West Virginia University®

OFFICE OF UNDERGRADUATE RESEARCH

THE FIFTH ANNUAL
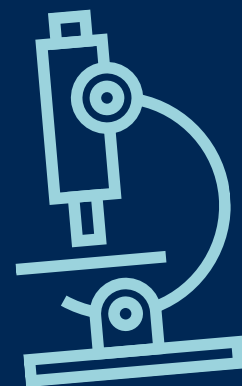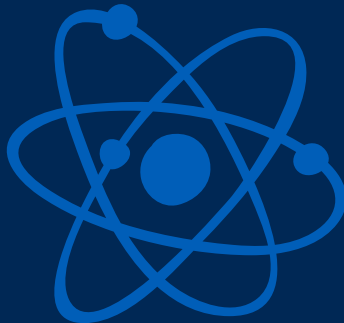
UNDERGRADUATE SPRING SYMPOSIUM

Launches Virtually On April 17, 2021 at 11 a.m.

Expert Panel Discussion | 1 - 2 p.m

Synchronous Commenting w/Presenters | 2 - 4:30 p.m.

Greetings and welcome to the 2021 Undergraduate Spring Symposium.

Tom Cech, past president of the Howard Hughes Medical Institute, once wrote that undergraduate research is the most inefficient teaching we do, and we need more of it. Cech noted this because this sort of engaged scholarship, whether research, creative activity or other scholarly work, is the most transformative for the individual. I am confident that the experience of our undergraduates whose work we appreciate here today is no less. And I can attest that my own experience as an undergraduate researcher altered the whole trajectory of my career.

To the undergraduate students who have performed the work as part of this symposium, congratulations. Congratulations for staying the course to bring your respective projects to this point. Congratulations on seizing the opportunity to do more, on challenging yourself to perform at a higher level. Congratulations also for managing your time, and yourself, at a higher level. And while it is you and your work that we celebrate, this work did not happen in a vacuum.
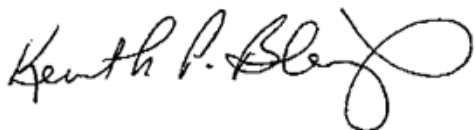
I want to express my sincere appreciation to the people who mentored our undergraduate scholars. This may have been another undergraduate student, a graduate student, a post-doctoral associate, a staff member or even a faculty member. Regardless of your title, thank you for taking the time to mentor these students. I hope and am trusting that the mentors found the work equally rewarding.

Scholarly work is challenging by nature. Those engaged in such work usually have a support network beyond their respective mentors that is key to their emotional and mental well-being, which is so critical in advancing their work. These support networks often include parents, grandparents, guardians, spouses, partners, advisors, siblings and other friends. To those in such networks, thank you for the important role you played in advancing the work we celebrate today.

The Office of Undergraduate Research is responsible for facilitating this symposium. The office also facilitates the Research Apprenticeship Program from which a good deal of the work in the symposium derives either directly or indirectly. I appreciate the great work of this office in advancing undergraduate research at West Virginia University.

We pursue knowledge so that we might have truth because truth sets us free. And Mountaineers are always free. Montani Semper Liberi.

Best regards,

Kenneth P. Blemings, PhD
Professor of Nutritional Biochemistry
Dean of the WVU Honors College

ORGANIZING COMMITTEE

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

Thank you to Kaley Vestal, our Professional Writing and Editing intern this semester, for her ongoing help with promoting the symposium and designing this year's cover art.

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

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

APPROXIMATE SCHEDULE OF EVENTS

Saturday April 17, 2021

11:00 am onward — <u>Symposium Opens</u> – Presentations available from 11:00 am onward and for a minimum of one week. *All welcome: parents, research mentors, graduate and undergraduate students (current and incoming), and members of the public.*

11:00 am-2:00 pm — <u>Presentation Judging</u> – Judging of presentations- all categories.

1:00 pm-2:00 pm — <u>Expert Panel Discussion</u> – Panelists will discuss "Innovative Research Initiatives in Response to Social Justice"

2:00 pm-4:30 pm — <u>Synchronous Commenting</u> – Presenters will monitor and respond to questions and comments posted within their YouTube presentations in real-time.

Friday April 23, 2021
4:00 pm or before — <u>Awards Announced</u> – Top presenters in each presentation category will be posted on the Symposium website.

West Virginia University®
OFFICE OF UNDERGRADUATE RESEARCH

POSTER JUDGES

Judge	WVU Affiliation
Alexander Crum	Health Sciences
Amanda Chappell	Behavioral & Social Sciences
Andrey Bobko	Physical Sciences & Engineering
Anna Korol	Multidisciplinary
Bethany Boback	Behavioral & Social Sciences
Bhanukiran Gurijala	Science & Technology
Carinna Ferguson	Behavioral & Social Sciences
Carly Callender	Health Sciences
Catherine Ferrari	Arts & Humanities
David Sokolov	Multidisciplinary
Deniz Talan	Physical Sciences & Engineering
Duncan Lorimer	Physical Sciences & Engineering
Eliana Aerts	Health Sciences
Emilee Briggs	Agricultural & Environmental Sciences
Fred Wu	Multidisciplinary
Gang Siva Sasanka Katreddi	Science & Technology
Hana Thixton	Science & Technology
Hangang Yu	Health Sciences
Hasan El Rifai	Multidisciplinary
Hong Yin	Physical Sciences & Engineering
Jake Klinger	Arts & Humanities
Janelle Chuah	Science & Technology
Jared Beard	Physical Sciences & Engineering
Jeffrey Siegfried	Arts & Humanities
Jenna Dodson	Agricultural & Environmental Sciences
Jessica Towey	Science & Technology
Joanna Ridgeway	Agricultural & Environmental Sciences
John R Christian	Arts & Humanities
Jordan Bennett	Arts & Humanities
Kaleb Hatch	Science & Technology
Kristin Grogg	Health Sciences
Kyle Davis	Science & Technology
Lyn Yuen Choo	Health Sciences
Madison White	Arts & Humanities
Madison White	Behavioral & Social Sciences
Mark Timmons	Health Sciences

"Virtual" Undergraduate Spring Symposium 2021
West Virginia University

Matthew Keaton	Science & Technology
Megan McDougal	Health Sciences
Michael Jones	Behavioral & Social Sciences
Morgan Simpson	Arts & Humanities
Rajan Lamichhane	Science & Technology
Rebecca Newman	Science & Technology
Rebekah Damitz	Behavioral & Social Sciences
Ryan Haupt	Science & Technology
Sanish Rai	Science & Technology
Savannah Sims	Health Sciences
Sridhar Malkaram	Science & Technology
Suvayan De	Behavioral & Social Sciences
Tobi Micheal Ore	Physical Sciences & Engineering
Xufeng Zhang	Agricultural & Environmental Sciences

We want to take this opportunity to thank our presentation judges. Their willingness to act as judges for this event is appreciated by the organizers and participants!

* Human Engagement includes research and scholarship pertaining to how humans interact and engage within society in the areas of business, education, creative arts, and humanities.

Special thanks to Dr. Craig Barrett who mentored and organized the judges for the Biological & Biochemical Sciences category. All judges are current graduate students at West Virginia University. We thank them for their commitment to the research enterprise and their contributions to research communication. Their willingness to act as judges for this event enhances the presentation skills of our presenters through personalized feedback!

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

UNDERGRADUATE PRESENTERS AND FACULTY RESEARCH MENTORS

We want to take this opportunity to thank our undergraduate presenters. This year, we welcome presenters from West Virginia University and from West Virginia University Institute of Technology. These students' willingness to present and discuss their scholarly activities in virtual format is appreciated.

In addition, special thanks to our faculty research 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!

A. Human Engagement (Oral Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Breezlyn Lash	1	Hospitality and Tourism Management	Ajay Aluri	The Impact of COVID-19 on the Theme Park Industry
Mackenzie Halliday	2	Management	Ryan Angus	The Hiring Helper
Raven Forshee	3	Biology	Alyssa Beall	Death Among the Mountains: Examining West Virginian Burial and Funeral Traditions
Madeline Miller	4	English and Spanish	Nancy Caronia	Italians and Italian Americans in 19th and 20th Century Dime Novels
Andrea Rupp	5	English	Rose Casey	Outside, Yet Within: Representations of Kimberlé Crenshaw's Intersectionality in Mahasweta Devi's "The Hunt"
Martha Lacek	6	German Studies and Computer Science	Cynthia Chalupa	The Sudeten German Experience and its Impact on Present-Day German-Czech Relations
Fatma Alansary	7	Management	Annie Cui	How COVID Affected Businesses?
Ryan Ratcliff	8	Hospitality and Tourism Management	Annie Cui	A Modern Solution to the Homeless Crisis

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Megan McCullough	9	Forensic Chemistry	Amy Cyphert	GPT-3 and its Impact on Ethics in the Practice of Law
Vijay Bharti	10	Organizational Leadership	Paula Fitzgerald	'You Can't Make Me Do It!' Consumer Social Distancing Compliance Behavior
Maureen Budka	11	Art Education	Terese Giobbia	Traditional Painting Techniques in the Contemporary Classroom
Gwendolyn Nurkiewicz	12	Immunology and Medical Microbiology	Renee Nicholson	Considering Literary Craft in Science Writing: An Interdisciplinary Response to Barriers in Science Communications
Connor Kelly	13	Economics	Shuichiro Nishioka	Coal Market Share Concentration and its Relationship with Economic Inequality in Appalachia
Cassidy Kidwell	14	Music Education	Travis Stimeling	Appalachian Music: Giving Credit Where Credit is Due
Jeffrey Petty	15	Biochemistry	Kevin Walden	Mountaineer Undergraduate Research Review: Building a Sustainable Undergraduate Research Journal
Micah Buser	16	Music Education	Jennifer Walker	Moralizing the Music of an Italian Renaissance Courtesan: Barbara Salutati and Niccolo Machiavelli
Dana Mace	17	Economics and Finance	Li Wang	Winning the Job Search

B. Science & Technology (Oral Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Sara Kuberski	18	Forensic and Investigative Science and Chemistry	Luis Arroyo	Electrochemical and Spectroscopic Sensors for Drugs Targeting the μ-Opioid Receptor and Common Adulterants
Marissa Gibides	19	Neuroscience	Andrey Bobko	Development of Noninvasive Oxygen Imaging Approach Using Water-dispersible Microparticulate Lithium Naphtalocyanine Probes
Desirae Smith	20	Animal and Nutritional Science	Scott Bowdridge	Selection for FEC EBV Correlates with Greater Circulating Antibody in Sheep
Marcayla King	21	Biochemistry	Rudolph Castellani	Examining Female Brains for Chronic Traumatic Encephalopathy

