneducated populations. Few studies, however, have examined cancer health literacy among college-going/college-educated populations in West Virginia or the Appalachian region. In this study we explored knowledge and perceptions of cancer by doing in-person interviews with students and employees of WVU. During these interviews we collected free list and pile sort data. Free list data were collected by asking participants to list any word or phrase they think of in response to four prompts related to cancer. Pile sort data were collected by asking participants to organize words and ideas drawn from the free list data. These methods were chosen because anthropologists have determined free listing and pile sorting provide a rapid way to elicit cultural knowledge and perceptions. One goal of this study is to see if free listing and pile sorting are reasonable ways to conduct this research. At the end of the research project, we will know more about the knowledge and perceptions of cancer among college going/college educated people within North Central Appalachia. Preliminary results suggest that pile sorting is a reasonable way to elicit perceptions of cancer and free listing is beneficial for generating words for pile sorting. Knowledge gained as a result of this study will inform methods to educate the public about cancer and its treatments and will contribute to efforts to improve patient-doctor communication.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #3

Low-Carbon ETFs v. Energy ETFs

Jefferson Bustos* and Gulnara Zaynutdinova

John Chambers College of Business and Economics West Virginia University, Morgantown, 26505

Field (Broad Category): Finance (Oral-Human Engagement)

Student's Major: Business

ETFs, otherwise known as exchange-traded funds is a pool of various numbers of securities that are traded just as stocks to the open market. Several types of ETFs are grouped for different reasons. Sometimes they are tied together based on their similar performances, and other times because they are all in the same sector. None the less they are thought out very thoroughly to reach expectations and eventually become a good investment in the market. However, I used them not as an investment tool, but rather as a performance tracking tool. I used ETFs to find out if investors care for environmentally friendly companies and investments, and if it has some benefits in regards to securities performances. For this, I compared the performance of top alternative energy equities, to energy equities. We used historical data and analysis to see which has greater advantages, performance-wise and what makes them more appealing. And while going through this information and analysis, we do so to answer whether the more environmental-friendly investments are worth it, or not.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #4

Women's Incarceration: Employment

Lukas Carpenter*, Ian Ridgeway, Farrah Fratt and Evan Brunette*
Reed College of Media, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Communications/Journalism (Oral-Human Engagement)
Student's Major: Strategic Communications - AD/PR

The research explores the ways pre-release programs and unemployment agencies can raise awareness and help women secure employment who have criminal records. The research was found primarily through three over-the-phone interviews with one interview conducted in person. It has been proven that formerly incarcerated women have difficulties finding employment after they serve their sentence. There is a stigma associated with people who have a criminal record that might interfere with these individuals to get hired. However, some organizations and companies are willing to help people who have been formerly incarcerated to find a job. These organizations do provide training and assistance to help these people secure a job giving them a second chance. The common themes found include that employers are willing to hire previously incarcerated individuals. Secondly, it was found that the service industry tries its best to be non-judgemental in the hiring process throughout. Employers state if someone has the desire and drive to work then they are fit for their company. The state is currently assisting in the rehabilitation of previously incarcerated individuals through changes in policy, including pre-release programs that assist women in securing a job after incarceration.

Funding:

Program/mechanism supporting research/creative efforts: Capstone Course Within Department

Oral #5

Insight into the Professional Opinion of Ethics in the Field of Forensics

Alexis Kibe*, Hannah Webb*, Skylar Bennet*, Skyler Clemons* and Robin Bowen

Department of Forensic and Investigative Science, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Forensics (Oral-Human Engagement)

Student's Major: Forensic Examiner

Within law enforcement and forensic science, it is an unspoken requirement that each person within the field needs to have strong ethics. Forensic scientists are called upon to be expert witnesses, and that calls for swearing an oath to "tell the truth, the whole truth, and nothing but the truth." The job of a forensic scientist is to look at a piece of evidence objectively and find the facts without adding their own bias to it. How are forensic scientists able to keep their bias to a minimum? As a whole, what do the ethics among scientists and professionals in the field appear as, since the topic is not often discussed? In this research, a survey was sent to law enforcement and forensic professionals in order to get their views and beliefs on the ethics within their professions. This paper aims to address various ethical issues that are brought to attention through the responses of the survey participants. The results will impact the future of the different professions with in the criminal investigative realm to improve their standards and maintain their professional ethics. Strong ethical values are imperative to the integrity, reliability and credibility of everyone in the law enforcement and forensic fields.

Funding: West Virginia University

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #6

Strolling Through the Esplanade: A Dramaturgical Approach to Paul Taylor's Iconic Work

Madelyn Dempsey Dundon* and Jay Malarcher

College of Creative Arts, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Dance History (Oral-Human Engagement)

Student's Major: Dance

In *Strolling Through the Esplanade: A Dramaturgical Approach to Paul Taylor's Iconic Work*, author Madelyn Dundon explores the qualities that make America's last great giant of modern dance a humanist artist, and what makes *Esplanade* (1975) his definitive work. Through utilizing the diachronic and synchronic approach of dramaturgical research, Dundon formulates a firm grasp on *Esplanade's* heritage and legacy. Diachronically, she concentrates on his teachers, including Martha Graham and Merce Cunningham, and synchronically on such contemporaries as George Balanchine and Twyla Tharp, as well as multiple artists who influenced or were influenced by Taylor himself. This research paper was created in junction with the WVU School of Theatre & Dance's performance of *Esplanade* in this year's mainstage dance concert. *Esplanade* was restaged by faculty member and Paul Taylor Dance Company alum, Maureen Kaddar, and featured our program's leader and fellow company alum, Dr. Yoav Kaddar, and Dundon was blessed with the opportunity to perform the work alongside a few selected dance majors. In interviews with members of the original 1975 cast (dancers Ruth Andrien and Bettie de Jong), current Paul Taylor Company member and interim head archivist, Lee Duvenceck, and a visit to the company's renowned studios in Manhattan, Dundon found that the consensus amongst company alumni, current dancers, critics and scholars alike, is that *Esplanade* was and remains Taylor's most beloved and universal piece.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary. independent study

Oral #7

Bullying the Bullies: An Exploration of Shaming and Vigilantism in Cyberspace

Kaylea Egnor* and Karen Weiss

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Sociology (Oral-Human Engagement)

Student's Major: Criminology

Social media has permanently changed the way that humans are able to interact with and view the world. In recent years, social media has also become a platform for what our research has deemed to be “cyber vigilantism.” Cyber vigilantism occurs when groups of people band together in order to shame and/or harass other people that are seen as having committed acts of crime or deviance, especially when these acts can be interpreted as motivated by prejudice. Actions taken by cyber vigilantes can include tracing and publishing personal information (such as home address or phone number), finding and contacting the employer of the individual involved, and encouraging the verbal, cyber or even physical harassment of the individual. This vigilantism attempts to use shaming mechanisms to prevent the individual from acting further. However, the escalating nature of these groups often leads to overreaction and cyber “mobs.” Though the vigilantes are often well-intended, viral attention of this magnitude can motivate people committing acts of crime or deviance to continue, beginning a process in which the two parties feed on one other. This study will explore illustrative cases that provide insight into these processes and serve as a framework for future research efforts.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #8

Plea Bargaining and Manipulation of Justice Within The "Justice" System

Jessica Geczo* and Corey Colyer

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Criminology/Criminal Justice (Oral-Human Engagement)

Student's Major: Criminology

The issue regarding plea bargaining and legal proceedings are important within our criminal justice system. Current plea bargaining practices discriminate against the lower classes. Every individual under the 6th and 5th amendment of the Constitution has a right to a fair and speedy public trial as well as a right against self-incrimination. Through my observations and research conducted within the Magistrate Court of Morgantown, WV; I have concluded that the due process of defendants are repeatedly infringed upon. With the majority of the population attending the Magistrate Court in Morgantown, WV being: citizens of the lower class, ill-educated regarding the justice system, as well as facing the opioid epidemic- it is evident that most defendants have no choice but to accept the plea bargain presented to them by the prosecutor in their case. Through my fieldwork, I have found that the opportunities of justice being served within courts that have a high population of lower classes attending are neglected; as well as the rights of the individual being deprived.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Oral #9

Data Privacy: Insights from Current Legislation and Survey Responses.

Jayda Guidry*, Jeremy Cook and Jena Martin.

College of Law, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Law & Legal Studies (Oral-Human Engagement)

Student's Major: Economics

Individuals are relying more heavily than ever on technology and applications to increase the efficiency of day-to-day tasks. With this growing reliance, however, comes concerns regarding how these technology-based services and products protect, use and store consumer data. This growing concern has prompted counteractive legislation in both the European Union and United States, namely through the European Union's General Data Protection Regulation and the California Consumer Privacy Act. However, the U.S. still lacks comprehensive regulation for the protection of personal data. What would comprehensive data privacy legislation entail? In this presentation, I will examine current data privacy legislation present in the U.S. and discuss factors that should be considered by lawmakers, particularly those of West Virginia, when constructing future legislation. These factors have been determined both qualitatively and quantitatively through a combination of desk-based research and information derived from focus group surveys in order to serve as prospective considerations for lawmakers. (my abstract has nothing else to be added to)

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #10

Examining Diversity and Inclusion: Italy's National Airline Uses Blackface in its #WhereIsWashington Campaign

Julia Hillman* and Julia D. Fraustino

Reed College of Media, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Communications/Journalism (Oral-Human Engagement)

Student's Major: ADPR

From top fashion brands to politicians, 2019 continued to demonstrate companies' and public figures' lack of knowledge about diversity, inclusion, and cultural understanding. Italy's national airline was among such organizations when they released the #WhereIsWashington campaign promoting their new route to Washington, D.C. The campaign consisted of four videos, but it was the one featuring an actor wearing blackface to portray President Barack Obama that got publics' attention. Backlash from this video underscored how publics' trust was violated, calling attention to the organization's ethics policies and (lack of) diversity and inclusion in leadership. Having a deeper cultural understanding can benefit organizations, as companies that have a multi-level understanding of diversity often succeed more in public relations excellence (Toth, 2009). The current study analyzes the Alitalia case and media surrounding the crisis, including news articles and Tweets, and provides an ethics-grounded critique. Based on findings from analysis, the current study makes recommendations for how requisite variety considerations can be applied to increase diversity and cultural understanding in organizations throughout the world.

Funding:

Program/mechanism supporting research/creative efforts: Other

Oral # 11

Why Satire: How the Socio-Political Events of the 70s Let to the Satire Boom

Rowan Jalso* and Jay Malarcher

College of Creative Arts, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Theatre/Drama (Oral-Human Engagement)

Student's Major: BA Theatre

The purpose of this term paper is to explain how the socio-political events in the 1970s led to a rise in satirical media, leading to its prevalence today. The political discontent that arose in the 70s around national events (such as the Vietnam War and Watergate) contributed to a need for the general populace to voice their opinions in a way that safeguarded them from criticism. Comedy is corrective and satire is the most corrective form of comedy, in so far that it highlights the issues that plague a certain topic and allows others to view and discuss those flaws. Not only is the use of satire a "safe" way to criticize a sensitive topic (politics), but the use of satire is a way to bring balance back to the group psychosis of a populace. Maslow's Hierarchy of Needs and Bandura's Bobo Doll experiment are used to showcase the effects that media trends can influence, and are influenced by, the citizens of a country. This trend of satire, arising from political events and upheaval, is explored in countries outside of America. All this culminates in the conclusion that the prevalence of political satire today, whether in America or in other countries, had its start in the satire boom of the 1970s.

Funding:

Program/mechanism supporting research/creative efforts: Other

Term Paper for Honors Class

Oral #12

Allen Ginsberg's Howl and Literature Interpretation: Intersectional Identity Contextualized within the Canon of Literature

Erica Kushner*

Department of English, West Virginia University, Morgantown, WV 26506

Field (Broad Category): English & Literature (Oral-Human Engagement)

Student's Major: English

In this critical manifesto, there will be a thorough exploration of disregarded identities of writers in context with how meaning is derived and understood through pieces of writing. When looking at "Howl" by Allen Ginsberg, there is frequent allusions to his nature as a gay man and as a Jewish man, yet when often taught in survey literature courses, these aspects of him are left out. The closest reference to these identities is to mention Ginsberg's work in relation to Walt Whitman, connecting the writers through the lense of being a gay man. In order to understand why this approach to teaching such writings is deeply flawed, a close reading of "Howl" and "Footnote to Howl" will be used to provide context for what is missing in the interpretation of these readings, along with an examination of how the cycle of being a professor in collegiate education functions and how that affects future reading and interpretations of literature. Ultimately, from this manifesto will come the appreciation of various identities and how they are not only intersecting but directly integral to the meaning of a piece of writing.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Oral #13

Russia and Ukraine: the Multi-method Approach to Understand an Interstate Conflict

Denis Lomov* and Boris Barkanov

Eberly College of Arts and Sciences, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Political Science-International Relations (Oral-Human Engagement)

Student's Major: International Relations

This research aims to investigate the reasons and context of the escalating Russian-Ukrainian military conflict. I argue that this case is a unique example of conflict in the sense that both realism/neorealism and neoliberalism International Relations' frameworks can be applied. I use the multi-method approach to examine how basic concepts of two main International Relations schools allow us to look at the conflict from several angles. Within the scope of this study, several theories have been used such as asymmetric interdependence, "zero-sum" strategy (security-seeking states), and democratic peace. In response to the theoretical arguments of two schools, I explain within this case that theories do not challenge the arguments of each other, rather facilitate the emergence of insights and new causal linkages for the military conflict theory itself. I first review how the least dependent state (Russia) appealed to the economic and energy coercion to exploit more dependent state's (Ukraine) vulnerabilities to secure regional stability. Then I examine how Russia reacted after the failure to maintain the status quo. Here the "zero-sum" strategy seeks to explain the expectations of both sides of the conflict. It demonstrates that both sides made assumptions about each other's goals, resources, and potential, which gradually affected the escalation of the conflict. I seek to provide clarification of the parties' main concerns. I conclude that countries with the early stages of transitions from authoritarian regimes to democracies seek to hide involvement in military conflict, likewise, they try to camouflage the fakeness of democratic instrumentalities.

Funding:

Program/mechanism supporting research/creative efforts: Other
POLS 495

Oral #14

The Frames of Corporate Social Responsibility

Benjamin R. Luikart*

Reed College of Media, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Public Relations (Oral-Human Engagement)

Student's Major: Public Relations and Advertising and Business Administration

This study sought to determine, in accordance with framing theory, if specific corporate social responsibility (CSR) frame categories can be identified as predominant in certain types of companies. It does this by identifying patterns of CSR between different business sectors i.e. finance, retail, energy, tech, and media. These trends were identified by examining the reports of Fortune 100 companies over a 5-year period. The keywords "community", "social justice", "sustainability", "better tomorrow", and "diversity" were searched for in the annual reports. The results were checked for CSR relevance, recorded and categorized according to the terms used. The data is expected to demonstrate that certain industry sectors predominantly use specific CSR frames: finance businesses focus on "community"; retail corporations focus on "social justice" issues; energy companies promote "sustainability"; tech corporations pursue a "better tomorrow"; and, media businesses focus on "diversity". It is argued that these frames are linked to key stakeholders targeted with the CSR efforts.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #15

Crime Deviance and Online Voyeurism

Kylee Marciello**Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505***Field (Broad Category):** Criminology/Criminal Justice (Oral-Human Engagement)**Student's Major:** Psychology & Criminology

Social Media has become a big part of social life, especially for younger generations. Although social media sites and apps can have many positive consequences for users, this study focuses on the negative effects of these sites, drawing from two psychological concepts – voyeurism, or the enjoyment from seeing the pain or distress of others, and narcissism – which follows the definition of a lack of empathy within an individual. Narcissism typically encompasses the need for admiration, all while possessing a large sense of self-centeredness. While there has been substantial research done in an effort to identify psychological factors related to social media use, the current study applies these issues specifically to the “performance” of crime and its spectatorship. To do so, it uses specific cases of intoxication crime and other deviance among college students found on college-based websites. While “bad behavior” among college students is far from a new phenomenon, the digital age creates new opportunities to document and share behaviors in ways that blur the lines between private and public, shame and fame, and in doing so, encourage rather than deters such behavior. Based on an analysis of selected cases, this study will explore these and other issues regarding voyeurism and narcissism to expand an understanding of crime motives and social control.

Funding:**Program/mechanism supporting research/creative efforts:** WVU Work Study (not associated with RAP)

Oral #16

How Theatre Affects Children

Michele Schmitz*

School of Theatre and Dance, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Theatre/Drama (Oral-Human Engagement)

Student's Major: Acting

Children are often referred to as the future. In teaching them, we often instill in them the best of our values in an attempt to indoctrinate them with the knowledge we long to possess. When endeavoring to create a children's theatre program, there are many ways that are beneficial, while others are more detrimental. Within our research we determined that there are many different ways to run an educational program aimed at both young and old children. In studying this we looked at several preschools, youth groups, and other youth organizations to understand the more organizational tasks and how they reach children. Often times children are left without theatre programs as they are the first thing to be cut when it comes to school budgeting. However, theatre supplies many children with opportunities to discover their true selves. Within this study, we also determined that there are many ways to better educate the staff members on how to reach out to students and get them to understand both the theatrical process and the arts.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #17

Autism Related Barriers to Healthcare Access

John Christopher Haddox*, Mark Ellison*, Amy Burt* and Sophia Spangler

*Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV
26506*

Field (Broad Category): Architecture & Interior Design (Oral-Human Engagement)

Student's Major: Political Science

The purpose of this study is to investigate barriers to healthcare access for persons Autism Spectrum Disorder (ASD.) We gathered data from Autism Societies and varying support groups from all fifty states. From the list of contact information, West Virginia University expects to enroll approximately 1500 subjects to participate in this study. This study involves completion of a questionnaire and will take approximately 5 minutes for one to complete. One will be asked to fill out a survey regarding their healthcare experience as it relates to ASD. Barriers to healthcare access include the lighting of the room, the height of counter tops, and unintentional physical layout boundaries persons with ASD are affected by. Completing the survey also enables the opportunity for individuals to be contacted for future focus group participation and reflection. The hope is to identify barriers not previously talked about within interior design and help inform future educators, architects, carpenters, etc... on how to design healthcare spaces more efficiently. With these steps in place, people learn to appreciate qualitative approaches being just as valuable as quantitative figures to design spaces and increase productivity.

Funding: NIFA: National Institute of Food and Agriculture

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #18

What Happens When You Write an Autobiography

Anastasia Stewart* and David Hoinski

Department of Philosophy, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Philosophy, Ethics, & Religious Studies (Oral-Human Engagement)

Student's Major: Philosophy Art History

The philosophy of autobiography is a subfield of continental philosophy that has often been ignored until the 20th century. It is not that philosophers have not been writing autobiographies and that people have not been studying autobiographies or that in general philosophical autobiographies have not been produced but that the analysis of them has been largely overlooked. Philosophical autobiographies are distinguished from the standard autobiography because they advance the philosophy of their writers, and they ultimately become an example of how to live in accordance with a set philosophy. Drawing from Lenore Wrights The Philosophers "I" why people write autobiographies, what is gained from autobiographies and what constitutes an autobiography is argued through Saint Augustine's Confessions which is a letter to God that describes his conversion to Christianity and ultimately results in the tale of his life, Mill's autobiography and Descartes' Discourse on the Method a philosophical and autobiographical treatise most known for the quote "I am thinking; therefore I exist." When people write autobiographies the self becomes both the subject and the object that the author is creating through the literary process. Hopefully, this research will result in more people studying philosophical autobiography because, for people that are not philosophers, the process of writing an autobiography can result in the profound experience of self-discovery.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #19

Children Of Incarcerated Parents

Broghan Swart*, Abdulla Alkaabi*, Hannah Carasco, Olivia Burtand, Jacqueline Kautz*
Reed College of Media, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Communications/Journalism (Oral-Human Engagement)

Student's Major: Public Relations

In this research study, we have covered the mental health effects on children that have or had incarcerated parents. We questioned how we can resolve negative cognitive effects, along with coping mechanisms and programs that could be provided for the children. After speaking to a psychiatrist, a social worker, a daycare worker, and numerous people who have first-handedly seen this situation; it has become more clear how to help these children. A survey methodology of research has been provided to each of these participants. It was found that it is understood the underlying mental health effects on children that have incarcerated parents. It was also found that there are multiple program that help children to cope with this and teach them multiple different coping mechanisms, also teaches them how to make better relationships with the parent that has been incarcerated. The underlying mental health effects were found to be negative, but with the help we have discovered for these children is very beneficial and will serve not only the child, but also the parent.

Funding:

Program/mechanism supporting research/creative efforts: Other
Strat Comm 421

Oral #20

The Italian Other in 19th/20th Century Dime Novels

Lillian Wright*, Allison Groves* and Nancy Caronia

Department of English, West Virginia University, Morgantown, WV 26506

Field (Broad Category): English & Literature (Oral-Human Engagement)

Student's Major: English & French

Dismissed as mental trash due to their repetitive plots and short form narratives, dime novels were the working class's cheap entertainment before radio or television were invented. Dime novel serial fiction stereotyped many groups, including indigenous, black, and immigrant populations. This negative stereotyping helped to promote a xenophobic attitude towards those deemed Other and reinforced whiteness as the norm. This research focuses specifically on the presence of Italian and Italian American characters and the identity ascribed to them. Other dime novel researchers assert Italians play no significant role in dime novel serials, but this research has shown Italian Americans have an established prevalence, representing approximately 8% of 50 issues read between 1872 to 1888 in the Beadles New Dime Novels series. Slurs, including pejorative words such as dago and brigand, directed towards Italian are peppered throughout these novels. In addition, out of the 8% of issues, all of the Italians were the antagonists and were outlaws or fugitives. The legacy of this negative stereotyping evolved to normalize Italians as violent and criminal. Portrayals of Italians as outlaws in the dime novel serial creates a place where Italian immigrants are viewed only as the Other and give a foundation to the gangster archetype displayed in twentieth and twenty-first century popular culture. This presentation will discuss the findings myself and Allison Groves have documented over the course of the past year.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #202

The Wonderful World of Wounds

Toby Francis*, Mary McClung

College of Creative Arts, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Theatre/Drama (Oral-Human Engagement)

Student's Major: Theatre Design & Technology

My field of research is theatre makeup and prosthetics. What that entails is prosthetic cuts, burns, bullet wounds, warts, pimples, etc. To start I need multiple clear reference photos on the subject to begin sculpting. The material used for this is Monster Clay, which is a reusable oil and wax-based clay that never dries out. I use clay tools and other unconventional objects to sculpt the prosthetics and create layers in the clay. When I am pleased with my clay sculpt I use grey clay to create a well around the sculpt. Once I have that attached to the same surface as my monster clay I begin mixing together powder concrete and warm water to pour into the well. I slowly pour in the plaster to prevent air bubbles ruining the mold and once the well is filled 3/4th of the way up I stop pouring. After a few days of waiting to be sure it's dry all the way, I break apart the grey clay wall and separate the plaster mold from the clay sculpture. At this point I begin layering the latex onto the plaster and when it is complete brush baby powder on all surfaces of the latex as you peel it from the mold.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #21

Implementation of Active Learning in Calculus Instruction

Michelle Adkins* and Vicki Sealey

Department of Mathematics, West Virginia University, Morgantown, WV, 26506

Field (Broad Category): Mathematics (Oral-Science & Technology)

Student's Major: Mechanical and Aerospace Engineering

As students struggle through their calculus classes, many fail, meaning many are at risk to losing their scholarships. Without these scholarships many students cannot afford to continue college, withdrawing from the university or changing their major and giving up their dream. The question becomes, "How can proficiency in math courses, especially calculus be improved?" Different pedagogical approaches in the classroom, such as lecturing and active learning, may have a major impact. Active learning is a method of teaching that engages students in meaningful activities designed to allow students to learn the material as opposed to listening to it in a lecture. Previous research has demonstrated the benefits of active learning, and the goal of our study is to determine how instructors implement active learning in their classrooms. Research has been conducted by observing classrooms, conducting interviews of math faculty at West Virginia University, and reading journal articles. For example, instead of listening to a lecture on mean value theorem, students can work in groups to determine criteria where mean value theorem applies by sketching graphs with different qualities. By discovering the concepts for themselves, students are more likely to retain information. Despite this, many professors oppose active learning. This research also delves into why this occurs. So far, it has been found that common obstacles of active learning include class size, bolted down theater-style seats, student resistance, and a lack of resources. It is predicted that the integration of active learning in conjunction with lecture will increase calculus proficiency.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #22

Bayesian Calibration Assisted by Markov Chain Monte Carlo in DFT+U for Iron Compounds

(1)Reese Boucher*, (1)Pedram Tavadze, (1)Guillermo Avendano, (2)Keenan X. Cocan, (3)Sobhit Singh, (2)David S. Mebane, (1)Aldo H. Romero

(1) Department of Physics, (2) Department of Mechanical and Aerospace Engineering, West Virginia University, Morgantown, WV 26506. (3) Department of Physics, Rutgers University, Piscataway, NJ

Field (Broad Category): Physics & Astronomy (Oral-Science & Technology)

Student's Major: Physics

Density Functional Theory (DFT) revolutionized condensed matter physics by mapping the electron problem solved by the Schrodinger's Equation to a series of mean field electron independent equations. In DFT, the most crucial approximation is from the exchange correlation functional. Although many have attempted the development of accurate functionals, they all fail to reproduce the behavior of strongly correlated materials when kinetic energy is as large as the Coulomb interaction. To solve this problem, local exchange correlation functionals are corrected by a Hubbard term. This is DFT+U which depends on two correctional parameters, U (on-site coulomb interaction) and J (on-site exchange interaction). These parameters are usually fitted from experimental values or obtained by using density functional perturbation theory. Either way the quality of the parameter values can only be assessed by comparing to experimental data. In this work, we use uncertainty quantification methods to study the dependence of different experimental observables where we evaluate the relevance of errors by utilizing Bayesian Calibration facilitated by Markov Chain Monte Carlo simulation with a number of strongly correlated materials.

Funding: O'brien Fund of WVU Energy Institute

Program/mechanism supporting research/creative efforts: WVU's SURE program

Oral #23

Opioid Use Disorder: A Multifaceted Approach

Parker Carte* and Scott Galster

Rockefeller Neuroscience Institute, West Virginia University, Morgantown, West Virginia 26506

Field (Broad Category): Neuroscience (Oral-Science & Technology)

Student's Major: Multi-Disciplinary Studies

Opioid addiction has become a public health emergency in the United States with more than 15 million people suffering from an opioid use disorder (OUD); furthermore, 130 people are dying across the country every day from opioid overdoses (Han et al. 2017; Scholl et al. 2019). Meanwhile, West Virginia leads the country in opioid overdose mortality per capita with 49.6 per 100,000 (National Institute on Drug Abuse, 2019). Opioids are a class of drugs that include the illegal drug heroin as well as very strong prescription pain medications, including morphine, methadone, fentanyl, and oxycodone. In 2019, WVU Medicine's Rockefeller Neuroscience Institute (RNI) launched the nation's first clinical trial using Deep Brain Stimulation (DBS) to treat patients suffering from treatment-resistant OUD. RNI researchers are currently exploring the use of focused ultrasound to modulate the nucleus accumbens to reduce cravings in opioid addiction. In addition, RNI is collecting physiological, cognitive, behavioral, and subjective data from patients in recovery. RNI uses the data to develop models of "success and abstinence" and models of "failure and relapse." These noninvasive, targeted OUD treatments offer critically needed, new options for those suffering with difficult to treat addictions.

Funding: Unknown

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #24

Ecological Comparison of *Sholopax minor* in the United States Through Time

Morgan L. Dial*

West Virginia University Institute of Technology, Beckley, WV 25801

Field (Broad Category): Biology (Oral-Science & Technology)

Student's Major: Biology

Documentation of bird species have been important over the years to study their evolution, ecology, and behavior. These documentations were mostly from physical sightings by researchers or just bird-lovers alone. Technology is continuing to grow and help in different aspects around the globe, including the documentation of specific species spotted. Launched in 2008, iNaturalist is now a well-known community website that documents species around the world by ordinary people and scientists using photographs. This website pinpoints the location of the sightings as well as other relevant details. American Woodcocks, *Sholopax minor*, were scored using iNaturalist's data through R Studio to compare where they were located at certain times of the year. The data was then compared to another source, eBird, where more American woodcocks were documented. This offers a new way to explore and study different species of plants and animals for scientific study and provides a new opportunity for the community to come together and help. This comparison demonstrates a new form of communication to test and study animal ecology.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Oral #25

West Virginia Trout Stocking Survey: Catch Expectations Vs. Reality Considering Angler Effort

Lindsey Hartzell*, Ross Andrew, Mary Allen, Kyle Hartman and Robert Burns

Division of Forestry & Natural Resources, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Environmental Science & Sustainability-Wildlife & Fisheries (Oral-Science & Technology)

Student's Major: Wildlife & Fisheries

From January to June each year, the West Virginia Division of Natural Resources (WVDNR) stocks trout into 200+ lakes and streams across the state. As the public agency responsible for fisheries management in West Virginia, the WVDNR strives to achieve high levels of angler satisfaction with its hatchery program and stocking efforts. Therefore, understanding perceptions of anglers utilizing these stocked resources is important to achieving optimal benefits while recognizing realistic expectations. Researchers at West Virginia University conducted in-person interviews (n=303) of anglers from March to June 2019. The survey questions assessed the anglers fishing experience that day versus their expectations. The angler's outcome of expectation versus experience was quantified based on the number of fish caught and the number of fish expected to be caught that day. These outcome values were compared across angler groups defined by # of days fished/year and % of weekend fishing effort. Using analysis of variance, no significant differences in expectation-reality outcomes were observed across three groups of # of days fished in a year (1-60, 61-180, 180+ days) or across three groups of % weekend fishing (0-30, 31-50, 51-100%). Using regression, a significant ($p < 0.001$) positive relationship between the expectation-reality outcome and overall angler satisfaction was observed. A significant ($p = 0.03$) negative trend was also observed between expectation-reality outcome and angler crowding perception. These results indicate that these expectation-reality outcomes may be driven by other factors outside of angler effort across annual and weekly frequencies, but outcome may predict satisfaction and perceptions of crowding.

Funding: West Virginia Division of Natural Resources

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Oral #26

The Function of Engrailed and Invected in Horned Beetle Development

Paul Lawer-Yolar* and Teiya Kijimoto

Eberly College of Arts and Sciences, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology (Oral-Science & Technology)

Student's Major: Biochemistry

Many genes are similar in the sequence between different organisms even between humans and insects, however, the outcomes such as how those organisms develop are often different. Here we report another example of such difference/similarity by using two genes that are similar to each other - engrailed (*en*) and invected (*inv*) - in the context of beetle horn development. In the past, two paralogous genes *en* and *inv* were shown to be involved in the anterior-posterior axis patterning in fruit flies. In our beetle system, the gene hedgehog (*hh*) and associating genes have been shown to be involved in the horn development. Since *en* is known to regulate *hh* in fruit flies, we tested if *en* and *inv* may also be involved in the horn development. PCR was performed to amplify *en* and *inv* from beetles and obtained fragments were cloned into a bacterial plasmid followed by the generation of double stranded RNA for RNAi. RNAi with the beetle larvae will reveal these genes' function on the development of beetles. Given the function of *en* and *inv* in fruit flies, expected results of RNAi in beetles would be deformation of wings and thorax, along with horn deformation. Subsequently, results drawn from beetle experiments can widen the knowledge in the evolution of genes and developmental processes.

Funding: Work Study

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Oral #27

Net Zero with Hardwood Mass Timber

Vernon Lewis* and Gloria Oporto-Velasquez

Department of Wood Science and Technology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Environmental Science & Sustainability (Oral-Science & Technology)

Student's Major: Wood Science and Technology

Net Zero Housing with Hardwood Mass Timber Vernon Lewis and Gloria Oporto-Velasquez Wood Science and Technology Department, West Virginia University, Morgantown, WV 26506 Abstract: The purpose of this research is to determine the mechanical properties and sustainable applications of mass plywood panels (MPP) made from hardwood species of the Appalachian area. Mass plywood panels are made from glued layers of veneer that are laid in opposing directions. Softwood mass plywood panels have been approved for an 18 story building and it can be used for walls, floors, roofs, and beams. MPP are lighter than cross laminated timber which reduces transportation costs and it can be machined for door and windows at the factory to reduce time at the construction site. It is a dense product that provides natural insulation and it doesn't pollute the air of the living space. MPP are a relative new product to the engineered wood products market and currently only has one manufacturer in the world. This is a great opportunity to utilize Appalachian hardwoods and provide more jobs for West Virginians.

Funding:

Program/mechanism supporting research/creative efforts: Other

Oral #28

Characterizing Monoclonal Antibodies as a Novel Therapeutic for Pseudomonas aeruginosa Infections.

Aaron C. Malkowski*, Alexander M. Horspool, Emel Sen-Kilic, Scott L. Breslow and Mariette Barbier

West Virginia University Vaccine Development Center, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Medical Sciences (Oral-Science & Technology)

Student's Major: Immunology and Medical Microbiology

Pseudomonas aeruginosa is a Gram-negative rod-shaped bacterium, and a causative agent in urinary tract, ear, and skin infections, as well as acute and chronic lung infections. As an antimicrobial-resistant pathogen with no approved vaccines or immunotherapies, alternative therapeutics are urgently needed. Recently we have shown that an acellular vaccine, targeting the iron-acquisition protein FpvA, protects against Pseudomonas aeruginosa infection. The vaccine induces antibody production against the bacterium which we can purify to generate specific immunotherapies against P. aeruginosa. Monoclonal antibodies (mAbs) could prove useful as a treatment for P. aeruginosa infections and an alternative to antibiotics. We hope to produce our own mAb therapy to P. aeruginosa using antibodies generated in response to our FpvA vaccine. After immunizing mice with the acellular FpvA vaccine, we isolated antibody-producing splenocytes and created using cell-to-cell fusion stable, mAb-producing colonies of cells called hybridomas. Several mAb candidates have been identified, which we have begun to characterize as novel treatments to P. aeruginosa infections. We performed in vitro functional assays to characterize these antibodies. Assays performed measured characteristics of the mAbs, such as binding to FpvA or P. aeruginosa and determining their function in vitro. Our results from these assays provide the basis for testing antibodies in vivo, and for other critical pre-clinical studies.

Funding: Cystic Fibrosis Foundation; WVU MICB Department; WVU Vaccine Development Center
Program/mechanism supporting research/creative efforts: An External Internship or Other Type of Program

Oral #29

Seeking A Framing Effect: Millennials and a Sugary Beverage Tax

Mary Morgado*, Laura Andress, Kyle Strother

School of Public Health, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Nursing & Public Health (Oral-Science & Technology)

Student's Major: Public Health

Introduction: This research is based on the notion of the embodied brain and the unconscious reasoning process introduced by George Lakoff to explain how phenomena are incorporated into the brain, stimulating the use of available cognitive models to reason. Public health graduate students at WVU used talkback testing to interview forty millennials to assess support for/against a sugary beverage tax based on two different framing messages. The study analyzed the interviews to identify the dominant cognitive models triggered by the framing message and used to reason about a sugary beverage tax for West Virginia. **Methods:** This 2019 research on millennials and framing was part of a public health graduate course, issue analysis and the non-medical determinants of health. After agreeing to participate in the study, individuals were scheduled for a recorded interview (in-person or video-chat). The method used for the interviews was talkback testing. Participants were exposed to two framing messages. Interviews were transcribed and coded. **Results:** General Findings Whether exposed to either frame, the results were that participants reasoned through the cognitive model labeled "corporate greed". Alternatively, across both frames, the preferred strategy was increasing physical activity in schools. **Implications:** The implications of the study posed a paradox. Across both frames, the most frequent cognitive model was corporate greed while the most frequent strategy (increase physical activity in schools) was aligned with individualism. What frame will move millennials to steer away from individualism and use the cognitive model of corporate greed to formulate external policy action?