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Name		#	Department	Mentor		Title
John Holden		22	Forest Resource Management	Steve Chhin		Preliminary Assessment of Climatic Sensitivity of Riparian Old-Growth Hemlock
Jacob Cardinal Tremblay		23	Physics	Maura McLaughlin		Optimal Frequency Channelization for Pulsar Dispersion Measurements
Claire Kelly		24	Immunology and Medical Microbiology	Gordon Meares		Regulation of Interleukin-6 by an Upstream Open Reading Frame
Rylee Cisney		25	Immunology and Medical Microbiology	Gordon Meares		Liver Kinase B 1 Regulates Antigen Presentation Genes in Murine Astrocytes
Abigail Jones		26	Biochemistry	Daniel Panaccione		Discovery of pharmaceutically important ergot alkaloids in three species of the fungal genus Aspergillus
Kelcie Britton[a]		27	Immunology and Medical Microbiology	Daniel Panaccione		Identification of a Gene Involved in Production of Pharmaceutically Important Lysergic Acid Amides
Amanda Swistok		28	Biochemistry	Brian Popp		Boron Based NSAIDs as a Treatment Option for Chronic Pain
Linda Ma		29	Immunology and Medical Microbiology	Xuefang Ren		Hypoxia Ischemia Induces Cathepsin L Secretion in Cerebrovascular Endothelial Cells
Anthony Marmorella		30	Environmental, Soil and Water Science	Chris Russoniello		Stream Flow Comparisons Between Deckers and Aaron Creek
James Lamp		31	Neuroscience	Vincent Setola		Investigating Regulator of G protein Signaling 12 (RGS12) as a Potential Target for Cocaine Use Disorder Therapeutics
Bennington Opdahl		32	Chemistry	Shikha Sharma		Rare Earth Elements Association in Different Fractions of Appalachian Coals: Extraction and Enrichment
Anthony Siler		33	Biology	Shafic Sraj		Assessing Perioperative Patient Distress in Office-Based Hand Surgery
Tristan Sanders		34	Biochemistry	Nicole Waterland		Influence of Light Emitting Diodes on Brassica oleracea Growth, Metabolites, and Antioxidant Capacity
Megan Cozort (WVU IT)		35	Biology	Matthew Williams		Antagonism of Staphylococcus aureus Using Naturally Occurring Bacterial Isolates as a Potential Novel Probiotic

WestVirginiaUniversity®
OFFICE OF UNDERGRADUATE RESEARCH

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Mackenzie Miller (WVU IT)	36	Biology	Adrienne Williams	Glioblastoma Cancer Neurosphere Formation In-Vitro using a Non-Serum Stem-Cell Media
Hayley Logan (WVU IT)	37	Civil Engineering	Horng-Jyh Yang	Redesign of Campus Traffic Flow

C. Behavioral & Social Sciences (Oral Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Jordan Murray	38	International Studies and Political Science	Boris Barkanov	Russia's Current Political Ideologies
Lindsay Hapak	39	Political Science	Boris Barkanov	Civil Society and Protest in Putin's Russia
Madison Crane	40	History	Robert Blobaum	The Stolen Babies of Francoist Spain
Sierra Thompson	41	History	William Brustein	Anti-Semitism Hatred
Matthew Ellis	42	Geology	Jeffrey Daniels	Identifying the Behaviors of Mass Murderers
Emma Schwartzmiller	43	History	Julia Fraustino	Communication and Community Resilience in WV During COVID-19
Jared Icenhower	44	Economics	Scott Galster	The Concussion: How to Prevent and Properly Treat the Strangling Head Injury.
Christopher Palkon	45	Finance and Accounting	Peter Giacobbi	Replication of Munroe et. al
Carolina Rascon	46	Regents Bachelor of Arts	Josh Lohnes	The Right to Food in West Virginia
Falon Snodgrass	47	French and International Studies	Joshua Lohnnes	Friends of Food: How Ethical Consumerism Can Advance the Cooperative Movement for Food Sovereignty

Tucker Miller	48	Mathematics	Shuichiro Nishioka	The COVID-19 Trade Collapse: How US Trade Changed Throughout the Pandemic
Alexander Robb	49	Psychology	Scott Williams	How Media Affects Us All: Fiction, Reality, and Our Altered Lives
Maria Johnston	50	Forensic Biology	Jesse Wozniak	What Factors Influence Police Discretion for Cannabis-Related Offenses?

D. Visual & Performing Arts (Performances)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Ashley Knox	51	Music Composition	Cynthia Anderson	Wait For Me: To Hell and Back
Taylor Walker	52	Dance	Yoav Kaddar	Enough
Lilly Runion	53	Dance and Women's and Gender Studies	Maureen Mansfield Kaddar	Women in Dance: Making Noise Through Movement

E. Agricultural & Environmental Sciences (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Lee Shaw	54	Wildlife and Fisheries	Jim Anderson	Can Pipeline Erosion Best Management Practices Cause Accidental Source Habitats for Amphibians?
Lucas Kinder	55	Environmental and Energy Resource Management	Samuel Bearinger	Assessment of sUAS Based NDVI for Pipeline Vegetation Monitoring
Alexander Lawson	56	Wildlife and Fisheries Resources	Donald Brown	The Effects of Land Use on Habitat Fragmentation in the Allegheny National Forest
Lydia Peterson	57	Horticulture	Edward Brzostek	Which fungal friend is the best to trees at nutrient highs and lows?

"Virtual" Undergraduate Spring Symposium 2021
West Virginia University

Riley Pierce	58	Forest Resources Management	Gregory Dahle	The Street Tree Diversity of Eleven Small Ohio Communities
Abigail Paul	59	Chemical Engineering	Shawn Grushecky	Recommendations for a New Water Treatment Facility based on Water Production Data
Jonathan Morgan	60	Horticulture	Michael Gutensohn	The Effect of Arbuscular Mycorrhizal Fungi on Terpene and Cannabinoid Levels in Industrial Hemp
Ayden Bailey	61	Forensic Chemistry	Kyle Hartman	Understanding Microplastic Accumulation in Smallmouth Bass, Micropterus dolomieu, in the Monongahela River, WV
Samantha Williams	62	Environmental, Soil, and Water Sciences	Jason Hubbart	Analyzing Total Suspended Solids in the West Run Water Shed using method SM2540B
Hannah Petronek	63	Biochemistry	Matthew Kasson	Exploring Species Boundaries for Neonectria magnoliae
Michael Fiala	64	Environmental Microbiology	Paul Kinder	Monitoring Revegetation with NDVI and Associated Soil Composition and Microbial Biomass and Activity
Teagan Kuzniar	65	Environmental Microbiology	Ember Morrissey	Assessing the Impacts of Hydraulic Fracturing on Stream Health using Algal Diversity in Biofilms
Daniel Rubianto	66	Wildlife and Fisheries Resources	Christopher Rota	Difference in the Number of Passerine Complex Songs Between a Rural and Urban Site
Nicholas Summerlin	67	Wildlife and Fisheries Resources/Recreation, Parks, and Tourism Resources	Christopher Rota	Body Condition Index of Birds Across Two Sites in Northern West Virginia
Jisu Kim	68	Wildlife and Fisheries Resources	Christopher Rota	Population Change of White-throated Sparrows (Zonotrichia Albicollis) in West Virginia During Winter season
Ian Perkins	69	Wildlife and Fisheries Resources	Christopher Rota	The Presence of Domestic Cats Near Bird Populations in Urban and Non-Urban Settings
Maighan Bailey	70	Immunology and Medical Microbiology	Jianbo Yao	Expression of OOSNCR1 and OOSNCR5 Within Bovine Tissue Cells

F. Behavioral & Social Sciences (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Molly Summers	71	Neuroscience	Mariya Cherkasova	The Effects of Sensory Reward Cues on Reinforcement Learning
Katherine Lee	72	Immunology and Medical Microbiology	Gregory Epps	HSTA In College: Strengthening The Pipeline for Underrepresented Students in STEM and Health Sciences
Sarah Smith	73	Child Development and Family Studies	Shauna Fisher	Police Officers in Schools - Helpful or Harmful?
Sean van Besouw	74	Political Science	William Franko	The Effects of Different State Policies on Rising Inequality and Costs in the States
Nicolette Shaffer	75	Social Work	Megan Gandy	Trans*forming Healthcare in West Virginia
Anna Moody	76	Psychology	Amy Gentzler	Parents' Valuing Happiness and Teen Depression: The Mediating Effect of Teens' Value of Happiness
Wren King	77	Anthropology, Women's and Gender Studies, and Geography	Lindsay Kahle Semprevivo	Assessing Risk Factors of Sexual Assault Victimization on College Campuses
Tyler Giorcelli	78	Exercise Physiology	Miriam Leary	Comparative Study of Social Integration Disparities Between First-Generation and Non-First-Generation STEM Students
Joanna Rose Jacinto	79	Art Education	Annie McFarland	The Effectiveness of Art therapy Interventions in Cancer Center Institutes
Hannah Brown	80	Psychology and Communication Studies	Daniel McNeil	Associations among Pregnancy, Distress Tolerance, and Fear of Pain
Miranda Signorelli	81	Psychology	Cheryl McNeil	Considering the Role of Ethnicity and Romantic Attachment Style in Understanding Parenting Stress
Lauren Browning	82	Psychology	Cheryl McNeil	Qualitative and Quantitative Changes in Verbalizations during PCIT for Children with Autism Spectrum Disorder

Emily Lafferty	83	Psychology	Cheryl McNeil	Changes in Child Compliance after Parent-Child Interaction Therapy for Children with Autism Spectrum Disorder
Heather Massey	84	Forensic and Investigative Science	James Nolan	Neighborhood Dynamics and Crime: Apartment Complexes
Sarah Collett	85	Psychology	Julie Patrick	Age Differences In Positive Emotions
Garrett Shingler	86	Exercise Physiology	Benjamin Silverberg	What Makes an Ally? Experiences and Perceptions of LGBTQ+ Allies on a University Campus
Julean Bender	87	Psychology	Shari Steinman	Do OCPD Symptoms and Intolerance of Uncertainty Predict Emotions?
Charlie Boone	88	Psychology	Shari Steinman	Depression, Anxiety, and Stress during Early Months of COVID-19 in Appalachia
Jude Platz	89	Environmental and Natural Resource Economics	Heather Stephens	Regional disparities in the election of women to state legislature positions
Kristen Knight	90	Music Therapy	Nicholas Turiano	Maternal Attachment Explains Why Familial Adversity Predicts Perceived Stress Among College Freshmen

G. Biological & Biochemical Sciences (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
George Holmes	91	Biology and Psychology	Sadie Bergeron	Generation of Cacng2a Promotor-less Mutant Line in Zebrafish Using CRISPR/Cas9 Genome Editing Technology
Maureen Cleary	92	Biology	Christopher Bianco	Breast Arterial Calcifications as a Risk Factor for Cardiovascular Disease in Breast Cancer Patients
Alexandra Dickey	93	Biology	Julie Brefczynski-Lewis	Short-term behavioral, physiological, and brain differences in real life and virtual reality social interactions
Lauren Parsons	94	Biology	Christina Duncan	Improving Knowledge about Palliative Care among Caregivers in Appalachia: A Brief Educational Intervention
Hanna Jandrain	95	Biochemistry	Werner Geldenhuys	Investigating Novel MitoNEET Ligand CI987 on Oxidative Stress Protection in Models of Aging

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Sofhia Elad	96	Chemistry	Werner Geldenhuys	Transgenic Caenorhabditis elegans Models of Learning and Memory Dysfunction in MitoNEET-/- and Alzheimer's Disease
Grant DuVall	97	Biology	Treah Haggerty	Facilitators and Barriers of Food Journaling Measures In A Rural Weight Management Clinical Setting
Emmelia Braun	98	Biology	Jennifer Hawkins	Morphological and Physiological Variations Associated with Reproductive and Vegetative Salinity Tolerance in Sorghum
Hosanna Barrett	99	Biology	Matt Kasson	Conoideocrella luteorostrata, a potential fungal biocontrol of invasive Christmas tree pest elongate hemlock scale
Emily Donley	100	Biochemistry	Justin Legleiter	Stabilized Huntingtin Oligomers Used to Determine Mechanism of Lipid Membrane Binding
Derek Bertrams	101	Biochemistry	Roberta Leonardi	The Plausibility of Utilizing Hibernation to Reduce Energetic Needs in Humans
Makaela Quinn	102	Biology	Peng Li	Evaluating the Influence of Surfactant Concentration on Capillary Induced Droplet Generation
Jacob Payne	103	Biology	Jennifer Liu	Dim Light at Night Dysregulates Immune Function and Exacerbates Stroke Outcome
Madison Sites	104	Biology	Randy Nelson	Dim Light at Night Accelerates Mammary Tumor Development and Progression
Aaliyah Williams	105	Biology	Fotinos Panagakos	Impact of Dental Medicaid Expansion on Oral and Overall Health in West Virginia
Brittany Gray	106	Biology	Fotinos Panagakos	Determining Dental Deserts Throughout West Virginia
Marleah Knights	107	Biology	Rita Rio	Comparison of Peritrophic Matrix-Associated Gene Expression within Tsetse Species of Varying Vector Competence
Noah Spencer	108	Biology	Rita Rio	Genome Sequencing Provides Insight Into Coevolution Between an Insect Vector and Its Microbial Partner
Matthew Rexroad	109	Biochemistry	David Smith	Identifying the Cause of Protein Accumulation in Alzheimer's Disease
Madison Lilly (WVU IT)	110	Biology	Adrienne Williams	The Formation and Dissolution of Kidney Stones

H. Health Sciences (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

"Virtual" Undergraduate Spring Symposium 2021
West Virginia University

Sarah Morgan	111	Chemistry	Yehenew Agazie	The Role of β-Catenin in Triple-Negative Breast Cancer
Sierra Arbaugh	112	Nursing	Stephen Akers	Effect of a Silverman-Andersen Respiratory Severity Score-based CPAP Weaning Algorithm on Newborn CPAP Duration
Briana Hines	113	Nursing	Tina Antill Keener	Through the Eyes of a Patient With Substance Use Disorder: Observations of Compassionate Care
Kaitlyn Coleman	114	Nursing	Roger Carpenter	Nursing Student Attitudes and Behavioral Intentions Towards People with Mental Illness
Shay Babich	115	Exercise Physiology	Paul Chantler	Chronic Stress Leads to Decreased Interest in Self-Care
Joshua Ferrar	116	Biochemistry	Brandon Choi	Conformational Changes of Syntaxin-3B in Regulating SNARE Complex Assembly
Diana Davidson	117	Sociology	Elizabeth Claydon	Intersection between Fertility Treatment and Eating Behaviors
Jillian Dodson	118	Communication Sciences and Disorders	Jeremy Donai	High Frequency Speaker Identification Through the use of Automated Recognition Models
Mirissa Garchar	119	Psychology and Neuroscience	Scott Galster	Effects of Acute Stress on Measures of Heart Rate and Heart Rate Variability
Kamil Abbas	120	Immunology and Medical Microbiology	Daniel Grabo	Incorporation of Fresh Tissue Training for General Surgery Residents
MacKenzie Barr	121	Exercise Physiology	Valeriya Gritsenko	Effects of Functional Electrical Stimulation on Upper-Limb Performance in Stoke Survivors
Annabelle Smith	122	Music and Health	Valeriya Gritsenko	Quantifying Fatigue with Wearable Assistive FES Devices for the Shoulder
Jessica Amedro	123	Immunology and Medical Microbiology	Salik Hussain	Nod-Like Receptor X-1 (NLRX1) is a Novel Mediator of Ozone-Induced Lung Inflammation
Jordan Means	124	Immunology and Medical Microbiology	Alexey Ivanov	Expression Profiling of Epithelial Transcription Factors in Breast Cancer Cell Lines
Morgan Glass	125	Biochemistry	Paul Lockman	Analyzing the effect of radiation-induced blood-brain barrier disruption on barrier protein expression
Jordan Payton	126	Psychology and Biology	Randy Nelson	Chronic Dim Light at Night Disrupts Immune Function and Increases Mortality in Aged Females

Rachel Plants	127	Exercise Physiology	Mark Olfert	E-Liquid Base Solution Used in Electronic Cigarettes Impairs Cerebrovascular Reactivity
Jhanvee Patel	128	Journalism	Ming Pei	Influence of Oxygen Concentration on Trilineage Differentiation of Human Fetal Cells
Nicholas Miller	129	Immunology and Medical Microbiology	Cory Robinson	Examining the Effects of In Utero Opioid Exposure on Neonatal Immune Profiles
Eva Dolde	130	Health & Well-being (Pre-Med)	Angel Smothers	The Influence of Faith Community Nurses on Patients and Hospitals
Duncan McGee	131	Biomedical Engineering	Mark Tseytlin	Optimizing a 3D Bioprinter for FRESH Bioprinting
Camila Romero	132	Neuroscience	Kate Weil	Optimal Levels of Exercise for Recovery of Traumatic Brain Injuries

I. Human Engagement (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Michael DiBacco	133	English and Biology	Nancy Caronia	Discrimination through Italian American Caricature in 19th and 20th Century Dime Novels
Natalie Rogers	134	Economics	Annie Cui	Data Analytics in the Undergraduate Business Curriculum - Relevance and Practical Applications
Jaxon Lamb	135	Sport and Exercise Psychology	Kristen Dieffenbach	The Preliminary National Sport Report
Kailia Pua'auli	136	Anthropology	Susanna Donaldson	Evaluation of virtual pile-sorting as method to identify cultural perceptions of cancer/cancer care
Allison Ball	137	English and Criminology	Rosemary Hathaway	More Diverse than You Might Imagine: A Survey of Recent Young-adult Appalachian Literature
Aerianna McClanahan	138	English and Women's and Gender Studies	Rosemary Hathaway	Combatting Negative Depictions of Appalachia by Analyzing Diversity and Inclusivity within the Region
Skylar Watson	139	Exercise Physiology	Miriam Leary	Starting College Online: Strategies for Academic Success in STEM Freshman

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Samuel Hensley	140	Art History	Megan Leight	Exploring Pre-Columbian Owl Iconography: Harbingers of Bad Omens, Death, and Successful Hunts
Olivia McCarty	141	Dance and Psychology	Maureen Mansfield Kaddar	WVU Dance Archiving: Creating a Community of Memories
Yaronn James Arciaga	142	Mathematics	Laura Pyzdrowski	Dual Enrollment - Review of Literature Abstract
Lauren Gould	143	Social Work	Leslie Tower	Peer Learning Communities Effectiveness on Work-Life Balance

J. Physical Sciences & Engineering (Poster Presentations)

Presenter Name	Present. No.	Major	Faculty Research Mentor	Presentation Title
Alyssa Reeves	144	Biomedical Engineering	Jessica Allen	Differences in Reactive Muscle Recruitment Between Standing and Sit-to-Stand Perturbations
Mara Looney-Sanders	145	Engineering	Margaret Bennewitz	Encapsulation of Manganese Oxide Nanoparticles to Maximize MRI Signal Intensity
Robert Coleman	146	Computer Science	Tom Devine	Astro-Data Distributed Computing
Rushik Patel	147	Biomedical Engineering	Cerasela Zoica Dinu	Perspective: Decontamination of Chemical and Biological Warfare Agents Using Green Technologies
Logan McFadden	148	Chemistry	Brian Dolinar	Contrast Agents and Their Use in MRIs
Cole Henderson	149	Computer Science and Computer Engineering	Gianfranco Doretto	Organ-based Visual Classification for Plant Analysis
Marisa Organiscak	150	Chemistry	Emily Garner	Antibiotic Resistant Microorganisms and their Genetic Determinants in Recycled Water: A systematic Review
Malik Mukdadi	151	Electrical and Computer Engineering	David Graham	Interfacing an Embedded Wireless Sensor Network for Monitoring the Temperature of Coal Gasifiers

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

"Virtual" Undergraduate Spring Symposium 2021
West Virginia University

Hunter Hardway	152	Chemical Engineering	Rakesh Gupta	Manufacturing of Polymer Composites by Recycling Discarded Thermoset Polymer Composites through Partial Solvolysis
Jacob Smothers	153	Chemistry	Jessica Hoover	Nickel-Catalyzed Nitration of 8-Benzamidoquinoline
Ethan Wimer	154	Civil and Environmental Engineering	Leslie Hopkinson	Evaluating Acid Mine Waste as a Soil Amendment
Nathan McFall	155	Mechanical Engineering	Terence Musho	Determining the Water Flowrate using an Airlift Approach in Geothermal Wells
Jessica Underwood	156	Chemistry	Joshua Osbourn	Dopamine Reward Pathway in Cocaine Addiction
Joshua Caswell	157	Aerospace and Mechanical Engineering	Songgang Qiu	System Configuration Study of Free-Piston Stirling Engine with Additive Design Components
Michael Ferrebee	158	Chemical Engineering	Oishi Sanyal	3D-Printed Membranes For Hypersaline Produced Water Treatment
Rebecca Erwin	159	Chemical Engineering	Oishi Sanyal	Designing Advanced Membrane Materials for Produced Water Treatment
Sarah Mosinski	160	Forensic Chemistry	Jacqueline Speir	Efficacy of Hyperspectral Imaging in Identifying Latent Trace Signatures
Vignesh Sivashankar	161	Electrical Engineering	Mark Tseytlin	Bioprinter Construction Using an Open-Source 3-D printer
Jason Plants	162	Exercise Physiology	Sergiy Yakovenko	Is the Diagramming Neural Network OpenPose Ready for Widespread Use?