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #30

All Wood Mass Timber – Developing a Prototype for Hardwood Species

Jonathan R. Norris* and Gloria S. Oporto-Velasquez

Wood Science and Technology Department, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Wood Science (Oral-Science & Technology)

Student's Major: Wood Science and Technology

The purpose of this research is to promote the use of underutilized Appalachian Hardwood species through the development and performance characterization of a mass timber product that will not require glue or resin in its fabrication. Dowel Laminated Timber (DLT) is part of the mass timber family together with Cross Laminated Timber (CLT) and Nailed Laminated Timber (NLT). DLT is fabricated using wooden dowels only; no glues, resins, nails or metal fasteners. The dowels hold each board side-by-side, forming a stiffer and stronger connection than the nails in nailed laminated timber (NLT). Since no adhesives are used, manufacturing costs are lower than that of comparable products such as cross laminated timber (CLT). In this project, Yellow poplar (*Liriodendron tulipifera*) will be used as raw material to prepare woody laminations and a CNC router machine will be used to cut specific sites for dowel application. Characterization of this new mass timber will be performed using standards for mass timber products ANSI/APA PRG 320 and ANSI/APA A 190.

Funding:

Program/mechanism supporting research/creative efforts: Other
WDSC 495 - Independent Study

Oral #31

The Effects of Acid Mine Drainage in Kanawha County, West Virginia

Alexander Pall*, Melissa O'Neal* and Sarah Cayton*

West Virginia Water Research Institute, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Environmental Science & Sustainability (Oral-Science & Technology)

Student's Major: Environmental, soil and water sciences

Acid mine drainage is the outflow of acidic water from metal mines or coal mines. Cane Fork, located in the Cabin Creek Watershed in Kanawha County, West Virginia, is impaired by acid mine drainage from pre-Surface Mining and Reclamation Act (SMCRA) mining activity. Based on data collected by the West Virginia Department of Environmental Protection (WVDEP), one specific tributary contributes 1,579 pounds per year of aluminum, 208 pounds per year of iron, and 665 pounds per year of manganese to Cane Fork. This has had major impacts on the environment near the area, destroying the ecosystem. To begin the process, we placed water measuring instruments, called sondes to see the specifics of the water quality. The data we received confirmed our hypothesis that the water was severely contaminated. It has been determined that the Cane Fork valley is very narrow with steep slopes on either side of the valley. To install a proper passive treatment system large enough to treat Cane Fork, could compromise the integrity of the valley slopes and cause catastrophic landslides. Due to issues with the terrain, the office of abandoned mine lands and reclamation has partnered on the project and will be installing lime dumps to treat Cane Fork for a trial period. We expect that adding lime to the water will neutralize the acidity in the water and help return the water back to a normal state.

Funding: The Office of Abandoned Mine Lands and Reclamation

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #32

Recycle Plastic Beads Utilized in Concrete Mix Design

Felipe Mota Ruiz*, Paulo Ignacio* and Horng-Jyh Yang*Civil Engineering, WVU TECH, Beckley, WV 25801***Field (Broad Category):** Engineering (Oral-Science & Technology)**Student's Major:** Civil Engineering

Concrete is one of the most used construction materials in the civil engineering industry throughout the world. Columns, beams, slabs, walls, and pavements are just a few examples of structures that are basically made from concrete. A concrete mix is basically a proportion of cement, water, coarse aggregate (gravel) and fine aggregate (sand). While these materials are vastly available in the world, the overutilization of the fine aggregate (sand) has led to the extraction restrictions in some countries due to environmental concern. Finding a substitute for sand in the concrete mix became a challenge imposed on material scientists and civil engineers. The alternative solution in this research is the "recycle plastic" material that has similar physical properties to substitute the fine aggregate in concrete mixes. The consequences of the single-use plastics and the lack of a recycling consciousness in many societies turned used plastic waste into the biggest environmental threat of the modern world. In addition to reducing the use of sand, the recycle plastic materials applied in the concrete mix can also solve the biggest challenge in waste management. The purpose of this research is to evaluate the feasibility and its economic, social and environmental impacts of recycling plastics, as a substitute for fine aggregates in concrete mixes. The aspects of concrete mixes analyzed are the compressive strength, tensile strength and workability, which are the quality requirements that will determine the marketability of this effort.

Funding:**Program/mechanism supporting research/creative efforts:** Capstone Course Within my Department

Oral #33

Using sex ratios of Brook Trout to identify population resilience and spawning adult size

Bethany Wager*, Ross Andrew, Christopher Schwinghamer and Kyle Hartman
Division of Forestry and Natural Resources, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Natural Resources/Wood Science/Plant Science (Oral-Science & Technology)
Student's Major: Wildlife and Fisheries Resources

Brook Trout are the only native species of trout in West Virginia. Some Brook Trout populations may be more or less resilient to fluctuations over time and identifying drivers of their resiliency is important for conservation of these populations. Through research on 25 streams in West Virginia, we investigated sex ratios as a metric which may influence population variation and resilience over time. Defining the size of both male and female fish during the spawning period may also help determine reproductive potential within a given stream. We analyzed data from 2016-2017 and found females (153mm & 34g) to be slightly smaller than males (165mm & 41g) across sites on average. When comparing sex ratios, the expected result is that streams with a low population of females will also have higher levels of variation in population. Across sites, as the sex ratios descend from female-dominant and approach 1:1 the population numbers decrease. Furthermore, a negative trend was identified between the average female proportion of the population sample and the long-term coefficient of variation for overall Brook Trout abundance. We illustrate females as drivers of reproductive magnitude and their critical role to ensure stable population numbers and genetic variation into the future.

Funding: West Virginia Division of Natural Resources

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Oral #34

Data Simulation to Constrain Fast Radio Burst (FRB) Periodicity Search Techniques

Olivia Young*, Devansh Agarwal, Kshitij Aggarwal , Maura McLaughlin and Duncan Lorimer

Department of Physics and Astronomy, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Physics & Astronomy (Oral-Science & Technology)

Student's Major: Physics

Since their discovery in 2007, large amounts of telescope time and effort have been dedicated to the detection and study of Fast Radio Bursts (FRBs). Almost 100 FRBs have been cataloged, with three being localized to host galaxies. These detections can be used to constrain the rates at which FRBs occur and prove their extragalactic origins. While FRBs at first appeared to be one-off events, multiple sources emitting repeating bursts have now been discovered. Recently, Ravi (2019) argued that repeating FRBs are not an exception for FRBs but rather the rule, making their study incredibly important. Although there has been some work to find periodicity in the arrival times of repeating bursts, attempts have thus far been unsuccessful. The goal of this project was to determine if repeating FRBs have intrinsic periodicities. We present the first step in this process, the simulation of data that can be used to evaluate the sensitivity of various periodicity search techniques. This provides greater insight into the sensitivity of our current methods, thus leading to a better understanding of possibly underlying periodicities of the repeating FRBs if any.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

VISUAL & PERFORMING ARTS ABSTRACTS

Visual & Performing Arts #35

Preparation, Performance, and Recording of 12 Memorized and Choreographed Works for Four Flutes

Juan Carlos Narvaez,* Lydia Moenssen,* Ethan Nylander*and Nina Assimakopoulos
College of Creative Arts, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Music/Music Therapy (Visual & Performing Arts)

Student's Major: Flute Performance

The Aether Quartet is comprised of four WVU School of Music undergraduate flute performance majors. Aether Quartet's research during the 2019-2020 academic year has focused on preparation, memorization and choreographed performances of 60 minutes of music for four flutes spanning the years of 1140 to 2020. This research has culminated in the submission of recordings to prestigious music competitions, public performances (campus, regional, and national), and an audio and video production project leading to the publication of the ensemble's first compact disc which includes five world premiere recordings. Works included in the ensemble's research feature contemporary extended playing techniques (flute beat-box, singing and playing, etc.), newly commissioned works, and the arrangement of pre-Renaissance and Renaissance hymns. The ensemble has successfully submitted entries to three international competitions: Fischhoff International Chamber Music Competition, the Kentucky Flute Association Chamber Music Competition (currently in the final round), and the Great Composers Music of the Americas competition (currently in the final round). They were the First Prize undergraduate winners of the WVU ChaMP Chamber Music Competition and performed at the 2020 Mid-Atlantic Flute Convention. The ensemble research has also included public relations, branding, social platform building and content creation, supporting the successful launch of an Instagram platform (480 followers) with goals of crowd-funding campaigns and the booking of professional performances. Aether's vision includes being a force in a movement to redefine "classical" chamber music performance through dynamic presentations of works that span over 1,000 years of western art music.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Visual & Performing Arts #36

The Exploration of Sounds and Techniques in String Quartet, Love Languages, by Euna Joh

Euna Joh* and Yu-Chun Chien

School of Music, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Music/Music Therapy (Visual & Performing Arts)

Student's Major: Music Composition, Piano Performance

The composition explores a diversity of timbres and techniques on string instruments, such as bowing positions, bowing motions, plucking strings (pizzicato), overpressure, air sound (tonlos), fingering tapping, and so forth. The first movement acts as an introduction, encompassing elements from the following movements. The second movement focuses on the combination of bowing and pizzicato. The form of the third movement is more flexible that lays stress on harmonics, air sound, and fingering tapping. The last movement is a conclusion, developing materials used in the previous movements. The title is inspired by Gary Chapman's book "The Five Love Languages," which motivated me to think about what kind of love languages one uses to communicate. Growing up in two different countries with two different cultures, I have been always interested in various ways that people express love to others. People have different ways to express and receive love and appreciation; and everyone has different love languages. As you listen to this piece, I would like to invite you to think about your love languages. This is my first string quartet, documenting the process of composition, in which I develop and enrich my compositional language. The work was selected through a competitive process to be performed and recorded by the internationally-renowned JACK Quartet in New York City on December 9, 2019.

Funding:

Program/mechanism supporting research/creative efforts: Other

Visual & Performing Arts #37

A Study of the Relationships Between American, Swiss, and French Rudimental Drumming

Elizabeth Rockwell* and George Willis

College of Creative Arts, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Music/Music Therapy (Visual & Performing Arts)

Student's Major: Music Performance

The main purpose of this study is to examine the technical and musical similarities and differences between traditional American, Swiss, and French rudimental drumming, specifically in the design and use of the military reveilles. The common attribute between these three cultures is their use of rudimental drumming as a method of communication in a militaristic setting. As rudimental drumming grows into a more complex artform, finding the connections between different musical cultures can allow for relationships to be built and can develop a unique form of rudimental drumming that intelligently combines multiple drumming heritages. To address this question we used an artistic methodology of analyzing and learning key skills required for each technique in order to represent and perform the findings. We also read and summarized texts and documents dating back to the conception of each artform, as well as texts written by experts on the subjects in order to confirm the proper execution of learned techniques and accurate interpretation of our findings. The main findings will suggest that there are a plethora of connections and relationships between the three, while also containing clear variations to distinguish between them. These relationships provide a way to take information and technique from each culture and combine them into one style. Therefore, these results will support the conclusion that each style can be utilized and melded with one another to create a unique performance of traditional rudimental pieces.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Visual & Performing Arts #38

Basilisk Breakout, A Virtual Reality Experience

Bijan Fandey*

Reed College of Media, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Other (Visual & Performing Arts)

Student's Major: Interactive Design for Media

Basilisk Breakout is a virtual reality game that is currently in development. The point of this project is to explore how to tell stories through different and new media such as virtual and augmented reality. I chose virtual reality because it allows for the most immersive experience in new media than anything else. This will also be a horror game, which allows for many different mechanics that are not used very often. Most of the research has been about game optimization and mechanics through a variety of courses and tutorials via online resources. This game is being made in Unity for Oculus. Telling a story in virtual reality can be hard, as it is still new. Some challenges I expect to face are mostly during player testing. Communicating what to do in virtual reality is extremely difficult and finding an effective way to communicate with the player seems to be my main challenge at the moment, but that is why doing a project like this is important, it shows new problems and solutions that have yet to be explored thoroughly.

Funding:

Program/mechanism supporting research/creative efforts: Other
Independent Study

POSTER ABSTRACTS

Poster #39

Assessment of a Novel Pelleting Throughput Aid, AZOMITE®, a Hydrated Sodium Calcium Aluminosilicate

Megan Alderman*, Tim Boltz and Joe Moritz

Department of Agriculture, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Agriculture (Agricultural & Environmental Sciences)

Student's Major: Animal Science

Poultry is the number one consumed animal protein in the United States. All meat type poultry, broiler chickens and turkeys, are fed pelleted diets due to production advantages such as decreased ingredient segregation, selective feeding, and feed wastage as well as increased productive energy associated with the prehension of feed. Due to high poultry production volume, feed mills necessitate a high degree of throughput in order to meet pelleted feed demand within a given shift. The objective of the study was to assess the effect of AZOMITE®, a hydrated sodium calcium aluminosilicate on pellet mill throughput and subsequent pellet quality in broiler diets containing ingredients notorious for decreasing throughput and varying in inorganic feed phosphate source. Treatments were arranged in a 2 x 2 factorial within a Latin Square Design. Day of manufacture was the blocking criterion. Diets were of corn, soybean meal, and corn distillers dried grains and solubles with dicalcium phosphate or tricalcium phosphate. Each diet formulation either contained Azomite at 0.25% inclusion or was devoid of Azomite. The pellet mill motor load was set to a constant amperage of 40% for all treatments. Measured variables included pellet throughput, hot pellet temperature, and pellet durability. Results: interaction, main effects, multiple comparisons, and contrasts (TBD). Conclusion: TBD

Funding: Azomite Mineral Products, Inc

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #40

Long-term Soil Moisture Data Among Three Forested Watersheds Reveal Increasing Soil Moisture Decade

Mauricio Barro*, Brooke Eastman and William Peterjohn

Department of Biology, West Virginia University, Morgantown, WV, 26506

Field (Broad Category): Biology (Agricultural & Environmental Sciences)

Student's Major: Political Science

Soil moisture in forest ecosystems is an important source of water for both plants and soil microbes that can be altered by changes in climate, land use, vegetation, and soil conditions. To examine how some of these factors may influence soil moisture, I used long-term measurements of soil water in forested watersheds that differed in stand age and degree of soil acidity. More specifically, I compared measurements between three adjacent watersheds in West Virginia: one that was last cut ca. 1905; one that was clearcut ca. 1970 and has been experimentally acidified since 1989; and one that was clearcut ca. 1970 but was not experimentally acidified. Analysis of twelve years of measurements (from 2007 – 2019) revealed that soil moisture was consistently higher in the more mature, untreated watershed compared to the younger watersheds. When averaged across all forest stands and years, soil moisture declined through the growing season and reached its lowest level in early autumn, but the degree of seasonal decline varied among years. We hypothesize that this year-to-year variability is related to differences in climate, such as precipitation and temperature. These long-term data provide a unique and valuable resource to better understand dynamics of soil moisture. Determining the driving factors that influence soil moisture can help to predict variability in seasonal and inter-annual forest growth.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #41

What is the Proper Amount of Rings Needed for Accurate Dating of Trees?

Ethan Cade* and Amy Hessl

Department of Geology and Geography, West Virginia University, Morgantown, WV, 26506

Field (Broad Category): Geography/Geology (Agricultural & Environmental Sciences)

Student's Major: Environmental Geoscience

Ancient trees can yield important climate data through their chronologies. Many of these samples are hundreds of years old and by dating these trees, it is possible to uncover more of a region's climate history prior to instrumental records. The process we used to analyse species of trees includes counting the outer 300 rings to ascertain whether a match in the chronology can be found. However, it has been raised that only 200 rings may be needed for this process, at least with some species. Our aim is to test whether counting 200 rings would be a more sufficient process that produces the same results for *Athrotaxis Selaginoides* as well as other species utilized in dendrochronology. Therefore, a test of whether results are the same with 200 or 300 rings was conducted with both *Athrotaxis Selaginoides* and other species. Based on preliminary results, it is expected that Conifer species will require only 200 rings to achieve the same results as with 300 rings.

Funding: National Science Foundation

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #42

Are Invasive Spotted Wing Drosophila Affecting Eastern Songbird Diets?

Peyton Caylor*, Daniel P. Roche and Christopher M. Lituma

Division of Forestry and Natural Resources, West Virginia University, Morgantown, WV, 26505

Field (Broad Category): Wildlife and Fisheries Resources (Agricultural & Environmental Sciences)

Student's Major: Wildlife and Fisheries Resources

Non-native invasive species can severely alter ecosystems and disrupt ecosystem processes. The Spotted Wing Drosophila (SWD), a fruit fly, is a non-native invasive species that originated from Asia and has become increasingly present in the United States, particularly in berry plants. Their populations have proliferated due to the females' serrated ovipositors that cut into hard fruits, which is something other native fruit flies lack. It is unknown how the presence of this species and its abundance in songbird (Passeriformes) food sources, specifically berries, is affecting songbird diets. Three different samples were collected at the Allegheny National Forest, PA: berries to determine SWD prevalence within fruits; fly samples using passive traps (baited with yeast and sugar) to determine SWD distribution; and songbird fecal samples to determine songbird diets, including SWD. So far, the berry samples have been overrun with SWD. I expect the fly samples will yield a large percentage of SWD and the bird feces will contain minimal traces of seeds from berries. The predicted results would indicate the birds are being affected by the presence of SWD in the berries, and that SWD may pose a threat to fundamental ecological relationships. Further action may need to be taken to protect songbird food resources, and control techniques may be warranted to slow the spread of invasive SWD.

Funding: United States Forest Service

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #43

How Did We Get Here? Insights From Local Mantle-Derived Kimberlites and Pyroxenites

Brenna G. Cole,* Jayden N. Ware* and Graham D. M. Andrews

Department of Geology and Geography, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Geography/Geology (Agricultural & Environmental Sciences)

Student's Major: Geology

Kimberlites and pyroxenites are ultramafic (i.e. rich in iron and magnesium) igneous rocks formed from melting of the Earth's mantle and are the primary sources of diamonds. Both of these rocks occur as small dikes throughout Appalachia from Quebec to North Carolina, despite the region being dominated by sedimentary rocks. The Masontown kimberlite (type-II) dike in Fayette County, PA, and the Sugar Grove mica pyroxenite dike in Pendleton County, WV, are about 170 km apart and are both Jurassic (~160 Ma) in age. Kimberlites are dominated by the mineral olivine, whereas pyroxenites are dominated by pyroxenes; both are rich in phlogopite mica and xenoliths (mantle fragments in the kimberlite and crustal fragments in the pyroxenite). Our goal is to determine whether their emplacement mechanisms are similar. Using the Kimberlite Factory model of emplacement established by Brett et al. (2015) and thin section petrography, we have established that the Masontown kimberlite exhibits textural features consistent with ascent as a gas-filled, turbulent fracture quickly inundated by kimberlite magma. The primary evidence of this is rounded xenoliths surrounded by a selvage of olivine-free kimberlite, set in a matrix of olivine-rich kimberlite. Petrography of the pyroxenite and the xenoliths within it will allow us to compare the textures with the kimberlite. Pyroxenite dikes are very rare globally, and little to nothing is known of how they are emplaced; comparing the Sugar Grove dike to a contemporaneous kimberlite will allow us to assess if the Kimberlite Factory model is appropriate for this composition too.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #44

Electrochemical Detection of Lead and Cadmium in Drinking Waters Using Screen-Printed Carbon Electrodes

Kourtney A. Dalzell*, Colby E. Ott and Luis E. Arroyo

*Department of Forensic and Investigative Science, West Virginia University, 1600 University Ave.
Morgantown, WV 26506*

Field (Broad Category): Forensic Chemistry (Agricultural & Environmental Sciences)

Student's Major: Forensic Chemistry

Exposure to heavy metals such as lead and cadmium from environmental waterways, tap water, and other routes can have significant impacts on human health. The metal poisoning disrupts the functions of major organ systems like the nervous, cardiovascular, and reproductive systems. Lead has shown adverse effects on critical organs like the liver and is especially hazardous for children exposed to contaminated sources. A compounded effect is related to discrepancies between national and state regulations about agreed-upon harmful lead concentrations. Current testing methods rely on sensitive instrumentation such as Inductively Coupled Plasma-Mass Spectrometry (ICP-MS), and Graphite Furnace Atomic Absorption Spectroscopy (GFAAS) that can involve lengthy and expensive analysis. Nonetheless, electrochemistry has been utilized for several years in fields like the pharmaceutical industry, forensics, and for environmental applications. The electrochemical screening for heavy metal identification using smart technologies applicable for field detection is proposed in this work. The proposed method utilizes a square-wave anodic stripping voltammetry technique as a quick screening protocol providing a fast, cost-effective, portable, and sensitive approach to detect heavy metals, including lead and cadmium, using unmodified screen-printed carbon electrodes (SPCEs). A Plackett-Burman design was performed to identify contributing parameters followed by response surface methods to optimize the sensitivity and selectivity of the process for the metal compounds. Limits of detection were below 100 parts-per-billion. Precision was assessed by repeatability and reproducibility, which were within an acceptable range. This method provides a viable screening technique for on-site use and holds promise for future analysis of other heavy metals.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #45

Surveying Depredation of Livestock in the State of West Virginia by Eastern Coyotes

Matthew Day* and Sheldon Owen

Appalachian Hardwood Center, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Natural Resources/Wood Science/Plant Science (Agricultural & Environmental Sciences)

Student's Major: Wildlife & Fisheries Resources

The number of individual sheep and producers have been steadily declining in contrast to an increase of the eastern coyote (*Canis latrans* var.) population within West Virginia. The increase in coyote populations and predation has been projected to cause the decline in West Virginia's sheep industry that has been taking place in the past several decades and for this, the state's Integrated Predation Management Program, administered by the USDA APHIS Wildlife Services (WS), was established in 1996 to counteract the threat. Just prior to this program in 1995, West Virginia sheep and goat producers were surveyed to assess the impacts of coyote depredation. The goal of this study is to evaluate the Integrated Predation Management Program and assess current trends in coyote depredation. This survey utilizes questions from the 1995 survey to assess changes over the past 25 years. The survey was mailed to 2,000 livestock, goat, and cattle producers around the state. This study will provide insights into the current state of coyote depredation across West Virginia as well as assess the effectiveness of the IPMP.

Funding: Appalachian Hardwood Center

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #46

Does Adding Manure Improve Soil Health in an Organic Grassland System?

Seth Fields*, Chisom Ejimofor*, David Stas, Robert Rockis and Eugenia Pena-Yewtukhiw
Davis College of Agriculture, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Agriculture (Agricultural & Environmental Sciences)

Student's Major: Agroecology

The concept of soil health has become important to the agricultural industry as people become increasingly concerned with sustainability and the desire to move away from industrial agriculture to organic or regenerative farming. Organic farming differs from industrial agriculture because it eliminates synthetic fertilizer use and, instead, uses organic or composted manure as fertilizer. West Virginia University has its own organically certified farm, which was used to conduct preliminary soil health research. Samples were taken from four experimental plots with two manure input levels (added and not added), and two grassland managements (hay or pasture). Soil health tests were performed on these soil samples. The following soil health indicators were measured: dry and wet aggregation, infiltration, organic matter, porosity, and bulk density. Organic matter was clearly higher and soil bulk density was lower in the manure treated plots. Water infiltration was related to porosity, and bulk density. From the data, we have been able to observe the improvement of soil health with manure application.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #47

Changes in Water Demand in West Virginia

Hannah Foley* and Leslie Hopkinson

Benjamin M. Statler Department of Civil Engineering, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Environmental Science & Sustainability-Civil Engineering (Agricultural & Environmental Sciences)

Student's Major: Civil Engineering

Continuous water needs and uses greatly impact water resources in West Virginia. Water also plays a critical role in the extraction of natural gas. The overall objective of the study was to evaluate water availability at an unregulated water stream in southern West Virginia. Data from a long-term water gage (data extracted from 1967 to 2018) in Dunlow, West Virginia from the United States Geological Survey (USGS) database. This data was used to evaluate available water for large quantity users for the future development of natural gas industries. Large quantity users are those who withdraw over seven hundred and fifty thousand gallons of water within a calendar month from their state's water supply. Statistical analysis was utilized to create flow-duration curves over the historical time period. Using daily data from the water gage, monthly data curves were created for time periods of 51 years, 30 years, and 15 years. These curves will be used to determine changes in future monthly water availability within the Marcellus shale region of West Virginia.

Funding: United States Geological Survey

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #48

Sex Determination Genes Intersex and Transformer-2's Role in the Development of *Onthophagus taurus* Horns

Sydney Friend,*and Teyia Kijimoto

Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology (Agricultural & Environmental Sciences)

Student's Major: Animal and Nutritional Sciences

The mechanisms in which dimorphism occurs has not been fully understood despite its significance in ecological diversification. This study utilized the development of sexually dimorphic traits in the dung beetle species *Onthophagus taurus*. In *O. taurus*, the gene doublesex (*dsx*) regulates sexual dimorphisms by promoting trait development in males and inhibiting it in females. Particularly, just like other beetles, their horns play an important ecological role in males (i.e. competition for females) therefore this species is used as a model to study the genetic underpinnings of horn development. The focus of this study is on genes intersex (*ix*) and transformer-2 (*tra2*) and their significance in the development of *O. taurus* horns in relation to *dsx*. *Tra-2* is assumed to be a regulator of the sex-specific splicing of *dsx* pre-mRNA in female *Drosophila* (fruit flies) while remaining inactive in males. *Ix* in *Drosophila* is proposed to be a transcriptional cofactor of doublesex but like *tra-2* it is inactive in male flies. The interactions of *ix* and *tra-2* in regard to the developmental pathway of beetles and their horns are not presently known. To address this question, systematic knockdowns of *ix* and *tra-2* will be implemented to observe developmental changes in male and female beetles. If similar to the interactions found in flies it is expected that by repressing *ix* and *tra-2*, horn development will not be affected in males. Females; however, may have their pathway altered in a way that they will develop male traits such as horns. We will present current data and discuss their significance.

Funding: WVU

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #49

The Effect of Varying Steam Conditioning on Enzyme Products in a Pelleted Broiler Diet

Jenna N. Friend* and Joseph Moritz

*Davis College of Agriculture, Natural Resources and Design, Division of Animal and Nutritional Science,
West Virginia University, Morgantown, WV 26506*

Field (Broad Category): Agriculture (Agricultural & Environmental Sciences)

Student's Major: Animal and Nutritional Science

Commercial poultry diets are typically pelleted, involving exposure to saturated steam in a conditioner and frictional force within the pellet die during extrusion. For feed enzymes to have efficacy within the gastrointestinal tract of the bird, the enzymes must be thermally tolerant of the pelleting process. The objective of this study was to determine the activity of eight enzyme products in a corn and soybean meal based diet post pelleting. Enzymes were added at the mixer to 454 kg of basal diet. Each experimental diet was conditioned at 82 °C and then 88 °C for 15 seconds and subsequently pelleted through a 4.7 x 38 mm pellet die. Descriptive pelleting conditions were recorded and pellet quality assessed. Mash and pelleted samples were analyzed for enzyme recovery by two different commercial analytical laboratories. Pellet mill motor load and pellet quality decreased and increased respectively due to increasing conditioning temperature. Most enzymes demonstrated similar trends in activity regardless of laboratory. Enzymes 1, 2, and 3 did not vary in activity due to conditioning temperature while enzymes 4 and 8 decreased in activity due to 88 °C conditioning. Activity of enzymes 5, 6, and 7 were dependent on analytical laboratory. Analytical activity of enzymes post pelleting may predict enzyme efficacy in vivo; however, laboratory bias may influence results.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #50

Structural Analysis of Tensile Fracture Sets in The Medicine Lake Dacite Lava, California

Kailee Gokey* and Graham D.M. Andrews

Department of Geology & Geography, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Geography/Geology (Agricultural & Environmental Sciences)

Student's Major: Geology

The Medicine Lake Glass lava, Medicine Lake volcano, in Siskiyou County, California is a dacitic lava flow covering an approximate area of 2.4 square kilometers. Previous studies of this dacite flow have documented the orientations of small numbers of fractures in the Medicine Lake dacite, but these studies did not integrate their formation with the emplacement of the lava. We present a preliminary structural analysis of tensile fracture sets in the upper surface of the Medicine Lake dacite lava. Using Google Earth Pro and orthorectified drone images, we have analyzed 1,171 tensile fractures across the entire lava to produce a representative data-set. We have measured the lengths, widths and orientations of major fractures, and used drone image-derived 3-D models and Digital Elevation Models (DEMs) to estimate fracture depth and fracture surface curvature. On-going research into silicic lava flow emplacement emphasizes the importance of tensile fracturing during emplacement and the extreme unlikelihood that silicic lavas will fold. The unlikelihood of silicic lava folding contradicts the existing literature that interprets many upper surface structures as ductile and compressional (i.e. folds). Therefore, it is important to understand the structural context of undisputed fracture sets to assess how and when they formed.

Funding: National Science Foundation

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #51

West Virginia Lake Budget

Andrew Hay* and Leslie Hopkinson

Benjamin M. Statler College of Engineering, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Engineering (Agricultural & Environmental Sciences)

Student's Major: Civil Engineering

This water budget was created with the intention of addressing future weather patterns and changing water needs. This project created a model for the reservoir Stonewall Jackson Lake in central WV. The intent was to visualize the impact of a drought or water stress on future water availability. The lake provides many large West Virginia towns such as Bridgeport, Weston, and Clarksburg with drinking water. The data used was pulled from the NOAA, USGS, and USACE for precipitation data, flow rate, and stream data respectively. This data was collected for four different years and was recorded per month. Water depth was the focus of our data and was collected by the following equation $\text{Precipitation} + \text{Inflow} - \text{Outflow} - \text{Evapotranspiration} = \text{Monthly Change in Depth}$ (values recorded in metric SI units). At this time we still cannot predict water needs with enough accuracy to conclude the research. The current error is likely due to our inflow and further investigation to unmarked streams would be needed to reduce the error to a reasonable level.

Funding: Unknown

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #52

GIS Mapping of Volcanic Landform Age Distribution in Lago de Patzcuaro Region, Michoacan, Mexico

Anna Himmelstein* and Graham Andrews

Department of Geology and Geography, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Geography/Geology (Agricultural & Environmental Sciences)

Student's Major: Geology

The Trans-Mexican Volcanic Belt (TMVB) is home to numerous volcanoes, all of differing ages and states of weathering and erosion. Our area of focus is in the region around Lago de Patzcuaro in Michoacan State, central Mexico, a well-populated rural area that is popular with tourists. The Lago de Patzcuaro area has not experienced an eruption in recorded history but major destructive eruptions have occurred in adjacent parts of the TMVB. The area has also not been mapped geologically. To understand the volcanic hazards posed to communities in the Lago de Patzcuaro area, we have classified pre-historic volcanoes to estimate their relative age, size, and eruption style. We have created 5 age categories based on physical characteristics observed in Google Earth Pro: vegetation, valley incisions, cone shape, and crater visibility. For approximately 90 likely volcanic edifices we can estimate the relative age, with pristine volcanic cones being youngest. This is very essential to understanding the likely behavior of near-future eruptions in this part of the TMVB.

Funding:

Program/mechanism supporting research/creative efforts: Other
GEOL 494 B Senior Thesis

Poster #53

Constructing Digital Rocks

Gabrielle Labishak*, Anthony Minnick*, Allison Popp*, Mackenzie Stone* and Graham Andrews

Department of Geology and Geography, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Geography/Geology (Agricultural & Environmental Sciences)

Student's Major: Geology

As three-dimensional digital technology continues to grow in relevancy, it is important to understand its applications in the fields of geology and geoscience education. Our team has explored one application by utilizing three-dimensional modeling technology to construct digital samples of igneous and volcanic rocks. Igneous rocks, which vary greatly in color, texture, and composition, provide a wide range of samples to model; this range allows us to develop a consistent workflow that produces concise models for the vast majority of samples. This process involves thorough photography of the sample from hundreds of different directions, which can be easily achieved by placing the sample on a rotating surface. Agisoft Metashape Professional software sorts the images into a collection of points identifiable in multiple adjacent images, that can be crafted into a complete, three-dimensional model. These models can then be shared online using SketchFab.com, which allows us to build a comprehensive library of digitalized rock samples. From here, the rock samples are made available to the general public and can be shared directly with other organizations, institutions, universities, or individuals. The sample sharing process is greatly streamlined through the digitalization of samples, allowing us to send rock models across the globe with the click of a button.

Funding: RAP and National Science Foundation

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #54

Water Consumption Related to Unconventional Drilling in West Virginia and Pennsylvania

Kayla McConahy* and Shawn Grushecky

*Division of Forestry and Natural Resources, Davis College of Agriculture, Natural Resources and Design,
West Virginia University, Morgantown, WV 26506*

Field (Broad Category): Environmental Science & Sustainability-Energy Management (Agricultural & Environmental Sciences)

Student's Major: Energy Land Management

The objective of this project was to investigate and compare total water consumption and water consumption per lateral foot of well depth in unconventional drilling operations in West Virginia and Pennsylvania. Both states' Department of Environmental Protection require operators to permit wells before drilling. By analyzing permits, data on the number and location of wells, well production, can be determined for each state. Coupled with this data is information from FracFocus, a database managed by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission, which provides public access to information on hydraulic fracturing and chemical usage in the oil and natural gas industry. Data extracted from FracFocus and both states' Departments of Environmental Protection were compiled to create a database of information on water use per well, total vertical length, total depth drilled, lateral length, and water usage per foot for the period of 2011 to 2017. Spatial patterns of water use were analyzed within and among the states studied. The available data provided approximately 440 Pennsylvania wells and 1,000 West Virginia wells for analysis. Results indicate higher water consumption per lateral foot for Pennsylvania than West Virginia, with variance among the states for individual years.

Funding: National Science Foundation EPSCOR project

Program/mechanism supporting research/creative efforts: WVU Work Study (not associated with RAP)

Poster #55

Did a 600 Year Old Volcanic Eruption Knock Down The Surrounding Forest

Robert I. McFarland* and Graham Andrews.

Department of Geology and Geography, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Geography/Geology (Agricultural & Environmental Sciences)

Student's Major: Geology

There are several fallen redwood trees around the obsidian dome in California. Many of these trees may have fallen due to volcanic blasts caused during the formation of the dome. Lidar data will be used to determine if the trees had fallen due to these blasts or if it was due to weather and surrounding geology in the area. If these trees have fallen due to the volcanic blasts it can provide vital information on who would need to be evacuated from the area if the domes were to become active again by using the data to determine the strength of the blasts. Lidar data was gathered in this area and stripped down to show only fallen trees. These trees were marked using QGIS and the slope, aspect, length, and direction of the fallen trees was analyzed to determine if the blasts caused the destruction or if it was by natural forces. If the trees have fallen due to the obsidian dome there will be a correlation in the direction the tree lie and no correlation to the slope of the hills in the area. If the trees have fallen due to the blasts the force will be calculated by using the distance of the tree have fallen and the size of the trees. This will allow communities nearby to be aware of any possible danger if the dome was to reactivate.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Poster #56

Life Cycle Cost Model for Transit Buses

Robert Minard*, Connor Jack and Scott Wayne

Benjamin M. Statler College of Engineering, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Engineering (Agricultural & Environmental Sciences)

Student's Major: Industrial Engineering

Transit bus companies are constantly looking for ways to save money to limit cost on the business while still providing public transportation. There are many different ways for a bus company to go when choosing a bus for the service. There are diesel, CNG, hybrid, and electric buses commercially sold on the market. Each cost for the bus has many variables affecting that cost in the long term. This is why a Life-Cycle Cost Model was developed. It allows companies to put in factors on a spread sheet such as average speed, weight, etc. This model then takes those factors and gives a 12-year cost estimate for the bus. The model does this for each kind of bus, so that companies can easily see which bus will be most cost efficient for them. With so much new technology on the rise in the market, it can be confusing for bus companies to choose a bus. This model simplifies the process for them.

Funding: n/a

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #57

The Use of Bioremediation as a Potential Treatment for Produced Water

Abigail Paul*, Shawn Grushecky and Zachary Freedman

*Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV
26506*

Field (Broad Category): Environmental Science & Sustainability-Environmental Microbiology
(Agricultural & Environmental Sciences)

Student's Major: Chemical Engineering

A byproduct from the production of natural gas and petroleum is produced water. Large volumes of produced water are generated annually and can be as high as 2 million gallons per unconventional well. Produced water can be reused in the fracking process, injected in storage wells after use, or treated before being released into the environment. One possible treatment option, bioremediation, uses naturally occurring bacteria in soil around the sites of fracking to remove some of these toxins, specifically hydrocarbons. Using this method, produced water can be inoculated with these bacteria to potentially reduce the number of toxins present in the water. In this experiment, bacteria from well sites in the Appalachian region were cultured and used to study their effectiveness in treating produced water. A pure culture of bacteria from Saskatchewan that has been shown to degrade hydrocarbons was also cultured. These samples will be grown under three conditions; nutrient media with crude oil, nutrient media with produced water, and nutrient media with a mix of crude oil and produced water. A total of 36 samples were included, 3 replicates per treatment and bacteria culture. Water quality samples will be taken and sent to the West Virginia University analytical lab where it is then tested. The results are then compared to the heat killed samples to determine if the bacteria had any effect on the produced water. A significant reduction in the hydrocarbons present in the samples as well as a reduction in ion concentration is expected.

Funding: National Science Foundation EPSCOR project "Improving Water Management, Treatment, Recovery in Oil and Gas Production"

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #58

Exploring the Influence of Soil Amendments on Fungal to Bacterial Ratios in Bioenergy Agroecosystems

Shayna Redford*, Zachary Freedman and Jenni Kane

Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Environmental Microbiology (Agricultural & Environmental Sciences)

Student's Major: Biochemistry

By 2022, the United States Environmental Protection Agency has mandated that 60.5 billion liters of bioenergy be produced. This is largely due to the rising demands of a growing human population. To accomplish this goal, marginal lands within the Appalachian region are being explored for their suitability for bioenergy crop production. Specifically, the promising bioenergy crop *Miscanthus x giganteus* is favored for growth in marginal land due to its high biomass yield and low nutrient needs. Benefits of its growth reach beyond bioenergy and include reducing soil erosion and minimizing nutrient runoff. One influential factor in the success of the crop is a productive microbial community. Specifically, bacteria and fungi in the soil are responsible for decomposing organic matter which directly impacts a plant's nutrient uptake. As an indicator of soil fertility, the ratio of bacterial to fungal DNA is often used. Managing this balance and maintaining a healthy bacterial to fungal ratio is crucial for supporting marginal land productivity. This ratio will be quantified using quantitative polymerase chain reaction, where the genomic targets of bacterial and fungal abundance will be the 16S ribosomal RNA gene and the Internal Transcribed Spacer region, respectively. Upon comparing the data with a known standard curve, the impact of soil amendments on the bacterial to fungal ratio and the fertility of the soil will be better understood. This will improve future soil amendments and lead to more efficient management of central Appalachian marginal lands to support sustainable bioenergy agroecosystems in the future.

Funding: United States Department of Agriculture (USDA)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #59

Analysis of Fungal Communities in Agricultural Soils Under Varying Methods of Cultivation

Marshall Robinson*, Jeth Walkup and Ember Morrissey

Davis College of Agriculture, Natural Resources and Design, Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Environmental Science & Sustainability (Agricultural & Environmental Sciences)

Student's Major: Applied and Environmental Microbiology

The fungal communities within soil are incredibly important to agriculture. Some are necessary for certain plants to grow, such as mycorrhizae, which aid in nutrient uptake by crops. The impact made on the fungal communities in soil relates to crop health and production, making this of significant importance to agriculture. Through analysis of fungal communities, we can gain useful insight into better cultivation and land management. Our aim is to better understand the impact of cultivation and land management on fungal biodiversity. To do this we have extracted DNA from soil samples from three farms, each with two different combinations of crop rotation, tillage, nitrogen source, and organic or conventional management. Currently we are working to amplify the internal transcribed spacer 2 region of the fungal rRNA gene. The PCR product will be sequenced to give us data on the fungal community composition and biodiversity. We will then compare the differences in community to the differences in crop rotation, tillage, and fertilization to see the impact of various cultivation methods on fungal biodiversity.

Funding:

Program/mechanism supporting research/creative efforts: Other

Poster #60

Measuring Carbon Storage on Soil Mineral Surfaces by Microbes Under Increased Nitrogen Deposition

Rachel Winslett*, Chansotheary Dang, Juan Pineiro Nevado and Ember Morrissey

Davis College of Agriculture, Natural Resources and Design, Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Microbial Soil Ecology (Agricultural & Environmental Sciences)

Student's Major: Applied and Environmental Microbiology

The largest portion of global carbon is stored in soil as organic matter, making terrestrial ecosystems important carbon sinks. Climate change drivers such as increasing carbon dioxide and nitrogen deposition are predicted to impact soil carbon storage. Carbon that has been metabolized by microorganisms is more likely to be stabilized on clay particles and in microaggregates, which makes it less accessible for other microorganisms. Nitrogen deposition is predicted to alter the metabolism of soil microbes, however the extent of these changes in AM and ECM soil communities is poorly understood. Soil microbial communities from arbuscular (AM) and ectomycorrhizal (ECM) plants fundamentally differ in their C and N metabolism, and thus might differ in their response to N deposition. We hypothesized that AM communities will store more carbon on clay particles under nitrogen deposition than ECM communities. For the experiment, a one-week soil incubation was conducted with carbon-13 synthetic root exudates with soils from AM and ECM plots treated with increased nitrogen deposition conditions. Afterward, soils were sieved with 2 mm, 53 μm , and 20 μm sieves to separate coarse and clay fractions. The ratio of carbon-12 to carbon-13 on the different fractions indicate where the microbes deposit the newly assimilated carbon, thus determining how the two microbial communities respond to increased nitrogen deposition and how carbon storage in soil will be impacted by future climate change drivers.

Funding: Department of Energy

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #61

Investigating the Genetic Compatibility of Cryphonectria Parasitica and Effects in Relation to Castanea Dentata

Lauren Young*, Amy Metheny and Matthew Kasson

Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Biology (Agricultural & Environmental Sciences)

Student's Major: Biochemistry

Castanea dentata, or more commonly known as the American chestnut tree, was once a keystone tree species within Northeast America prior to its almost complete removal due to the invasive fungal pathogen Cryphonectria parasitica, causal agent of chestnut blight. Prior to chestnut blight, C. dentata was integral to the Northeast economy, particularly for Southern Appalachians for whom the effects of its loss was both ecologically and economically devastating. In an effort to restore American chestnut, plant pathologists have begun to analyze the genetic variability of C. parasitica. The purpose of this experiment is to analyze the genetic variability of C. parasitica in cankers to better understand how genetic diversity of the pathogen affects disease progression on C. dentata, and control efforts. To investigate this, cankers infected with C. dentata were sampled from the WVU Agronomy farm for isolation; once completed, a genetic compatibility test is to be conducted using the isolated samples. This test will be conducted through the creation of a matrix with the isolated samples of C. parasitica; each sample of C. parasitica is to be plated with every other isolated sample for later examination. Isolates will also be molecularly confirmed. The yield of information from this study is vital to the field, as it allows plant pathologists to gain insight into what limitations may exist in the prevention of C. parasitica from spreading due to key features regarding genetic compatibility, but also gives insight into new possibilities of preventing further spread of the pathogen.

Funding: Unknown

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #62

The Pressure to Plead

Kaitlin Bailey*

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Criminology/Criminal Justice (Behavioral & Social Sciences)

Student's Major: Criminology

Plea bargaining exists as a fundamental mechanism of the misdemeanor court system in the United States. While the criminal justice process would fail to function without it, research conducted by legal scholars, such as Alexandra Natapoff, has demonstrated that it often denies defendants counsel, due process, and self-determination. Such constitutional neglect leaves defendants labeled criminal, a title that carries vast social and economic repercussions. Over the course of 14 weeks from September to December, a small research team of students from West Virginia University and I observed the Magistrate court of Monongalia County, West Virginia to investigate how local proceedings compare to those discussed in Natapoff's work. The Magistrate court oversees all proceedings for misdemeanor cases, as well as pre-trial proceedings for felony cases. Our observations reveal that there exists an overwhelming incentive for defendants to waive the rights guaranteed to them in the Constitution rather than exercise them, and how this negatively impacts vulnerable people. My paper and presentation will dissect the systematic flaws within the system that result in pleas instead of justice.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #63

Identifying How and Where to Deliver Sports News Digital Content to Fans

Jeffrey Boggess,* Miranda Wolfe* and Jaden Wolff*

Reed College of Media, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Communications/Journalism (Behavioral & Social Sciences)

Student's Major: ADPR

The growth of digital news subscriptions has left some newspaper publishers without marketing plans detailing how to transition their content online. The McClatchy Company, however, has found relative success by implementing niche subscription services for its online content, yet the overall brand has continued to suffer due to a lack of clearly defined competitors and a lack of owned media presence. This paper uses an online survey and focus group findings to identify where consumers who identify as sports fans are most likely to come across and engage with sports news content. This research identifies the McClatchy Company's direct and indirect competition, and the gateways consumers use to access their preferred content while revealing the weaknesses in the McClatchy Company's current strategy. Through identification of the many variables that lead consumers through content paywalls, this research explores which qualities—such as loyalty, convenience, and expendable income—consumers consider important in identifying as sports fans and subscribing to sports news. All of these findings are important in configuring a successful strategic communication for the McClatchy Company to better appeal to its target audiences across its sister newspapers.

Funding:

Program/mechanism supporting research/creative efforts: Other

Poster #64

Study Abroad in Sport and Exercise Psychology: A Cross-Cultural Experience in Scandinavia

Candice Brown* and Scott Barnicle

College of Physical Activity and Sport Sciences, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Sports Management/Sport Exercise Psychology (Behavioral & Social Sciences)

Student's Major: Sport and Exercise Psychology

Little research has been conducted pertaining to cross cultural studies in the field of Sport and Exercise Psychology. Therefore, the purpose of this study was to understand the relationships that emerged between various student experiences during a Sport and Exercise Psychology study abroad trip, as well as establish themes across student reflections of the trip. A thematic analysis was utilized to examine ten participant (n = 10) essays pertaining to the ten day study abroad trip between Halmstad University and West Virginia University Sport and Exercise Psychology students. Two researchers coded the essays for recurring themes and then compared results. Results shown themes occurring in three broad categories: university differences, cultural differences, and sport differences. This research is relevant to West Virginia University students considering study abroad, as this research gives insight into the study abroad experience overall. Additionally, the information presented is relevant to students or scholars in the field of Sport and Exercise Psychology with interest in cultural differences and similarities within the field.

Funding:

Program/mechanism supporting research/creative efforts: Other
Independent study

Poster #65

Childcare Affordability in West Virginia

Blake Caldwell*, Maja Holmes, Blake Humphrey, Lonnie Long,
Department of Public Administration, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Public Administration (Behavioral & Social Sciences)
Student's Major: Political Science

The lack of affordable quality childcare in West Virginia is creating many issues for families throughout the mountain state. The purpose of our research was to determine how improved affordability and increased access to childcare helps to improve work rate participation, especially in West Virginia. The research identified barriers to affordable and accessible childcare in West Virginia to reduce obstacles for workforce participation. The research compared federal and state policies regarding childcare, including examining regulatory barriers in state code that make it expensive and difficult to establish and maintain a childcare facility. The research findings highlight that West Virginia does not have the Quality Rating and Improvement System (QRIS) in place to receive federal grants to assist in childcare funding, and the state needs to reevaluate the outcomes of current childcare regulations. The research findings provide specific recommendations to revise the regulatory environment to increase access to affordable childcare, with the aim to increase workforce participation rates in the state. This research helps to explain the reasons that childcare is out of reach for many working West Virginia families, with hopes to be able to work to create a regulatory environment to help bridge the affordability gap.

Funding: West Virginia University

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #66

Memory for Actions in Twins and Friends

Brianna DeLarge* and Elisa Krackow

Department of Psychology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology

Memory recall is used throughout daily life but is not always accurate (Mullet & Marsh, 2015). In this experiment, memory recall was tested and evaluated through a study using actions. The participants were pairs of twins, as well as pairs of friends. A researcher read each set of twins/friends a list of actions and provided one or the other twin/friend with one of four of the following directives: complete the action themselves, observe their twin/friend completing the action, imagine themselves completing the action, or imagine their twin/friend completing the action. Afterwards, they were given a 10-minute distractor task to and were then given a memory questionnaire with the four directives as answer choices. The expected results are that compared to friends, twins are more likely to make an error when differentiating whether they imagined their twin or themselves completing an action. This can be useful in understanding identity memory recall. Research in this field can be applied to other professions, such as law enforcement and court law, in the form of eyewitness testimony.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #67

Frequent Baseline Reinforcement Reduces Treatment Efficacy

Shedrick Garrett*, Stephanie Jones and Claire St Peter

Department of Psychology, West Virginia University, Morgantown, WV, 26506

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology/Neuroscience

Individuals enter treatment with a variety of histories for challenging behavior. Existing research suggests that behavioral treatments based on discontinuing reinforcement may be more effective when they immediately follow a history of receiving reinforcement for every response ("continuous reinforcement") instead of intermittently ("intermittent reinforcement"). However, the effects of these histories when challenging behavior also continues to produce some reinforcers is unknown. We assessed effects of continuous and intermittent histories with a non-clinical sample during "treatment" of an arbitrary response (mouse-clicking on a computer) using a within-subject design. Each participant experienced two replications of three conditions: baseline (reinforcement for clicking), treatment that discontinued reinforcement for clicking, and treatment with intermittent reinforcement for clicking, in that order. Baseline consisted of continuous reinforcement in one replication and intermittent reinforcement in the other. In contrast with previous findings, preliminary results suggest that a history of continuous reinforcement worsened treatment outcomes when treatment included continued intermittent reinforcers for challenging behavior, relative to initial intermittent reinforcement. Results suggest that clinicians should be careful about following previous recommendations to shift to continuous reinforcement before commencing treatment.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #68

Analyzing Social Media Interactivity and Emerging Sports Leagues

Julia L. Hillman*, Isabelle Henney* and Cheyenne Ballard*
Reed College of Media, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Communications/Journalism (Behavioral & Social Sciences)
Student's Major: ADPR

Over the past decade, Twitter has become a platform that has given sports leagues, teams, and athletes the ability to interact personally and quickly with their fans (Chinn et al., 2014). Through hashtags, fans can not only interact with content from emerging sports leagues, teams, and athletes but also with other fans during sporting events (Clavio & Walsh, 2012). Past studies have also analyzed how sports fans interact with different kinds of content posted by leagues, teams, and players on Twitter (Anderson, 2018). Not only is content a factor when studying fan interactivity, but motivations like entertainment and fanship as well as economic and social constraints contribute to fan interactivity (Witkemper et al., 2012). While these interactions have been studied to an extent, less has been done to research the motivations driving fans to interact with content centered around and produced by emerging sports teams, organizations, and players. The current study analyses the interactivity between fans and both the re-launched XFL and last year's failed Alliance of American Football (AAF) on Twitter. By using a focus group, an online survey and social network analysis, this research is collecting data from sports fans across the U.S. Through analysis of the twitter accounts of users who have interacted with tweets from both the XFL and AAF official Twitter accounts, and the personal motivations for that interactivity, recommendations can be made on how best to boost fan interactivity on social media for emerging sports leagues.

Funding:
Program/mechanism supporting research/creative efforts: Other

Poster #69

Problem Solving, Depopulation and Vacant Land in a Pittsburgh Neighborhood

Sarah Hogan*

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Criminology/Criminal Justice (Behavioral & Social Sciences)

Student's Major: Criminology

This project is a portrait of an urban neighborhood by examining a neighborhood's demographics, cultural attributes, economic characteristics, social conditions, and the characteristics of its buildings and infrastructure. I chose to investigate Perry Hilltop, a neighborhood on the Northern side of Pittsburgh, PA. For the collection of my data, first I compiled census data involving housing, demographic, social and economic characteristics for my neighborhood. Census data was also collected on Allegheny county as a whole to be compared to the neighborhood. I then traveled to Perry Hilltop to conduct an interview with a resident of the neighborhood in order to get first-hand knowledge of what living in the area is like. Through my research, I found a fundamental issue with the infrastructure throughout the neighborhood: there were abandoned buildings and vacant lots littering the area. To combat this, The Perry Hilltop Citizen's Council is constantly working on new ways to bring the community together in order to push the neighborhood back up to the desirable area it once was.

Funding:

Program/mechanism supporting research/creative efforts: Other

SOCA 488: Capstone – Cities and Urban Life: "The Wire"

Poster #70

Preference for Quantitative and Qualitative Forms of Performance Feedback

Alexis D. Humphreys*, Cory Whitley and Claire C. St. Peter

Department of Psychology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology

The purpose of our study was to evaluate adults' preference for different forms of performance feedback (PF). PF is defined as information provided to a trainee about past performance. Although different methods of PF have been effective at helping people acquire new skills, less is known about the type of PF strategies that trainees prefer or enjoy. We conducted two experiments using within-subject designs in which we trained undergraduate participants to implement common clinical tasks in a laboratory. During the first half of each session, we provided either qualitative (i.e., written descriptions) or quantitative (i.e., percentage of correct components) feedback following each performance. Then, the participants chose the type of feedback they would like to receive following all subsequent performances. This allowed us to evaluate preference for the alternatives. In Experiment 1, the participants ($n = 5$) chose between summaries of their performance in the form of either (a) qualitative or (b) a checklist accompanied quantitative. In Experiment 2, the participants ($n = 4$) chose between either (a) qualitative or (b) quantitative without a checklist. Most of the participants in Experiment 1 (80%) and Experiment 2 (75%) preferred the quantitative feedback. These results may be useful for clinicians tasked with providing training to individuals that are acquiring new skills.

Funding: Behavioral and Biomedical Sciences Training Grant

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #71

Parental Attachment and Mental Health in College Students: The Moderating Role of Self-Control

Madison Johnston*, Rebekah L. Damitz and Nicholas A. Turiano

Department of Psychology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology

High quality relationships with parents are crucial for children to develop early in life to reduce risk for increased substance use, stress, anxiety, and academic struggles. Thus, in the current study, maternal and paternal attachment were examined in their prediction of mental health functioning prior to starting college, hypothesizing that higher levels of anxious and avoidant attachment with parents would be associated with higher levels of depression and anxiety, and lower levels of happiness. Additionally, it was hypothesized that having a strong sense of self-control would moderate the negative effects anxious and avoidant attachment would have on mental health. We utilized data from 579 first-time freshmen that participated in the College Student Transition Study conducted at a large public university in the Appalachian region of the United States. Data were collected in August prior to students' arrival on campus. A series of multiple linear regression models was conducted and found that higher levels of anxious attachment predicted increased levels of depression ($b = 1.43, p < .05$) and higher levels of self-control predicted lower levels of depression ($b = 4.51, p < .05$), stress ($b = -3.14, p < .01$) and higher happiness ($b = 0.39, p < .05$). Moreover, we found that self-control moderated the attachment-depression association such that at high levels of anxious attachment, if someone endorsed high self-control, they did not experience increased depression, showing support for our hypotheses. This may indicate that the ability to self-regulate can promote resilience to adverse experiences.

Funding: National Institute of General Medical Sciences

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #72

Social Capital and Homicide: Are They Related?

Mariah Justus,* Lynne Cossman and Jacob Souch

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Sociology (Behavioral & Social Sciences)

Student's Major: Forensic Science

With this study, I am mapping social capital and how it is related to homicide rates in the United States. Mapping county rates of social capital and homicide will help us if social capital has an effect on homicide. Social capital is the rate at which a community is more known to each other and how close members of the community are. If I find there is a relationship between social capital and homicide, I can provide that information in a manner to potentially help prevent homicide. I expect that counties with significantly more social capital will also have significantly lower homicide rates. I hypothesize this because more tight-knit communities where people know each other better would have residents who are less interested in killing each other. While studying social capital we can find if there is a correlation between the two points of interest. We can find if having more social capital is associated with higher or lower rates of homicide.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #73

Demographic and Self-Control Levels as Predictors of College Drop-out and Performance

Emily King*, Rebekah L. Damitz and Nicholas A. Turiano

Department of Psychology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology

Earning a college degree has many benefits on health, wealth and well-being. If having a degree can increase the likelihood of life success, why are so many students dropping out? Dropping out not only costs the student money long-term, but universities also have lost tuition. West Virginia University (WVU) has a projected loss of \$22 million over the last 6 years. To better understand academic performance at WVU, we utilized data from the College Student Transition Study. We tested whether key demographic factors and self-control levels would predict grade point average and drop-out rates in 579 freshmen attending WVU in the 2016-17 academic year. All participants completed a baseline web-survey in August 2016 and academic data was obtained from the WVU registrar's office over the 2016-17 academic year. Demographic factors included: gender, institution risk score, first generation status, WV residency, and perceived socioeconomic status. To calculate the odds of drop-out a series of logistic regressions were used and a series of multiple linear regression analyses to examine end of the year cumulative GPA. Interactions of self-control and each demographic factor were added to the models. Higher institution risk score was strongest predictor of increased drop out and lower grade point average, and higher self-control was associated with a lower risk of drop out and higher GPA. No other demographic factors were significant predictors, nor were there interactions with self-control. Findings underscore the need to identify demographic and psychological factors associated with academic struggles so prevention strategies can be implemented.

Funding: National Institute of General Medical Sciences

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #74

Exploring the Impact of Wait Time on Child Behavior in a Pediatric Dental Setting

Sarah M. Lipinski*, Morgan Simpson*, Hannah Brown*, Christopher K Owen, Lauren B. Quetsch, Kelly Hickey, Kelsey Eackles, Christa Lilly, Masahiro Heima, Cheryl B. McNeil, Daniel W. McNeil
Department of Psychology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology

Longer waiting times before and during healthcare appointments have been shown to have negative impacts on patient satisfaction, patient-provider relations, and treatment adherence. Nearly all prior research, however, has focused on adults, leaving little known about the effects of wait time length on pediatric patient populations. Since children, in general, have shorter attention spans and lower frustration tolerance relative to adults, wait time is an especially important component of their healthcare experience, and that of their parents/caregivers, who are accompanying them and are responsible for their behavior. Given the frequency of child disruptive behaviors during dental appointments, this study sought to analyze the relation between child compliance during dental procedures and their amount of experienced wait time. Preventive and restorative dental appointments for 120 children under the age of six were videotaped, transcribed, and analyzed using the Dyadic Parent-Child Interaction Coding System (DPICS). Dental providers completed the Frankl (1962) scale to evaluate the child's behavior during treatment. The compliance codes of DPICS also were used to measure child behavior during treatment. The amount of wait time experienced was assessed using video recordings that spanned the time from child entry into the treatment room until first and later entry of various staff and providers (e.g., dental hygienist, dentist). Preliminary results suggest that spending a greater amount of waiting time during an appointment is correlated with Frankl scores suggesting less cooperative behaviors in young child dental patients ($r's > .30, p < .001$). Future analysis should also examine parent/caregiver satisfaction and stress.

Funding: NIH/NIDCR R21 Grant

Program/mechanism supporting research/creative efforts: Capstone Course Within Department

Poster #75

Deconstructing the Tin-Foil Hat: The Role of Conspiratorial Beliefs and Disgust in Anti-Vaccination Attitudes

Eva MacFarland*, Natalie Shook, Holly Fitzgerald and Ilana Haliwa
Department of Psychology, West Virginia University, Morgantown, WV, 26505

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology & Biology

Despite the importance of vaccines for public health, coverage trends in recent years have shown growing animosity towards vaccination. Misconceptions about the safety and efficacy of vaccines have predominated the rationale for vaccine refusal. However, psychological factors that contribute to these beliefs are understudied. Disgust sensitivity and conspiratorial beliefs have individually been suggested as factors that shape anti-vaccination attitudes, but these factors have not been considered in combination. The present study will test a model that may elucidate the role of these variables and increase our understanding of why people form negative attitudes toward vaccination. A total of 500 participants will be recruited online through Amazon's Mechanical Turk (MTurk) and will complete measures assessing disgust sensitivity, dangerous world beliefs, conspiratorial beliefs, vaccination attitudes, and demographic variables. It is hypothesized that dangerous world beliefs will mediate the relation between disgust sensitivity and anti-vaccination attitudes, but conspiratorial beliefs will moderate this relation. That is, for those who harbor conspiratorial beliefs, greater disgust sensitivity will be associated with greater belief in a dangerous world, which will result in more negative views toward vaccines. For those who do not harbor conspiratorial beliefs, greater disgust sensitivity will be associated with greater beliefs in a dangerous world but will result in more positive views toward vaccines. It is necessary to identify a pathway through which anti-vaccination attitudes take shape in order to narrow efforts addressing misconceptions about vaccines.

Funding:

Program/mechanism supporting research/creative efforts: Capstone Course Within Department

Poster #76

Analyzing the Relationship between Delay Discounting and Obsessive-Compulsive Symptomatology through Mindfulness

Madison N. McCormick*, Cierra B. Edwards and Shari A. Steinman

Department of Psychology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology

Delay discounting is defined as the perceived decline in the value of a reward as a function of the delay to receipt. Past research has found an association between increased delay discounting and various mental disorders, like substance abuse, behavioral addictions, impulse-control disorders, and obsessive-compulsive disorder (OCD). The current study focuses specifically on the relationship between delay discounting and obsessive-compulsive symptomatology because less is known about the nature of the relationship between the two variables. OCD is defined as having repetitive, intrusive thoughts and performing behaviors to reduce the thoughts. It was hypothesized that those with OCD-like symptoms would show decreased delay discounting after being exposed to a brief mindfulness intervention. Participants with high obsessive-compulsive symptoms were recruited from West Virginia University and the surrounding community. Participants listened to a short mindfulness intervention or a thought-wandering control intervention. After completing the listening interventions, participants completed delay discounting tasks and symptomatology measures. The delay discounting tasks had participants analyze if they would prefer washing their hands immediately and receive a small hypothetical reward, or if they would prefer washing their hands after some span of time and receive a larger reward. Choosing the former indicated an increase in delay discounting, meaning their choice is more impulsive. This study is the first to explore if mindfulness practices can reduce delay discounting among people with significant obsessive-compulsive symptomatology. Data collect for the study is still underway. Preliminary findings and exploratory results from preselection will be discussed.

Funding: Doctoral Fund for Eberly College

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #77

Trauma-Informed Care for Children of Incarcerated Mothers in West Virginia

Taylor Miller*, Claudia Breaux*, Mitchell Sinicropi*, Olivia Vigna*, Ife Abel* and Dr. Geah Pressgrove

Reed College of Media, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Communications/Journalism (Behavioral & Social Sciences)

Student's Major: Strategic Communications

Women's incarceration has risen significantly since the war on drugs was created by the Nixon administration, and West Virginia has reported higher rates of population-based incarceration of women than the United States as a whole. Of these women, over 60% in prisons and 80% in jails are mothers. Removing the primary caregiver of dependent children leads to adverse childhood experiences, higher rates of justice-involvement, and a lower likelihood of graduating college. Public school employees and law enforcement officers are some of the most involved individuals in the lives of these children. We have chosen to investigate ways to raise awareness within these stakeholders to help improve trauma-informed care for children of incarcerated mothers through our research question: what components should be included in a strategic communications campaign to best inform West Virginia schools and law enforcement officials about the importance of trauma-informed care. Research for this project has been performed through secondary research regarding the background, policies, effects, and organizations assisting children of incarcerated women. Additionally, primary research has been conducted through in-depth interviews with experts on the topic and analogous sources, and further research will be conducted. Increased awareness of the importance of trauma-informed care for children of incarcerated women will provide these children with better counseling resources from schools and better perception of law enforcement officials. This could lead to improvement in behavior development, college graduation rates, and reduce the cycle of generational incarceration.

Funding:

Program/mechanism supporting research/creative efforts: Other
Women Beyond Bars

Poster #78

Minocycline Ineffective in Treatment of Impulsivity and Attention Impairment Resulting from Traumatic Brain Injury

Virginia M. Milleson*, Kristen M. Pechacek and Cole Vonder Haar

Department of Psychology, West Virginia University, Morgantown, WV, 26505

Field (Broad Category): Neuroscience (Behavioral & Social Sciences)

Student's Major: Neuroscience and Psychology

TBI (traumatic brain injury) has been associated with several cognitive deficits including impulsivity and inattention. Chronic neuroinflammation is linked with both TBI and psychiatric conditions with similar symptoms. Thus, treatments targeting neuroinflammation may relieve such symptoms. Minocycline is a broad spectrum antibiotic that has anti-inflammatory properties. The purpose of this study is to attempt to treat TBI-induced neuroinflammation, and by extension treat impulsivity and inattention. Rats were trained on the five-choice serial reaction time task, an operant task that measures motor impulsivity and attention. In this task, rats first initiate a trial, then there is a five second inter-trial interval in which responding must be inhibited (motor impulsivity). A stimulus light will then be illuminated above one of five nose-poke holes and correctly respond to that hole results in reinforcement (attention). A controlled cortical impact was used to induce a severe bilateral TBI or sham injury. Minocycline or saline was administered via intraperitoneal injection at 45 mg/kg every twelve hours for five days, either one hour or eight weeks after injury. Brain injury increased both impulsivity and inattention. Minocycline beginning at one hour and eight weeks post-injury failed to treat these deficits. Minocycline does not appear to be an effective treatment for TBI-related impulsivity and inattention under these conditions. Future work should consider further characterizing the anti-inflammatory properties of minocycline to fully understand this relationship.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Poster #79

Interactions Between Religion and Science Among Graduate Students in Sciences

Margaret Moss* and Christopher Scheitle

*Eberly College Department of Sociology and Anthropology, West Virginia University, Morgantown, WV
26505*

Field (Broad Category): Sociology (Behavioral & Social Sciences)

Student's Major: Psychology

It is often assumed that there is a conflict with one's religion and scientific identity; that scientific work and religious views cannot go hand in hand. This study aims to understand how scientists-in-training view their religious lives as an influence on their scientific lives and vice versa. Sixty-six graduate students in natural and social sciences programs across the United States were interviewed regarding their scientific and religious lives. These students come from many scientific and religious backgrounds. Analysis of these interviews identifies several themes of how science graduate students understand their religious and scientific lives as influencing each other. Quite a few students were nonreligious, so they saw no correlation or conflict. The interviews also showed that studying science has made multiple students more critical on religion. However, a large number of students have found a balance between their religious and scientific identities. Their religion has helped them shape their morals or find motivation to help people. They see religion and science working together to help them understand the world and the people around them.

Funding: West Virginia University, National Science Foundation

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #80

A Child in Distress: The Effects of Workplace Raids on Families and Children

Megan Ondeck* and Cynthia Gorman

Department of Geology and Geography, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Geography/Geology (Behavioral & Social Sciences)

Student's Major: Anthropology and Women and Gender Studies

According to U.S. Immigration and Customs Enforcement (ICE), workplace raids are an integral tool to deter illegal immigration to the U.S. in an attempt to eliminate pull factors of illegal employment but often, raids result in the removal of a breadwinning parent from a family. This study investigates the effects of workplace raids on families and children. Findings will be considered in relation to ICE raids and their impact on immigrants living in West Virginia. Workplace raids raise different community responses to border enforcement and immigration experiences. The interplay between the legal systems and industries that experience workplace raids is largely due to state legislation regarding refugees and immigrants. Along with affecting broader communities home to the industries that are raided, workplace raids impact the families of those detained. Many detained workers are part of mixed status families. Furthermore, American born children of undocumented immigrants have become caught up in deportation operations. By reviewing secondary literature in multiple disciplines, as well as analyzing congressional hearings and national legislation concerning refugees and immigration, this study seeks to understand the impact of workplace raids on families, especially children. It has been found that children face economic hardship, emotional distress, and educational setbacks after one or more of their bread-winning parents are detained. By gaining a better understanding of the effects raids place on immigrants and immigrant children nationally, we can see how they relate or do not relate to WV immigrants and their families.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #81

Questioning Authority: The Diffusion of Misinformation Among the Scientific Community

Jillian Peyton* and Jennifer Harker

Reed College of Media, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Communications/Journalism (Behavioral & Social Sciences)

Student's Major: ADPR

The National Institutes of Health and the National Science Foundation define “scientific misconduct” as consisting of fabrication, falsification, and plagiarism (“Part 689—research misconduct,” 2002). Scientific misconduct occurs in scientific literature, and commonly, after an article faces retraction, it is still cited as factual information, plaguing readers with false ideas (Lewandowsky et al., 2012). Resulting from both misconduct and unintentional errors in scientific literature, misinformation diffuses among social networks despite counterefforts (Budd et al., 1999). This spread of misinformation has the potential to negatively impact the scientific community and the public’s knowledge and health (Chen and Milbank, 2013). To learn more about the diffusion of false and fabricated data within the scientific community and beyond, we analyzed 840 retracted articles collected from the website RetractionWatch.org database that were published from 2000 to 2018 by authors with four or more retractions. This time period was selected to ensure audiences have means of being notified of retractions via internet publishing. Citations of the retracted works were then collected by using the webofknowledge database. The final number of citing articles (n = 49,630) are being tracked to examine the types of post-retraction citations that occur. Further, we apply social network analysis to explore the diffusion of misinformation across academic journals. Using this data, we hope to devise methods to help slow the spread of misinformation among scientific literature.

Funding:

Program/mechanism supporting research/creative efforts: Other

Poster #82

The McClatchy Company Sports Pass: Effects of Game Outcome on Digital Sport Subscription

Victoria Price,* Kathryn Donnelly*

Reed College of Media, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Communications/Journalism (Behavioral & Social Sciences)

Student's Major: ADPR

In 2018, The McClatchy Company launched an experimental sports-only news subscription product, called Sports Pass. McClatchy wanted to build their digital-only subscribers while still catering to a niche audience (Kozankowyza, 2019). The purpose of this study is to determine if sports fans will be more willing to purchase a Sports Pass subscription if their favorite local college or professional teams are winning. The focus will be on the Kansas City Star, who have already introduced the Sports Pass. Qualitative and quantitative research methods will be used by conducting a focus group of sports fans at West Virginia University and an online questionnaire for sports fans at University of Missouri to determine what motivates sports fans to consume local sports news, and how they prefer to obtain that news. Digital marketing, especially social media, has been shown to have the most effect on consumers (Gadiraju, 2016), so a social network analysis will also be used to analyze consumers' Twitter engagement with Kansas City Star sports journalists who are tweeting about the Sports Pass. Game outcomes have a significant impact on sports fans' attitude and brand identity (Phua, 2017), including higher purchase intention (Phua, 2018). Higher fan identification also leads to an increased tendency to bask in reflected glory (BIRG) and a decreased tendency to cut off reflected failure (CORF) (Wann & Branscombe, 1990). We anticipate our findings will conclude that if their favorite local teams are winning, sports fans will be more willing to buy a Sports Pass subscription.