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

<u>**Presentation #1**</u>

The Impact of COVID-19 on the Theme Park Industry

Breezlyn Lash*, Ajay Aluri

Hospitality Innovation and Technology Lab, West Virginia University, Morgantown, WV 26506

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

Student's Major: Hospitality and Tourism Management

The purpose of this study is to investigate the impact of COVID-19 on the theme park industry. The theme park industry offers insights regarding leisure, group, and business travel and to examine consumer behavior and travel patterns during the pandemic. The COVID-19 pandemic has greatly impacted the entire hospitality and tourism industry. With some theme parks being closed for months and even a year now, cities that rely on them to create revenue and attract tourists have struggled. Using secondary data analysis, we examined possible connections between COVID-19 data and Key Performance Indicators (KPIs) of the hospitality industry using STR Trend Reports, COVID-19 county data, and theme park attendance. The beginning of the pandemic caused a drastic change in the way travelers experience theme parks that led to a significant initial decrease in almost all KPIs. Between March and December 2020, RevPAR, revenue, and demand had negative percent changes from 2019 in all major theme park cities. RevPAR had an average of -56.7% change in 2020. Revenue hit its lowest dip of 2020 at -85.08% in April with an overall average of -58.7% change from last year. Demand slowly increased as the year went on, but there were no significant increases or decreases based on the number of COVID-19 cases. This leads to the conclusion that the theme park industry had a significant negative impact, but travelers were comfortable visiting theme parks during the pandemic whether positive cases are on the rise or decline.

Funding:

Presentation #2

The Hiring Helper

Mackenzie Halliday*

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

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

Student's Major: Management

The Hiring Helper was created to help solve the issue of high turnover rates by streamlining the hiring process. This includes a set interview questionnaire and an on boarding process that will enable companies to hire and retain the best fit employee. Theoretical research was conducted to understand why turnover occurs, who needs the Hiring Helper, and how to better the hiring process. Through this research I found that that turnover most occurs due to the fact that someone has had a poor experience with the company or they simply don't feel appreciated. It was also discovered that people who have very little business experience and/or new business owners would be more likely to use the Hiring Helper. Finally, having a singular, uniformed interview script that asked the candidates questions about themselves that revealed deep personality characteristics was shown to improve the ability to pick the best fit employee for the company. Then, having an on boarding process that focused on developing the new candidate in a personal way, example: implementing their personal goals into their work position, decreased turnover and increased job satisfaction dramatically. The research shows that if companies theoretically used the Hiring Helper, they would be able to decrease turnover and improve job satisfaction.

Funding:

Presentation #3

Death Among the Mountains: Examining West Virginian Burial and Funeral Traditions

Raven Forshee* and Alyssa Beall
Program for Religious Studies, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biology

West Virginia has long been overlooked in the academic space, resulting in many of the traditions of the state being ignored by researchers. Instead, many key traditions are passed along solely by families. One set of traditions that are often overlooked by researchers are those of funerals and burials within the state. With no physical space constraints, lax laws surrounding burial, and generations of people with diverse various backgrounds, why, then, do people choose to have certain types of funerals and be buried the way they choose to be buried? This project set out to explore the funeral and burial traditions within the state and uncover how they were formed. Focusing on a series of interviews with people who live within the state, funeral home directors, as well as a review of the current literature, I discuss how funerary traditions came to be and the impact of the COVID-19 pandemic. My presentation also serves to spark a conversation with people about what they want out of their death and how to create a plan for their loved ones. My goal with this project is to discuss why people choose to be laid to rest in certain ways, and how people can speak more candidly about their own expectations for their death.

Funding:

Program/mechanism supporting research/creative efforts:
Other
Honors EXCEL

Presentation #4

Italians and Italian Americans in 19th and 20th Century Dime Novels

Madeline Miller*, Michael DiBacco*, Lillian Wright*, Allison Groves*, and Dr. Nancy Caronia
Department of English, West Virginia University, Morgantown, WV 26505

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

Student's Major: English, Spanish

Dime novels were a popular culture phenomenon of the late nineteenth and early twentieth centuries. The nickel and dime priced paperback, serial short stories captivated the working class of America; however, dime novels reign coincided with one of the largest immigration influxes as well. The novels were often published anonymously and almost solely in English, allowing the writers to depict and encourage many of the ethnic and racial tensions of the urban areas where they were consumed. Dime novels' overarching genre was adventure with the main hero, mostly white men, employing many methods of subterfuge. This subterfuge all too often involved disguises that mocked and degraded ethnic and racial minorities. In the case of Italian Americans in dime novels, many of the disguises allow characters, as if by magic, to speak multiple dialects of Italian, know the whereabouts of every mafioso in town, and even fool their "fellow" Italians. In my portion of our research, I read dime novels published by Frank Tousey between 1889 and 1900 which was dominated by 154 issues of the Wide Awake Library series. The issues I read were outliers within our group's overall research, with most of the issues following narratives of Italians in Italy; however, they provide better perspective on the American public's views of Italians versus Italian Americans, specifically in contrast to the Nick Carter novels that Michael DiBacco read.

Funding:

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

Presentation #5

Outside, Yet Within: Representations of Kimberlé Crenshaw's Intersectionality in Mahasweta Devi's "The Hunt"

Andrea Rupp* and Rose Casey
Department of English, West Virginia University, Morgantown, WV 26506

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

Student's Major: English

Mahasweta Devi's "The Hunt" explores sexism, inter-ethnic conflict, and the consequences of industrial capitalism and colonialization in India via the circumstances and actions of its protagonist, Mary Oraon. In "The Hunt," Mary's mixed Advasi and white status alienates her from her community members, who appreciate her but do not see her as a true Advasi woman. Mary's existence at several intersections of oppression leaves her especially vulnerable to outside oppressors. However, because Mary has always existed both "inside" and "outside" her Advasi community, she is able to navigate a complex postcolonial environment, reclaiming her identity and even appropriating her oppressor's traits without succumbing to either culture's failings. Within my work, I use Kimberlé Crenshaw's theory of intersectionality to explore how Mary weaponizes her simultaneous status as insider and outsider within layered oppressive systems. I argue that Mary's employment of the titular hunt serves as a reclamation of her Advasi identity and demonstrates the potential of the intersection of femininity and Advasi culture to liberate a multiply oppressed person. Mary's actions create a framework of action for other multiply marginalized Women of Color (WoC) to navigate layered oppressive systems. Through Mary, Devi explores the complexities of belonging and liberation when the people and practices we consider "home" do not protect us.

Funding:

Program/mechanism supporting research/creative efforts:
Other
WVU course: ENGL 226 - Non-Western World Literature

Presentation #6

The Sudeten German Experience and its Impact on Present-Day German-Czech Relations

Martha Lacek*
Department of World Languages, Literatures and Linguistics, West Virginia University,
Morgantown, WV 26506

Field (Broad Category): Linguistics & World Languages (Oral-Human Engagement)

Student's Major: German Studies and Computer Science

The Czechs and Germans who inhabited the border regions of the modern-day Czech Republic had over 700 years of contentious shared history. The conflict between the two countries reached its pinnacle in the Nazi occupation of the so-called Sudetenland and the subsequent expulsion of ethnic Germans by the Czech government at the end of the war. For many years, exiled Sudeten Germans were silent regarding their displacement after the war, which was both brutal and deadly, because of the culturally instilled acceptance of German culpability for the war. The silence about the expulsion of Germans and their subsequent lives as refugees contributed to a lack of widespread knowledge regarding the Sudetenland and its troubled history during and after the war. The conflicts that took place in the area and the silence about them continue to influence the modern German-Czech relations, which are, in many ways, still troubled. This project examines how the aforementioned historical conflicts have influenced current cultural and political interactions, with both positive and negative outcomes. It sheds light on how crimes of the past, enacted on and by both cultures, continue to impact local and national relations and emphasizes the need for open dialogue about the past in order to improve present-day interactions and official policy.

Funding:

Program/mechanism supporting research/creative efforts:
capstone course within my department

Presentation #7

How COVID Affected Businesses?

Fatma Alansary* and Annie Cui
John Chambers College of Business & Economics, West Virginia University, Morgantown, WV 26506

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

Student's Major: Management

The project is reflective research on how two different companies are coping with COVID-19. COVID-19 increased the growth of some businesses and other businesses did not get affected. In the ENTR 430 course, me and my group worked together to measure the growth in Tucker County, West Virginia. We discovered that COVID-19 has positively affected businesses in the area. On other hand, COVID-19 did not affect some businesses in the same area as I learned in MKTG 440 course.

There are two primary sources I used for my EXCEL project. The first source is the ENTR 430 class, we did research and analysis of market feasibility, as well as financial modeling and analysis. For the market feasibility, we researched several things and one of them is the growth in Tucker County. The second source I am using this semester is the MKTG 440 course. There are several differences between this course and the previous course ENTR 430. Even though both businesses are in West Virginia, the COVID-19 effect on the businesses is entirely different. The growth of the business depends on the area and what activities are offered.

Funding:

Program/mechanism supporting research/creative efforts:
Other
Honors EXCEL Program

Presentation #8

A Modern Solution to the Homeless Crisis

Ryan Ratcliff*

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

Field (Broad Category): Social Work & Human Services (Oral-Human Engagement)

Student's Major: Hospitality and Tourism Management

My research is based on Maslow's Hierarchy of Needs ideologies to create a new-age solution to the homeless crisis that our modern world faces. My research shows that if we can allow the homeless population to fulfill Maslow's pyramid's physiological needs section, they need to have a more fulfilling life. My main goal is to create a self-sustaining tiny home village for homeless recovery. Giving people a place with a locked door and an area that they can call their own where they can reflect gives them the chance to come to terms with the trauma they have experienced. My research shows the community also benefits from these types of areas. Crime rates, pollution, and property values all increase. It's a win-win situation for everyone involved. After talking with various homeless people within the local area, they would be on board with this solution to their problem. This is a great cost-effective solution to a problem that hasn't been addressed properly in the past.

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

Presentation #9

GPT-3 and its Impact on Ethics in the Practice of Law

Megan McCullough* and Amy Cyphert
College of Law, West Virginia University, Morgantown, WV 26506

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

Student's Major: Forensic Chemistry

The introduction of Artificial Intelligence tools into the practice of law has raised issues of ethics and raised questions about the adequacy of the Model Rules of Professional Conduct (a continuously updated set of ethical rules and professional responsibilities for lawyers created by the American Bar Association that is used in most states). GPT-3, the third generative pre-training model created by OpenAI, has made its way into the hands of beta testers and will soon be commercially available to everyone, including lawyers. This specific software is a natural language processor that recognizes writing pattern. It uses these patterns to generate writing, and presumably it can draft legal documents after receiving an input of just a few sentences. GPT-3 is better than many other AI programs because it can produce documents faster than a human and be refined on the users' documents. GPT-3 has weaknesses such as bias and was trained on a dataset that included sources, such as Redditt, which can question the accuracy and usefulness of its output. Research is being conducted by reading articles of the basic structure and functions of GPT-3 and its reviews on the demos from technology professionals. There are strengths in using GPT-3 in the practice of law when it comes to efficiency, but the issue of ethics with this software raises a major concern in using it in the justice system. This specific AI technology may not have been used by lawyers yet, but there are potential violations to rules in the field.