Funding:

Program/mechanism supporting research/creative efforts: Other

Poster #83

Community Dynamics and Crime in Rural Areas

Holly Ryczek*, Robert Nicewarner and James Nolan

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Sociology (Behavioral & Social Sciences)

Student's Major: Forensic and Investigative Science

Crime and fear of crime in rural areas are immense issues that are often overlooked by researchers. There is a tendency for sociologists and criminologists to study crime in urban contexts. Theories of urban crime do not necessarily fit these rural areas. For example, collective efficacy in urban neighborhoods has been found to be inversely related to crime and fear of crime. In rural areas, this connection has been difficult to study because neighborhoods do not look the same in rural places. In this study, we expand the notions of collective efficacy in neighborhoods by introducing community dynamics, which are latent psychodynamic processes that related to expectations residents have of each other and of the police. These psychodynamic processes include levels of interdependence, conflict, and dependence. Using a social media survey method from residents in rural West Virginia, we found that high levels of interdependence lead to an increase in quality of life, and decreases in risk and fear of crime, while high levels of conflict lead to a decrease in quality of life, and an increase in risk and fear of crime.

Funding: The Office of Community Oriented Policing Services, U.S. Department of Justice

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #84

Child Compliance with Oral Health Providers and Caregivers in the Dental Setting

Sophia Shank*, Christopher Owen, Morgan Simpson*, Sarah Lipinski*, Masahiro Heima, Daniel W. Mcneil, Cheryl B. McNeil

Department of Psychology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology, B.S.

Dental fear and anxiety are common in individuals of all age. According to a study done by Taani, El-Qaderi, and Abu Alhajja (2005) with 12-15 year-olds, 43% of participants had general dental fear and 10% of participants had high dental fear. Dental fear and anxiety can be related to observing others who are fearful or experiencing an unpleasant or painful dental appointment. For young, impressionable children, the first dental appointments are particularly salient. The triadic interactions between the oral health provider, the patient, and the caregiver become crucial parts of a patient's experience and memory, especially for preschool children. In the current study, we coded these triadic interactions for the types of commands that were issued to children under 5 years of age and children's compliance with those commands. In a study done by McLaren and Kopycka-Kedzierawski (2015) children complied 56%-100% of the time and these rates tended to be higher when it took fewer visitations to complete treatment. Our goal was to determine whether children complied differentially to caregivers and dental providers. These data will also be used to determine whether certain types of commands (e.g., direct versus indirect) are related to child compliance. The overall goal of this study is to gain information that could improve techniques to be taught to dental providers to decrease child anxiety and fear, making it more enjoyable and more likely for children to want to go to the dentist.

Funding: RHI-NIH

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #85

The Effects of 'Jackpot' Stimuli on Suboptimal Decision-Making after Traumatic Brain Injury

Trinity K. Shaver*, **Lauren P. Giesler***, **Christopher M. O'Hearn**, **Alyssa Blancke*** and **Cole Vonder Haar**

Department of Psychology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology and Multidisciplinary Studies

Traumatic brain injury (TBI) is a serious medical condition that chronically affects everyday life. Alongside the development of potential psychiatric illnesses such as gambling disorder and substance-use disorder, many patients report cognitive-related deficits such as impulsivity and risky-decision making. Prior research has shown that the jackpot stimuli featured in casino settings, such as flashing lights and jangly music, are environmental cues that play a large role in gambling-like behavior. To better understand the role of cues on suboptimal choice behavior, we evaluated the effects of audiovisual cues on risk-based decision-making in rats on the cued rodent gambling task (cRGT) a variation of the Rodent Gambling Task (RGT) where reward delivery was accompanied by audiovisual cues that increased in complexity and intensity as the option increased in risk. Rats were given either a bilateral, frontal controlled cortical impact injury (AP/ML/DV: +3.0/0.0/-2.5 @ 3 m/s; n = 16) or sham-intact procedures (n = 16) before training on either the cRGT (n = 16) or the non-cued RGT (n = 16). There were no significant difference between TBI and sham or effect of cue manipulation on choice behavior in both TBI and sham. These findings suggest that jackpot stimuli may not affect choice behavior which is discrepant with the current literature. Further research will be needed to parse the effects of cues on decision-making and how this interacts with TBI.

Funding:

Program/mechanism supporting research/creative efforts: Capstone Course Within Department

Poster #86

Students Perception and Effectiveness of Homework in Higher Education

Marra Sigler*, Taniya Chawla, and Kimberly Meigh

Department of Communication Sciences and Disorders, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Physical/Occupational Therapy, Speech Language Pathology & Audiology
(Behavioral & Social Sciences)

Student's Major: Communication Sciences and Disorders

The aim of this study was to determine if homework increased graduate SLP students' accuracy and efficiency in completing a diagnostic voice examination and clinical note. Homework has been traditionally viewed as beneficial to students; however, the type of homework may vary the overall benefit to student and instructor. Despite the surge of interest in clinical simulations as a training mechanism, there is little evidence to suggest that hands-on experience using extra practice, or homework, will result in beneficial educational outcomes for graduate student clinicians. Twenty-seven participants were randomly assigned to a homework or no-homework group. Homework consisted of using SONA-II voice software to collect and analyze voice data, as well as practice in interpreting data to write a clinical note. Timing was controlled for all presentations of the software: initial presentation to all groups, extra practice for the homework group, and a post-test condition for all groups. During post-testing, all participants were given a new case study, where they were required to use the software to generate data that would be analyzed and written as a clinical note. The following variables were analyzed: number of hesitations and mouse clicks during software use, the amount of time using the software and writing the clinical note, and the accuracy of data in the clinical note. Results are pending but trends suggest homework is effective at increasing efficiency in using clinical software and aiding interpretations in clinical writing. These results suggest homework influences positive learning outcomes in graduate students' clinical education.

Funding: Teaching and Learning Commons

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #87

The Development of a Visual Catalogue Comprised of Ceramic Potsherds from the Tarascan State

Carolyn Sommer* and Amy J. Hirshman

Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Anthropology & Archeology (Behavioral & Social Sciences)

Student's Major: Anthropology

Archaeologists excavate an array of materials that people left behind; this is how archaeologists document past lives. One problem that archaeologists face is the variation in the excavated artifacts, such as different materials, color, and shape. Archaeologists need to classify the artifacts, by seeking patterns in the different types, in order to understand what they are examining. This is especially true for ceramic artifacts. Ceramics are subject to extensive variation because of their versatility in creation and use. The information that can be derived from ceramics (e.g. cultural or technological change) makes them important archaeologically. The ceramics in this project originate from the pre-Hispanic Tarascan state, which emerged in western Mexico by the 1350s. The state's capital, Tzintzuntzan, is located in the Lake Pátzcuaro Basin. During the 1970s, Helen Pollard surveyed Tzintzuntzan and from the survey collection, created a typology, a type of classification, which consists of 151 potsherds (i.e. fragmented pieces of ceramic material). The original Tzintzuntzan ceramics collection was expanded to include the Urichu ceramics (early 1990s), which are the primary focus in this stage of the project. Using the information attached to each individual sherd, a database was created and maintained. A visual component will be included as a primary aspect of the database, and due to this, an establishment of ceramic artifact photography protocols is necessary. This collection of sherds and the corresponding database will be used to form a visual catalogue that will be referenced by archaeologists in both Mexico and the United States.

Funding: Unknown

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #88

Impulsivity Levels Predict Risky Sexual Behaviors During the Transition to College

Sherley K. Vazquez*, Rebekah L. Damitz, Nicholas A. Turiano

Eblery College of Arts and Sciences, Department of Psychology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Psychology (Behavioral & Social Sciences)

Student's Major: Psychology B.S.

Understanding factors that predict sexual risk taking is paramount during college because risky sex can lead to a number of health problems, such as sexually transmitted infections and unwanted pregnancies (Winer, Lee, Hughes, Adam, Kiviat & Koutsky, 2003; Finer & Zolna, 2016). Prior research has found that individual differences in impulsivity are related to risky behavior, including sexual risk taking. However, much of this research is based on cross-sectional data and single risk behaviors (e.g., using a condom versus not). In the current study, we investigated whether impulsivity (negative urgency, positive urgency, lack of premeditation, lack of perseverance, or sensation seeking) measured midway through freshman year (November) predicts sexual risk taking at the end of freshman year. Data was collected via the College Student Transition (CST) study. The sample consisted of 353 first-time freshmen from a large public University in the Appalachian region. Participants completed an online Survey Monkey questionnaire 5 times throughout their freshman year (2016-17). Regression analyses indicated no significant associations among impulsivity and risky sexual behaviors. However, more impulsive individuals reported a greater number of sexual partners over their freshman year. Overall, research in this field is crucial to narrowing down possible factors that contribute to risky sex behaviors to reduce the incidence of sexually transmitted infections and unwanted pregnancies. Future work should look at specific contraception use behaviors to fully understand how impulsivity is related to sexual risk taking.

Funding: National Institute of General Medical Sciences

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #89

Comparing Salt and Drought Effects on Gene Expression in a Populus Tree Hybrid

Ismail Asad, * Stephen DiFazio, Dayane Cristina Lima and Danielle Ellis*Department of Biology, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Biology (Biological & Biochemical Sciences)**Student's Major:** Biology

High salt concentrations in soil can limit viability of agricultural crop growth by promoting detrimental ionic and osmotic stresses (Munns, 2005). Over 800 million hectares of Earth's land contain high salinity soil, NaCl being the most abundant (FAO, 2005). Marginal lands with high salinity have reduced economic potential, and hinder land-use efficiency towards fighting world hunger. Drought also jeopardizes crop yield by decreasing plant growth efficiency as well as exacerbating salinity effects (Mi Huh et al, 2010). Genes controlling salt-regulation should follow equivalent expression patterns in salt and drought stressed plants. A hybrid of *Populus tremula* x *Populus alba* (female clone 717-1B4) was used in this experiment to compare gene expression differences and similarities between salt- and drought-stressed individuals. Three treatment groups of 5 samples each included salt stress, drought stress, and a control group. Various morphological data were recorded, followed by leaf mRNA extraction and quantitative RT-qPCR. Candidate genes were selected based on a previous salt exposure study, including phosphoribulokinase (PRK) gene, protein phosphatase 2C family gene, KNOTTED-like gene, and an unknown gene involved in chloroplast localization (Lima et al, unpublished). Ubiquitin (UBQ) was used as a housekeeping gene. RT-qPCR results were analyzed using the JMP software to determine normalized gene expression levels. Salt stress reduced basal diameter and shoot dry weight. Drought stress also reduced basal diameter, but additionally stunted new leaf production and leaf expansion. All candidate genes had statistically equivalent expression levels throughout all treatment groups.

Funding: Henry W. Hurlbutt Memorial Fund - Department of Biology at WVU**Program/mechanism supporting research/creative efforts:** Biology 486 capstone
N/A

Poster #90

Tissue-Nonspecific Alkaline Phosphatase Maintains the Intestinal Microenvironment in Mouse Experimental Sepsis

Mikaela A. Barbour*, Allison L. Brichacek, Divine C. Nwafor and Candice M. Brown

Departments of Neuroscience and Microbiology, Immunology, and Cell Biology; Center for Basic and Translational Stroke Research, West Virginia University School of Medicine, Morgantown, WV 26506

Field (Broad Category): Medical Sciences (Biological & Biochemical Sciences)

Student's Major: Biology

Over 1.7 million people in the US develop sepsis each year. Sepsis—a systemic response to infection—increases intestinal inflammation and permeability by disrupting the intestinal microenvironment. Despite being the leading cause of death in intensive care units, there are currently no FDA-approved targeted treatments for sepsis, and many current treatments for infection further interfere with the intestinal microenvironment. Tissue-nonspecific alkaline phosphatase (TNAP) is an enzyme found in many body tissues, and although its exact function is unclear, increased TNAP levels have been observed in septic patients' blood samples. We hypothesized that TNAP depletion in endothelial cells would increase intestinal inflammation and permeability and disrupt microbial balance in experimental sepsis. Experimental sepsis was induced with cecal ligation and puncture in mice with conditional TNAP deletion in endothelial cells—VE-cKO mice—as well as littermate control mice. Sham surgery animals had similar abdominal incisions, but their cecums were left intact. Small intestine segments (duodenum, jejunum, and ileum) and lung tissue were collected 24 hours post-surgery. Both genotypes showed increased alkaline phosphatase enzyme activity and pro-inflammatory cytokine interleukin (IL)-6 levels in the intestines post-sepsis. However, VE-cKO septic mice had higher bacterial load in the ileum, examined on brain-heart infusion media plates, compared to controls. MALDI-TOF mass spectrometry was used to identify bacteria from representative plates. While both genotypes showed clinically relevant bacteria, VE-cKO mice had greater species diversity. These results indicate that endothelial-specific TNAP may have a crucial role in maintaining microbial homeostasis in the gut after sepsis.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #91

Behavioral Differences Between the Wildtype and Genomic Screen Homeobox 1 Mutant Zebrafish

Andrew Booher*, Oliver Cook, Alexandra Rose Schmidt and Sadie A Bergeron

Department of Biology, West Virginia University, Morgantown, WV, 26505

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

The genomic screen homeobox 1 (*gsx1*) gene encodes a transcription factor and is expressed by 10 hours post fertilization in some of the earliest born neurons in the zebrafish brain. Juvenile and adult *gsx1* mutant zebrafish exhibit variable behavioral patterns. These mutants have been carefully compared to their non-mutant siblings to quantify the significant behavioral differences between the genotypes. Tanks with 4 individuals of each genotype (*gsx1*^{+/+} and *gsx1*^{-/-}) were constructed. Videos were recorded for 3 or 5 minutes, without and with food respectively, and behavior was manually quantified for numerous parameters. The tanks are measured into three equal zones to assess overall swim patterns and tank position, and fish-to-fish distance is used to quantify shoaling behavior. Response to the addition of food in feeding trials is measured by fish position in the tank before and after food introduction. Additionally, the length and bouts of repetitive swimming behavior into the side or corner of the tank are also recorded. We also assessed spawning behavior by crossing different genotypes and counting the number of fertilized eggs produced. We have found that *gsx1* mutants exhibit behavior that is more isolated and independent in nature. They lack the ability or drive to travel to the top of the tank when food is added and have more frequent bouts of repetitive swimming behavior. When crossed with non-mutant genotypes they do not produce fertilized eggs. Together these results show a degradation in social behaviors as a result of mutating *gsx1*.

Funding: West Virginia University Department of Biology

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #92

Functional Analysis of an Esterase Gene Involved in Synthesis of Ergot Alkaloids

Kelcie Britton*, Chey Steen*, Jessi Sampson* and Daniel Panaccione*Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV
26506***Field (Broad Category):** Biochemistry (Biological & Biochemical Sciences)**Student's Major:** Immunology and Medical Microbiology

Best known for their roles in human and animal toxicoses, represented by waves of hysteria and gangrenous appendages, ergot alkaloids represent a broad class of nitrogenous metabolites produced across a range of fungal species. Despite their toxicity, fungal alkaloid derivatives have shown as effective pharmaceutical treatments for dementia, migraines, and hyperprolactinemia. Pathways to some ergot alkaloids have been studied both biochemically and genetically, but critical steps in the synthesis of lysergic acid amides remain elusive. These gaps are significant because many of the pharmaceutically relevant ergot alkaloids are semi-synthetically derived from lysergic acid amides. Lysergic acid α -hydroxyethylamide (LAH) is the main lysergic acid amide produced by the fungus *Metarhizium brunneum*. We hypothesize a gene named *easP* encodes a carboxylesterase involved in the final step of LAH biosynthesis. To test this hypothesis a CRISPR mutant was engineered. An *easP* sgRNA/Cas9 construct containing phosphinothricin resistance was introduced into *M. brunneum* protoplasts. Molecular studies showed that the construct replaced the *easP* gene, which prompted analysis of alkaloid profiles on high performance liquid chromatography (HPLC). Alkaloid profiles produced on HPLC from the media-grown cultures showed modest accumulation of typical alkaloids, whereas the injection of spores into *Galleria mellonella* larvae resulted in increased quantities for analysis. When quantified relative to fungal biomass, the concentration of LAH was reduced by ~50% relative to the concentration observed in the wild-type fungus, this indicates significantly reduced capacity for conversion of lysergyl-alanine to LAH. Altogether, these data indicate that *EasP* plays a significant role in producing LAH.

Funding: NIH**Program/mechanism supporting research/creative efforts:** WVU 497-level course

Poster #93

Novel Bacterial Isolates that Antagonize Human Pathogens and Could Lead to New Probiotics

Brooklyn Butcher*, Seth Conley* and Matthew Williams

Department of Biology, West Virginia University Institute of Technology, Beckley, WV, 25801

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

Several human diseases are caused by pathogens such as bacteria. Antibiotics revolutionized the treatment of infectious diseases and have saved countless lives. Unfortunately, many pathogens are not susceptible to treatment with antibiotics and many that are have started becoming resistant to antibiotic treatment. A probiotic is a living organism that is introduced into an ecosystem for some beneficial outcome. In humans probiotic microorganisms are often introduced to promote health. Many probiotics are bacteria, but rather than being harmful they are a species or strain that is beneficial. It has been shown that probiotics can be useful in treating many diseases. Probiotics can be used to create a good flora of bacteria making it harder for pathogenic bacteria to survive. If this is the case the probiotic bacteria are termed to be antagonistic against the pathogens. The purpose of this current study was to isolate bacteria from novel sources to determine whether they could be antagonistic against specific human pathogens. In vitro antagonism assays were performed against eight human pathogens. Several novel isolates were found to antagonize and prevent growth of many human pathogens. Select isolates were then identified via 16S genetic sequencing. Novel strains of *Pseudomonas fluorescens*, *Bacillus mycoides*, and *Bacillus cereus* were determined to prevent growth of several human pathogens. These isolates have the potential to serve as novel probiotics in preventing and treating human infections.

Funding: West Virginia University Institute of Technology

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #94

Activating MsAHns in a Putative Inhibitory CDC in *D. melanogaster* and Associated Behavioral Responses

Andrew Cook,* Kaleb Hatch, Kevin Daly and Malia Miller.

Department of Biology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biochemistry

In *Drosophila melanogaster*, a pair of mesothoracic ascending histaminergic neurons (MsAHns) project up to mechanosensory processing regions of the brain, the saddle and vest. Building on research in *Manduca sexta*, it is thought that these neurons may be part of a corollary discharge circuit used to distinguish self-made mechanosensory stimuli from external stimuli of the same nature. Through the use of optogenetic techniques, MsAHn activation can be induced during mechanosensory behaviors, such as grooming, and the actual effects of the MsAHns can begin to be determined. In addition, the structural properties of the MsAHn are being examined through track tracing via an electron microscopy dataset in order to provide structural evidence for the function of the neurons. Preliminary data suggests overdriving the cells results in the cessation of mechanosensory behavior and that the structure of the MsAHns is consistent with immunohistochemistry data. The results of these experiments are expected to connect the structure of the MsAHns to the behavioral relevance of the neurons.

Funding: U.S. Air Force

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #95

Effects of Intraoperative CT Scanning on Stereotactic Accuracy of Deep Brain Stimulation Surgery

Piper Cook* and Nicholas Brandmeir

Rockefeller Neuroscience Institute, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Biological & Biochemical Sciences)

Student's Major: Biology

Introduction: This study is aimed to comparatively test the stereotactic accuracy of electrode placement in patients undergoing deep brain stimulation surgery with and without the use of intraoperative computed tomography (CT) scanning. **Methods:** The stereotactic accuracy of electrode placement in patients during deep brain stimulation surgery with use of a computed tomography (CT) scan and in absence of a computed tomography (CT) scan is measured using CranialSuite. Deep brain stimulation surgery performed in absence of a CT scan is reliant upon use of a STarFix Stereotactic Platform. These measurements are compared to determine the most stereotactically accurate method of placement of electrodes in deep brain stimulation surgery. **Results:** It is predicted that electrode placement during deep brain stimulation with use of intraoperative computed tomography (CT) scanning will yield no higher stereotactic accuracy than electrode placement during deep brain stimulation with use of a STarFix Stereotactic Platform. **Conclusion:** The conclusion of this study is to be determined upon completion of experimental procedure.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #96

Phylogenetic Relationships in New Caledonian Palms (Arecaceae) with a Focus on Archontophoeniceae and Chambeyronia

Aubrey Cumberledge,* Craig F. Barrett, Mathilda Santee,* Donald R. Hodel

Department of Biology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

New Caledonia is a tropical archipelago ~2,500 km off of Australia. It is home to a large number of endemic plant species, genera, and families, including ~40 palms. Palm subtribe Archontophoeniceae comprises five genera and occurs throughout tropical Australasia. Actinokentia, Chambeyronia, and Kentiopsis occur on New Caledonia, while Actinorhytis occurs on Papua-New Guinea and Archontophoenix occurs in Australia. Chambeyronia includes *C. lepidota*, *C. macrocarpa*, *C. macrocarpa* 'Hookeri', and *C. macrocarpa* 'Houailu'. Phylogenetic relationships and species delimitation within this subtribe remain poorly defined. An earlier study placed Actinorhytis as sister to all other Archontophoeniceae, followed by a grade of Actinokentia, Chambeyronia, Kentiopsis, and Archontophoenix. We have increased taxon sampling and sequenced nuclear (RPB2 and PRK) and plastid DNA (rpl32-trnL spacer) from ~50 individuals representing most species. Our objectives are to: 1) resolve relationships among Archontophoeniceae, 2) clarify species within Chambeyronia; and 3) update taxonomy of the subtribe. Our analysis places Actinorhytis as sister to all other Archontophoeniceae, followed by clades of: 1) Kentiopsis piersoniana+Archontophoenix; 2) *K. oliviformis*; 3) *C. macrocarpa* 'Houailu'; 4) *K. pyriformis* + *Actinokentia divaricata*; 5) *K. magnifica*; and 6) *C. lepidota*, *C. macrocarpa*, and *C. macrocarpa* 'Hookeri'. Although branch support values are generally low, species of Kentiopsis receive moderate support in different regions of the tree, suggesting this genus may be paraphyletic. Our analysis also places Chambeyronia in two distinct positions, raising the possibility that *C. macrocarpa* 'Houailu' is a distinct species, and possibly a new genus. Additional markers will help resolve relationships and taxonomy within Archontophoeniceae.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #97

It Runs in the Family: Optimizing Paratransgenesis for Vector Control of African Trypanosomes

Raven Forshee*, Miguel Medina Munoz, and Rita Rio

Department of Biology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

Paratransgenesis is the genetic alteration of a vector through the manipulation of its microbiota. The tsetse fly is a strict blood feeder with medical significance as the obligate vector of the protozoa *Trypanosoma brucei* which are the causative agents of African trypanosomiasis. Despite high morbidity and mortality rates in many animals, African trypanosomiasis lacks a vaccine and has few options for treatment. Thus, vector control remains the most significant tool for control of disease transmission. Tsetse flies are unique to other insects as they produce one egg at a time which develops "in utero" through larval development. Within the mother, the offspring receive nutrition and are seeded with their microbiota (naturally occurring members of the microbial community). This distinct reproductive strategy provides a route for the deployment of paratransgenesis aimed at reducing tsetse vector competence. *Sodalis praecaptivus* provides an ideal model for paratransgenesis because it can be maintained in culture and genetically engineered. Here, we injected tsetse flies with genetically tractable *S. praecaptivus* and subsequently mated these individuals. Reproductive output was determined in this cohort of flies. Further, individual offspring deposited by each mother were identified to determine the presence of *S. praecaptivus* through subsequent generations. Individuals were identified to be infected with *S. praecaptivus* by plating fly homogenates and verifying colony identification through *S. praecaptivus* specific PCR. This project seeks to understand the generational stability of *S. praecaptivus* following microinjections within the tsetse fly. These results are critical towards the optimization of paratransgenesis as a tool for vector control.

Funding: National Institutes of Health: National Institute of Allergy and Infectious Diseases

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #98

The Connectivity of a Serotonin Releasing Neuron within a Fruit Fly Sensory Network

Kaylynn E. Coates, Steven A. Calle-Schuler, Victoria L. Knotts*, Brennah N. Martik, Farzaan Salman*, Lauren T. Warner*, Sophia V. Valla*, Davi D. Bock and Andrew M. Dacks
Department of Biology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Biological & Biochemical Sciences)

Student's Major: Biology & Biochemistry

Serotonergic modulatory neurons alter the way that neurons process information in a context-dependent manner. Serotonergic neuron populations containing tens of thousands of neurons have been shown to have heterogeneous innervation across brain regions and contain neurons with opposing influences on behavior. To understand the heterogeneity that an individual neuron can have across brain regions, we analyze the neuronal partners of a single serotonergic neuron, the CSDn, across olfactory brain regions known as glomeruli. Two contralaterally projecting, serotonin-immunoreactive deutocerebral neurons (CSDns) serve as the sole source for serotonin in the main olfactory processing regions. In this project, the synaptic partners of the CSDn were classified in nine glomeruli which vary in their odor tuning. An analysis of the regional synaptic contributions by different neuron classes will tell us if the heterogeneous innervation is associated with the specificity of those glomeruli to odorants. This project was executed by using an electron microscopy database of a female adult fruit fly brain to map the skeletons of CSDn partners and classify them into known neuron classes. Results have shown that output from the CSDns tend to be largely and consistently onto local interneurons that span across glomeruli. However, input varies widely among glomeruli with no association to odor tuning, suggesting some other connectivity schema. This shows that the input onto a single serotonergic neuron differs in a glomerulus dependent manner while the output does not, thus, demonstrating that the complexity of large populations of serotonergic neurons can be conserved at the single neuron level.

Funding: NIH DC 016293 and a USAFOSR FA9550-17-800 1-0117 to AMD, the HHMI Janelia Research Campus Visiting Scientist Program project 801 to AMD and KEC, and a Wellcome Trust Collaborative Award (203261/Z/16/Z) and NIH 802 RF1 MH120679 01 award to DDB

Program/mechanism supporting research/creative efforts: Biology 486 capstone

Poster #99

Investigating Expression of Genes Associated with Oculomotor Dysfunction Using Zebrafish

Samantha Hershman*, Alexandra Rose Schmidt, George (AJ) Holmes*, Rebekah Shephard* and Sadie Bergeron

Department of Biology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

Oculomotor disruption in schizophrenic patients has been observed by clinicians since the early 1900s. In particular, the anti-saccade (AS) task—which measures one's ability to refrain from visually tracking irrelevant stimuli—is impaired. Schizophrenia remains one of psychiatry's most immense challenges, as it is largely untreatable due to its elusive etiology. It is of interest to delineate the genetic factors dictating proper formation and function of the neural circuitry involved with this task in hopes of further understanding the molecular basis of schizophrenia. Two candidate genes, *cacng2a* and *cdh22*, were chosen for this project from GWAS studies of anti-saccade error. Both genes have enhancer sites for and are putative target genes of the transcription factor *Gsx1*. *Gsx1* is expressed in the optic tectum in zebrafish and the optic stalk in mice and has roles in glutamatergic neuron differentiation; *gsx1* mutant zebrafish lack glutamate transporter expression in the pretectum, indicative of a novel role for *gsx1* in visual neural circuit differentiation. In this project, we sought to confirm expression of the AS candidate genes in zebrafish and investigate potential regulation by *Gsx1*. To achieve this, whole-mount in situ hybridization (WISH) and RT-PCR were performed to analyze candidate gene expression at various stages of development. While WISH probe synthesis has been a challenge, preliminary RT-PCR data shows *cacng2a* expression at specific ages and may lead to the synthesis of an effective probe with which we can assess if and where this gene is expressed with and regulated by *gsx1*.

Funding:

Program/mechanism supporting research/creative efforts: Biology 486 capstone Honors Excel Experiential Grant (2018-2019)

Poster #100

Patient's Expectation of Medication for Dental Pain

Isabella Hurley*, Jonathan Gore, D. Cade Brawley, Jamey T. Brumbaugh, Casey D. Wright, and Daniel W. McNeil

Department of Psychology and Dental Practice & Rural Health, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Medical Sciences (Biological & Biochemical Sciences)

Student's Major: Biology

This study investigated potential factors that affect a patient's expectation for medication in a dental setting. It was hypothesized that current dental pain severity, dental fear/anxiety, and fear of pain would influence patients' expectations for opioid medications. This study included 108 outpatient adults (M age = 39.3 years, SD = 15.0; 55.6% female) seeking dental care at West Virginia University's School of Dentistry urgent care clinic. Each patient completed self-reported measures of demographics, dental care-related fear/anxiety, fear of pain, current dental pain level, and expectations for opioid medications to manage pain. Logistic regression models were used to examine potential predictive associations between the measures while controlling for age, gender, education, and income. There were 71 (64%) of the sample who expected to need over-the-counter medications for their dental pain, and 41 (38%) who expected to need opioid medications for their dental pain. Current dental pain levels significantly predicted patient expectations to need opioids for their dental pain (OR = 1.26, $p = 0.017$); higher pain levels were associated with greater expectations of the need for opioids. Patient dental fear/anxiety and fear of pain levels were not identified as being predictive factors in expectations for opioid medication. Expectations about over-the-counter medications were not associated with current level of dental pain, dental fear/anxiety, or fear of pain levels. Results suggest that the patient's pain severity may outweigh other factors when determining pain medication expectations.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) and the American Association of Endodontists.

Poster #101

Stem Cell Therapy that Allows Cartilage Regeneration

Amaya Jernigan* and Ming Pei

Cancer Institute Research Program, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

The overall problem is that cartilage defects have limited ability to self-heal. Many Orthopedic doctors and surgeons are trying to figure out how to repair and create more cartilage cells from what is readily available to them in surgery. There are popular techniques for replacing cartilage such as microfracture, osteochondral autograft, and synthetic scaffold. These methods are fine for short term and patients who are under the age of 45. Scientists and many Doctors are searching for better techniques that last longer and are efficient for every age group. What Dr. Pei's research is focusing on is the stem cell therapy method. This method is focused on a minimally invasive approach that allows stem cells that have been extracted from bone marrow, synovial tissue or adipose to be injected into defect areas to hopefully yield essential cartilage cells, less inflammation, and the release of certain proteins. This method of stem cell therapy is fairly new and has many different approaches. The problem that most researchers are having is that when they take the stem cell out of the origin and the stem cell tending to in vitro replicative senescence becomes a challenge to acquiring large quantities and high quality stem cells. Dr. Pei's research focuses on how to maintain the stemness of these stem cells to further replicate the specific cell type and make more durable stem cells that allow cartilage regeneration.

Funding: Unkown

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #102

An Evaluation of a Weight Sensitivity Training for Clinicians

Zoya A. Khan*, Caterina DeFazio and Elizabeth Claydon

*School of Public Health, Department of Social & Behavioral Sciences, West Virginia University,
Morgantown, WV 26506*

Field (Broad Category): Nursing & Public Health (Biological & Biochemical Sciences)

Student's Major: Biology

Previous studies have found eating disorders (EDs) to be more common during pregnancy than previously believed, indicating a greater need for clinical understanding of ED symptomology and appropriate screening tools to be incorporated into prenatal and postpartum care. Pregnant women with a history of EDs or an active ED have a greater risk of giving birth to a child with lower birth weight, smaller head circumference, microcephaly, and small for gestational age. Furthermore, most Obstetrician-Gynecologists (OB/GYNs) indicated they were not confident in their previous training for ED treatment. This study aims to evaluate the feasibility of implementing alternate treatment options for patients with EDs by clinicians. A sensitivity training was developed for clinicians that provided various clinical strategies that would be reasonable to integrate into their daily treatment of patients, particularly those with EDs and pregnancy. Clinicians were administered a questionnaire prior to undergoing the sensitivity training and after the completion of the sensitivity training. Data will be analyzed using JMP software. It is expected that a majority of clinicians will indicate that a patient's history with an ED would be a critical factor in their care and treatment. It is also expected that clinicians' responses will illustrate a need for additional clinical strategies to be developed for the treatment of patients with EDs, and the strategies provided in the sensitivity training could easily be integrated into their daily treatment of patients.

Funding: Ophelia Fund, Rhode Island Foundation

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #103

Assessing the Impacts of Hydraulic Fracturing on Stream Health using Biofilm Diversity

Teagan Kuzniar*, Rachel Michaels, Ember Morrissey

Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV, 26506

Field (Broad Category): Environmental Science & Sustainability (Biological & Biochemical Sciences)

Student's Major: Biology and Spanish

Hydraulic fracturing, commonly known as “fracking,” is a method of gas and oil extraction that involves injecting high pressure liquids into bedrock, which causes a fracture and allows oil and gas to flow. Within the U.S. during 2015, there were 1.5 million active wells that produced 14 billion gallons of wastewater. Mismanagement of wastewater at fracking wells can lead to ground and surface water pollution that has the potential to impact ecosystems, including freshwater streams. Research on the effects of wastewater and other byproducts of hydraulic fracturing on streams is limited. Stream biofilms are layers of microorganisms, such as bacteria and algae, that adhere to benthic surfaces. Biofilms are the base of the stream food web; they fix gases, recycle organic matter, and serve as a food source for other stream life including invertebrates and fish. Therefore, stress in these communities will impact the entire ecosystem. This study aims to explore the effects of hydraulic fracturing on streams by examining the biodiversity of bacteria and algae in biofilms close to hydraulic fracturing sites. We collected biofilm samples from 26 streams within WV: 19 impacted sites and 7 reference sites. We completed DNA extractions and are currently performing PCR on the eukaryotic 18S gene, which will be sequenced to determine algal biodiversity. We hypothesize an alteration to composition of microbial communities in streams close to hydraulic fracturing sites. This research will help to build a better understanding of how hydraulic fracturing affects microbial communities, and therefore, broader ecosystem function.

Funding: National Science Foundation

Program/mechanism supporting research/creative efforts: Other
Paid Student Worker (not Work Study)

Poster #104

Comparison of Nutrition Knowledge, Confidence and Attitudes Across Four Health Professional Programs at WVU

A.L. Pampalone*, R.A. Wattick, F Panagakos and MD Olfert

Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Education (Biological & Biochemical Sciences)

Student's Major: Biology

Given the role nutrition plays in the prevention of chronic disease, future health professionals need a greater understanding of nutrition and competence in applying skills related to optimal nutrition. This study compared nutrition knowledge and competence between WVU students enrolled in one of four health professional programs (dentistry, medicine, nursing, and pharmacy) using a peer-validated survey tool, Nutrition Competence questionnaire (NUTCOMP). Participant responses (n=258) by program as a percentage of total program population were dentistry (n=39) at 19.5%, Medicine (n=43) at 11%, Pharmacy (n=105) at 35% and nursing (n=71) at 18%. Mean scores in confidence about nutrition and chronic disease (NCD), confidence in nutrition skills (NS), and attitudes towards nutrition care (ATNC) were 17 ± 0.2 out of 25, 30 ± 0.39 out of 45 and 27 ± 0.2 out of 30 respectively. One-way ANOVA and Wilcoxon analyses were used to analyze relationships between parametric and non-parametric variables, respectively. Out of a maximum score of 100, nursing had the highest mean score at 78.6 ± 1.17 , while pharmacy the lowest mean score at 73.0 ± 0.96 . Formal assessment as part of the student's curriculum correlated significantly with high NCD, NS and total scores ($p < .0001$, $p < .0001$, and $p = .0005$, respectively). Students within these programs had high attitudes regarding nutrition as it pertains to patient care and wish to learn more about nutrition within their program. However, they display low confidence in using nutrition care in their future practice. Increasing nutrition education and evaluation could alleviate these discrepancies in nutrition knowledge and confidence among programs.

Funding: WVU school of Dentistry

Program/mechanism supporting research/creative efforts: An External Internship or Other Type of Program

Poster #105

Investigating the Role of Gsx2 In the Development of the Zebrafish Hypothalamus

Caitlyn J. Parker*, **R. Madison Riffe***, **Samantha L. Phelix***, **Sarah N. Peterson***, **Zoe Dobler***,
Rebecca A. Coltogirone, **Alexandra R. Schmidt** and **Sadie A. Bergeron**

Department of Biology, West Virginia University, Morgantown, WV, USA 26505-6057

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

Neurodevelopment is controlled by expression of a series of transcription factors encoded by homeobox genes. These proteins bind to specific DNA sequences to direct the growth and migration of neural progenitors into their mature state. In this project, we investigated the role of genomic screen homeobox 2 (gsx2) in the development of the zebrafish hypothalamus. Due to a known gsx2 binding site near the retinal homeobox 3 (rx3) and vesicular glutamate transporter 2a (vglut2a) genes, we hypothesize a loss of gsx2 to result in a change in quantity of progenitors and neurons that express these genes. In order to test this, we used transgenic and mutant lines, including Tg;rx3-GFP;gsx2 Δ 13a \pm and Tg;vglut2a-RFP;gsx2 Δ 13a \pm , to examine rx3-expressing neural progenitors and vglut2a-expressing neurons in the larval zebrafish hypothalamus of gsx2 mutants and heterozygotes through confocal microscopy. Preliminary results indicate a significant decrease in the number of mature neurons in the posterior hypothalamus of both mutants and heterozygotes compared to their wild type siblings. Additional Bergeron lab studies investigated a role for gsx1 in the developing hypothalamus, but neuron and progenitor quantities were not significantly different from WT siblings. We looked at the number of neurons and progenitors in the loss of both gsx1 and gsx2, and results are awaiting quantification. In this study we provide novel information on the role of gsx2 in the developing hypothalamus in addition to looking at the effect of the loss of both gsx1 and gsx2.

Funding: WVU Department of Biology

Program/mechanism supporting research/creative efforts: Biology 486 capstone

Poster #106

Comparison of Diets in Predatory Vertebrates

Annika Ponton*, Faith Hysell*, Cassie Tyler* and Jonathan Mitchell
West Virginia University Institute of Technology, Beckley, West Virginia 25801

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

The goal of this research is to determine dietary preferences and selectivity of various species of predatory vertebrates. This is done using a data analysis of vertebrate diets to find noteworthy differences and trends within subgroups by comparing diets of different species. Information for predators and prey are from a collection of over 200 studies on dietary habits for various predatory vertebrates. Each study on predator diets in this database was read and classified according to the mode of observation, and the data on predator-prey interactions was entered in a spreadsheet. Information and data on the spreadsheet includes the classification of a predator including species, genus, subgroup (ex. owl), and major group (ex. bird); as well as the location/region and time of the publication, mass of the predator, species and mass of the prey, number of each prey eaten, and diet observation type. I am analyzing over 170 species of predators from various regions and over 170,000 predator and prey interactions. Analysis will be based on the relationships between predator and prey mass to create slopes for every species; and separately every subgroup to determine variations across species and across subgroups. Analysis will also be conducted for the diversity of diets for different species within subgroups. Comparison between species and subgroups will show preferences of prey size per species and subgroup, and selectivity of diets based on diversity. Understanding dietary preferences and selectivity in predators contributes to understanding prey community dynamics.

Funding:
Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #107

Understanding Microbial Trait Responses to Increased Sea Level Rise Along a Coastal Forest Boundary

Ashton J. Rush*, Nannete Raczka and Edward Brzostek

Department of Biology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biochemistry

As the Earth's climate is changing, the effects of these changes on ecosystem functions may in turn exacerbate the changing pace. Soils hold a large stock of carbon, and microbes drive the extent of how much may be stored or respired, potentially adding more carbon dioxide to the atmosphere. As sea levels rise, a large uncertainty is how the increase in salinity from the ocean water may affect soil microbes in riparian zones. This project is studying the extent to which the increase in salinity impacts riparian soil microbes. This experiment was conducted by taking soil samples from multiple plots of varying salinity (low, medium, and high) and placing them in opposing soil locations. We performed an assay to measure the extracellular enzyme activity to acquire labile carbon, nitrogen, phosphorous from the soil. We hypothesize that the soils from the different salinities will all show a decreased efficiency in any new environment due to increased levels of stress from the drastic increase or decrease of salinity in the water. In measuring enzyme activity, we found that soil origin drove microbial response in different saline environments. The soil exchanged from the high to low salinity regions had higher enzyme activity to acquire carbon, nitrogen and phosphorous than in high saline conditions. When soil exchanged from medium to low salinity, enzyme activity was reduced. This research is important in understanding how microbes in the soil respond to salinity, which could aid in predicting how soil carbon will respond to global change.

Funding: Smithsonian Institute

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #108

Integrative Species Delimitation in Californian Striped Coralroot Orchids

Mathilda Santee* and Craig Barrett

Department of Biology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

Corallorhiza striata (striped coralroot) is a rare, leafless orchid, found in the western United States, Canada, and Mexico, that relies upon ectomycorrhizal fungi to obtain energy. With widespread populations, this orchid complex gives excellent insight into molecular and species evolution. Multiple populations and variants have formed across North America, including *Corallorhiza striata* var. *striata*, var. *vreelandii*; and two distinct species, *C. bentleyi* and *C. involuta*. Taxonomic status among members of this complex are poorly understood, but this information is crucial for conservation efforts in these rare orchids. Specifically, preliminary data show mixed evidence for genetic and morphological divergence between coastal Californian and Sierra Nevadan populations. We used three types of data to investigate these populations: morphology, genomics, and fungal associations. We are further conducting a novel approach to genotyping via Inter-Simple Sequence Repeats (ISSR) to determine evolutionary history, environmental niche overlap among populations, and adaptation to effectively target fungal host genotypes by means of single nucleotide polymorphism (SNP) detection. This protocol has the potential to be used across diverse subdisciplines in biology as an economical and straightforward sequencing tool. Impacts of this research include an increased understanding of the forces that drive diversification in mycoheterotrophic plant species, as well as awareness and conservation of this rare orchid complex. The overall goal is to accurately determine and draw species boundaries in the state of California, while creating a better definition of species for this plant and other species across the biosphere.

Funding: WVU Department of Biology, WVU PSCoR Grant, and the American Orchid Society

Program/mechanism supporting research/creative efforts: Biology 486 capstone

Poster #109

West Virginia University Herbarium Digitization Projects

Matthew L. Sheik,* Donna I. Ford-Werntz and Cynthia D. Huebner
Department of Biology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biology-Plant Taxonomy (Biological & Biochemical Sciences)
Student's Major: Biology

This poster summarizes three recent digitization projects at the WVU Herbarium. The NSF "Keys to the Cabinet" digitizing and georeferencing grant, targeting botanical specimens from across the southeastern U.S., concluded at the WVU Herbarium in June 2019. More than 92,000 plant collections in 223 families, 1314 genera and 4639 species from the 12-state region were imaged and uploaded to the SERNEC portal. With the end of this grant, the WVU Herbarium began work on two new projects. A multi-year U.S. Forest Service contract was funded to support student labor for invasive plant research. The initial semesters of this project involved transcribing label data from WVU Herbarium records worldwide for seven species. Current work is focused on images from the iDigBio portal: *Arthraxon hispidus* and *Polygonum caespitosum* are completed; *Glechoma hederacea* and *Stellaria media* are ongoing. The final project is a 3-year NSF Pteridophyte Collections Consortium grant. Funding is distributed among nine research centers to digitize fern herbarium specimens and fossils. The WVU Herbarium is participating through a data hub at the University of North Carolina, Chapel Hill. More than 8500 WVU Herbarium fern collections have been imaged and will be linked to specimen label information at the award website. These three projects demonstrate a sampling of digitization foci in taxonomy, floristics, and ecology.

Funding: National Science Foundation and U.S. Forest Service

Program/mechanism supporting research/creative efforts: WVU Work Study (not associated with RAP)

Poster #110

Proteasome Regulation Through Activators and Inhibitors

Elisabeth Smiley*, David Smith and Taylor Thomas

Health Science Center North, West Virginia University, Morgantown, WV, 26505

Field (Broad Category): Biochemistry (Biological & Biochemical Sciences)

Student's Major: Biology

Proteasomes are protein complexes that break down proteins that are no longer necessary and that functions similar to a machine, where activators increase its activity and inhibitors slow down its activity. A protein will go into the proteasome through a gate, and then molecular scissors cut the protein into small particles or pieces, and then what is left over comes out of the other end of the proteasome. When it is not working properly, it can lead to significant illnesses. Some examples of this would be neurodegenerative diseases such as Parkinson's, Alzheimer's, and Huntington's disease, as well as cancer. A nuclear proteasome activator, PA28y, has been shown to be overexpressed in some cancers and underexpressed in some neurodegenerative diseases. The implications of disease progression in relation to the function of the PA28y proteasome interaction is not well established. It is still uncertain how this interaction influences the gate of the proteasome or its proteolytic regulatory mechanism. This project tested the effect of multiple substrates with and without proteasome inhibitors on proteasomal activity, with a specific focus on the 20s proteasome through fluorescence. Excitation and emission of fluorescence molecules to gauge how specific PA28y regulates substrate breakdown via the proteasome was used.

Funding: National Institute of Health

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #111

More Than Meets the Eye: Roles of NAD-synthase NMNAT1 in Retinal Development and Metabolism

David Sokolov*, Joseph Murphy, Emily Sechrest, Yekai Wang, Jianhai Du, Saravanan Koldaivelu

Department of Ophthalmology, West Virginia University, Morgantown, WV, 26505

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology, Mathematics

Mutations in the NAD-synthesizing protein nicotinamide mononucleotide adenylyltransferase 1 (NMNAT1) are linked to Leber's congenital amaurosis, a severe blinding disease which is the leading cause of inherited blindness in children. Strikingly, these mutations in NMNAT1—which is present in all cells of the body—often result in blindness without other detectable symptoms, suggesting an especially crucial role for this protein in the retina of the eye. Despite this, the specific functions of NMNAT—especially in the retina—are not well described. To better understand these functions, we generated and characterized a mouse model with retinal-specific deletion of the NMNAT1 gene. Our results indicate that retina lacking NMNAT1 experience very early and severe retinal degeneration, starting at birth and complete by one month of age. Large scale analyses of retinal metabolism and gene expression reveal that NMNAT1-null retina experience defects in cell-energy pathways including glycolysis, as well as specific problems with proper gene regulation. Specifically, our RNA-sequencing results implicate NMNAT1 in the proper development of cilia—the long, light-sensing structures which some retinal cells use to detect light signals. Overall, our findings show that NMNAT1 is crucial for the late-stage development of the retina, most likely due to NMNAT1's central role in retinal metabolism and gene regulation. Our results contribute to an understanding of NMNAT1's normal function in the retina, and its dysfunction in blinding diseases like LCA.

Funding: Henry Hurlbutt Research Award (to DS)

Program/mechanism supporting research/creative efforts: Biology 486 capstone

Poster #112

Determining the Role of Monocytes in Dextran Sulfate Sodium (DSS)-Induced Colitis

Kassidy M. Spears*, Kelly Monaghan and Edwin Wan

*Department of Microbiology, Immunology, and Cell Biology, West Virginia University, Morgantown, WV
26506*

Field (Broad Category): Medical Sciences (Biological & Biochemical Sciences)

Student's Major: Biology

Inflammatory bowel disease (IBD), comprised of Crohn's disease and ulcerative colitis, is a common disease characterized by chronic inflammation of the gastrointestinal tract. In this study, dextran sulfate sodium (DSS)- induced colitis model in mice is used to study IBD. DSS is toxic to epithelial cells therefore causing erosion and tissue death. Over the past few months we have established a DSS-induced model in the lab. To do this, a 1% DSS drinking water solution was administered to mice for either 4 or 7 days and mice were scored daily on a 5-point scale. Colons were then harvested on either day 4 or 7 and were stained with hematoxylin and eosin (H&E). Pathological score was determined using a six-point scale and based on the extent of tissue damage and immune cell infiltration. In addition, studies have shown that CCR2+ pro-inflammatory monocytes are located in the lamina propria, a thin layer of loose tissue in the colon wall. Moving forward, our research goal is to determine the role of monocytes in DSS-induced colitis, with the hypothesis that monocyte activation exacerbates DSS-induced colitis. This hypothesis can be addressed using genetically manipulated CCR2-red fluorescent protein tagged mice, which lack CCR2. This means that the monocytes in these mice cannot migrate, therefore these mice can be used to study the function of monocytes in DSS-induced colitis by tracking the red fluorescent protein tag. This study is clinically relevant because monocytes may be a potential therapeutic target for treating IBD.

Funding: School of Medicine Research and Education Office

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #113

Plasmid DNA Sequence Analysis Elucidates Evolution of Species-Specific Tsetse Fly Symbiotic Bacteria

Noah J. Spencer*, Miguel E. Medina Muñoz, Rita V.M. Rio

Department of Biology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Biology (Biological & Biochemical Sciences)

Student's Major: Biology

Tsetse flies, blood-feeding insects that transmit the deadly parasite *Trypanosoma brucei*, rely on the specialized bacterium *Wigglesworthia glossinidia* to survive on their strict blood diet. These bacteria live exclusively within the tsetse fly and are transmitted from parent to offspring each time the fly reproduces. This strict association has led to irreversible shrinking of the *Wigglesworthia* genome, making it streamlined for symbiosis. Genome sequencing of *Wigglesworthia* isolates from two distantly related tsetse species, *Glossina morsitans* and *Glossina brevipalpis* revealed that, despite evolving in separate host fly lineages for millions of years, they shared a roughly 5kb plasmid (extrachromosomal DNA) encoding several known stress response genes. This conservation suggested a potential function of these genes towards symbiosis. However, quantification of *Wigglesworthia* plasmid sequences in *G. morsitans* revealed that it was present in low copy numbers, suggesting that the plasmid structure itself may not be adaptive and could be lost in other lineages. Genome sequencing of *Wigglesworthia* symbionts from additional tsetse species will reveal the patterns of this genomic feature's evolution, highlighting trends in the evolution of highly reduced genomes and potentially elucidating differences in the capacity of different tsetse species to transmit trypanosomes. Here, we report on novel sequencing results for the *Wigglesworthia* symbiont of the tsetse fly species *Glossina palpalis gambiensis* with a focus on the evolution of the *Wigglesworthia* plasmid and associated genes.

Funding: National Institutes of Health

Program/mechanism supporting research/creative efforts: Biology 486 capstone

Poster #114

Evaluation of Anti-pertussis IgG Serum Titers Over Time in a Murine Model

Emily Airing,* Kelly Weaver and Mariette Barbier

*Department of Microbiology, Immunology, and Cell Biology, West Virginia University, Morgantown, WV
26505*

Field (Broad Category): Medical Sciences-Immunology (Health Sciences)

Student's Major: Immunology and Medical Microbiology

Bordetella pertussis is a Gram-negative bacterium, which is the causative agent of whooping cough. This infection is highly contagious, and mostly affects children under the age of twelve months, who have not yet completed the vaccination course. Pertussis, Diphtheria and Tetanus are the diseases targeted by the acellular pertussis vaccines. DTaP is administered to children in five doses between the ages of 0 and 6 years, which includes formaldehyde-inactivated forms of pertussis, diphtheria and tetanus toxins, as well as other *B. pertussis* antigens. In this study, the long-term vaccine-induced memory responses of both the acellular and whole-cell *B. pertussis* vaccines were evaluated in a murine model. Antibodies are known correlates of protection for pertussis vaccines, thus serum IgG antibody titers of acellular vaccinated versus whole-cell vaccinated mice were evaluated over the course of 90 days. The IgG antibody response was measured over time to determine the longevity of antibody production in response to pertussis antigens, and was compared to titers for diphtheria and tetanus toxoids. This datum is important for development of a new acellular pertussis vaccine that can provide a long-term vaccine-induced memory, and prevent infection and death amongst infants.

Funding: NIH

Program/mechanism supporting research/creative efforts: Other
Undergraduate Research Assistant

Poster #115

Effects of miR-34a Promoter Regulation on PD-L1 Expression in Lung Cancer Cell Lines.

Brooke Brothers,* Alyson Stevens* and Ivan Martinez

WVU Cancer Institute, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Medical Sciences (Health Sciences)

Student's Major: Immunology and Medical Microbiology

PD-L1 is a protein found in the membranes of antigen presenting cells that binds its receptor PD-1 on T cells, resulting in the suppression of an immune response. Cancer cells express high quantities of PD-L1 to evade immune system detection and allow tumor proliferation. PD-L1 synthesis can be inhibited post-transcriptionally by miR-34a, a microRNA regulated by tumor suppressor p53. Preliminary research was performed by treating male and female non-small cell lung cancer (NSCLC) cell lines with radiotherapy and analyzing gene expression of PD-L1 and miR-34a post radiation. Results suggested females had higher expression of PD-L1 and lower or plateaued expression of miR-34a after radiation. In contrast, males had lower or plateaued expression of PD-L1 and higher expression of miR-34a after radiation. Cell lines studied were a mix of wild type and mutated p53, suggesting potential p53 independent miR-34a regulation. This study builds upon previous data by examining the promoter region of miR-34a mRNA through transfection of a luciferase reporter plasmid into male and female NSCLC cell lines, followed by analysis of luciferase expression. Additional studies will be performed to measure miR-34a promoter methylation differences between male and female NSCLC cell lines. Previous publications establish the capability of the miR-34a promoter to be methylated, but no previous research has considered a difference in methylation between sexes and how that could affect PD-L1 expression. This project's findings aid in further progression of understanding how cancer therapies, such as targeted PD-L1 immunotherapy, could potentially have sex-dependent efficacies.

Funding: NAH

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #116

Association of Stroke Health Literacy with Stroke Risk Factors and Post- Stroke Depression

Callista Clairmont,* Jessica Frey, Amelia Adcock and Nicholas Koenig.*

Department of Neurology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Spanish

Previous studies have found a low prevalence of stroke health literacy in populations across the country, and stroke education is an important aspect of post-stroke care. The purpose of this study was to determine the association between stroke health literacy and modifiable stroke risk factors or post-stroke depression (PSD). This was a prospective cross-sectional survey study assessing stroke health literacy in 24 acute ischemic stroke patients. Patients with evidence of stroke were given questions from a modified version of the Stroke Knowledge Test. Patients were also screened for PSD with the Hamilton Depression Rating Scale (HAMD-17). Information such as age, gender, NIHSS, stroke etiology, trust in the health care system and health insurance was also collected. Data was analyzed with T-test and ANOVA. Patients with 3 or more stroke risk factors scored significantly higher on the health literacy exam (M= 63.6) compared to individuals with 2 or less stroke risk factors (M= 50, $p=0.0095$). Though there was a trend toward patients with HAMD >7 scoring higher on the literacy exam (M= 64.1 vs M = 58.6), this was not significant ($p = 0.201$). There was a trend toward low NIHSS with increased stroke health literacy (M=8.3 vs M=6.417) but this was not statistically significant ($p=0.516$). These results indicate that patients with fewer known stroke risk factors may have a poorer understanding of stroke. These results, along with the results obtained from ongoing data collection may help target populations that may benefit from additional stroke education.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #117

Glutamate Levels in Post Stroke Depression

Lea B. Colantonio* and Jessica Frey

Ruby Memorial Hospital, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Medical Sciences (Health Sciences)

Student's Major: Biochemistry

Post-stroke depression (PSD) is a frequent psychiatric disorder that frequently causes a delay to patient recovery following ischemic stroke. The causes of post-stroke depression and the pathogenesis of post-stroke depression is complicated and is still relatively unknown. Many researchers and scientists have recently focused on the important amino acid glutamate as a key factor in moderate depression disorder and post stroke depression. The purpose of this research experiment is to determine if there is a relation between levels of a marker in the blood, glutamate, and depressive symptoms following a stroke. Two patient group types, depressed and non-depressed, will have their blood drawn upon consent following an ischemic stroke. The depression criteria of each patient will be assessed via the Hamilton Depression Rating Scale. Peripheral blood will be drawn from the patients as part of the Amino Acid Quantitative Plasma set, which includes glutamate and a series of other markers. The levels of glutamate and other biomarkers will be analyzed and recorded in order to conclude if there is a significant difference between post stroke depression patients and patients without post stroke depression. We hypothesize that higher levels of plasma glutamate will correlate with the existence of post stroke depression, based on the information surrounding studies that have been completed. In addition to examining the protein glutamate, a level of knowledge and understanding will be gained on the principle of PSD in efforts to improve quality of life following the incident of a stroke.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #118

Functional Connectivity Differences in Individuals with Autism Spectrum Disorder

Michelle M. Coleman,* Paula J. Webster, Sam Salmassi, Chris Frum and James W. Lewis*Department of Neuroscience, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Neuroscience (Health Sciences)**Student's Major:** Exercise Physiology and Psychology

Autism spectrum disorder (ASD) is prevalent in the United States, with about one in 59 children having ASD. Implications of the disorder mostly pertain to social interactions, as an inability to take audio and visual social cues such as facial expressions and body language deciphering, evidenced by lack of eye contact and nonunderstanding of emotions. To better understand how the brain of someone with ASD functions, functional and resting state magnetic resonance imaging (MRI) can measure changes in brain metabolism (and "activity"), while a participant lies in the scanner. We imaged 19 ASD and 18 typically developing (TD) individuals while they perceived a real-world functional task of watching a person bounce a basketball. This revealed the left putamen/globus pallidus (GP) and left intraparietal sulcus (IPS) foci as being hypoactivated in the ASD group. Based on this information, the current study used resting state functional MRI (rsfMRI) to assess how these structures related while at rest. Here we explored how the left putamen/GP and IPS, together with previously studied visual areas of the extrastriate and fusiform body areas (EBA and FBA), communicate with each other functionally and observed additional differences between groups. These findings newly reveal some of the physiological bases of ASD.

Funding: WVCTSI NIGMS and crowd-funding donors**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #119

Evaluation of Pupillometry as a Method of mTBI Diagnosis

Kevin Dubaj*, Brenden Balcik, Sam Scifo and Aaron Monseau

Department of Emergency Medicine, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Medical Sciences (Health Sciences)

Student's Major: Biochemistry

The purpose of this study is to examine the pupillary light reflex in subjects with mild traumatic brain injuries (mTBI), concussions, in comparison to normal subjects, as a possible way of quantitatively diagnosing mTBI. Diagnosis of mTBI is currently done qualitatively, revolving around subjective pupil analysis, neuro exam and questioning. However, providing clinicians with the ability to accurately measure pupil responses and use the resulting data as a method of mTBI diagnosis would be a major advancement in head injuries. This relationship between measured pupil response and mTBI would provide accurate, objective measurements to aid in diagnosis. To explore this idea, pupillary response of mTBI and normal individuals were measured with a pupillometer. The pupillometer, using white step stimulus, measured various responses (constriction and dilation velocities, maximum and minimum pupil diameters, and constriction latency) in the pupil. Decreased responses in certain parameters, most significantly in constriction velocity and latency, when comparing mTBI subjects to normal subjects was seen. These slowed responses represent mTBI's quantifiable, negative effect on the pupillary light reflex. This decrease displays the ability of pupillometry to successfully diagnose mTBI. This diagnostic tool is a quantitative, objective way of identifying mTBI, providing a method of effective identification and in turn proper treatment.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #120

How mitoNEET Functionally Affects Learning and Memory in C Elegans

Sarah Faber*, Brandon Moore*, Jacob Boos and Werner Geldenhuys*School of Pharmacy, Robert C. Byrd Health Sciences Center, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Neuroscience (Health Sciences)**Student's Major:** Neuroscience

Learning and memory are the comprehension and recollection of experiences and skills through teaching and studying. There are multiple types of memory, including short-term, working, and long-term memory. In order for neurons to store the information learned and make it into a memory, they need proper energy in the form of ATP supplied from the mitochondria. Insufficient ATP supply to the neurons will hinder their abilities to carry out learning and memory as efficiently. MitoNEET is an outer mitochondrial membrane protein integral for mitochondrial function. Previous studies have shown that mitoNEET regulates mitochondrial oxidative capacity, a crucial component for cellular respiration and ATP production via the transfer of electrons during oxidative phosphorylation. In this study, we examined the function of mitoNEET during short-term memory acquisition and recollection in wild-type and mitoNEET knockout C. elegans strains. Both strains were trained to associate attractive odors with their food source after periods of starvation and chemotactic behaviors were analyzed to calculate a learning index, assessing the ability to acquire and retain the associative chemotactic response. The results from this study show that in aged populations, mitoNEET is crucial for the acquisition and retention of short-term memory behaviors as supported by the reduced learning index value in the mitoNEET knockout strain compared to the wild-type strain. Therefore, this study sheds light on the field of learning and memory, allowing us to understand alternative approaches for the progression of memory loss associated with normal cognitive aging and neurodegenerative diseases.

Funding: National Institute of Health**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course
Federal Work Study

Poster #121

Effects of Mouthrinses on Salivary pH After Acidic Drink Consumption

Megan Fisher*, Matthew Duggan*, Alcinda Trickett-Shockey and Amy Funk*Department of Dental Hygiene, Robert C. Byrd Health Sciences Center North, Morgantown, WV 26506***Field (Broad Category):** Dental Hygiene (Health Sciences)**Student's Major:** Dental Hygiene

Introduction: Consumption of acidic beverages, is a frequent occurrence for many dental patients, causing an increase in the acidity of the oral environment and potentially tooth decay. Currently, no recommendations are available for a protocol to prevent such an acidic environment, if one chooses to consume acidic beverages. **Purpose:** The purpose was to determine what mouthrinses elevate salivary pH to baseline or a more neutral pH. Thus, minimizing acidic exposure to prevent dental erosion, and be able to give patients a product recommendation. **Methods:** Twenty participants were gathered on six different days. Baseline salivary pH readings were acquired each day. Subjects would consume Coca-Cola®, test their salivary pH, and proceed to use a different mouthrinse on each day to compare salivary pH at one, ten, and twenty minutes post rinsing. Mouthrinses included: Cool Mint Listerine®, ACT® Anticavity, CariFree CTx4, Chlorhexidine, distilled water; and one day of no post rinsing. **Results:** All mouthrinses increased salivary pH to more basic levels than without a rinse. Mean salivary pH testing indicates that Cool Mint Listerine® elevates salivary pH the fastest. At the 20 minute testing interval, the only mouthrinses that were more basic than at baseline, were distilled water and ACT® Anticavity. However, when considering standard deviation the only mouthrinse that proves to be significant was ACT® Anticavity. **Conclusions:** From this research, dental professionals can provide evidence based nutritional counselling to patients who drink acidic beverages. Recommendations can be made to rinse post consumption with ACT® Anticavity mouthrinse.

Funding:**Program/mechanism supporting research/creative efforts:** Capstone Course within Department

Poster #122

Identifying Cancer Inhibitory Drugs that Can Penetrate the Blood-Brain Barrier

Rachel Gadd*, Sam Sprowls, Lealand Earp and Paul Lockman*Pharmaceutical Sciences, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Pharmaceutical Sciences (Health Sciences)**Student's Major:** Biochemistry

Breast cancer (BC) affects a large proportion of women every year. The most severe complication of BC occurs when a primary tumor cell moves from the breast to the brain creating a brain metastatic tumor. Some palliative options include chemotherapy, radiotherapy, and/or surgical removal if the patient is medically operable. However, radiation and surgery are rarely curative, and an overwhelming majority of chemotherapies are rendered ineffective because the therapeutics cannot penetrate the blood-brain barrier (BBB). Thus, different agents are needed that can penetrate the BBB and successfully treat BC brain lesions. To find new anti-cancer agents, high through-put screens will be used to identify candidates with anti-cancer activity from a panel of investigatory compounds. Once candidates are identified a half maximal inhibitory concentration (IC₅₀) assay will be conducted with different hits to determine what concentration of the candidate is necessary to kill half of the total cancer cells present. Hits are defined as agents that successfully kill cancer cells as discovered through the IC₅₀ experiments. These medications will be used to treat mice with breast cancer to access how well these medications perform in live specimens. Hopefully, a breast cancer inhibitory drug can be identified from this experiment and used to successfully treat cancer in mice. Once this is accomplished the new drug can go on to be tested in clinical trials and hopefully successfully treat breast cancer patients with brain metastases.

Funding: NIGMS:P20GM121322 and the Mylan Chair Endowment Fund**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #123

Cognitive Behavioral Therapy Affects Function of the Immune System

Josie Gilbert* and Elizabeth Engler-Chiurazzi

Department of Neuroscience, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Neuroscience

Major depressive disorder, characterized by anhedonia, low mood, decreased motivation, and in some cases, suicidality, is a major public health concern. Indeed, MDD is the fourth leading cause of disability worldwide and has an economic burden in the United States of \$210 billion per year. A growing body of evidence supports the connection between dysfunction of the immune system and MDD, in particular a pro-inflammatory response; however, the mechanism by which immune system activity affects MDD is unclear. Several behavioral interventions are known to abate depressive symptoms, so we would expect biomarkers indicative of an immune response to change following successful treatment. I hypothesize that if CBT is given to individuals with MDD, there should be a trend towards an anti-inflammatory response and decreased levels of pro-inflammatory cytokines in blood serum following treatment. To examine this, a literature search was conducted on studies that measured cytokine levels in blood before and after treatment with CBT. These studies measured several biomarkers, including IL-6 and TNF- α , predominantly pro-inflammatory cytokines, and IL-10, a predominantly anti-inflammatory cytokine. A general trend of IL-6 and TNF- α reduction following CBT occurred across most studies, while the effect of CBT on IL-10 is inconsistent, supporting the hypothesis that there is a diminished presence of circulating pro-inflammatory cytokines following CBT but not consistently supporting the hypothesis that circulating anti-inflammatory cytokines are increased following CBT. Additional research into immune system changes before and after behavioral interventions could lead to predictions of treatment efficacy and the development of novel therapeutic drugs.

Funding: EEC (K01 MH117343 NATIONAL; U54 GM104942 NATIONAL; WVU Research Office STATE), JWS (P20 GM10998 NATIONAL), and EEC/JWS (Brain Health Project PRIVATE COMPANY; WVU College of Medicine Funds STATE).

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #124

Effects of Aldosterone on the Ion Channels in the Colon

Wenjuan Gu*, Vazhaikkurichi Rajendran and Andrew Nickerson

Department of Biochemistry, West Virginia University, Morgantown, WV, 26505

Field (Broad Category): Biochemistry (Health Sciences)

Student's Major: Biochemistry

Water is absorbed through the guts. The colon absorbs about a third amount of water of that of the small intestine. To absorb water, salt (ions, chloride) is absorbed first which pulls water molecules along with it through osmosis. The gradient usually moves from the Lumen side (intestinal side) to the blood side. The question asked in this experiment is based on how Aldosterone, a hormone, changes the chloride ion channels. The original hypothesis is that the channels would be turned off when there is a depletion in sodium. Rats were put on a sodium depleted diet for a week to increase their Aldosterone production. Western blots were used to determine protein expression for chloride ion channels CFTR and TMEM16a. Calcium chelation is used to separate the epithelium from muscle layers. Extracted proteins were then homogenized in RIPA buffer from tissue samples and sonicated. Protein assay was done by using a BCA protein assay kit. Loading dye and a reducing agent called DTT were loaded onto a polyacrylamide gel called Electrophoresis. Next, the product was transferred onto a membrane (PVDF) and blocked membranes in bovine serum albumin. We probed the membranes for CFTR and TMEM16a and for beta-actin. Primary antibodies were put against these three categories and secondary antibody to primary which is conjugated to HRP. The resulting membranes were imaged with substrate. HRP will make substrate glow. The protein band intensity with Image J between control and aldosterone CFTR and TMEM16a were not expected (TMEM didn't show at all).

Funding: Grant from the National Institutes of Health

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #125

Association Between Social Behavior and Face Responsiveness in Autistic and Healthy Brains

Savannah P. Hays*, Runnan Cao and Shuo Wang

Department of Chemical and Biomedical Engineering and Department of Neuroscience, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Biomedical Engineering

Face perception plays a key role in human's social behavior and humans have a dedicated neural system to process faces. However, brain activation strength and patterns within this face-processing system vary substantially across neurotypical individuals and people with autism spectrum disorder (ASD). Although there is a plethora of literature showing atypical face processing in people with ASD, the underlying neural mechanism for this profound social impairment still remains unclear. Furthermore, whether and how individual differences in neural response to faces are related to social behavior remains controversial. Solving these questions is important for unravelling the neural mechanism of face perception and providing new clues for autism diagnosis and early interference. In this study, we first investigated these questions by correlating the strength of neural activity in face-selective areas (i.e., brain areas that specifically respond when participants view faces) with behavioral measurements of social personality traits. Next, we compared brain-behavior association between neurotypical individuals and individuals with ASD. Our results from the neurotypical group showed a significant correlation between social behavior with 1) activation magnitude in the left amygdala, anterior temporal lobe (ATL), and right anterior superior temporal sulcus (raSTS), 2) size of the rpSTS and inferior frontal gyrus (IFG). Preliminary results from the ASD group showed no significant correlations between behavior and activation magnitude. Our findings suggest that prosocial behavior is associated with higher neural activity in face selective areas in healthy people.

Funding: Dana Foundational Clinical Neuroscience Award

Program/mechanism supporting research/creative efforts: WVU 497-level course
WVU RAP and SURE

Poster #126

Pilot Testing for Reduced Exertion High-Intensity Interval Training in and Aquatic Setting

Anna Jenkins,* Olivia Naylor*, Miriam Leary, Lori Sherlock and Victoria Corsi

School of Medicine, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Exercise Science & Nutrition (Health Sciences)

Student's Major: Exercise Physiology

Reduced exertion high-intensity interval training, REHIIT, is the lowest amount of exercise that produces benefits equal to those of steady state exercise. Aquatic REHIIT has not yet been investigated and could produce benefits comparable to or beyond those of land-based REHIIT. This pilot study determined a protocol to elicit maximal effort in the water to compare aquatic and land-based REHIIT. In this study, 10 healthy, college-age individuals were asked to complete four sets of squat jumps at maximal effort. The squat jumps were performed in the pool at navel depth (N) and xiphoid depth (X), with ankle weights (W) and without ankle weights. The participants performed each combination for 30 seconds with a 2-minute rest between each set, totaling eight minutes of work. The order of trials between subjects was randomized. Effort of each trial was assessed with heart rate (bpm), Rating of Perceived Exertion (RPE), and participants subjective reporting of the hardest trial. The highest heart rate (160 ± 19 bpm) and RPE (13 ± 3) were found in the N+W trial. Sixty percent of participants also rated the N+W combination as the hardest. This pilot study determined that maximal squat jumps at navel depth with ankle weights was the hardest trial subjectively and physiologically. The combination of navel depth and ankle weights will be used as the aquatic protocol in future studies that compare aquatic and land-based REHIIT.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #127

Assessing the Toxicity of DNI (3,4-Dichloro-N-isobutyramide) in a Human T-cell Cell Line

Saaketh Kyathari*, Jamie L. McCall, Kensey N. Bergdorf, Casey Hall, Jonathan Soboloff, Bjorn Soderberg and John B. Barnett

Department of Microbiology, Immunology & Cell Biology; Department of Chemistry, West Virginia University, Morgantown, WV 26506; Department of Medical Genetics and Molecular Biochemistry, Temple University, Philadelphia, PA 19140

Field (Broad Category): Medical Sciences (Health Sciences)

Student's Major: Immunology and Medical Microbiology

Propanil (3,4-dichloropropionaniline, DCPA) is a post-emergence herbicide used in crops. Propanil reduces the T cell-dependent antibody response and bone erosion in a mouse model of arthritis. However, its major metabolite, 3,4-dichloroaniline (DCA), is immunotoxic in a C57BL/6 mouse model. Therefore, we sought to identify an analog of DCPA that cannot be metabolized to DCA in attempt to reduce the inflammatory response without inducing the side effects observed with the parent compound metabolite. We first assessed four DCPA analogs for reduced toxicity in a human T-cell cell line, Jurkats. While several compounds reduced cell death, as measured by 7-AAD staining, we identified 3,4-Dichloro-N-isobutyramide (DNI) as the compound with the least toxicity at 48 hours. We hypothesized that DNI has similar anti-inflammatory efficacy but reduced toxicity as compared to the parent compound, DCPA, in vitro. To further define its toxicity profile, we treated Jurkats with increasing concentrations of DNI (25-400 μm) and assessed cell number using trypan-blue exclusion over 96 hours. There was a dose-dependent decrease in cell number with increasing concentrations of DNI. This reduction in cell number may be due to decreased proliferation or increased apoptosis. In future studies, we will assess proliferation using alamar blue, which measures cellular oxidation-reduction (REDOX), and apoptosis by measuring caspase 3/7 activity. Using these data, we will identify a dose that is non-toxic to the cells, which we can then assess for efficacy in a mouse model of arthritis.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #128

The Autonomic Nervous System and its Relationship to Human Performance and Recovery

Erin Langan* and Scott Galster

Rockefeller Neuroscience Institute, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Neuroscience

The two parts of the Autonomic Nervous System (ANS), the Sympathetic Nervous System (SNS) and Parasympathetic Nervous System (PSNS), are major components to one's ability to survive. Each of the two parts has individual capabilities that aid in physiological function. The SNS, for example, is most active in times of danger or excitement. It can increase heart rate and sweat production, slow digestion, and more. The PSNS is most active during recovery. It decreases heart rate and blood pressure, aids in digestion, and more. Both systems, therefore, are important to human performance and recovery. The SNS and PSNS can be activated through artificial means in order to improve physiological function, whether it be in terms of an athlete or veteran's performance on a physical test or of the average person's ability to recover quickly from a surgery. In order to test this, a number of physiological tests that indicate ANS function can be done under various conditions. Some of these tests include monitoring heart rate and Heart Rate Variability (HRV). Other tests, like Electrodermal Activity (EDA) measures, that focus on sweat production can also be recorded. These tests, along with measures of performance such as tests of cognitive ability and tests of physical ability, can be used to indicate whether the SNS or PSNS is dominantly activated. We can also use these tests to examine the efficacy of next generation recovery modalities such as photobiomodulation, cryotherapy, and the use of floatation tanks to modify the state activation of these systems.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #129

Berberine: An Advancement in Effective Drugs to Treat Diabetes?