Funding:

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

Presentation #10

'You Can't Make Me Do It!' Consumer Social Distancing Compliance Behavior

Vijay Payal Bharti*, M. Paula Fitzgerald, and Elizabeth T. Gratz
John Chambers College of Business and Economics, West Virginia University, Morgantown, WV 26506

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

Student's Major: Organizational Leadership

The United States Centers for Disease Control and Prevention (CDC) identifies social distancing as an essential behavior to slow the spread of COVID-19. However, as the high counts of noncompliance indicate, marketers (broadly defined as retailers, personal services providers, healthcare providers, and restaurants) have struggled to enforce these guidelines. We explore consumer attitudes towards social distancing using tweets and survey data to address our primary research question: What drives social distancing behavior and evaluations of communications that encourage social distancing? This study is particularly timely due to the advent of more contagious variants, which may require greater compliance to prevent their spread. In Study 1 (Linguistic analysis), individual tweets (n = 22,230) using two terms, Social Distance and COVID, were collected from March 3 to August 30, 2020. LIWC results showed significant variance in Analytic, Clout, Authentic, and Tone in consumer communications regarding social distancing, which indicates that consumers use a variety of rhetorical methods. For Study 2 (Experimental study), our results show that political ideology, mediated by perceptions of restricted freedom, feelings of complacency resulting from low-risk perceptions and COVID fatigue, and perceived ethicality of social distancing impact compliance with social distancing. Therefore, we suggest marketers use communications encouraging social distancing that emphasizes the ethical choice to socially distance, which may positively impact others. For example, "Choose to protect your family and friends by social distancing" is likely to be more palatable to both conservatives and progressives than "Follow Federal Distancing Guidelines because it is necessary for our community."

Program/mechanism supporting research/creative efforts:
Other
HONORS Excel Program

<u>**Presentation #11**</u>

Traditional Painting Techniques in the Contemporary Classroom

Maureen Budka*
Honors EXCEL Program, West Virginia University, Morgantown, WV 26505

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

Student's Major: Art Education

This research project explores the practical implementation of traditional Renaissance painting techniques in the typical secondary art classroom. The project began with a trip to San Gemini, Italy to study four art making techniques commonly used during the Italian Renaissance: fresco painting, egg tempera painting, gold leaf gilding, and sgraffito. In high school art classes, these techniques may be mentioned in theory during art history lectures but they are rarely put into practice. Based on the theory that students learn best when actively participating in learning tasks, the techniques were adapted to create a five-week art curriculum appropriate for high schoolers. The resulting lessons are interactive and multidimensional, consisting of art activities, historical examples from various cultures, and connections to contemporary art. The traditional techniques were altered to utilize safe and affordable materials. The project culminated in a workshop offered to other art educators on WVU's campus, where the lesson plans and traditional art making techniques were taught. The objective of this project is to create engaging lessons that art educators can use to teach art history in their own classrooms.

Funding: Honor EXCEL Program

Program/mechanism supporting research/creative efforts:
Other
Honors EXCEL Program

<u>**Presentation #12**</u>

Considering Literary Craft in Science Writing: An Interdisciplinary Response to Barriers in Science Communications

Gwendolyn Nurkiewicz*and Renee Nicholson
Interdisciplinary Studies, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Interdisciplinary Studies (Oral-Human Engagement)

Student's Major: Immunology and Medical Microbiology

We have previously investigated the functional nature of science writing, specifically that of primary scientific literature, scientific journalism, and television science, and found a need for the implementation of literary techniques in science writing. To address the specific strengths and weaknesses in current models of science writing, we presented the Storied Research (SR) model. As the SR model became fully realized, it became clear that SR was a response to a much larger problem than originally anticipated. In utilizing literary techniques, we considered science writing as literature, which is inherently problematic. Science writing, in general, is often missing key tenants of craft. Without these tools, science writing has specific weaknesses that are otherwise unacceptable within literature. As we continue our investigation, it becomes abundantly clear the influence of pedagogy and the consumption of science writing has on its genre standards. These factors have led to a stagnant style that consistently fails to respond to the demand for effective communication about scientific research for those outside of that research. Here, we discuss the place literary craft has in science writing, and why an interdisciplinary approach to the pedagogy of science writing is integral to its success. Science writing absolutely deserves to be treated as literature. Elevating this genre presents a distinct opportunity to elevate the success of science communication.

Program/mechanism supporting research/creative efforts:
Other
Honors College EXCEL program

Presentation #13

Coal Market Share Concentration and its Relationship with Economic Inequality in Appalachia

Connor Kelly*, Shuichiro Nishioka, and Sara Guffey
Department of Economics, West Virginia University, Morgantown, WV 26505

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

Student's Major: Economics

Economic inequality is a constant trend globally, but especially in Appalachia which is a historically poor region. Income inequality has expanded over the past few decades especially in the coal industry. Recent economic literature attributes this trend to increased market concentration by large and productive corporations (De Loecker et al, 2020; Autor et al, 2020). We used the EIA's transaction level data and the MSHA mine data to examine the cause of this increase in concentration in the coal industry specifically. Using this data we found that most of the 800 mines in the region are owned by a relatively small amount of companies. This concentration increased during the Obama administration due to environmental regulations among many other factors.
This increased concentration means that more of the money being made in the Appalachia region is leaving the area or being accumulated by the wealthiest individuals. These results could help Appalachia address the long-term issues it has had related to the coal industry.

Funding:

Presentation #14

Appalachian Music: Giving Credit Where Credit is Due

Cassidy Kidwell*
School of Music, West Virginia University, Morgantown, WV 26506-6111

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

Student's Major: Music Education

Within both the music community and society in general, there is a large misunderstanding in what defines Appalachian music. Appalachian music originates from the Appalachian region of the United States, which includes areas of states on the East Coast, ranging from the lower half of New York all the way down into the upper half of Alabama and Mississippi. The Appalachian Mountains run through this area giving it its name. Despite the stereotypes and misinformation about this region being a predominantly Caucasian area, uncivilized, and unprogressive, Appalachia has its roots within several different cultures and in many places is thriving and successful. My research, under the instruction of Dr. Travis D. Stimeling, aims to rewrite this misinformation. By helping Dr. Stimeling create a comprehensive and inclusive textbook that showcases the true tale of Appalachian music, this will help set the standards of teaching about Appalachian music. I assist him in this process by reviewing resources and collecting them into one, comprehensive Google Document. Along with the textbook, Dr. Stimeling has encouraged me to start my own project under his mentorship: creating zines about Appalachia. With these two projects, along with any others that come up along the way, our research will emphasize the breakaway from the tired, exclusionary narrative of Appalachians and showcase the area as it should be represented.

Funding:

Presentation #15

Mountaineer Undergraduate Research Review: Building a Sustainable Undergraduate Research Journal

Jeffrey Petty*, Teagan Kuzniar*, and Kevin Walden
Office of Undergraduate Research, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biochemistry

Undergraduate research journals (URJ) are beneficial to the learning of undergraduate researchers for multiple reasons. By participating in URJs, students have the opportunity for more complete learning regarding their work, to learn about the publication process, and to build connections within their respective disciplines. While the educational value of promoting an institutional URJ is clear, it is uncertain what methods should be deployed in starting a URJ. A dormant multidisciplinary URJ, Mountaineer Undergraduate Research Review (MURR), was reformed at West Virginia in 2019, and the newest volume was published in 2020. This article describes the paths chosen by MURR student leadership in re-launching WVU's multidisciplinary URJ. To elucidate best practices for institutions beginning URJs, an analysis of the methods used by
MURR was performed, and its practices and outcomes have been documented. It was found that the methods chosen by undergraduate leadership within MURR had both positive and negative impacts on the journal's production, public awareness, and future growth. It Is clear that decisions for expanding leadership roles and student involvement is crucial for the function and efficiency of URJs.

Program/mechanism supporting research/creative efforts:
Other
WVU Honors EXCEL

Presentation #16

Moralizing the Music of an Italian Renaissance Courtesan: Barbara Salutati and Niccolo Machiavelli

Micah Buser*
School of Music, Canady Creative Arts Center, West Virginia University, Morgantown, WV 26506

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

Student's Major: Music Education

During the Italian Renaissance, courtesans used their musical talents to attract wealthy and powerful men to whom they functioned as escorts. Though little is known about her life and work, this presentation shows how Barbara Salutati, unlike other courtesans of her time, used her musical talents to her advantage by inspiring the creative output and everyday life of one of her most famous patrons, Niccolò Machiavelli. Public performances were not common for women during the Renaissance, but Salutati still took the stage often and under Machiavelli's direction. But though courtesans like Salutati and a public figure like Machiavelli often had reputations that marked them as deceitful, immoral, and dangerous, these individuals curated their public images to be an antidote to such deceitful ills. To create an acceptable image for Salutati in the public eye, Machiavelli, and a commissioned artist, Domenico Puligo, blended aspects of Salutati's career and appearance with the most visible markers of Christianity – even going so far as to compare her to Christianity's most idealized woman, the Virgin Mary. This transformation was enacted within the framework of Machiavelli's own views on religion in society: while he saw religion as a man-made system of beliefs, he found the moral behaviors encouraged by religion to be necessary elements of a well-ordered society. This project reveals how Salutati's social and musical image, as the product of a collaborative creation between a courtesan and her high-profile client, both conformed to and challenged the narrative of the Italian Renaissance courtesan.

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

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #17

Winning the Job Search

Dana Mace*
Department of Business and Economics, West Virginia University, Morgantown, WV 26506

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

Student's Major: Economics and Finance

Students need more career support early in their academic career. The career search has increasingly became more competitive and companies are expecting more out of college graduates. Over the past few years, companies have started recruiting earlier and younger students. There are also countless Leadership and Development programs designed for Freshman and Sophomores to get a feel for companies and roles within them, that are not fully utilized. These act as great "pre-interview" tools for the companies, but also major resume builders and decision-making tools for students. These under utilized corporate programs are great ways to learn about specific majors and job descriptions. Many juniors and seniors still find themselves unsure about what they want to do. With more insight about these programs students would be more educated and have more confidence in the direction they are heading in their junior and senior years. Additionally, as a finance major, for example, simply searching "Finance" will not provide a detailed job search. Students need to learn the tools to effectively search through key job titles and perspective career paths. Students are taught later in their academic career how to correctly search databases through library workshops, but they are not provided the same expertise for their job/career researching. With these tools and increased insight students will be more competitive for internships and full-time positions, ultimately also increasing placement ratings.

Funding: Honors Excel

Program/mechanism supporting research/creative efforts:
Other
Honors EXCEL

Presentation #18

Electrochemical and Spectroscopic Sensors for Drugs Targeting the μ-Opioid Receptor and Common Adulterants

Sara L. Kuberski*, Colby E. Ott, and Luis E. Arroyo
Department of Forensic and Investigative Science, West Virginia University, Morgantown WV 26505

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

Student's Major: Forensic and Investigative Science; Chemistry

Drugs of abuse are a significant problem in the US that will be addressed from various angles. First, patients impacted by drug addiction need medical care. A currently utilized procedure is through medication assisted treatment (MAT), where drugs such as buprenorphine and naltrexone must be monitored to ensure patient compliance. Second, the prevalence of cases leads to a large amount of evidence being submitted to laboratories for analysis. These seized drugs often include adulterants, such as acetaminophen, which is also present in pharmaceutical products and can reach wastewater plants as a contaminant. Screening tests are useful to process samples quickly and reduce costs and backlog. Therefore, the goal of this work is to develop electrochemical and spectrochemical methods for buprenorphine, naltrexone, and acetaminophen as a valuable approach to tackle existing needs. Electrochemical methods are ideal for screening because they are fast and inexpensive yet are still sensitive and selective. Spectrochemical methods take this to the next level by simultaneously adding orthogonal information about how the compound responds to light. Electrochemical detection of buprenorphine and naltrexone yielded oxidation peaks with acceptable separation (+0.29 V; +0.45 V and +0.86 V, respectively). Acetaminophen demonstrated both oxidation (+0.289 V) and reduction (+0.0265 V) with a reversible process. Calibration curves were constructed for buprenorphine, naltrexone, and acetaminophen in triplicate with linear ranges of 1.9-14 ppm, 0.5-10 ppm, and 1.0-10 ppm, respectively. Spectroelectrochemical methods employing surface-enhanced Raman spectroscopy (SERS) with different supporting electrolytes and surfaces as well as the measurement of various simulated samples were investigated.

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

Presentation #19

Development of Noninvasive Oxygen Imaging Approach Using Water-dispersible
Microparticulate Lithium Naphtalocyanine Probes

Marissa Gibides* and Andrey Bobko
Cancer Institute, West Virginia University, Morgantown, WV 26505

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

Student's Major: Neuroscience

Introduction: Blood flow associated with tumor vasculature is often irregular, sluggish, and intermittent. This results in areas of hypoxia, which is a common feature of new, abnormal growth. It is known that the presence of these hypoxic cells leads to therapeutic resistance in preclinical tumors as well as harming the ability to control human malignancies. In this study, we developed a noninvasive oxygen imaging approach using a water-dispersible micro particulate LiNc-BuO probe.

Results: Lithium naphtalocyanine probes (LiNc-BuO) were prepared using microfluidics techniques which generate uniform microparticles with a diameter in the range 5-20 µm dispersible in the water solution. Microparticles were coated with different coating: cell-adhesive polydopamine, native to tissue microenvironment hyaluronic acid, and just bare lithium naphtalocyanine surface. In vivo experiments of microparticles biocompatibility and distribution in tumor tissue were performed using an orthotopic model of mammary tumor in mice. PyMT tumor cells (0.5 million) and microcrystal probe (0.5 mg) in 50 uL media were injected into the mammary fat pad. Tumors were growing, measured, and imaged once a week till tumor size reached 1 cm. Tumors were collected, fixed cross-sectioned, and analyzed on the density of the particles in each layer. Tumors were then stained for the hypoxic areas.

Conclusion: Microfluidic technics allow for the production of uniformly distributed microparticles of various sizes. The coating of LiNc-BuO particles with biocompatible polymers (polydopamine and hyaluronic acid) significantly improves microparticles' biocompatibility and tissue distribution. The developed approach allows for fast and accurate oxygen imaging in a preclinical tumor mouse model.

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

WestVirginiaUniversity
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #20

Selection for FEC EBV Correlates with Greater Circulating Antibody in Sheep

Desirae Smith*, Kelsey Bentley*, and Scott Bowdridge
Division of Animal and Nutritional Sciences, West Virginia University, Morgantown, WV 26506

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

Student's Major: Animal and Nutritional Science

Sheep selected for resistance to gastro-intestinal parasites have been shown to have greater survivability to weaning. Data from Katahdin sheep indicates that selection based on post-weaning fecal egg count estimated breeding values (PWFEC EBV) may further improve generalized immunity. However, no data exists to confirm this increased circulating antibody occurs in breeds genetically unrelated to Katahdins. In the fall of 2020 post-weaning blood and fecal samples were collected from Shropshire sheep (n=42) and Polypay sheep (n=91). The blood samples were analyzed for total immunoglobulin-G (IgG) using ELISA. Shropshire sheep were sorted into low (PWFEC EBV < 0) and high (PWFEC EBV > 0) groups based on fecal egg count (FEC), which were analyzed via a modified McMaster's method. Polypay sheep were sorted into three groups by PWEC EBV; A (< -50) B (>-50 <+50) and C (>+50). In Shropshire group, individuals with low FEC had greater average IgG concentration (87.9 µg/mL) than those with high FEC (62.4 µg/mL) ($P>0.05$). In the Polypay group, sheep in PWFEC EBV group A had numerically higher IgG concentration (86.2 µg/mL) than sheep in group B (71.2 µg/mL) and group C (53.1 µg/mL) ($P>0.05$). While data in either breed were not significant, the trend observed across breeds indicate that sheep with a lower PWFEC EBV have numerically greater circulating antibody.

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

Presentation #21

Examining Female Brains for Chronic Traumatic Encephalopathy

Marcayla King* (WVU), Emily Dumford* (WVU), Rudy J. Castellani (WVU), Brittany S. Erskine (Western Michigan University Homer Stryker), Tabitha Golda (Western Michigan University Homer Stryker), and Grant L. Iverson (Harvard University)
Department of Pathology, Anatomy, and Laboratory Medicine, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biochemistry

Objective: The goal of this research is to characterize the extent of tauopathy in females who sustained traumatic brain injury (TBI) or participate in sport.

Background: There is limited understanding of the relationship between TBI and neurodegenerative disease. The initial hypothesis that neurodegenerative diseases resulted from TBI was conceptualized in early 20th century boxers, and extended in the 21st century to other contact sport athletes. However, case studies to date lack involvement of females. We therefore wanted to study brain tissue from females for changes linked to TBI.

Materials/Methods: Brain was obtained at autopsy from 33 female decedents. Of the 33 total subjects, 18 suffered TBI. The average age of the decedents with TBI was 66 (range 5 to 71). There were also 16 females who participated in sports which the average age was 42 (range 17 to 59). Brains were fixed in 10% neutral buffered formalin, followed by routine sectioning of multiple brain regions, sampling into paraffin blocks for H&E staining, and phospho-tau immunohistochemistry using monoclonal antibody AT8.

Results: No evidence of chronic traumatic encephalopathy (CTE) neuropathology was encountered in any of the cases. Only 2 of the 33 cases showed features of early-stage Alzheimer's disease. The remainder showed scant phospho-tau in cortical and subcortical areas, compatible with healthy aging.

Discussion: The results of this case series show no evidence of a specific neurodegenerative disease associated with TBI or sport participation in females.

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

Presentation #22

Preliminary Assessment of Climatic Sensitivity of Riparian Old-Growth Hemlock

John B. Holden IV*, Sophan Chhin, Andrew Hirsch, and Eric Yetter
Forest Resources Management Program, 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: Forest Resource Management

Eastern hemlock is a long-lived, slow growing climax species in North America currently undergoing a major decline in population due to a combination of effects derived from hemlock woolly adelgid (HWA) as well as changing climate patterns. Data collection was conducted in an old-growth, riparian hemlock forest within the West Virginia University Research Forest to understand the effect of monthly climate factors (mean temperature, mean precipitation, and CMI) on hemlock radial growth. Results indicated that March mean temperature and May CMI of the current growth year are positively associated with hemlock growth whereas prior year summer conditions of each climate variable resulted in negative correlations. Spring temperature as well as winter precipitation of the current year also lessened hemlock growth. Many of the significant relationships ascertained by this study were well supported by other studies; however, increased June precipitation and CMI resulting in a reduction in growth may be explained by summer storm damage or root anoxia, resulting in lessened growth. Also, previous studies conducted south of the study area found winter precipitation to positively affect growth; this incongruence is explainable by differences in precipitation types and how heavy snow could contribute to hemlock damage.

Program/mechanism supporting research/creative efforts:
a WVU 497-level course
Also completed working as an undergraduate research assisstant.

Presentation #23

Optimal Frequency Channelization for Pulsar Dispersion Measurements

Jacob Cardinal Tremblay*, Maura McLaughlin, and Brent Shapiro-Albert
Department of Physics and Astronomy, West Virginia University, Morgantown, WV 26506-6315

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

Student's Major: Physics

The goal of this project is to simulate and analyze pulsar signal data resembling what we would receive from the Green Bank Telescope. Typically, after receiving data from the telescope and before doing certain analysis, we select the number frequency channels that we want to use. This is an important step in processing the data, as it will affect the error in measurements. If we use more channels, we will have a better resolution, however, the signal to noise will be smaller in each channel. This is why we need to find a "sweet spot" where resolution will be high enough to measure dispersion accurately, but we will still have a signal to noise ratio that is high enough to achieve small errors on our measurements. In this project we look at the error in the simulated dispersion measure (DM), to determine the optimum number of frequency channels. This can depend on many factors, such as the specific pulsar being observed, the instrument doing the observing, the length of the observation and the frequency at which it was observed. This project's biggest impact will be of helping the NANOGrav collaboration determine the specific number of frequency channels that is best for their pulsar timing goals of detecting gravitational waves. Over the course of this project, we have been taking the steps to start developing a model that will help find the optimal number of frequency channels and help in the detection of gravitational waves.

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

Presentation #24

Regulation of Interleukin-6 by an Upstream Open Reading Frame

Claire Kelly*, Savannah Sims, and Gordon Meares
Department of Microbiology, Immunology, and Cell Biology, West Virginia University, Morgantown, WV, 26506

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

Student's Major: Immunology and Medical Microbiology

Interleukin-6 (IL-6) is a cytokine involved in inflammatory responses and is commonly increased in chronic diseases. This cytokine stimulates the synthesis of proteins, such as other cytokines and chemokines, involved in the inflammatory response and the growth and support of some immune cells. IL-6 is typically only expressed during inflammation to ensure proper control of the immune response. Regulation that controls this pattern of expression is not completely understood. Because the code to produce a protein must be transcribed from DNA to mRNA and then translated, there are a variety of potential mechanisms that could be controlling the expression of IL-6. We hypothesize that a key regulatory component may lie within the untranslated region of the mRNA transcript. To test this possibility, we used the CRISPR/Cas9 gene editing technique to create IL-6 human glioma cell lines containing different mutations in the upstream open reading frame (ORF). We then isolated and sequenced the IL-6 gene in our mutants to determine what mutations were introduced. We performed an enzyme-linked immunosorbent assay (ELISA) to measure the amount of IL-6 protein produced by each of these mutants under conditions that provoke IL-6 expression. We also measured the relative amount of the IL-6 transcripts (mRNA) produced under these conditions. Identifying the mechanism behind IL-6 regulation will allow us to better understand the neuroinflammatory response and the potential role in neurological diseases such as Multiple Sclerosis, Alzheimer's disease, and ischemic stroke.