Cheyenne Lewis*, Knox Van Dyke and Cinthia Pacheco*Department of Biochemistry, Office of Undergraduate Research, West Virginia University, Morantown, WV 26505***Field (Broad Category):** Biochemistry (Health Sciences)**Student's Major:** Biochemistry

Diabetes, especially type 2 diabetes, has become one of the most common public health challenges due to its increasing prevalence worldwide, including the US. The CDC reported that in 2018, 10.5% of the US population was affected by the disease and one third was prediabetic. Diabetes is a chronic metabolic disorder that causes a variety of complications in different tissues and organs. The management of the disease involves lifestyle changes and, in most cases, the use of different drugs to control blood sugar levels. Currently, the drugs prescribed to patients with type 2 diabetes fails after long term administration, therefore, the search for new drugs is needed. Researchers have been investigating a substance, named Berberine, to aid in the treatment of diabetes. Berberine is a purified herbal compound that has been used as an OTC drug to treat conditions such as diarrhea, dysentery, and stomatitis. Recently, Berberine has shown glucose-lowering effects and increased insulin sensitivity in diabetics. However, studies have shown that Berberine is not well absorbed by the gastrointestinal tract after oral administration due to its molecular structure, which could hinder its use as a potential antidiabetic agent. Studies with a modified, uncharged, and more absorbable molecule called Dihydroberberine, have been conducted and have shown promising results. Development of different formulations containing either Berberine or Dihydroberberine has also been performed. The results of these studies can help to bring to the market a new and more effective drug in the management of type 2 diabetes.

Funding:**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #130

Cellular Toxicity of Various Zinc Particles

Mikhaela Lichvar*, Nicole Olgun, Anna Morris, Raef Lambertson and Stephen Leonard
West Virginia University, Morgantown, WV 26506 and National Institute for Occupational Safety and Health, Morgantown, WV 26506

Field (Broad Category): Biology (Health Sciences)

Student's Major: biochemistry

Zinc and Zinc Oxide nanoparticles are found in many everyday household items as well as occupational environments. For instance, sunscreen contains the zinc oxide nanoparticle to help reflect light. Exposures to these particles can happen in occupational and consumer environments. Little is known how these particles may affect cells. Our investigation examines different shapes, sizes, and chemical composition of zinc. These include zinc nanoparticles, zinc oxide nanoparticles, zinc oxide microparticles, and zinc oxide nanowires. The cell line RAW 264.7, a mouse monocyte macrophage, was used to conduct experiments on. Zinc particles were suspended in dispersion media, which models lung fluid, to prevent the particles from aggregating. The cells were then treated with concentrations of 10 µg/ml, 25 µg/ml, and 50 µg/ml of each zinc particle for 4 hours and 24 hours. An alamar blue assay was completed to test cell viability. It is predicted that the zinc oxide nanoparticles will be most detrimental to cell viability as the small particle size has the largest surface area available to react with cells and cause cell damage. The zinc oxide is expected to be more toxic as the oxide will likely produce free radicals in the cells.

Funding: NIOSH/CDC

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #131

The Role of Intestinal Alkaline Phosphatase in Ischemic Stroke

Grace Maley*, Allison Brichacek and Candice Brown

Department of Neuroscience, School of Medicine, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Neuroscience-Microbiology (Health Sciences)

Student's Major: Biochemistry

Stroke is the fifth leading cause of death in the United States. Therapeutic drugs to treat stroke and improve post-stroke recovery are limited. Recent literature demonstrates that stroke results in both brain and systemic inflammation, although the mechanisms are complex and not well understood. Previously, our lab has found evidence for chronic gut dysbiosis following ischemic stroke. The gut-derived enzyme, intestinal alkaline phosphatase (IAP), regulates gut homeostasis by maintaining a tight gut barrier. Previous studies have found that when Akp3, the gene that codes for IAP, is deleted, systemic inflammation increases. We hypothesized that mice with Akp3 gene deletion (Akp3^{-/-}) would exhibit more severe brain and gut inflammation compared to control mice when subjected to ischemic stroke. Akp3^{-/-} and control mice were subjected to 60 minutes of stroke or placebo surgery followed by euthanasia after seven days. Brain and intestine tissues were harvested for analysis at the time of euthanasia. Changes in brain blood flow were examined before, during, and after surgery. Akp3^{-/-} stroke mice showed a significant decrease in brain blood flow compared to control mice. Overall, Akp3^{-/-} stroke mice had decreased survival rates compared to control stroke mice with no significant differences in clinical or behavioral scores. Akp3^{-/-} stroke mice also showed a significant increase in aerobic gut bacteria compared to control mice. In addition, fecal bacteria were also higher in Akp3^{-/-} stroke mice. Taken together, these findings demonstrate that intestinal anti-inflammatory signals, such as those from IAP, are critical for stroke recovery in mammals.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #132

Coaching Palliative Home Care for Family Caregivers of Heart Failure Patients

Serenity McDill* and Ubolrat Piamjariyakul*School of Nursing Office of Research and Scholarly Activities, West Virginia University, Morgantown, WV
26506***Field (Broad Category):** Nursing & Public Health (Health Sciences)**Student's Major:** Nursing

Heart failure (HF) afflicts 6.5 million Americans with devastating consequences to patients and their family caregivers especially during severe symptoms in the advanced stage (NYHA III or IV). West Virginia has the highest HF death rates in the U.S. HF patients and their caregivers in rural settings lack sufficient guidance for managing HF symptoms at home. The goal of home palliative care for HF is to help patients live better by relieving major symptoms (breathlessness, fatigue, depression and/or anxiety) and improving quality of life (QoL). Palliative care can be provided along with routine HF treatment, regardless of the stage of illness. Studies show that when patients and family members are educated about the typical progression of their symptoms and in-home treatment options, patients have less depression and anxiety and are less likely to readmit to the hospital. The overall objective of this clinical trial study is to test whether the nurse-led palliative home care coaching intervention (FamPALcare) will improve home health outcomes for advanced HF at the 6-month follow up. Thirty-six patient and family dyads will be randomly assigned to standard care or FamPALcare intervention group. Standard care patients receive routine HF care while, FamPALcare patients receive standard care and 5-weekly coaching sessions in managing the HF symptoms and discuss selecting HF specific treatment options based on their preferences. Outcomes include improving QoL for patients and their families and decreasing unwarranted hospitalizations, improving quality of life for patients and their families. Students have opportunity to engage in the research process.

Funding:**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #133

Isolation of Mouse Macrophages and Differentiation to M1 and M2 Phenotypes

Jordan Means*, Marieta Gencheva, Hannah Hoblitzell, Nicole Mihalik and Timothy Eubank
*Department of Microbiology, Immunology & Cell Biology, West Virginia University, Morgantown, WV
26506*

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

Macrophages found in various tissues arise from different sources. Tissue resident macrophages originate from the yolk sac during development and migrate to tissues to maintain homeostasis. Tissue insults such as acute infections, wound healing, or tumor formation leads to factors being produced to recruit new macrophages from the bone marrow or spleen to resolve such issues. Macrophage function depends on the characteristics of these tissues. Macrophage polarity consists of a pro-inflammatory ("M1", supporting a Th1 response) or anti-inflammatory ("M2", supporting a Th2 response) subtype. To generate these cell types, we will flush the bone marrow from mouse femurs, isolate the stem cells, and culture these cells over 5 days with colony-stimulating factor-1 (CSF1) that differentiate these cells into quiescent macrophages ("M0"). After, we will treat some of these M0 macrophages with interferon-gamma (IFN-g) to induce an "M1" response. To generate "M2" macrophages, we will inject thioglycolate into the peritoneal cavity of mice. After 4 days, we will collect and culture these cells with LPS. All cells will be lysed in Trizol to isolate total RNA and synthesize cDNA. We will perform quantitative (q)PCR to determine mRNA expression of genes that represent an "M1" or "M2" response, including IL-10, Nos2, Arg1, Mrc1 and Tgm2. Our ability to collect and differentiate macrophage subtypes allows us to study their activities in vitro.

Funding: NIH/ National Cancer Institute**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #134

Tumor Progression Induces Alterations to Extracellular Vesicle Populations and Neutrophil Extracellular Trap-Supporting Functionality

Olivia Miller*, Hunter Snoderly and Margaret Bennewitz

Erma Byrd Biomedical Research Center, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Engineering (Health Sciences)

Student's Major: Biomedical Engineering

Every two minutes a woman is diagnosed with breast cancer, accounting for approximately 15.2% of new cancer cases in the US. Cancer-related mortality is commonly attributed to metastasis; understanding the mechanisms by which this occurs is critically important to improving patient outcomes. Metastasis has been noted to be facilitated by processes involving the interaction of neutrophils, neutrophil extracellular traps (NETs), and extracellular vesicles (EVs). Biomarkers for both EVs and NETs are markedly elevated in breast cancer patients. NETs form via NETosis as a response to inflammation or infection from extruded neutrophil DNA in web-like structures. NETs can be induced via EV-mediated activation of neutrophils and can arrest circulating tumor cells to facilitate metastasis. However, the role of EVs in contributing to this process is ill-defined. In this study, 4T1 murine mammary carcinoma cells were orthotopically injected into 35 mice, with IVIS performed weekly for 5 weeks to monitor tumor growth. Plasma, lung, liver, and primary tumor were collected from n=7 mice weekly, with EVs subsequently isolated from plasma. EVs from each group were used to stimulate neutrophils from healthy mice in vitro; their potential to induce NETosis was measured compared to 4T1 EVs derived from conditioned cell culture medium. Electron microscopy and NanoSight Tracking Analysis (NTA) were utilized to validate morphological differences in EV populations. We hypothesize that EVs from timepoints correlating with the onset of distant organ metastases will display enhanced induction of NETosis compared to EVs from timepoints either closer to primary tumor establishment or after metastatic occurrence.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #135

Investigation of Novel Therapeutic for Physiological Deficits in a Post-Stroke Model

Brandon Moore*, Michael Watcher*, Pushkar Saralkar, Jacob Boos and Werner Geldenhuys

Department of Neuroscience, West Virginia University School of Medicine, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Exercise Physiology

Stroke is a detrimental condition caused by a lack of oxygen and nutrients to cerebral tissue ultimately leading to severe mental deficits, physical deficits, and even death. Ischemic strokes, resulting from occlusion of cerebral blood flow, have the highest incidence rate within the stroke population. The lack of oxygen seen in these patients leads to mitochondrial dysfunction, accumulation of reactive oxygen species (ROS), and a resultant increase in neuronal damage and death. MitoNEET (*cisd1*) is an outer mitochondrial membrane protein that has shown to have implications in regulating oxidative stress and has been successfully targeted in previous studies using thiazolidinedione (TZD)-class drugs. The role of mitoNEET in oxidative stress regulation post-stroke, however, has yet to be elucidated from the current literature. In this study, an in vivo ischemic-reperfusion stroke model using *Caenorhabditis elegans* was utilized to test the importance of mitoNEET and the effects of a mitoNEET-binding TZD-class drug on ROS accumulation in both wild-type and mitoNEET-knockout *C. elegans*. Survival and physiological functions including pharyngeal pumping rates, motility, and ROS production were used to assess effectiveness of treatment post-stroke. The data collected from this study suggest that post-stroke treatment with our novel TZD-class compound improves survival and physiological function compared to controls, thus providing data on a new alternative treatment following incidents of ischemic stroke.

Funding: National Institutes of Health

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #136

Implementing Sleep Hygiene and Stress Management Curriculum in a Physical Therapy Wellness Course

Olivia Naylor* and Miriam Leary

*Division of Exercise Physiology, Department of Human Performance and Applied Exercise Science,
School of Medicine, West Virginia University, Morgantown, WV 26505*

Field (Broad Category): Medical Sciences (Health Sciences)

Student's Major: Exercise Physiology

Education is a central tenant in changing health behaviors and, for aspiring healthcare practitioners, understanding the role of wellness practices is critical for their own and patients' wellbeing. Therefore, the purpose of this mixed-methods Scholarship of Teaching and Learning study was to determine if implementing Sleep Hygiene and Stress Management curriculum into a Physical Therapy Wellness Course would improve self-reported health outcomes. Validated surveys were administered online at the start and end of the 2019 summer semester, including the Pittsburgh Sleep Quality Index (PSQI) and Perceived Stress Scale (PSS). At the end of the semester, students also completed the Course Objectives Survey and were invited to complete SEI course evaluations, which were analyzed for common themes. Most (88%) students completed all surveys, but only half (54%) completed the course evaluations. There were no differences between pre and post assessments for the PSQI and the PSS ($p > 0.05$) and while few (12%) were getting more sleep because of this class, most had started incorporating mindfulness practices (62%). Most students felt the class gave them a better understanding of the neurobiology of sleep (8%) and the importance of promoting sleep for health and healing (74%) as well as how to apply strategies for resilience (65%). Feedback from the students recommended that the lecture on sleep be more application based, and that more interactive activities should be added to the course. Implementing curriculum on Sleep Hygiene and Stress Management through a required Wellness Course successfully educated students and improved health behaviors.

Funding: N/A

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Poster #137

The mitoNEET Ligand NL-1 Increased Adiponectin Levels in Mice Via Bioenergetic Changes

Jared M. Norris*, Werner Geldenhuys and Pushkar Saralkar

Department of Pharmaceutical Sciences, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Pharmaceutical Sciences (Health Sciences)

Student's Major: Biochemistry

MitoNEET is an iron sulfur protein located on the outer mitochondrial membrane and functions as redox and pH sensor for mitochondrial bioenergetics. This protein belongs to the zinc finger protein family, but contains 2Fe-2S clusters. Our previous data show that use of mitoNEET ligands can be neuroprotective in both traumatic brain injury as well as cerebral stroke. Overexpression of mitoNEET in obese mice, led to an improved metabolism, primarily attributable to the signaling from adiponectin. In this study, we hypothesized that the mitoNEET ligand NL-1 is neuroprotective by increasing adiponectin levels in mice. C57BL/6 mice were treated with NL-1 at 10 mg/kg i.p. for two weeks, and the levels of serum adiponectin were measured. We also evaluated the effect of NL-1 on mitochondrial function in a neuronal N2A cell culture model using the Seahorse BioFlux analyzer. We found in this study that mice treated with NL-1 for two weeks led to increased levels of serum adiponectin. Additionally, we found that the neuronal cells treated with NL-1 led to improved mitochondrial function, as observed via improved ATP synthesis. Also, cells treated with NL-1 showed a significant reduction in reactive oxygen species levels. Taken together, this suggests that the mitoNEET ligand NL-1 may have positive effects on mitochondrial metabolism via signaling from adiponectin.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #138

Evaluating the Accuracy of Wearable Sensors to Measure Heart Rate Variability

Hanna O'Savage*, Rondalyn Whitney and Elliott Theeke

Division of Occupational Therapy, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Occupational Therapy (Health Sciences)

Student's Major: Occupational Therapy

Wearable sensor technology (WST) is becoming an increasingly popular way for people to make personal health decisions. However, there is little research beyond product marketing on the accuracy of wearable sensors, specifically for those measuring heart rate variability (HRV) as a proxy for stress. The purpose of this study is to compare the accuracy of HRV as measured by three devices. This study is critical evidence as more people are using wearable sensors and HRV as a measure of stress. Thirty-two participants performed three tasks wearing three different wearable sensors. The three tasks included sitting (at rest), playing a game (sitting active), and walking up two flights of stairs carrying a twenty-five-pound bag of rice (MET 6). The three devices included the LETSCOM Fitness Tracker, the Garmin Vivosmart, and the medical-grade Polar A300 chest monitor. HRV was recorded before, during, and after each activity from each wearable sensor worn by participants. At rest, the three wearable sensors did not produce significantly different results. During the board game activity, the LETSCOM Fitness Tracker was less accurate in measuring HRV compared to the Garmin Vivosmart and Polar A300. The Garmin Vivosmart and LETSCOM Fitness Tracker were each less accurate than the Polar A300 during the active portion of the procedure. Our study provides the first measure of accuracy for wearable sensor technology. Commercially available measures of HRV provide accurate measures of stress when at rest, but lose accuracy when engaged in activity, especially during exercise.

Funding: Start Up funds for Dr. Rondalyn Whitney, Division of Occupational Therapy SOM

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #139

Effect of Novel Phosphodiesterase 4 (PDE4) Inhibitors on Ethanol Consumption in Mice

Nikoli Peacher* and Han-Ting Zhang

Department of Neuroscience, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Neuroscience

Alcohol is one of the most widely used substances worldwide. Eighty-six percent of people 18 years old or older surveyed have consumed alcohol at some point in their lifetime. Alcohol use disorder is a psychiatric disorder that is characterized by a change in neuronal structure and function. Despite its prevalence, there are no ideal treatments. The cyclic adenosine monophosphate (cAMP) signaling pathway has been indicated as an important mediator in the development and maintenance of substance use disorders, including alcohol dependence. Novel drug therapies are targeted at the enzyme superfamily of phosphodiesterases (PDEs), specifically phosphodiesterase 4 (PDE4) which hydrolyzes cAMP and is found throughout the central nervous system. PDE4 inhibitors blocks the hydrolysis of cAMP and subsequently increase the levels of cAMP in the cells. The aim of the present study was to investigate the role of PDE4 inhibitors as a novel drug therapy for the treatment of alcohol dependence, through ethanol intake experiments. We hypothesize that the novel treatment with the ability to inhibit PDE4 will decrease ethanol consumption. To test the hypothesis, we will examine the effect of novel compounds, which have been shown to inhibit PDE4 in vitro, on ethanol intake and preference using ethanol two-bottle choice voluntary drinking in mice. If this is successful, we will discover PDE4 inhibitors for potential treatment of alcohol use disorders (this work was supported by the research grant from NIH/NIAAA HHS 75N94019C00010).

Funding: NIH/NIAAA HHS

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #140

Evaluating the Radiosensitivities of Chemo-Radiation Treatments for Brain Metastatic Breast Cancer.

William Pentz*, Samuel Sprowls, Vincenzo Pizzuti, Tasneem Arsiwala and Paul Lockman

Department of Pharmaceutical Sciences, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Pharmaceutical Sciences (Health Sciences)

Student's Major: Biochemistry and Mathematics

Hindrance of drug passage across the blood-brain barrier (BBB) limits the efficacy of current chemoradiation therapy treatments for brain metastatic tumors. However, over the past decade, improved targeted-drug delivery methods and novel temporary BBB disruption mechanisms are beginning to make localized administration of chemotherapeutics into brain lesions a viable option. Currently, literature evaluating the radiosensitizing effects of chemotherapeutics on brain metastatic cell lines is limited. This study evaluates the radiosensitizing effects of doxorubicin on the brain metastatic breast cancer cell line MDA-MB-231-Br. MTT assays were used to predict necessary doxorubicin concentrations for a 24-hour incubation period after irradiation. In vitro radiosensitivity was assessed with clonogenic assays. The linear-quadratic model was used to provide quantitative values to the radiosensitivities of the cell line with and without doxorubicin. Between 0-9 Gy, 15nM doxorubicin had a predicted sensitizer-enhancement ratio of 1.51. Due to the dynamic environment and heterogeneous characteristics of metastatic cancers seen in vivo, performing concurrent chemotherapy and radiation therapy treatments in a controlled in vitro environment provides a fundamental basis for evaluating the inherent interactions between the two modalities.

Funding: Mylan Chair Endowment

Program/mechanism supporting research/creative efforts: Capstone Course within Department AGBI 486: UG Research Experience 2

Poster #141

Interstitial Mitochondria Localize to Cellular Membrane Following Transplantation in HL-1 Cardiomyocytes

Katelyn G. Pinti,* Andrya J. Durr, Andrew D. Taylor and John M. Hollander

*Department of Exercise Physiology, School of Medicine, West Virginia University, Morgantown, WV
26505*

Field (Broad Category): Biology (Health Sciences)

Student's Major: Exercise Physiology

Mitochondrial transplantation has been identified as a therapeutic procedure that provides benefit to ailing heart during ischemia reperfusion. Though the benefit of the procedure is unquestionable, mitochondrial localization during and after transplantation has not been fully elucidated. Few studies suggest that some mitochondria are incorporated into the cell and the mitochondrial network, while others remain in the interstitial space based on immunohistology analysis. This study seeks to understand the localization of mitochondria following transplantation and determine whether mitochondria achieve intracellular localization or remain in the interstitial space using an in vitro model. The knowledge of whether mitochondria are inside of the cells or remaining extracellularly would aid in the identification of the mechanism occurring during transplantation and assist in identifying how they are contributing to functional benefit. Through the use of cell culture, specifically HL-1 immortalized mouse cardiomyocytes, we monitored mitochondrial localization using the MIF NikonA1R confocal microscope for 24 hours post transplantation. Video compilation and Z-stack images reveal that mitochondria appear to be attached to the surface of the cell, particularly in close proximity to the nucleus, but are not incorporated into the cellular space. They further illuminate that mitochondria attached to the surface do not appear to coincide with host cell mitochondrial networks, suggesting that the mechanism of benefit is not dependent on intracellular localization of mitochondria. In summary these data suggest that transplanted mitochondria are not incorporated into cells, but attach to the cellular membrane and remain in the interstitial space.

Funding: National Heart, Lung, & Blood Institute; Community Foundation for the Ohio Valley Whipkey Trust

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #142

Usage of LPS to Combat Effects of Stroke

**Ali Rai*, Ashley E. Russell, John Z. Cavendish, Maya Vannoy*, Ahmad Dakhlallah*, Heng Hu*,
Xuefang Ren, Clay B. Marsh, James W. Simpkins and Duaa Dakhlallah**
Health Sciences Center, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Biology-Immunology (Health Sciences)

Student's Major: Biomedical Engineering

In the United States, stroke is a leading cause of both disability and death. There are a variety of factors that contribute to causing strokes, such as diabetes, obesity, and, more recently shown, recent infection. A byproduct of recent infection is a substance known as lipopolysaccharide (LPS), which was believed to worsen the effects of stroke. In this study, mice were intermittently exposed to LPS and then a stroke occurred. After the stroke, various factors were measured and tested to determine the severity of the stroke compared to a control group, which was given saline solution as opposed to LPS. In the animals given LPS, it was found that there was a larger infarct volume and increased methylation of genes related to autophagy. The increase in infarct volume means that a larger portion of the brain was damaged by the stroke than the control group. As for the methylation of genes related to autophagy, this meant the many of the autophagy genes were down-regulated, which is harmful because autophagy is a process that helps remove waste and damaged cells, so if this process doesn't occur then the body is more prone to damage. To conclude, application of LPS prior to stroke significantly increases negative affects caused by the stroke.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Poster #143

Dim Light at Night Exposure Induces Cold Hyperalgesia and Mechanical Allodynia in Male Mice

Alexandra A. Richmond*, Jacob R. Bumgarner, William H. Walker II, Jennifer A. Liu, James C. Walton and Randy J. Nelson.

Department of Neuroscience, Rockefeller Neuroscience Institute, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Neuroscience

The prevalence of artificial light at night (LAN) has grown substantially during the past century. Though 24-hour access to light has benefitted quality of life, it has altered the natural environmental light-dark cycle. This light-dark cycle synchronizes and regulates circadian rhythms by signaling to the suprachiasmatic nuclei of the hypothalamus. When circadian rhythms are disturbed by LAN, adverse effects can be seen in rodents, such as elevated obesity, cancer, and depression. Further, other forms of circadian disruption, such as night-shift work, alters nociception by reducing pain thresholds. In this experiment, we sought to test the effects of dim LAN (dLAN; 5 lux) exposure on pain responsiveness in mice. We hypothesized that dLAN exposure increases pain responsiveness. We tested this hypothesis by exposing male mice to dLAN and performing pain behavioral tests after 4- and 28-days of dLAN exposure. Cold hyperalgesia (i.e., increased pain sensitivity) was observed after 4- and 28- days of dLAN exposure, and mechanical allodynia (i.e., increased pain responses to nonpainful stimuli) was observed after 28-days of exposure. We then examined the gene expression of several pro-inflammatory cytokines and pro-nociceptive peptides in regions of the pain neurocircuitry including the dorsal root ganglia, the spinal cord, and the medulla. Interleukin-6 and nerve growth factor gene expression was increased in the medulla in response to dLAN. These data suggest that neuroinflammation heightens pain responsiveness. We conclude that dLAN exposure induces cold hyperalgesia and mechanical allodynia, potentially via elevated neuroinflammation.

Funding: National Institute of General Medical Sciences of the National Institutes of Health

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Poster #144

Vaping Behaviors are Associated with Other Health Behaviors in College Students

Emily G. Saurborn*, Rachel A. Wattick B.S. and Melissa D. Olfert

*Davis College of Agricultural, Natural Resources and Design, West Virginia University, Morgantown, WV
26506*

Field (Broad Category): Human Nutrition and Foods (Health Sciences)

Student's Major: Exercise Physiology

The prevalence of vaping in young adults is increasing and presents problematic health effects with rapid evidence in recent alarming publications. Strong evidence concludes negative health behaviors are associated with tobacco use, there is less known about whether vaping is dependent on other factors such as food insecurity, stress, mental health or Adverse Childhood Experiences (ACEs). The objective of this study is to investigate the possible variables that lead young adults to vape in a college environment. Survey data was collected in Spring of 2019 using Qualtrics from an email request to ~29,000 students. Questions about vaping usage and motives, mental health, stress, and ACEs were evaluated. Data analysis using JMP Pro Version 12.0 to conduct One Way ANOVA and Chi-Squared tests was completed. Respondents (N=3367) indicated most often that they used the smoking device multiple times a day (30.3%) and said that their motivation for using a vaping product was to decrease stress (27.1%). Individuals who vaped had higher stress levels ($p = 0.0003$), higher rates of anxiety ($p = 0.0003$) and depression ($p < 0.0001$), higher rates of food insecurity ($p < 0.0001$), and a higher ACE score ($p < 0.0001$). These results show that the prevalence of vaping in college students is associated with other health factors such as food insecurity, behavioral health, or ACE scores. Determining the health behaviors of those who vape is important as it will allow for specific intervention programs to be established.

Funding: West Virginia University's Hatch Fund

Program/mechanism supporting research/creative efforts: An External Internship or Other Type of Program

Lifestyle Intervention Research Lab, Olfert Research Lab

Poster #145

Cooperation of ZEB1 and SNAI1 Transcription Factors in Induction of Epithelial to Mesenchymal Transition

Hanna Traggiai*, Emily Means, Pete Womack, Jessica Johnson and Alexey Ivanov

Department of Biochemistry and WVU Cancer Institute, School of Medicine, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biochemistry - Cancer/Cell/Molecular Biology (Health Sciences)

Student's Major: Biochemistry

EMT is activated during cancer invasion, promotes metastasis and predicts poor patient outcome. The transcriptional network involved in the activation of EMT has been found to be governed by few transcription factors including ZEB1, SNAI1 (Snail), and TCF4. Previous research has shown in mesenchymal cell lines that although ZEB1 played the major role, multiple EMT transcription factors cooperated in induction of full EMT. This research investigated individual and combinatorial roles of ZEB1, SNAI1 and TCF4 in induction of EMT in luminal epithelial cells. These three EMT-TFs were overexpressed separately and in combination, in T47D breast cancer cells and then their expression of EMT markers was analyzed by Western blotting. Individually SNAI1 and ZEB1 activated only partial EMT and decreased cell proliferation, while expression of both led to much stronger EMT and stimulation of cell growth. Interestingly, when expressed separately, the EMT-TFs induced expression of cyclin dependent kinase (CDK) inhibitor proteins including p21/CDKN1A, p27/CDKN1B and p14ARF. However, expression of ZEB1 and SNAI1 together led to downregulation of p21 and p27, consistent with increased cell proliferation. These results suggest that the EMT program is likely orchestrated by combined action of several EMT-TFs.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #146

Influence of Adherence Packaging on a Hypertensive Population's Medication Adherence Habits and Blood Pressure

Amanda Wolfe,* Gretchen Garofoli, Kimberly Kelly, Bryce Adams, Kylin Park and Emma Schutt
Waterfront Family Pharmacy, Morgantown, WV 26501

Field (Broad Category): Pharmaceutical Sciences (Health Sciences)

Student's Major: Exercise Physiology

The aims of this study are to 1) to improve and measure adherence in patients with hypertension after the implementation of a multi-med, multi-dose blister pack adherence system in a community pharmacy setting and 2) to assess change in systolic blood pressure. This prospective, non-controlled, interventional, feasibility study will be completed at a single pharmacy. Individuals 45 years or older, fill their prescriptions at the study site, take more than 1 blood pressure medication, and take more than 5 medications on a daily basis will be included in this study. Individuals not enrolled in the adherence packaging will be excluded from the study. At the time of enrollment, participants will receive a survey to assess self-reported adherence behaviors and will have a baseline blood pressure measured and recorded. After enrolling in the Dispill program, blood pressure will be assessed at each refill pick-up for a 3-month period to examine change after adherence packaging is implemented. Medication fill dates will be analyzed. A post-survey will be given to all participants to assess change in self-reported adherence behaviors at the end of the 3-month study period. Participants will be individually interviewed using set questions and an audio recording device to assess perceptions regarding the blister packs and general medication adherence at the end of the 3-month enrollment period. Quantitative and qualitative analyses will be completed at the end of the study. Quantitative analyses will consist of a chi-squared and T-test. Grounded theory analysis will be used for qualitative analysis.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Poster #201

Maternal-fetal Consequences of E-Cigarette Vapor Exposure on Cerebral Microvessel Density in Rats

**(1)Staller, KE*, (2)EN Burrage, (2,3)E Aboaziza, (5)SA Reppert*, (5)J O'Reilly, (5)L Hare, (2,3,5)PD Chantler,
and (3,4,5)IM Olfert**

(1) Davis College, (2) School of Medicine, Division of Neuroscience, (3) West Virginia Clinical and Translational Science Institute, (4) Center of Inhalation Toxicology, (5) Division of Exercise Physiology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Animal Science

The vascular consequences of e-cigarette exposure, especially during pregnancy, on the offspring are unknown. Microvessel density (number of vessels) in the brain plays a critical role in brain health and normal development. The aim of this study was to examine how e-cigarette exposure during pregnancy impacts microvessel density in the offspring. We hypothesized that e-cigarette exposure will decrease microvessel density compared to air (control) rats. We examined the effects of maternal E-cig exposure (Joyetech eGrip OLED using 5-sec puffs @17.5 W) on cerebrovascular function in offspring (n=2-4 from each dam) from Sprague-Dawley rat dams exposed to air (Control), E-cig with 18 mg/ml nicotine (E-cig18) and without nicotine (E-cig0). Dams were exposed to low (20 puffs) dose for 1-hour each day, 5 days/week, starting on gestational day 2 and continued until pups were weaned. Pups themselves were never directly exposed to E-cig aerosol. Rats were euthanized and the brain samples were flash frozen and sectioned at 8um using a cryostat. Immunofluorescence was utilized to observe endothelial cells via a CD31 antibody. Images were taken using a Nikon Eclipse 800 at a 40X objective and analyzed and quantified for density using ImageJ. Preliminary data suggest that microvessel density is decreased in E-cig 0 and E-cig18 compared to air controls, suggesting that e-cigarette exposure during pregnancy is not safe to the fetus.

Funding: WVU Cancer Institute Philip R Dino Innovative Research Grant (IMO); APS STRIDE Fellowship (JO); NIHGMS 5U54GM104942-03 (PDC); WEST VIRGINIA IDEA NETWORK OF BIOMEDICAL RESEARCH EXCELLENCE (WV-INBRE) 3P20GM103434-19S1 (PDC, IMO)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #147

The "Wild West" Goes East: Finding Missing Pieces in a Portrait of 1900s America

Riley Bowers* and Bonnie M. Brown

Native American Studies Program, West Virginia University, Morgantown, WV, 26506

Field (Broad Category): Native American Studies (Human Engagement)

Student's Major: History

Western society's fascination with Indigenous American peoples, cultures, and artifacts expanded following territorial warfare, forced tribal land cessions, and relocation of North American tribes onto reservations. The desire for performances, memorabilia, and symbols of the, "noble, stoic Indian," became an international phenomenon. This research examines this collective fascination, as evidenced by materials housed in the West Virginia and Regional History Collection at WVU Libraries, and discussed by visiting scholars, including the grandson of a World War One veteran from the Blood Tribe, Blackfoot Confederacy. The research includes historical detective work investigating: the veteran's buffalo horn-eagle feather headdress, which was last seen in England during World War One; ledger art drawings purportedly drawn by Lakota Chief Sitting Bull, which are part of the WVU Libraries' Collection; an archival photo documenting a parade of Plains Indians riding on horseback down Morgantown's High Street; and published letters written by an Austrian woman who married a Lakota man after seeing him perform in Buffalo Bill's Wild West Show.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #148

Welfenschatz: Treasures of the House of Welf

Rebekah Gooding*, Rhonda Reymond and Janet Snyder

School of Art and Design, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Art History & Visual Arts (Human Engagement)

Student's Major: Art History

The Cult of Relics - the veneration of the physical remains of Christian Saints – has been an important part of Christian tradition for centuries as they were the physical manifestations of the Saints and Martyrs. The Cathedrals of Medieval Europe boasted troves of relics of incredible value. One such collection, known as the “Welfenschatz” or Guelph Treasure, was started by Henry the Lion, Duke of Saxony and Bavaria, who brought a bounty of relics with him upon his return from travels to Jerusalem. He began to commission grand reliquaries (containers) for his new relics, beginning the Guelph Treasure that would be housed in the Mary Altar (Marienaltar) at Brunswick Cathedral (Cathedral of St. Blasius). During the Reformation, even under the pressure to convert, Brunswick Cathedral and the Duchy remained Catholic until the mid-sixteenth century. When the cathedral did convert, the relics that were of little value to Protestants were removed from the Mary Altar and moved around Europe until the early-twentieth century when the Guelph Treasure was purchased by a group of art dealers in Germany. These dealers sold a total of nine pieces from the treasure in their possession to the Cleveland Museum of Art, where they currently reside on display. These nine ecclesiastic objects – while not all reliquaries – are all beautiful examples of Henry the Lion’s vision for his treasury and his intention to show off the talent of the local craftsmen around Brunswick.