Program/mechanism supporting research/creative efforts:
Other
Immunology and Medical Microbiology Internship

Presentation #25

Liver Kinase B 1 Regulates Antigen Presentation Genes in Murine Astrocytes

Rylee N. Cisney*, Savannah G. Sims, Jacob Feldmann, and Gordon P. Meares
Microbiology, Immunology, and Cell Biology Department, School of Medicine, West Virginia University, Morgantown, WV 26506

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

Student's Major: Immunology and Medical Microbiology

Adaptive immunity is the body's long-term memory immunity and is commonly found to be dysregulated in autoimmune diseases, such as Multiple Sclerosis (MS). Previous data has shown that a single nucleotide polymorphism (SNP) in the Liver Kinase B1 (LKB1) gene may be a risk factor for Multiple Sclerosis. LKB1 is a ubiquitous kinase protein involved in the regulation of metabolism, cell growth, and inflammatory activation. LKB1 is known to regulate cellular responses induced by the inflammatory cytokine interferon gamma (INF-γ). IFN-γ commonly induces the expression of major histocompatibility complex class I and II (MHC). MHCs are molecules that present processed antigen peptides to T cell receptors, causing the subsequent activation of the T cell. Activated T cells mount an adaptive immune response targeting the specific antigen and produce inflammatory cytokines, like IFN-γ. Our data show that gene expression of MHC class II and MHC class I is negatively regulated by LKB1 in response to IFN-γ in human astrocytoma cells. Now, we are interested to see how or if LKB1 regulates a number of antigen presentation genes in response to IFN-γ and IFN-α signaling in murine astrocytes. Preliminary data suggests that wildtype C57BL/6 murine astrocytes utilize LKB1 as a negative regulator of H2-Aa, H2-Ab1, H2-Eb1, H2-K1, CIITA, NLRC5, and STAT1 gene expression in response to IFN-γ and IFN-α signaling. Thus, identifying LKB1 as a potential checkpoint for adaptive immunity by constraining antigen presentation which there is an abundance of in autoimmune diseases, such as MS.

Funding: National Institutes of Health

Program/mechanism supporting research/creative efforts:
Other
Paid Research Assistant funded by PI

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #26

Discovery of pharmaceutically important ergot alkaloids in three species of the fungal genus Aspergillus

Abigail Jones* and Daniel Panaccione
Division of Plant & Soil Sciences, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biochemistry

Lysergic acid-derived ergot alkaloids are used to produce pharmaceuticals. The fungi that typically produce them are difficult to grow and manipulate, so we mined genomes of fungi with greater industrial potential for ergot alkaloid synthesis genes. We discovered three species of Aspergillus capable of producing lysergic acid-derived ergot alkaloids. Aspergillus leporis, Aspergillus homomorphus, and Aspergillus hancockii all were fast-growing and able to produce large quantities of ergot alkaloids. A. leporis and A. homomorphus secreted most of the ergot alkaloids into the culture medium, which is beneficial for pharmaceutical purposes. A. leporis infected larvae of the insect Galleria mellonella (which is used as a model for microbial pathogenesis of animals), killed the insect, and sporulated on it after its death. High concentrations of ergot alkaloids accumulated in infected insects. A. leporis possessed previously uncharacterized ergot alkaloid synthesis genes; one, called easT, had sequence properties of a major facilitator transporter. We expressed easT in a strain of Aspergillus fumigatus previously engineered to produce lysergic acid but only at low yields to test if easT would increase production or secretion of ergot alkaloids. The easT-transformed A. fumigatus strain produced more ergot alkaloids than the parent strain but retained most of them in the fungus. Our data show for the first time that Aspergillus species are capable of producing lysergic acid-derived ergot alkaloids and indicate these fungi could be useful for production of these pharmaceutically important compounds. The gene clusters in these fungi also are a source of novel ergot alkaloid synthesis genes.

Program/mechanism supporting research/creative efforts:
Other
Was hired through grant funding.

Presentation #27

Identification of a Gene Involved in Production of Pharmaceutically Important Lysergic Acid Amides

Kelcie N. Britton*, Chey R. Steen, Jessi K. Sampson, and Daniel G. Panaccione
Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 26506

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

Student's Major: Immunology and Medical Microbiology

Ergot alkaloids are lysergic acid containing compounds produced by several species of fungi associated with significant human and animal toxicoses. Despite their toxicity, modified and appropriately dosed ergot alkaloid derivatives are effective pharmaceutical treatments for dementia, migraines, and hyperprolactinemia. Biochemical pathways to some ergot alkaloids have been determined, but the final step in the synthesis of lysergic acid amides remains elusive. This gap is significant because many of the pharmaceutically relevant ergot alkaloids are derived from lysergic acid amides. Lysergic acid α-hydroxyethylamide (LAH) is the main ergot alkaloid produced by the fungus Metarhizium brunneum. We hypothesize two genes, named easP and estA, encode esterases involved in the final step of LAH biosynthesis. To test this hypothesis, CRISPR mutants were engineered in a M. brunneum background with easP alone mutated and with both estA and easP mutated. Biochemical analysis of our mutant strains demonstrated the product of easP has a significant role in the production of LAH; where the easP mutant only accumulated half of the LAH measured in non-mutant strains when normalized relative to fungal biomass as estimated by the fungal metabolite ergosterol. Mutation of estA did not affect accumulation of lysergic acid amides, indicating another enzyme is contributing the easP redundant activity. The hypothesized activity of EasP as an esterase is being tested by expressing the protein in E. coli. The phenotype of our CRISPR mutant demonstrates that easP is an integral part of the pathway to LAH.

Program/mechanism supporting research/creative efforts:
an external internship or other type of program
Arnold and Mabel Beckman Foundation

WestVirginiaUniversity.
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #28

Boron Based NSAIDs as a Treatment Option for Chronic Pain

Amanda Swistok*, Brian Popp, Randika Abeysinghe, and Steven Knowlden
C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biochemistry

Background: WV is the epicenter for what has been called the opioid epidemic. Opioids are an addictive class of drugs typically used to treat chronic pain. Nonsteroidal anti-inflammatory drugs, another class of painkillers, have many drawbacks to chronic use, including stomach ulceration and kidney disease. Between these two candidates, there is no significant difference in pain relief. Boron has been shown to have anti-inflammatory properties which makes it an excellent candidate for treatment of chronic pain. With the recent upswing in the FDA approval of several boron-based drugs and the ease of utilizing boron in chemical reactions with high yields, using boracarboxylation methodology to produce a new class of boron-based NSAIDs could provide better chronic pain management.

Methods: Compounds are synthesized according to boracarboxylation protocol. COX assays performed according to protocol given by manufacturer.

Results: Cytotoxicity assays and Griess assays show that boron-based derivatives show no significant difference in performance from ibuprofen.

Conclusions: These compounds can be made in masse due to the high yield of these reactions. As drug candidates, they perform well in vitro which leads us to believe in vivo studies should be conducted. At the least, these drugs should perform similarly to current NSAIDs on the market and at most could potentially relieve the negative symptoms of chronic use. This would be groundbreaking in the treatment of chronic pain, leading to reduced use of addictive opioids.

Program/mechanism supporting research/creative efforts:
Other
Honors EXCEL

Presentation #29

Hypoxia Ischemia Induces Cathepsin L Secretion in Cerebrovascular Endothelial Cells

Linda Ma* and Xuefang Ren
Department of Neuroscience, West Virginia University, Morgantown, WV 26505

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

Student's Major: Immunology and Medical Microbiology

Background
Stroke is a leading cause of both death and impairment worldwide. The Blood-Brain Barrier (BBB) is opened during ischemia, and Cathepsin L (a protease) is activated and participates in BBB opening in stroke. However, it is unknown which type of cells is responsible for the activation of this protease.

Goal
The goal of this experiment is to investigate whether Cathepsin L activity is generated during ischemia in Cerebrovascular Endothelial Cells (CEC).

Methods
CECs (bEND.3 cell line) in passages 25-30 were cultured in a 175 cm2 flask and passaged in 24-well plates. The cells were placed in glucose deprivation medium, then cultured in a hypoxia ischemia (HI) chamber for 3 or 6 hours. Entire proteins were extracted from the cells via cell lysis buffer. Cathepsin L activity was then evaluated with Cathepsin L activity kit from Abcam. The data were then recorded via a plate reader and analyzed by Student's t test.

Results
Cathepsin L activity is decreased in the cells; however, activity was increased in supernatant from CECs at 3 and 6 hours post ischemia in vitro.

Conclusion
Secretion of Cathepsin L is found in the supernatant of CEC's in oxygen glucose deprivation conditions. This indicates that ischemia activates Cathepsin L in CECs. The data also suggests that CEC is a source of Cathepsin L in ischemia.

Future Direction
Further experiments on varying types of cells are to be studied for Cathepsin L activity.

Presentation #30

Stream Flow Comparisons Between Deckers and Aaron Creek

Anthony Marmorella* and Chris Russoniello
Department of Geology & Geography, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Geography/Geology (Oral-Science & Technology)

Student's Major: Environmental, Soil and Water Science

This research project will compare stream flow and discharge data between sites on upper Deckers Creek and Aaron Creek. Both streams feed into the Monongahela River. The question posed is how the discharge response differs between the two separate streams. These streams have been plagued by water quality issues in recent years—especially Acid Mine Drainage issues in Deckers Creek . Understanding the hydrology and flow response of these streams is important for categorizing the streams and potentially solving some of these issues. There are gages at both streams but little attempt to compare the two streams under different flow conditions. I will gage the two streams under a variety of flow conditions and compare to water level data at each site to construct a stage-discharge curve. The flow responses in the two streams will be analyzed and compared to understand hydrology differences between Deckers and Aaron Creek. I expect a more rapid recession curve along Aaron Creek because of the smaller size, but more variability in Deckers Creek because the larger watershed is likely to capture more precipitation events. Results will help to answer the initial research question and could lead to future questions to test.

Funding:

Program/mechanism supporting research/creative efforts:
capstone course within my department

Presentation #31

Investigating Regulator of G protein Signaling 12 (RGS12) as a Potential Target for Cocaine Use Disorder Therapeutics

James Lamp* (1), Allison White (2), and Vincent Setola (3)
(1) Research Apprenticeship Program, Office of Undergraduate Research, West Virginia University, Morgantown, WV 26506
(2) West Virginia University School of Medicine, Cellular and Integrative Physiology Program, West Virginia University, Morgantown, WV 26506

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

Student's Major: Neuroscience

Cocaine is the most-used illegal psychostimulant in the United States today. As a result of its widespread usage, cocaine use disorder (CUD) is the third most common drug-related disorder in the world after alcoholism and opioid use disorder. Currently, there is no approved pharmacological method for helping persons with CUD achieve and sustain abstinence, so identifying potential treatments for CUD is an important unmet medical need. Cocaine exerts its effects on the brain by blocking the reuptake of synaptic dopamine and serotonin through the dopamine transporter (DAT) and the serotonin transporter (SERT), respectively. Our group recently discovered that mice lacking the Regulator of G protein Signaling 12 (RGS12) protein exhibit blunted locomotor responses to cocaine and to other psychostimulants that target DAT and SERT (e.g., amphetamine, MDMA). Further, mice lacking RGS12 exhibit increased expression and function of DAT and SERT, the primary molecular targets through which cocaine blocks dopamine and serotonin reuptake. Based on these findings, we sought to address whether the absence of RGS12 in mice affects behavioral features associated with cocaine withdrawal. To do so, we treated wild-type and Rgs12 knockout mice with a twelve-day regimen of cocaine that has been shown to result in somatic signs (e.g., digging, grooming, rubbing) of withdrawal. We hypothesized that the insensitivity of mice lacking RGS12 to the locomotor-stimulating effects of cocaine may indicate a resistance to withdrawal from the drug. If correct, our hypothesis would suggest that pharmaceuticals targeting RGS12 might be effective treatments for persons with CUD.