Funding: West Virginia University

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #149

The Italian Other in 19th/20th Century Dime Novels

Allison Groves, *Lillian Wright* and Nancy Caronia

Department of English, West Virginia University, Morgantown, WV 26506-6296

Field (Broad Category): English & Literature (Human Engagement)

Student's Major: English and Spanish

Dismissed as mental trash due to their repetitive plots and short form narratives, dime novels were the working class's cheap entertainment before radio or television were invented. Dime novel serial fiction stereotyped many groups, including indigenous, black, and immigrant populations. This negative stereotyping helped to promote a xenophobic attitude towards those deemed Other and reinforced whiteness as the norm. This research focuses specifically on the presence of Italian and Italian American characters and the identity ascribed to them. Other dime novel researchers assert Italians play no significant role in dime novel serials, but this research has shown Italian Americans have an established prevalence, representing approximately 8% of 50 issues read between 1872 to 1888 in the Beadles New Dime Novels series. Slurs, including pejorative words such as dago and brigand, directed towards Italian are peppered throughout these novels. In addition, out of the 8% of issues, all of the Italians were the antagonists and were outlaws or fugitives. The legacy of this negative stereotyping evolved to normalize Italians as violent and criminal. Portrayals of Italians as outlaws in the dime novel serial creates a place where Italian immigrants are viewed only as the Other and give a foundation to the gangster archetype displayed in twentieth and twenty-first century popular culture. This poster presentation will outline the findings myself and Lily Wright have documented over the course of the past year.

Funding: WVU Research Apprenticeship Program

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #150

The Beginnings and Rebirth of Helvetia: The Swiss in West Virginia

Sarah Hartle* and William Gorby

Department of History, West Virginia University, Morgantown, WV 26505

Field (Broad Category): History (Human Engagement)

Student's Major: History

The small town of Helvetia, West Virginia was built on roots of Swiss immigrants whose traditions still prevail today, but are those traditions purely Swiss or something more? How does the commercialization of local customs affect traditional values? To address this topic, I investigated historical records, oral histories, and geographic and economic data to find out what had initially threatened the town's economy and to find out how it bounced back in the 1960s. The data points to the rebirth of the town as a hub of Appalachian-Swiss culture in the form of regional tourism. Festivals and other celebrations with their individual components highlight markers of their Swiss tradition. Even today these events are still alive and well, although older members of the community shy away due to concerns about the watering down of the town's traditions. The battle between keeping the town's heritage intact for the residents, versus the draws of tourism, is still an ongoing process for Helvetia.

Funding: Not funded

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

N/A

Poster #151

Out of Prison, Out of Work: The Employment of Formerly Incarcerated Women in West Virginia

Brittany James*, **Lana Aboushaar***, **Jacqueline Bonar***, **Judith D'Amato** and **Alejandra Roman***

Reed College of Media, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Communications/Journalism (Human Engagement)

Student's Major: Public Relations

Formerly incarcerated women in West Virginia are restricted by several barriers as soon as they are released from prison. Our findings are based on our primary research of qualitative data consisting of five in-depth interviews conducted with members of the business audience and relevant organizational experts. The interviews conducted by our team helped us narrow down some of the most important barriers and themes surrounding employment of formerly incarcerated women. One of the main barriers these women face are the background checks included in job applications and the gaps in their resumes. Online applications create a unique dilemma for formerly incarcerated women; due to filtering, business owners or hiring managers may never even see this woman's resume. Another barrier these women face are the negative stigmas businesses and society attach to these women. This makes it harder for them to find and secure an interview and develop a personal connection with employers. In addition, we discovered a lot of business employers are unaware of the tax and loyalty benefits in hiring these women. Our goal is to find a way to help these women and educate employers with a mutually beneficial campaign.

Funding: Women Behind Bars

Program/mechanism supporting research/creative efforts: Other

WVU STCM 421

Poster #152

A Survey of Religious Music in West Virginia

Mary Linscheid* and Travis Stimeling

School of Music in the College of Creative Arts, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Music/Music Therapy (Human Engagement)

Student's Major: Multidisciplinary Studies

Religious music in West Virginia has been undocumented and our understanding of the music made in houses of worship has been largely speculative for the past fifty years. By updating the previous ethnographic data, the goal of this project is to 1) determine whether there is a correlation between people of a certain economic class and the churches they choose to attend, and 2) to observe what forms of music-making exist in these circumstances. In order to do this, we sent out a survey asking houses of worship about their use of published and recorded music materials, instruments, ensembles, whether the musicians volunteer or are paid, etc. We then layered this data onto a geographical map of West Virginia along with the 2020 census data. The expected results are that people from higher socioeconomic brackets attend houses of worship with established music-making practices (e.g. music-making with the use of the Methodist hymnal). The information gathered by this research is meant to aid scholars and others who are studying Appalachian music and/or Appalachian religion by providing them with a foundation on which to base further studies.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #153

Perspectives on the Gay Community in Weimar Berlin

Jordan L. Nistendirik* and Katherine B. Aaslestad

Department of History, West Virginia University, Morgantown, WV 26506

Field (Broad Category): History (Human Engagement)

Student's Major: Political Science and History

During the early twentieth century, Berlin became the world's first modern "gay capital." The forthright activism of the homosexual community, lax enforcement of homophobic laws, and a thriving gay nightlife culture combined to make Berlin unique. By the dawn of the "Roaring Twenties," Berlin's gay community was the most visible and diverse in the world; home to scientists, artists, politicians and military figures advocating for homosexual acceptance. Cheap travel and salacious accounts of gay nightlife drew sex tourists from across the Western world and further increased the community's global visibility. This visibility, however, can be viewed as a double-edged sword. As media coverage of the gay community facilitated gay rights advocacy, it also prompted further attacks on the lives and spaces of gay Germans. This work will examine the variety of sexual expressions and ideologies that existed in Berlin during the Weimar Republic, and the gay community's coverage in local and international media sources. Despite the diversity and divisions that existed within the gay movement, tourist accounts of Berlin's gay community largely focused on nightlife. Furthermore, the community's increased visibility led to attacks from across the political spectrum, culminating in its near-destruction after the Nazi Party took power in 1933. In the present day, it is important to note the continuing trend of stereotypes minimizing the gay community to its party scene, as its diverse identities and expressions remain marginalized.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course
HIST 484 Capstone

Poster #154

A Yellow Star Rising: The Role of Children's Art in the Theresienstadt Ghetto

Molly Plante*

Department of History, West Virginia University, Morgantown, Wv 26506

Field (Broad Category): History (Human Engagement)

Student's Major: History

Although it was only one of hundreds of ghettos established by the Nazis, Theresienstadt held a special status within the Third Reich by embodying three roles: ghetto, transit camp, and concentration camp. It is most well known as a front for National Socialist propaganda. To those on the outside, it was a "Paradise Ghetto" where all residents could live comfortably. Those on the inside knew that conditions within the ghetto were as cruel and far from paradisiacal as they could possibly be. Theresienstadt is further unique since it is here that children were not the first to be targeted for deportation to the death camps in occupied Poland as they were in other camps and ghettos. What's more, there was a concentrated effort by the ghetto's elders to protect the children from the worst aspects of camp life, as well as efforts to allow children to express themselves through art. My research examines children's experiences and the mental and emotional changes they underwent during their internment in Theresienstadt through an assessment of poetry, paintings, and drawings they produced while imprisoned. The goal of this analysis is to answer the question-- how were cultural activities used by Theresienstadt's Jewish leaders to provide more support to the children there? And additionally to explain how these cultural opportunities allowed for the emotional nourishment of the imprisoned children, which in turn helped them adjust to living in nearly impossible circumstances and survive in greater numbers than any other ghetto in Nazi-occupied Europe.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #155

Theatre - The Unsinkable

Ian Ridgway* and Jennifer Harker

Reed College of Media, West Virginia University, Morgantown, Wv 26506

Field (Broad Category): Film/Photography Studies (Human Engagement)

Student's Major: Advertising

Theatre has been the anchor that will not sink. Sure, theatre districts have struggled from time-to-time, however, every so often there is that one show that comes along and enlivens not only Broadway but even the silver screen. Recently, Hamilton was the boost Broadway was looking for but the lingering question it raises is: "Why was Hamilton so popular with audiences?" A show that was representative of a high-class status symbol now can become affordable to the masses, but how will this show compare to other "Broadway-to-silver-screen" adaptations? This research compares Hamilton to other popular Broadway shows, like Wicked which also is in talks to hit the silver screen in 2021, and explores both in relation to those Broadway hits that have already hit the big screen: Les Misérables and Cats. This research content analyzes critics' reviews in the Los Angeles Times and the New York Times regarding all four Broadway productions, as well as the Les Misérables and Cats movies. Since critics' reviews can be important to a film's longevity in theatres (Souza et al., 2019). Given that Les Mis was a success and Cats a catastrophic failure that had the same director for both, the data collected will analyze how critics and audiences reacted to these shows in a positive and negative light. Due to the subject matter of both Hamilton and Wicked, it allows for two big box office successes within Broadway's transfer to Hollywood.

Funding:

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Poster #156

The Structure of State Oversight of K-12 Education Oversight and Regulatory Capture

Nathaniel Smith * and Joshua Hall

John Chambers College of Business and Economics, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Economics (Human Engagement)

Student's Major: Finance

State Boards of Education regulate primary and secondary education within each U.S. state. This consists of setting standards, rules, and examinations for local boards of education to follow in order to ensure educational standards are being met. These educational standards are driven by broad educational goals to create a uniform output. Boards are comprised of members and a Chief State School Officer. The method of selection for both positions vary across states between appointment or election. The economic theory of regulation posits that while the stated purpose of most regulation is to correct market failures, sometimes regulators end up being captured by those they are regulating. Regulators then are dominated by the interests they regulate and not of the public. Using data from 1970, Toma (1983) argues and presents empirical evidence that elected Boards and Chief State School Officers are more likely to be captured by local school boards. We replicate and extend her work and find little empirical evidence of regulatory capture.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #157

Preserving the Legacy of West Virginia's Historic African American Schools

Adrienne Thompson,* Jennifer Thornton and Jamie Billman

Department of History, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Public History (Human Engagement)

Student's Major: History

The presence of African American philanthropy, activism, and education throughout West Virginia's past is generally omitted from public knowledge and often neglected from modern textbooks. Historical African American schools, in particular, served as cultural hubs for African American communities who used the buildings for both free education following the Emancipation Proclamation and as widely accessible community centers, workshops, and focal points for extracurricular activities. After the Brown v. Board of Education of Topeka case of 1954, which deemed racial segregation in public schools unconstitutional, many former African American schools were either demolished entirely or left to decompose and crumble over time. Our research has outlined and identified hundreds of historic black schools that, if given proper funding and maintenance through organizations like the National Park Service's National Register of Historic Places, could be refurbished and rehabilitated into functioning structures. By visiting these buildings, recording their physical conditions, and capturing oral histories from former students, we're also simultaneously working toward preserving the legacy of West Virginia's historic African American schools.

Funding: Pedagogy Innovation Grant, Community Engagement Grant

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #158

Forensic Investigations of Vehicle-Related Crimes: Is it Elemental?

Zachary Andrews*, Oriana Ovide, Ruthmara Corzo, Claudia Martinez-Lopez, Lauryn Alexander, and Tatiana Trejos

Department of Forensic and Investigative Sciences, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Forensics (Physical Sciences & Engineering)

Student's Major: Forensic and Investigative Science

Vehicle glass is an important type of trace evidence that can provide a link between a potential suspect and crime, such as a hit and run, a burglary, or a drive-by shooting. The elemental profile of glass is informative in these investigations and can be analyzed using a variety of methods such as Micro x-ray fluorescence spectroscopy (μ -XRF) and Laser-Induced Breakdown Spectroscopy (LIBS). Although these methods have been previously reported to fit for purpose, recent advances in technology are anticipated to enhance their analytical performance further. The purpose of this study was to evaluate modern μ -XRF and LIBS instrumental configurations, including their discrimination power and error rates. Variability of elemental composition within 100 fragments from a single windshield was evaluated to assess false exclusion rates. Variability between glass originated from 22 different automobiles was used to estimate false inclusion rates. When comparing fragments within the same pane, the variability for the majority of elements was found to be lower than 10% RSD for both methods. Comparison methods simulating casework situations in which one questioned fragment is compared to three known fragments resulted in superior performance than single one-to-one pairwise comparisons, with false exclusions, false inclusions, and discrimination power better than 4.2%, 2.9%, and 97.1% respectively. LIBS and μ -XRF are shown to be complementary methods for the forensic comparisons of vehicle glass.

Funding: NIST SURF

Program/mechanism supporting research/creative efforts: NIST SURF

Poster #159

Mini/modular Roundabout: Practicing Survey

Alexander Bachy*, Kakan Dey and Amdad Hossen

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26506*

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Civil Engineering

In order to elevate congestion, increase safety and traffic flow, new traffic control alternatives must be considered when installing or renovating an intersection. There has been no previous study to comprehend practicing engineers understanding and professional judgments on implementation of mini/modular roundabouts as an alternate to stop controlled or signalized intersection. This study surveyed traffic engineers about their experience and perception about the implementation of mini/modular roundabouts in their jurisdictions. The agencies participated in the survey indicated that limiting the number of severe crashes was the most important consideration in installing a mini/modular roundabout. Agencies also intended to reduce crash frequency by installing a mini/modular roundabout, while also reducing congestion through an intersection. Overall, traffic engineers implemented this type of roundabout to increase the safety and operational improvement at an intersection. Practicing engineers' response recommended that a mini/modular roundabout may be an appropriate alternative to a traditional stop-controlled intersection on highways with low speeds, low volumes and limited right of way.

Funding: Ohio Department of Transportation

Program/mechanism supporting research/creative efforts: WVU Work Study (not associated with RAP)

Poster #160

Characterization of Mass-Flux Based Erosive Burning of a Solid Rocket Propellant

Daniel Bennett* and Patrick Browning

Department of Mechanical and Aerospace Engineering, Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Aerospace Engineering

The purpose of this study is to determine the effects which the mass flux inside of a solid rocket motor has on the burn rate augmentation, or erosive burning, of a propellant called Nevada AeroSpace Sciences Associates (NASSA) Yellow 1.0C. The need from this study comes from the work of the West Virginia University Experimental Rocketry team (WVUER) to improve the fidelity of their internal ballistics modeling. NASSA Yellow 1.0C was selected for this study because it is the main propellant utilized by WVUER for their motors. Currently, only the linear burn rate characteristics of the propellant without augmentation from mass flux has been successfully characterized. Through empirical testing, this study would identify, for a given chamber pressure, a threshold mass flux at which burn rate augmentation is not exhibited and identify the increase in burn rate as a function of mass flux. These results could then be used by WVUER and other amateur rocketeers to improve the accuracy of their models, increasing the reliability and safety of their motor designs.

Funding: NASA West Virginia Space Grant Consortium

Program/mechanism supporting research/creative efforts: An External Internship or Other Type of Program

NASA West Virginia Space Grant Consortium

Poster #161

Heterogenous Chemistry and Atmospheric Reactions of Organic Aerosols

Zachary Bohrer,* Tadini Masaya and Fabien Goulay*C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Chemistry (Physical Sciences & Engineering)**Student's Major:** Chemical Engineer

Heterogenous chemistry is when two species in different phases react, in this case gaseous free radicals and droplets of organic molecules. The process of heterogenous chemistry can be observed to better understand how suspended nanoparticles, or aerosols, react in an atmospheric environment. Heterogenous chemistry plays an important role in the chemical evolution of the atmosphere, such as cloud formation, ozone depletion, and pollution effects. This study determines the effects of OH radical reactions on pure and mixed solutions of organic nanoparticles. Experimental data were gathered by using solutions of organic molecules, such as glucose, lactose, urea, or acetamide, and dispersing small droplets through an atmospheric flow tube. Even though these organic particles may not be commonly found in the upper atmosphere they act as surrogates to improve our understanding of atmospheric reactions. While in the flow tube the organic particles reacted with OH radicals and were then sent to a scanning mobility particle sizer (SMPS) for particle size analysis. The chemical composition of the reacted particle is then determined by a gas chromatographer (GC). The data collected leads to the assumption that the density of the droplets may be changing due to the decrease of volume. The dramatic difference in diameter change of organic particles contradicts previous data collected on the effects of OH radicals on a mixture of monosaccharides and disaccharides. This new information can be used to understand how OH radicals effect different organic aerosols in Earth's upper atmosphere.

Funding: West Virginia University Start-up Package**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #162

Tethered Robots for the Exploration and Mapping of Unknown Environments

Kevin Bruce*, Danylo Shapovalov and Guilherme Augusto Silva Pereira*Department of Mechanical and Aerospace Engineering, West Virginia University, Morgantown, WV 26505***Field (Broad Category):** Engineering (Physical Sciences & Engineering)**Student's Major:** Computer Engineering

While quadcopter drones are extremely useful tools for surveying, they are severely limited by battery life. Quadcopters are four propeller flying vehicles that take off and land vertically and are highly maneuverable. However, due to the weight of batteries, they cannot carry a large enough energy reserve relative to their power consumption to fly for long. One solution for this problem is to run a power tether from a larger battery or reactor on the ground to the drone, allowing a nearly unlimited flight time while adding minimal weight. Despite its benefits, a tether sacrifices some freedom of movement and pathing efficiency. Research into this area requires both mechanical and algorithmic development. Mechanical goals include the development of systems for tether retention, guidance, and release to achieve a balance of reliability, freedom of movement, and cost. Algorithmic goals include creating guidance systems that avoid tangling and mapping algorithms using mounted sensors. A cart has been constructed to bend the tether perpendicularly at the ground to decrease tangling and algorithmic complexity. Also, a rotary part has been developed to decrease linear and rotational stress on important components. The room mapping algorithm is being developed using the Robot Operating System (ROS) to interface with a Light Detection and Ranging, or LiDAR, unit mounted on the drone. The drone that will be used for testing is still being designed, so initial tests will be completed using simulation software and the iRobot Create ground platform, and algorithmic changes will be made if issues arise.

Funding: West Virginia Space Grant Consortium**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #163

An Analysis of the Sensitivity of the Arecibo Drift Scan Survey

Jacob Cardinal Tremblay* and Maura McLaughlin

Department of Physics and Astronomy, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Physics & Astronomy (Physical Sciences & Engineering)

Student's Major: Physics

This project has the aim to check if the Arecibo Observatory drift-scan survey is properly detecting currently known pulsars. In this project we have been looking through the data that has been taken during the Arecibo drift scan in order to identify if it is working as intended. Arecibo is the second largest single dish radio telescope in the world with a diameter of 305 meters. The drift-scan is a passive scan of the sky performed while the telescope is fixed and the sky drifts overhead. My task has been to use the data in the Arecibo drift-scan survey and compare it to specific locations in the Galaxy where we know there are pulsars. To do this, I have developed code from an existing script and applied it to work with the drift-scan data. Using a pulsar that we knew to exist as an example, I have been able to determine that it was detected with the significance and properties like spin period that we expected. This existing script, however, does come with some problems, mainly that it is not efficient. Therefore, I am developing a new script that works in a similar way but improves the search time significantly. This will give researchers working on the drift-scan the ability to search for any pulsar in the database and find out whether it should have been detected, in addition to in which directory it should be located, in a matter of seconds.

Funding: National Space Grant Foundation

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #164

Statistical Methods for Model Building Coupled with the MOOSE Framework

Angelo Cassiadoro*, David S. Mebane and Alejandro Mejia

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV, 26506*

Field (Broad Category): Material Science (Physical Sciences & Engineering)

Student's Major: Mechanical and Aerospace Engineering

The Energy Systems and Materials Simulation group is focused on analysis and model building of chemical and electrochemical systems. The group utilizes a Bayesian approach to model-building, thus requiring acquisition of experimental data. The model-building processes are a series of Bayesian calibrations, in which model parameters are estimated as probability distributions. The calibrations incorporate Markov chain Monte Carlo routines to sample from the "posterior": the calibration process yields a probability distribution for the parameter space called a posterior distribution. The solver for the current project model is being developed in an external software known as MOOSE (Multiphysics Object Oriented Simulation Environment). MOOSE was chosen due to its extensive capabilities with finite elements and model solving. My objective is to create an interface routine that will allow the MOOSE solver results to be utilized within the C++ calibrations in an effective manner. This involves research into the operation of the calibration routines as well as ways to communicate data effectively with C++. The end goal is to incorporate the general routine into the sequential routine which will allow for parallel computing with MPI. A successful base calibration will allow for more complex model versions to be tested. From each different calibration, one can then utilize different statistical tools to determine which model has the best data coverage and least required complexity. Overall, this relatively new data science technique for model building is efficient, powerful, and may bring greater possibilities when coupled with MOOSE.

Funding: National Science Foundation

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #165

Combining Viral Rhodopsin and Retinal Rhodopsin for MD Simulations

Erin Cohan* and Blake Mertz

C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biophysics (Physical Sciences & Engineering)

Student's Major: Chemistry

By separating the chain E and keeping the protonation points of the viral rhodopsin, we can replace the protein with retinal rhodopsin and simulate the integration of the protein into the lipid bilayer. By generating an MD simulation using chain E we can then remove and replace the protein chain with a retinal chain in its place. An individual factor of this viral rhodopsin that makes it unique is that it is inverted in comparison to other rhodopsin function group. Along with the idea that by its shape it can also function as an ion channel. Within the research, the lab uses MD simulations to generate data and graphs measuring lipid concentration and other important factors. By swapping chain E with the retinal protein we hope to merge the two systems successfully. Along with merging the retinal protein, we are about to use the system in a more versatile fashion. By completing the MD simulations we hope to improve the uses for the medical field and alternative energy.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #166

Center of Mass Displacement in Young Adults While Experiencing External Disturbances During Sit-to-Stand Motion

Hannah N. Cohen*, Hannah D. Carey and Jessica L. Allen

Department of Chemical and Biomedical Engineering, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Biomechanics/Kinesiology (Physical Sciences & Engineering)

Student's Major: Biomedical Engineering

Many older adults have difficulty with the sit-to-stand motion, which is fundamental for daily life. Preventing a fall when a loss of balance occurs during sit-to-stand requires appropriate muscle recruitment. As a first step to understanding how fall prevention during sit-to-stand is altered in older adults, we investigated how healthy young adults recruit their muscles to control the movement of their center of mass (CoM) when experiencing an external disturbance during the sit-to-stand motion. Kinematic data was collected from subjects during the study using reflective ball markers. After performing the sit-to-stand motion as they would normally, subjects were exposed to external perturbations timed to occur after the subject began to stand. Perturbations were delivered through movement of the support surface 15cm forwards or backwards at different velocities in random order, each designed to produce varying levels of balance loss. OpenSim, an open-source musculoskeletal modeling software, was used to identify the contribution of lower-leg muscles to the return of the CoM towards a stable position across different perturbation directions and levels. Preliminary results indicate that peak anterior-posterior CoM displacement in response to the perturbation scales with increasing perturbation velocity. We expect to find that a) the recruitment of muscles used to return the CoM back to the stable position scales with perturbation velocity, and b) the muscles that contribute to this return depend on whether the perturbation was forward or backwards.

Funding: West Virginia Research Challenge Fund

Program/mechanism supporting research/creative efforts: WVU's SURE program

Poster #167

Subsurface Modelling of Deep Direct-Use (DDU) Geothermal on the West Virginia University Campus

Kevin Donnelly*, **Nagasree Garapati (1)**, **Yingqi Zhang (2)** and **Pierre Jeanne (2)**

(1) Dept. of Chemical and Biomedical Engineering, Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26506. (2) Lawrence Berkeley National Laboratory, Berkeley, CA 94720

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Chemical Engineering

The north-central region of West Virginia hosts a unique geological opportunity for the development of deep direct-use (DDU) geothermal energy. Being in the midst of this region, West Virginia University's (WVU) Morgantown campus could potentially supply its heat from DDU geothermal in an effort to increase renewable energy on campus. This work features the results of simulations done for a subsurface reservoir using TOUGH2/EOS1, a program utilized to simulate couple transport of water and heat in geothermal reservoirs. Reservoir behavior (pressure, temperature) over 60 years of production time is analyzed. In order to achieve a more accurate pressure profile at well bores, a radial mesh has been generated around injection and production well bores used in the simulations. ReInjection temperatures and flow rates were varied for different well configurations to more fully measure their effects on the reservoir. Longevity of the reservoir decreased with increased mass flowrate and lower reinjection temperatures. In comparison to single production well systems, multiple production wells resulted in faster thermal breakthroughs and larger pressure changes. These specific trends were analyzed through temperature and pressure contour maps created at various points within the 60 year time frame. These results from numerical simulation help in designing the optimum well configuration.

Funding: U.S. Department of Energy

Program/mechanism supporting research/creative efforts: An External Internship or Other Type of Program

Summer Research Assistant

Poster #168

Experimental Investigation of Custom Composite Rocket Body Tubes

Emma Dorsey* and Annette Straziuso*

*Benjamin M. Statler Mechanical & Aerospace Engineering Department, West Virginia University
Morgantown, WV 26506*

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Mechanical & Aerospace engineering

Two West Virginia University engineering students desire to research various materials and wind angles using a commercially available composite tube winder called X-Winder. Emma Dorsey and Annette Straziuso developed an interest in the composite winding process while designing rockets for the WVU Experimental Rocketry Club. Rockets must be strong enough to withstand the launch process yet must also be lightweight. Rocket bodies manufactured of a composite material such as fiberglass are both strong and light. During the manufacturing process, a composite filament is wound around a cylindrical core (called a mandrel) at predetermined overlapping wind angles while it is coated in resin, forming a cylinder. Once the resin is cured, the mandrel is removed, leaving a composite tube with a higher tensile strength than stainless steel. Through destructive and non-destructive testing, the students plan to identify the most efficient rocket body tube, along with establishing a database of statistical results. The latter serves to become a tool for use by future students and for other applications. The beneficiaries of this research include the individual students, the WVU Experimental Rocketry Club and potentially all future engineering students who use the X-Winder system.

Funding: West Virginia NASA Space Grant Consortium

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #169

Simulating Weathering of Ignitable Liquids to Understand the Effect of Mole Fraction on Weathering

Evan Ferweda*, Ahna Kotula*, Caitlyn Wensel and Glen P. Jackson

Department of Forensic and Investigative Science, C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Forensics (Physical Sciences & Engineering)

Student's Major: Forensic Chemistry

The ultimate goal of this project is to enable fire debris analysts to make more reliable predictions about the presence of ignitable liquids in fire debris samples. Towards that end, this study continues the development of a mathematical model to describe the composition of residues left behind when ignitable liquids, like gasoline, evaporate over time. Our previously published model, based on standard principals of ideal mixtures and ideal gases, was designed to predict how ignitable liquids would weather at different temperatures. That study determined that temperature has a significant effect on how ignitable liquids weathered, or evaporated, over time. The current study aims to establish how sensitive the model is to the molar fraction of each component of the mixture, and whether or not the model can be simplified. For example, if a particular component decreases below a certain mole fraction threshold, the term for mole fraction could become irrelevant or constant. To better understand this concept, the current model was edited to account for solutions up to 20 components and with a wider diversity of mole fractions than previously attempted. This poster will describe model that is used to simulate the weathering of different hypothetical mixtures and will discuss the relationship between the initial mole fractions and instantaneous mole fractions as a function of evaporation time or weathering. Other members of the group are currently validating the model with actual weathering of synthetic mixtures that replicate the simulations, and that work is to be presented in a complementary poster.

Funding: National Institute of Justice

Program/mechanism supporting research/creative efforts: WVU 497-level course

Comparison of CaCoOx and BiCaCoOx Thermoelectric Materials

Ellena Gemmen* and Cesar Romo-De-La-Cruz

Department of Mechanical and Aerospace Engineering, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Mechanical Engineering

Today's electrical power generation is produced primarily via energy conversion technologies reliant upon fossil fuel resources which contribute greatly to carbon emissions. To add on top of these environmental effects, only ~34% of the power generated is actually used, the other 66% is lost as either energy loss or as waste heat. As an effort to resolve these issues, thermoelectric materials are used to regain this lost heat by converting it into useful electric energy. The use of thermoelectric materials for waste heat recovery has already been implemented in remote sensor applications, and has also been used in other applications, such as NASA's New Horizons satellites, and in luxury cars for cooled seating. In order to optimize the efficiency of a thermoelectric material, it must have the highest conversion of heat energy to electric energy. In this work, thermoelectric materials CaCoOx and BiCaCoOx were manufactured and then tested using Linseis LSR-3 test unit and Scanning Electron Microscopy (SEM) to compare Resistivity, Absolute Seebeck Coefficient, Power Factor, surface structure, and grain structure to see which material is the optimal candidate for thermoelectric generators having the highest power output.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course
a WVU 497-level course

Poster #171

Efficiency Comparison of Collection Methods for Organic and Inorganic Analytes in Gunshot Residue

Emily Halpern,* William Feeney and Tatiana Trejos

Department of Forensic and Investigative Sciences, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Forensics (Physical Sciences & Engineering)

Student's Major: Forensic and Investigative Science and Chemistry

The forensic analysis of organic (OGSR) and inorganic (IGSR) gunshot residue has been widely studied using various methodologies. Recent efforts have described identifying both components of GSR to increase the confidence of a collected sample; however, few methods allow for dual detection of IGSR and OGSR on a single instrument which when used saves time and resources. To address this, our lab developed a method using LC-MS/MS, which is available in most crime labs. Two common materials for collecting GSR from hands of individuals are polymers and carbon tape. Standard GSR practice (ASTM-E1588) uses carbon tape to recover IGSR analytes. However, recent studies have shown that polymer collection is possible for IGSR and OGSR due to its porosity and the OGSR lipophilic nature. Realizing this, we tested carbon tape, "Tesa Tack", and two synthetic polymers. Each component (EC, MC, DPA, NNDPA, 2-NDPA, 4-NDPA, Ba, Pb, Sb) and a mixture of the components was deposited at 20uL at 20 ppm and extracted using acetonitrile for OGSR and an acid solution for IGSR. The intensity of response was monitored and recorded using MassHunter® Qualitative and Quantitative Analysis softwares. Hypothesis testing methods such as ANOVA was implemented to compare the efficiency of the substrates. Comparing methods, carbon tape indicated a more efficient extraction of OGSR than the "Tesa Tack."

Funding: National Institute of Justice

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #172

Improving Data Collection for Increased Manufacturing Efficiency

Murad Hamirani*and Thorsten Wuest

Smart Manufacturing Lab at Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Computer Science

Data collection is an important step in creating machine learning models. Machine learning is rooted in statistics and mathematics, so the need for data is paramount. Just how machine learning can improve efficiency in any manufacturing process, having a quick method of data collection can also lead to higher efficiency. My research involves the use of a Bluetooth sensor to transfer the data gathered from a manufacturing process machine to a computer. I have been working with a Dialog semiconductor sensor that has embedded Bluetooth technology. The steps involved include determining the feasibility of using the Dialog sensor and writing a program that connects to an Android tablet and relays the data. We expect our results to confirm that the data from the manufacturing process is successfully transmitted. An efficient transmission time would be around 3 to 5 seconds between attaining the data and transferring it to the tablet. Future work includes relaying the data to another program that can process and format it for easier use.

Funding: J. Wayne and Kathy Richards Faculty Fellows

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #173

Analysis of Inorganic GSR Microparticles Using Laser Induced Breakdown Spectroscopy (LIBS)

Emily Heller*, Korina Menking-Hoggatt, Claudia Martinez-Lopez and Tatiana Trejos

Department of Forensic and Investigative Science, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Forensics (Physical Sciences & Engineering)

Student's Major: Forensic Chemistry

Firearms-related investigations require fast, reliable, and sensitive analysis of gunshot residue (GSR) evidence. However, current standard methods are time-consuming and costly technique that is further challenged by new types of modern ammunition that lack characteristic GSR markers. Even more challenging is the lack of standard reference materials to assist in research and development of new methods. In this study we propose a rapid alternative method of analysis using Laser-Induced Breakdown Spectroscopy (LIBS), which provides multi-elemental characterization of inorganic GSR (IGSR) with minimal sample destruction. Analysis by LIBS was performed on twenty IGSR micro-particle standard solutions created in-house at Dr. Trejos' research group. The micro-IGSR standards were previously characterized qualitatively, quantitatively, and morphologically by two other analytical techniques (SEM-EDS and ICP-MS) and, therefore, served as controls for method optimization and cross-validation. The samples were analyzed by a LIBS microchemical mapping method that provided elemental analysis and spatial information. The LIBS method successfully identified the main standard IGSR markers: lead, barium, and antimony, in addition to other elements in lead-free ammunition (e.g., Al, Cu, K, Ti, Zn). An agreement of elemental composition was observed across all analytical techniques, demonstrating the utility of LIBS for IGSR detection. One advantage of LIBS over SEM-EDS and ICP-MS is its speed, where a typical analysis takes 1.5 minutes per sample, as opposed to 8 hours per sample by SEM-EDS or 3-5 hours by ICP-MS. The study demonstrates LIBS potential of becoming a rapid and accurate screening method for GSR analysis.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #174

The Impact of Intracellular Environmental Factors on htt Aggregation

Breanna Hodges*, Justin Legleiter and Sharon Groover

C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Chemistry (Physical Sciences & Engineering)

Student's Major: Chemistry

Huntington's disease (HD) is an autosomal dominant neurodegenerative disorder which causes chorea, psychiatric disorders, and disrupted cognitive thinking. A mutation in the htt gene results in expansion of a polyglutamine (polyQ) domain in the huntingtin protein (htt), with expansion beyond 35 repeats resulting in HD. Expansion directly promotes the formation of toxic htt aggregates. Aggregation is complex and heavily influenced by a variety of chemical factors within the intracellular space. These factors include the crowded cytosolic space and membranous surfaces associated with organelles; however, mechanistic details of how these specific features influence aggregation remain elusive. To determine how molecular crowding and the surface of the endoplasmic reticulum (ER) impact htt aggregation, a series of experiments using mutant htt proteins and peptides were performed. To mimic the crowded environment of the cytosol, htt aggregation reactions were analyzed in the presence and absence of chemically inert macromolecular crowders: dextran, ficoll, and polyethylene glycol (PEG). A fluorescent dye, thioflavin T (ThT), was used to monitor the kinetics of htt aggregation. Atomic force microscopy (AFM) was used to visualize aggregate morphology, and lipid binding assays were used to determine how a crowded environment alters htt's surface activity. Dextran and ficoll enhanced aggregation; PEG reduced it. A similar pattern was observed in how crowders impacted htt's surface activity. In addition, preliminary studies were performed to determine how the presence of ER purified from murine brains influences htt aggregation. Currently, the assays used are being optimized to compensate for noise associated with the addition of ER.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #175

Replicating Characteristics of Magnesium Based Rocket Propellant with Aluminum Based Propellant

Charles Howard*

Department of Mechanical and Aerospace Engineering, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Aerospace Engineering

Propellant made for solid rocket motors most often uses aluminum powder as the thermic agent. The thermic agent is a part of the propellant that is used to increase the temperature of the flame, which increases the performance of the motor. Aluminum powder is a good choice because it is relatively inexpensive and exhibits favorable properties during the burn. Another common choice for the propellant thermic agent is magnesium powder. Magnesium is more energetic than aluminum, and therefore often acts as a better thermic agent. The issue with magnesium is that it is very difficult to find a propellant-quality source for a reasonable price. Rocket motors made with low-quality magnesium can be unpredictable and dangerous. Within the West Virginia University Experimental Rocketry Team (WVUER), there is a desire to take advantage of the properties of magnesium-based propellants, specifically Nevada AeroSpace Science Associates (NASSA) Red 1.0 [1]. The problem is the aforementioned difficulty of sourcing acceptable magnesium powder. This study intends to research the effects of using aluminum instead as the thermic agent in various newly formulated propellants that are based on the original formula for NASSA Red 1.0 and to replicate NASSA Red 1.0 propellant characteristics. If successful, the results from this study will give WVUER more options when choosing propellants for future rocket motors and allow the team to avoid problems associated with common magnesium sources. This research is currently in progress and will be completed by mid-April 2020.

[1] NEVADA AEROSPACE SCIENCE ASSOCIATES,

<http://www.rimworld.com/nassarocketry/indexmotors.html>, [retrieved 19 September 2019]

Funding: West Virginia NASA Space Grant Consortium

Program/mechanism supporting research/creative efforts: Other
WV NASA SGC

Poster #176

Smart Soft Robotics

Isabelle M. Jacinto*, Domenic Cipollone and Kostas Sierros

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26505*

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Engineering Track 3 - Chemical Engineering

Soft robotics is an emergent field that allows for the use of inherently safe materials. Moreover, the soft nature of the bodies provides theoretically infinite degrees of freedom, allowing robotic systems to change their morphology, form, and function. However, many of these systems are currently tethered and require the use of pneumatic pumps. As a solution, this work explores the use of internally actuated soft robotics that utilize an internal heating element. The systems consist of silicone and ethanol emulsion, which when heated, induces a liquid to vapor transition and promotes expansion. The composites are tested under uniaxial compression to evaluate body stiffness as a function of internal temperature and ethanol volume fraction. The expansion is normalized to characterize the degree of expansion as a function of the heating element surface area and applied power. Finally, the expansion is characterized as a function of time to explore the speed of the heating and cooling cycle. With these fundamental characterizations, the soft bodies will be implemented to change the morphology and control response of robotic systems. Possible future work includes developing soft robots with embedded tactile sensors.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #177

Production of Methane from Natural Mixed Gas Hydrates

Hong Woo Kim* and Nagasree Garapati

Department of Chemical and Biomedical Engineering, Benjamim M. Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Chemical Engineering

Natural Gas hydrates (NGHs) are ice-like crystal compounds, formed by the gas guest molecules trapped in the cavities of built by the hydrogen bonding of water molecules. They exist at relatively high pressure and low temperatures, and are found naturally below permafrost on land, or under seafloor. NGHs have recently emerged as a promising future energy source as it is estimated to contain more carbon than all the other fossil sources combined. The goal of this research was to simulate and predict the phase equilibrium of mixed hydrates and assess the feasibility of guest-molecule-exchange technology to recover methane (CH₄) gas from NGHs. Using cell potential code, written in Intel FORTRAN, the composition of the gas, the pressure, and an initial guess for the calculated temperature was inputted to acquire the equilibrium temperature at which the mixed hydrates can form along with structure and composition of hydrate. Similarly, equilibrium pressure at various temperatures and gas composition is calculated. The information gained from this process is vital in predicting the amount of gas recovered from NGHs.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #178

Ohio River Valley Supply Chain and Scenario Analyses

Lydia Knutsen*, Leily Farrokhvar, Behrooz Kamali and Kenneth Currie

Department of Industrial and Management Systems Engineering, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Industrial Engineering

The Upper Ohio Valley transports materials through waterways, trucks, air, and rail. In this area, the Weirton Area Port Authority established a company specializing in transportation, commerce, technology, and related infrastructure, the Inter-Modal Holding, LLC (IMH). The main purpose of this study is to establish a data management plan to identify a thorough set of data related requirements for automating the IMH process of data collection and tracking commodities. To form the data management plan, we need to identify data types in IMH and develop a standardization plan to evaluate the existing data and how it can be related to the data to be collected. We need to define various metadata for capturing and documenting data, as well as determine approaches and standards for capturing metadata. We need to include policies like privacy regulations, protocols needed, and policies for accessing and sharing data. This includes developing processes for making data available, giving access, determining potential users, and provisions for reuse and redistribution. Lastly, we need to develop strategies for long-term storage of data, during and beyond the project, and determining storage location, format types, and backup approaches. The main findings hope to provide IMH with a data management system that can be used to alter the previous process of data collection and track commodities for the company. The installation of this system will overall improve the distribution planning of IMH to improve the efficiencies of domestic and international trade and harmonize communication services in the region.

Funding: Intermodal Holding LLC

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #179

Agglomeration and Removal of Microplastics from Water

Jacob Koller*, Rakesh Gupta, Sushant Agarwal and Hota GangaRao

Department of Chemical and Biomedical Engineering, Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Chemical Engineering

Microplastic pollution is a worldwide problem that can pose a significant threat to all types of life. Microplastics are defined as plastic particles less than 5mm in width. They can be found in oceans, rivers, and even treated tap water. Microplastics are too small to remove from water sources using conventional cleanup methods. However, numerous techniques to collect or agglomerate and remove microplastics are available. Most processes use chemical surfactants, or chemicals that alter the surface tension of liquids. This study attempts to determine the best method to collect microplastics in water using multiple surfactants. For experimental purposes, microplastics were represented by grinding and filtering polypropylene pellets to an average radius of about 20 microns. They were then introduced into a solution containing water and a surfactant. For each surfactant tested, agglomeration was observed at the surface of the solution and quantified experimentally with laboratory equipment. Agglomerates were removed from the solution via filtration techniques utilizing hydrophobic and hydrophilic materials, and the separation efficiency for each method was evaluated. The most moderately hydrophobic surfactant tested was the most effective at agglomerating the microplastics. This knowledge can be applied to water treatment facilities worldwide to remove microplastics, as well as other potential applications to cleaning up microplastic pollution.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #180

The Effects of Substrates and Elevated Temperatures on the Weathering of Ignitable Liquids

Ahna Kotula*, Caitlyn Wensel and Glen P. Jackson

Department of Forensic and Investigative Science, C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Forensics (Physical Sciences & Engineering)

Student's Major: Forensic Science

This study aims to assist forensic investigations by providing a deeper understanding of the weathering (i.e. evaporation) of ignitable liquid residues in fire debris. Initial experiments will employ a synthetic gasoline mixture that will be evaporated to various levels at various temperature on different substrates. These weathering experiments will reveal how two major factors impact the distribution of compounds in the weathered residues: 1) the temperature at which weathering occurs, and 2) the porosity of the substrate and how the gasoline penetrates into the substrate. The study will first examine the effect of different substrates on the evaporation rates of the nine different components in the artificial gasoline. To examine how the gasoline penetrates the substrates, the experiments will be repeated with different delays between spiking and weathering the gasoline. This will be done at different temperatures/durations. The residues of the gasoline in the substrates will be collected, analyzed, and quantified using gas chromatography-mass spectrometry (GC-MS). The four substrates that will be experimented on are hard wood, soft wood, nylon carpet, and cotton because they are commonly found in fire debris. Results from weathering the gasoline without a substrate demonstrated that temperature impacts the distribution of components. We anticipate that adsorption on the surface of the substrates will not impact the relative evaporation rates of the nine compounds in the synthetic gasoline, but that absorption of gasoline into the pores of a more porous substrate would slow the evaporation of the most volatile components.

Funding: National Institute of Justice

Program/mechanism supporting research/creative efforts: WVU 297-level course

Poster #181

Electrochemical Analysis of Buprenorphine and Naltrexone as Potential Tools to Tackle the Opioid Epidemic

Sara L. Kuberski*, Colby E. Ott and Luis E. Arroyo

Department of Forensic and Investigative Science, West Virginia University, Morgantown, WV, 26506

Field (Broad Category): Forensics (Physical Sciences & Engineering)

Student's Major: Forensic and Investigative Science; Chemistry

Deaths associated with drug overdose continue to contribute to mortality in the United States. According to the U.S. Department of Health and Human Services survey, in 2018, there were 67,367 drug overdose deaths, which represents 4.1% less compared to 2017 (70,237). However, the rate of overdose deaths involving synthetic opioids increased by 10% from 9.0 in 2017 to 9.9 in 2018. West Virginia ranked number one as the state with the highest drug overdose death rates in the country with 51.1 per 100,000 population. The West Virginia Department of Health and Human Resources promotes the Medication-Assisted Treatment (MAT) Program. MAT administers the drugs buprenorphine and naltrexone to patients dealing with opioid addiction. Ensuring patient compliance with the MAT program is a crucial step to increase the chance of treatment success. Therefore, the goal of this work was to develop an electrochemical sensor based on a screen-printed carbon electrode (SPCE) to quickly and effectively detect these compounds for compliance purposes. Both drugs demonstrated electroactivity. Buprenorphine showed an oxidation peak at +0.29 V, while naltrexone presented two oxidation peaks at +0.40 V and +0.77 V. Square-wave voltammetry (SWV) was optimized for detecting the target analytes and calibration curves were constructed for each drug. Buprenorphine was analyzed over the linear range of 1.86 ppm to 13.9 ppm ($R^2=0.992$), resulting in a calculated limit of detection (LOD) of 0.72 ppm. Naltrexone was analyzed between 0.5 ppm and 10 ppm ($R^2=0.998$), resulting in an LOD of 0.24 ppm.

Funding: SURE enrichment funding award for \$500

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #182

Intake Air Treatment for Use in s Traditional Diesel Engine and Optical Engine

Leslie Lacek* and Chris Ulishney

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26505*

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Mechanical Engineering

Engines can be found in all sorts of different laboratories for various purposes. One thing they all have in common is the set up for the engines for them to operate properly. This is especially true for diesel and optical engines, which require a bit more equipment for their intake systems. Optical engines are used to aid in visualizing and studying engine combustion and cycles. My research group is currently creating an intake system for both a diesel and an optical engine. For the optical engine, a compressor is used due to the need for extra compression in the cylinder for the engine to operate similarly to a production engine. If the pressure is anything less than atmospheric pressure, the sapphire plate within the optical access will dislodge from the seat. The filters are responsible for ensuring the air in the system is clean and dry for emission measurements. Any contaminants in the air can cause a loss in power. After my group successfully creates a proper intake system for the engines, the next goal is to fuel these engines with various natural gas mixtures and measure the torque and power output of them.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #183Nickel-Catalyzed C(sp²)-H Trifluoromethylation and Nitration of 8-Aminoquinoline Derivatives**Joseph P. Lokant***, **Mariah L. Murray*** and **Jessica M. Hoover***C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Chemistry (Physical Sciences & Engineering)**Student's Major:** Biochemistry (ACS Track)

The activation and functionalization of inert C(sp²)-H bonds continues to be a prominent area of research in organic chemistry. This field has the potential to significantly improve current synthetic routes to pharmaceuticals, materials, and natural products. Earth-abundant first-row transition metals, such as nickel, are often used as catalysts to mediate these difficult transformations. Much of the work in nickel-catalyzed C(sp²)-H activation involves the 8-aminoquinoline directing group, which has proven very versatile for enabling formation of new C-C or C-heteroatom bonds on a pendant amide. Functionalizations of the 8-aminoquinoline backbone are also highly targeted due to the motifs' presence in a variety of biologically active compounds. We recently identified an unexpected nickel-mediated trifluoromethylation at the C5 position of the quinoline moiety. In this reaction, nickel (II) nitrate is used as the catalyst in the presence of sodium carbonate base, pivalic acid, and Umemoto's Reagent I (a CF₃⁺ source). Interestingly, removal of the sodium carbonate base resulted in C5 nitration, with the nitro group being generated from the nickel (II) nitrate catalyst. Using tert-butyl nitrite as the nitro source greatly improved the yield of this compound. Current work in our laboratory is devoted to optimizing these two functionalizations independently, and the progress is reported herein.

Funding: NIH**Program/mechanism supporting research/creative efforts:** WVU 497-level course

Poster #184

Control for a Low-Powered Optoelectronic Characterizer for CubeSat: LOCC and III-V Nitride Based LEDs

Jakob Lovede*, Johnt'e Davis*, Bradley Cruise and Minh Nguyen*

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26505*

Field (Broad Category): Electrical Engineering (Physical Sciences & Engineering)

Student's Major: CPE/CS

In 2015 design and construction of a low-powered optoelectronic characterizer (LOCC) for a CubeSat with III-V Gallium Nitride based light emitting diodes (LEDs). CubeSats are miniature satellites typically only 10cm x 10cm x 10cm which have grown increasingly in popularity recently because of their low cost. Pachel's III-V GaN LEDs were sent up with STF-1. STF-1 is West Virginia University's first spacecraft that was designed and manufactured with NASA's Independent Verification and Validation (IV&V) program—and launched in December 2018. Gallium Nitride LED lights are particularly useful for space applications because of Gallium Nitride's superior hardness against things like proton irradiation and other ionizing radiations. While the LEDs orbit in the STF-1 data is being collected on how it is being affected by radiation and atmospheric challenges such as proton damage, gamma radiation, and temperatures ranging from 200K – 550K (-99.7 F – 530.33 F). The data collected will give indications of how useful the III-V LEDs will be for other space missions and even further insights on terrestrial applications. To increase the value of the information collected a control for the LOCC and III-V GaN LEDs was designed and constructed. The main differences between the control and the original design are: (1) there are no custom PCBs which were needed for communication between the ground STF-1, the LOCC and III-V GaN LEDs; (2) only one custom LED is used to collect data. We expect the data collected from the control to show where the main design is being affected the most.

Funding: West Virginia

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

N/A

Poster #185

Comparative Study of Segmentation Programs on the Human Cranio-Maxillary Structure

Egon Mamboleo* and Sam Mukdadi

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26505*

Field (Broad Category): Medical Sciences (Physical Sciences & Engineering)

Student's Major: Mechanical Engineering

Background: MARPE (Micro-Implant-Assisted Rapid Palatal Expander) is an orthodontic device designed to help older patients who are in need of Ortho-Skeletal assistance who want to attain proper teeth alignment without the need of invasive surgery. Before the device is implanted on a patient a 3D model is generated through segmentation and stress analysis is performed on that model. Methods: 5 3D model of 5 different patient's Cranium will be created by utilizing computer software such as ITK Snap, 3D Slicer, and Invalids through the process of Segmentation. A survey will be made to rate each of the 15 models with different parameters. Then an Ease of use study will be made, each person surveyed will create a model on each program and rate the ease of use and model quality. Results: The results of this process will be a comparative study of what program has the better ease of use and qualitatively creates the best model based on the survey given in the study. Conclusion: This study is meant to find the most suitable, cost effective, and flexible program to perform segmentations. The models created from this study could be 3D printed and studied or implemented into a structural simulation software.

Funding: Louis Stokes Alliances for Minority Participation (LSAMP)/National Science Foundation

Program/mechanism supporting research/creative efforts: WVU Work Study (not associated with RAP)

Louis Stokes Alliances for Minority Participation (LSAMP)

Poster #186

The Importance of Blind Quality Control Samples in the Field of Forensic Fingerprinting

Mikalaa Martin*, Tim Schmahl and Robert K. O'Brien

*Department of Forensic and Investigative Science, West Virginia University, Morgantown, WV 26505 and
Houston Forensic Science Center, Houston, TX 77002*

Field (Broad Category): Forensics (Physical Sciences & Engineering)

Student's Major: Forensic and Investigative Science

This research was conducted under the direction of the Houston Forensic Science Center (HFSC) as a component of my required junior summer internship by the Forensic and Investigative Science Department at West Virginia University. This project was organized and assigned by Tim Schmahl, CLPE, and Supervisor of the HFSC Latent Prints Section (LPS). HFSC entered blind quality control samples into their workflow within the LPS in 2017. These samples serve as an ongoing proficiency test to the examiners and also allow for HFSC to report on the usefulness of their blind quality assurance program which was enacted and designed after the release of the 2009 NAS Report and the recommendations for forensic science within it. This research pertained to analyzing the samples from 2017 to the beginning of 2019 and assessing their quality scores through the use of ULW Latent Editor software. Through ULW Latent Editor, generation of scores was possible for overall latent quality, value for identification, and value for comparison. These scores were used to give insight of comparable evidentiary value of the quality samples which consume approximately 5% of the examiners' workflow. Comparison between the blind samples data and the actual casework data will give insight as to if the blind samples are truly representative and comparable to the latent prints encountered when working through casework. This will allow for the quality assurance section to adjust the quality of the blind samples within the LPS to more accurately mirror latent prints obtained from crime scenes.

Funding: Honors EXCEL Experiential Learning Grant

Program/mechanism supporting research/creative efforts: An External Internship or Other Type of Program

FIS 386 required internship completed at the Houston Forensic Science Center in Houston, Texas

Poster #187

LC-MS/MS Analysis of 30+ Fentanyl Analogs in Human Liver to Support Medicolegal Death Investigations

Kylea Mathison*, Joseph Cox, Colby Ott and Luis Arroyo.

Department of Forensic and Investigative Science, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Forensics (Physical Sciences & Engineering)

Student's Major: Forensic Chemistry

As opioid abuse continues to increase across the United States; illicit modification to the fentanyl core structure results in novel analog molecules that have shown higher toxicity to humans. This continuous change in the synthetic opioid landscape represents an issue during the drug toxicological screening testing. Samples submitted in drug overdose death investigations include blood, urine, liver, and other biological tissues to determine if any identifiable drugs played a role in the death of an individual. From the medical examiner viewpoint, the interpretation of the postmortem redistribution of therapeutic and illicit drugs is a complicated task. To this end, the liver constitutes the ideal matrix as it is less susceptible to postmortem redistribution. The effective extraction of target drugs from this crucial biological endpoint represents a continuous battle among practitioners. This research presents a simple, clean, and efficient extraction of 34 fentanyl analogs from postmortem human liver specimens. These specimens were extracted using a modified quick, easy, cheap, effective, rugged, and safe (QuEChERS) method and analyzed through liquid chromatography-tandem mass spectrometry (LC-MS/MS). This in-house modified QuEChERS extraction allows for the analysis of the minimal sample (0.1g liver tissue) and prevents cross-contamination. The resulting average bias was -1.48% and -0.58%, with an average precision of 9.91% and 7.60% at low and high concentrations, respectively. The matrix effects, recovery, process efficiency, and application to authentic postmortem liver samples were evaluated for the QuEChERS extraction.

Funding:

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #188

Production of Styrene from Ethylbenzene

Trenton Miller*, Fernando Lima and Brent Bishop

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26505*

Field (Broad Category): Chemical Engineering (Physical Sciences & Engineering)

Student's Major: Chemical Engineering

Styrene is a monomer used in the production of Styrofoam which takes many different forms in consumer products and thus makes it a valuable product. The objective of this work is to minimize the equivalent annual operating cost (EAOC) for the process. This in turn will provide a more cost efficient and profitable process. The equipment design and operating conditions will be considered to minimize the EAOC of the process. The process is modeled using the CHEMCAD simulation software, a process simulation platform that is capable of designing and simulating the equipment required. Once a base case is established, the EAOC of the process will be optimized using tools in Microsoft Excel. DELETE the portion after this. System will not allow for saving with too few words. This process will have to be optimized once a base case is established, but CHEMCAD is not a suitable platform for optimization and Microsoft Excel will be used instead. Roughly 120 kmol/h of styrene product is expected.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #189

Center of Mass in Response to Walking Perturbations Scales with Perturbation Difficulty

Zoe Moore*, Daniel J. Liss and Jessica L. Allen

Department of Chemical and Biomedical Engineering, Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Biomedical Engineering

Maintaining balance in response to disturbances to walking is important for daily life. For an individual to maintain their balance, their center of mass (CoM) needs to remain within their base of support. The base of support consists of all of the points of contact between the feet and the ground. The purpose of this study was to examine the relationship between locomotor disturbances of varying difficulty and CoM position during walking. We expect that the deviation in CoM position will increase with increasing perturbation difficulty. Five healthy young adults walked on a dual-belt treadmill at their self-selected speed while a) walking normally and b) experiencing disturbances to their balance of varying difficulty. Body motion was collected using reflective markers that were placed on the participants at known locations. Peak CoM position during each step cycle were calculated for both the antero-posterior and mediolateral directions. The CoM position during the gait cycles in which a balance challenge occurred was compared to the average CoM position from the control. The deviation of the CoM from the control increased in both directions as perturbation difficulty increased. Future studies will include the aging population to understand if CoM deviation is a key parameter to fall risk.

Funding: NIH NIGMS. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Program/mechanism supporting research/creative efforts: My efforts were mainly voluntary.

Poster #190

Rovibronic Spectroscopy of the CN Radical

Hayden Moran*, James Lee and Fabien Goulay

C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Chemistry (Physical Sciences & Engineering)

Student's Major: Chemistry

Free Radicals are commonly found in a variety of chemical combustion processes. Radicals, however, are very reactive species. In engines, free radicals can contribute to emissions of pollutants through molecular growth. In the laboratory, the chemistry of free radicals can be investigated in flow reactor conditions. Investigations in flow reactor conditions can be coupled through a variety of free radical detection methods including Pump-Probe Spectroscopy. Using pump-probe spectroscopy allows us to monitor the fluorescence of the radical, and consequently to understand how it reacts with other combustion-relevant species. After detecting the rovibrational spectroscopy, further investigation can determine the temperature of the reaction. The spectra produce a Maxwell-Boltzmann distribution of the energy state of the molecule. After analyzing the Maxwell-Boltzmann distribution, we can determine the temperature of the gas at each energy transition state. Under these conditions the temperature of the gas was determined and further kinetic investigations of the radical can be performed and applied to a variety of systems to help advance energy efficiency.

Funding: National Science Foundation

Program/mechanism supporting research/creative efforts: WVU 497-level course

Poster #191

Exploring Chemical Reaction Mechanisms using in situ Infrared Spectroscopy

Christopher Nau*, Brian Popp, Jessica Rogers and Alexis Ravencroft

C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Chemistry (Physical Sciences & Engineering)

Student's Major: Chemistry

The Research Apprentice Program has given me a unique opportunity to participate in an authentic research experience early in my college career. My main goal throughout the year was to operate a Mettler Toledo React IR, allowing for collection of infrared spectra directly from a reaction solution, for my research group and gather experience using it. By inserting the probe into an ongoing reaction, the React IR can accurately measure when the reaction began, when it stopped, the kinetics of a reaction, and (determine mechanism and explain reaction trends). From this data, the rate law of a reaction can be elucidated. During the first semester, I utilized the React IR to study iron complexes, hydromagnesiation, and basic SN2 reactions, and I prepared a collection of complexes to study ligand structures. The ligand structures would help reveal that a previously thought twelve step process of ligand synthesis is more accurately sixteen steps. During the second semester I focused on gathering data on organic reactions and furthering my understanding of the machine, specifically by studying the influence of a catalyst of sulfuric acid on the strengthening of acetic anhydride. I was also learning the basics of kinetics of reactions and rate laws of reactions, along with assisting another undergraduate student with operating the React IR. With this experience, I plan on following future investigations into organometallic carboxylation reactions

Funding: National Science Foundation (CHE-1752986)

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #192

Extending the Applications of a Vicon Motion Capture System

Ross O'Hara**Department of Mechanical and Aerospace Engineering, West Virginia University, Morgantown, WV 26506***Field (Broad Category):** Engineering (Physical Sciences & Engineering)**Student's Major:** Aerospace and Mechanical Engineering

A Vicon motion capture system has been used to track rigid bodies during flight, both indoors and outdoors. Work is currently being done to extend the applications of such a system. The Vicon system is a collection of infrared cameras and software that is used for motion capture. It was purchased through a US Navy Contract to quickly and accurately tracking rigid bodies during flight. The system consists of 70 Vantage V5 cameras and the necessary software to operate the cameras, record data, and create 3D trajectories from the recorded data. The principle behind such a motion captures system is relatively straight-forward. The cameras emit infrared light, which is reflected by markers covered in a highly retro-reflective material. The use of infrared light allows all other light spectrums to appear as black to the camera, which aids in the contrast between the markers and the background. As long as at least three cameras can view a marker, the software can triangulate the 3D position of that particular marker. This method is used heavily in human kinematics and sports science. In addition to tracking individual markers, the system also has the capability to identify and track a pre-defined rigid object, which is a group of three or more markers. The system can provide real-time position and orientation information. The ease of use of the system and accuracy has shown promise of its use in additional applications. This work is currently investigating such applications as aerodynamic flow-visualization and quantitative string tuft analysis.

Funding:**Program/mechanism supporting research/creative efforts:** WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Trajectory Tracking of Unmanned Aerial Vehicles Under Adverse Conditions

Brandy Parker* and Mario Perhinschi

Department of Mechanical and Aerospace Engineering, Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Aerospace Engineering

The following experiment was conducted to analyze the performance of an unmanned aerial vehicle (UAV) under adverse conditions. Previous research has been conducted through the West Virginia University flight simulator and questions arose about how much impact different wind scenarios and control surface failures affect the performance of the aircraft. A detailed experimental design was created to test numerous flight scenarios that include variations in control surface failures and wind magnitude and direction. To evaluate how well a trajectory is followed autonomously, four different flight path geometries were considered for each scenario. To conclude how well the aircraft followed each trajectory, the commanded path is compared to the actual path taken by the aircraft. The expected results of this experiment after each test has been evaluated are that wind direction and control surface failures will have a major impact on how well the UAV follows the given path. These effects are evaluated in terms of metrics based on trajectory tracking errors and control activity. The results of this investigation show that the severity of the combined wind conditions and failures affect significantly autonomous flight performance and safety. It is expected that the results of this investigation will contribute to the development of UAV's what will be capable of safe and efficient autonomous flight.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #194

Investigating the Biomechanics of the Eye as a Treatment to Glaucoma

Kylie Pinion**Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26505***Field (Broad Category):** Medical Sciences (Physical Sciences & Engineering)**Student's Major:** Mechanical Engineering

Glaucoma is an eye condition that develops slowly over time. Glaucoma is a result of damage to the optic nerve and is, in part, related to the biomechanics of the eye that have yet to be elucidated. A literature review was completed to provide an understanding of the current state of research on biomechanics of the eye. Once educated on the topic of glaucoma and ocular biomechanics, it was determined that the thickness of the sclera, the major load bearing tissue of the eye, is of importance to the pathophysiology of glaucoma. To characterize the heterogeneous scleral thickness, micro CT scans (Skyscan 1172, Belgium) of 4 human eye globes were performed at a voxel resolution of 9 microns. Following this, the reconstructed imageslices of the eye were analyzed with a custom edge detection software to create a 3-dimensional point cloud and subsequent mesh. Thickness was calculated using the distance of vertex normal from the exterior scleral surface to their intersection with the internal scleral surface across 2 mm circumferential increments from the scleral canal opening to the limbus. The 3D coordinates, with thickness values, were collected and thickness maps generated in Mathematica. Specifically, the thickness data was transformed into a matrix. The data was then computed into a 3D color map of the eye, using a 3D density plot function in Mathematica. The thickness was found to be greatest in the posterior sclera and thinnest along the equator of the globe. The mean scleral thickness was 704 ± 85 microns ($n=4$).

Funding:**Program/mechanism supporting research/creative efforts:** My efforts were mainly voluntary.

Poster #195

Integration of Antennas onto Rockets Made out of Carbon Fiber

Cicely Sharafati*, Jonathan Pulley*, Matteo Cerasoli* and Patrick Browning

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26506*

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Mechanical and Aerospace Engineering

The purpose of this study is to determine what kind of antennas would be the best to integrate into the outer skin of a rocket manufactured from carbon fiber and how to facilitate such an integration. This study is a joint collaboration with the West Virginia University Amateur Radio Club and West Virginia University Experimental Rocketry Club (WVUER), whose work comes from designing and developing sounding rockets. Antennas are vital when launching rockets, as they allow for live data transmission back to a ground station, which could include systems such as tracking and other kinds of sensors. WVUER has traditionally used fiberglass tubes for their rockets, though carbon fiber is becoming more prevalent as an alternative due to its increased strength and other advantages. Unfortunately, carbon fiber's tendency to block radio waves requires experimenting with different antenna types and orientations to find a design that performs to a satisfactory degree. The results of this study could be used by WVUER to build rockets out of carbon fiber, while still maintaining and possibly enhancing real time telemetry data during flight.

Funding: NASA West Virginia Space Grant Consortium

Program/mechanism supporting research/creative efforts: Other

Poster #196

Using New Ligands for Palladium Catalyzed Reductive Cyclization to Give Indoles Under Mild Conditions

Brianna R. Sauvé*, Blaine T. McClay and Björn C.G. Söderberg

C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Chemistry (Physical Sciences & Engineering)

Student's Major: Forensic Chemistry

Indole is a naturally existing substructure found within a multitude of fungi, plant, and bacteria. Indoles can also be found as a core in certain medications, like anti-depressants and anti-cancer medications. They are present within regulatory chemicals like serotonin and melatonin. Currently there are about 55 known syntheses of indoles that vary with the type of indole, reagents, starting materials, etc. that are used. The current process of creating indoles for medicine is time consuming and expensive. The main goal of this research is to create new, active catalytic methods that will help simplify the process of reductive cyclization of 2-nitrostyrenes to indoles which in turn would make the process more cost efficient. This includes performing reactions at ambient temperature, utilizing lower catalyst loadings (1%), and at a lower carbon monoxide pressure (1 atm). In comparison to triphenylphosphine that had been used earlier in Dr. Söderberg's research, the 4,7-dimethoxy-1,10-phenanthroline was shown to be just as effective as a ligand. When using 1% of 4,7-dimethoxy-1,10-phenanthroline and a palladium catalyst, an increase in yield was observed compared to previous methods. It's indicated that the methoxy groups donate electron density to the binding site of the ligand. This increase in electron density has been suggested to contribute to the increase in efficiency. A new ligand 4,5,6,7-tetramethoxy-1,10-phenanthroline has been proven to be an even more efficient ligand compared to 4,7-dimethoxy-1,10-phenanthroline and has allowed for reactions affording comparable yields but under milder reaction conditions.

Funding: The National Institutes of Health

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #197

The Bioinformatic Analysis of Hand Bacteria for Forensic Identification using QIIME 2

Sarah L. Schmitz* and Jeremy M. Dawson

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26506*

Field (Broad Category): Forensics-Bioinformatics (Physical Sciences & Engineering)

Student's Major: Forensic Biology

Modern DNA sequencing technologies have allowed researchers to examine the ability of microbiome research to be able to be applied to biometrics and forensic identification via DNA analysis and matching. Using the hypervariable V3 region of the 16S rRNA gene, DNA sequences of various species of bacteria found in a microbiome can be identified to the genus level by comparing the sequences recognized to those already recorded in an online database. However, the goal of this research is to investigate the possibility of using the makeup of a person's bacterial microbiome as biometric identifier by directly comparing the sequences of two or more samples and analyzing the degree of dissimilarity. In previous studies, a program known as QIIME has been utilized as a bioinformatics platform in microbiome research. QIIME takes sequencing data from Illumina or other sequencing platforms and performs statistical analyses in order to determine what types of bacteria are present in a given sample along with data that relates each sample to one other based on phylogeny and sequence alignment. In January of 2018, QIIME 2 was released; a re-engineered and rewritten bioinformatics system that overcomes several of the limitations of QIIME and features even more tools for analysis. In this study, DNA sequence data samples from human palm swabs collected in a previous study will be re-analyzed using QIIME 2 in order to update the results of the study and reassess the potential for the contents of a person's microbiome to be used as a biometric identifier.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #198

Losses in Linear Engines

Matthew Thom*, Terence Musho, Duncan Manor, Ramanjaneya Mehar Baba Bade and Jayaram Subramnian

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26506*

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Mechanical/Aerospace Engineering

This study focuses on experimentally quantifying the energy loss per cycle for flexure springs that are currently being used in the design of a 1kW natural gas, combined heat and power (CHP) generator for domestic households. The unit currently being design at WVU is based on the working principle of a resonant linear engine that minimizes the losses that are typically associated with a traditional crack driven engine. A critical component in the linear engine design, and the focus of this study, are the flexure springs. Experimental testing has been performed to test the flexure springs at several different load profiles and frequencies using a hydraulic load frame. The force and displacement data was analyzed using MATLAB and the loss per cycle was quantized. Results indicated an increase in the energy loss per cycle with increasing frequency. These losses were reasoned to be due to heat generation and windage losses.

Funding: ARPA-E

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #199

Varying Oleylamine: Dibenzyl Ether Ratio for Fine-Tuning Manganese Oxide Nanoparticle Diameter and Controlled Release

Jenna Vito*, Alexander Pueschel*, Celia Martinez de la Torre and Margaret Bennewitz

Department of Chemical and Biomedical Engineering, Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Engineering (Physical Sciences & Engineering)

Student's Major: Chemical Engineering

The ultimate goal of this research project is to develop a contrast agent to reduce false positive and false negative imaging results associated with current breast cancer diagnosis techniques. Gadolinium chelates are the current clinically approved contrast agents for breast magnetic resonance imaging (MRI), but they are always “on”, highlight any vascularized structure, and lack targeting allowing benign and malignant breast tumors to be enhanced. By utilizing targeted pH-sensitive manganese oxide (MnO) nanoparticles, a contrast agent can be developed that only turns “on” in the presence of the lower pH of endosomes/lysosomes inside cancer cells. Reducing the size of MnO nanoparticles should increase dissolution of MnO to Mn²⁺ thereby enhancing MRI signals. By changing the ratio of oleyl amine (OA) and dibenzyl ether (DE) involved in MnO nanoparticle synthesis between 60:0 and 10:50, we reduced the average size of the MnO nanoparticles with the 10:50 ratio creating the smallest diameter of 18 ±5.5 nm, while the 50:10 ratio created the largest diameter of 38.8±14.6nm. MnO nanoparticles were incubated at three pHs to measure Mn²⁺ release over time including pH 7.4 (blood pH), 6.5 (pH of tumor extracellular space), and 5 (endosome/lysosome pH). The only significant release of Mn²⁺ was obtained at pH 5 (~50% in 24hr), indicating the importance of targeting MnO nanoparticles inside of cancer cells. The smallest nanoparticles had a ~7% increase in Mn²⁺ release at low pH by 24 hours compared to the largest nanoparticles, indicating that size reduction increases free Mn²⁺ to enhance the MRI signal.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course

Poster #200

Analysis of Rocket Propulsion Nozzle Efficiency and Effectiveness

Bradley Wohlfarth* and V'yacheslav Akkerman

*Benjamin M. Statler College of Engineering and Mineral Resources, West Virginia University,
Morgantown, WV 26505*

Field (Broad Category): Physics & Astronomy (Physical Sciences & Engineering)

Student's Major: Aerospace and Mechanical Engineering

Combustion is a chemical process that uses oxygen and other compounds to create heat as energy through molecular vibrations or molecular motion. Combustion theory is the understanding of heat generation and heat transfer in all mediums. Combustion theory is largely related to the physics of rocket propulsion and the flame acceleration from a nozzle. Flame acceleration is the analytical study of the total acceleration, growth rate, and increase of flame surface area. By using these theories, scientists and engineers can study the behavior of flame propagation to develop systems that use its propagation to produce propulsion. Scientists study flame propagation by collecting data through a series of programs and supercomputers that have the capability to map the propagation of a flame. This data is then used to create equations and theorems to explain the behavior of flames in different mediums. It is also used to further explain and prove combustion theory as a viable explanation for the behavior of the free flame. These topics are largely related to my research being the research of the efficiencies and effectiveness of different types of rocket nozzles.

Funding:

Program/mechanism supporting research/creative efforts: WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course