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

Presentation #32

Rare Earth Elements Association in Different Fractions of Appalachian Coals: Extraction and Enrichment

Bennington Opdahl*, Vikas Agrawal, and Shikha Sharma
Department of Geology & Geography, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Geography/Geology (Oral-Science & Technology)

Student's Major: Chemistry

Rare earth elements are in immense global demand as they are essential for all the major advancements in energy, electronics, optics and defense industries. To meet the high demands, REE supplies are getting scarce and expensive due to the depletion of conventional ores and supplies. In the recent few years, coal and its combustion/waste byproducts have been explored as a potential source of REEs due to their enriched REE content and lower costs. However, the association of REEs in inorganic or organic fractions of different types of coal (especially in bituminous coals) is still not well understood. In this study, we investigate the association of REEs in different fractions of bituminous Appalachian coals by using a sequential extraction procedure. Coal samples from Fireclay, Sewell, Harlem, Little Clarksburg and Upper Kittanning of the Appalachian basin have been acquired for this study. The REEs associated with the exchangeable fraction, carbonates, Fe-Mn oxides, organic bound, and silicates fraction in different coal samples are being investigated. The preliminary results from these experiments will help in determining the mechanism of REE enrichment in bituminous coals. The broader implications of this study are that it will help in developing strategies for maximizing the extraction efficiency and minimizing the extraction cost of REEs from Appalachian coals.

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

Presentation #33

Assessing Perioperative Patient Distress in Office-Based Hand Surgery

Anthony Siler*, Shafic M. Sraj, and Emily Ellis
Department of Orthopaedics/Hand Service, West Virginia University, Morgantown, WV 26501

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

Student's Major: Biology

Office-Based Hand Surgery (OBHS) is gaining popularity compared to hand surgery done in the Operating room because of its convenience and cost benefits. Some patients are concerned about being awake during the surgery, however. Patient experience has not been previously assessed in OBHS, and exploring expected and actual distress levels allows patients to make informed decisions regarding OBHS. The goal of this study is to assess patient distress levels starting at the time of surgical decision through the early recovery phase. We are in the process of recruiting 50-100+ patients to complete distress surveys prior to, during, and following OBHS. We are using the Amsterdam Preoperative Anxiety and Information Scale (APAIS) and Subjective Units of Distress/ Disturbance Scale (SUDS). We are applying SUDS to previously identified sources of distress including needle sticks, surgical pain, discomfort, outcome, etc. The secondary goal of this study is to identify patient variables that may contribute to an over prediction of distress, measured by the difference between pre- and post-operative distress scores. We predict an increasing level of distress up until the surgery, followed by a significant decline postoperatively once they realize how minimally invasive the surgery was. Understanding the patient experience will help surgeons gain knowledge about what causes patient distress in OBHS, develop screening tools for OBHS, and find methods to mitigate perioperative distress in OBHS.

WestVirginiaUniversity®
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #34

Influence of Light Emitting Diodes on Brassica oleracea Growth, Metabolites, and Antioxidant Capacity

Tristan D. Sanders*, Nicole L Waterland, and Youyoun Moon
Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biochemistry

The recent advancements in LED (light-emitting diode) technology have made it economically beneficial for indoor agriculture operations. The unique property of LEDs are the emission of narrow bandwidths of light and high-power use efficiency. Due to the emission of single bandwidths of light, it is necessary to combine multiple LEDs to increase crop yield and quality. LEDs emitting red and blue are often utilized to grow crops indoors since chlorophylls absorb them the most efficiently. However, it has been shown that other wavelengths of light can drastically influence the yield and physiology of crops. In this study the mineral uptake and secondary metabolites of kale (Brassica oleracea 'scarlet') were investigated. Kale was grown under seven LED treatments; red, blue, green, red+blue (RB), red+green (RG), blue+green (BG), red+blue+green (RBG) with a total photon flux density of 150umol/m2s with three replications. The ratio of each color in the combination groups resembled that of sunlight. The fresh and dry weights of kale grown under red LEDs were higher. Sole green light proved to be equally effective at accumulating fresh mass as other lights. Blue light led to a higher total phenolic content.   Utilizing LEDs to manipulate the physiology of food crops has the potential to increase nutritional content, and the health of those who consume them.

Program/mechanism supporting research/creative efforts:
Other
WVU Honors EXCEL Program

Presentation #35

Antagonism of Staphylococcus aureus Using Naturally Occurring Bacterial Isolates as a
Potential Novel Probiotic

Megan Cozort* and Matthew Williams
Department of Biology, West Virginia University Institute of Technology, Beckley, WV 25801

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

Student's Major: Biology

It is important to our health that we maintain a healthy complement of health associated commensal bacteria to fight off pathogenic disease causing bacteria that could cause infection. Staphylococcus aureus is an opportunistic pathogen which is carried by 30% of people in their nose and on their skin. While generally not harmful to healthy hosts, when given access to an incorrect body site or to immune compromised individuals it can cause sepsis, pneumonia, endocarditis, and severe skin infections all of which can become life-threatening. Resistance to the antibiotic methicillin is an increasing problem in many strains of S. aureus. These MRSA (methicillin resistant S. aureus) strains reflect a growing issue of antibiotic resistance found in multiple pathogens highlighting the importance of novel therapies, such as probiotics, to fight such infections. Our research project used antagonism studies to evaluate the efficacy of novel bacterial isolates in preventing the growth of pathogenic bacteria. This study evaluated the isolates as a preventative measure against S. aureus. Several isolates were successful at inhibiting the growth of the pathogen. The isolates were identified by bioinformatics analysis of their genomes, using 16s genetic sequencing. Results of the sequencing determined that one of the potential probiotics that was effective in preventing the growth of S. aureus was a novel strain of Pseudomonas tolaasii. Future studies will identify the other novel isolates and characterize our P. tolaasii strain further.

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

Presentation #36

Glioblastoma Cancer Neurosphere Formation In-Vitro using a Non-Serum Stem-Cell Media

Mackenzie Miller*, Sonikpreet Aulakh, and Adrienne Williams
Leonard C. Nelson College of Engineering and Sciences, Department of Biology, West Virginia University Institute of Technology, Beckley, WV 25801

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

Student's Major: Biology

Glioblastoma multiforme (GBM) is one of the most lethal cancers in the world. Almost 12,500 people each year are diagnosed with GBM with only about 35%-survival past one year. This raises a need for research into glioblastoma. However, traditional laboratory techniques used to maintain glioblastomas fail to replicate their real-life 3-dimensional (3D) nature, which makes it difficult to find effective treatment options. The purpose of this study was to find an effective laboratory growth condition for glioma cancer cells to form neurospheres (small neural cell clusters) that maintain original tumor characteristics. To do this, glioma cancer cells (LN229) were divided, resuspended in an appropriate growth medium, and transferred to 60mm plastic dishes (replicates of 4), and monitored every two days for up to 10 days maintained at 37°C with 5% carbon dioxide. Cell growth and neurosphere formation were monitored using a colorimetric cell viability assay and light microscopy. For each experiment ($n = 2$), the control condition contained typical blood serum-based growth medium compared to our experimental non-serum-based growth medium that contained essential stem-cell growth factors. Our hypothesis was that non-serum stem-cell media would form neurospheres most successfully. Non-serum-based media demonstrated significantly increased numbers of neurosphere formation ($p < 0.05$) and neurosphere diameter ($p < 0.05$) compared to the control condition. We found no significant difference in cell viability over the course of the experiments. Therefore, using the non-serum stem-cell media enhanced effectiveness of studying 3D glioblastoma growth in the laboratory setting and will be used for future treatment experimentation.

Funding:

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

Presentation #37

Redesign of Campus Traffic Flow

Tigra Yang, Hayley Logan*, and Sawyer Hawgood*
*Department of Civil Engineering, West Virginia University Institute of Technology, Beckley, WV
25801*

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

Student's Major: Civil Engineering

The purpose of this project is to redesign the traffic flow on WVUIT's Beckley campus. As WVU Tech continues to grow, the original design of roadways on our campus have became unsafe. The amount of traffic jams have increased and there have been 2 car-on-car accidents on the Mel-Hancock and South Kanawha intersection. There are 3 main intersections that need redesigned: Mel-Hancock and South Kanawha, Church Street and Minnesota Avenue, and lastly South Kanawha and Church Street. Our biggest part of this project is the Mel-Hancock and South Kanawha intersection. We plan to create a right-hand merge lane coming from South Kanawha onto Mel-Hancock in order to reduce the amount of traffic jams and reduce the amount of car-on-car accidents. For the South Kanawha and Church Street intersection, we plan to incorporate a three-way stop or a traffic light. This will reduce the amount of jams and create a safer walkway for students. For the Church Street and Minnesota Avenue intersection, we have discussed making it a one-way or creating another three-way stop. We believe that with all of these changes, the traffic flow on WVUIT's campus will majorly improve and remain safe as the campus grows.

Funding:

Program/mechanism supporting research/creative efforts:
capstone course within my department

Presentation #38

Russia's Current Political Ideologies

Jordan Murray* and Boris Barkanov

Department of Political Science, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Political Science (Oral-Behavioral & Social Sciences)

Student's Major: International Studies and Political Science

The current government in Russia is comprised of many representatives of different ideologies, but which ones dominate or fumble? The main two ideologies, liberalism and conservatism, along with their different variations compete for the lead, with liberalism calling for a more Western/European approach and conservatism countering that with traditional Russian values. Examining the modern system, one can find that both liberalism and conservatism have had large impacts on Russia; however, the current trend is upward for conservatism. With many believing in Russian historic and religious norms, some are hesitant to shift their views, especially with the strong influence of the opposition. While conservatism may rule, liberalism still has a heavy impact on Russian society. As the controlling ideology defines how the state governs, their international relations in affected heavily by this. Understanding the reasoning behind Russia's decisions betters the responses for other states, which is why it is important to study their ideologies. This provides clarity and offers a way to better communicate with them, especially in world affairs.

Funding:

W West Virginia University®
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #39

Civil Society and Protest in Putin's Russia

Lindsay Hapak* and Boris Barkanov

Department of Political Science and International Studies, West Virginia University,
Morgantown, WV 26506

Field (Broad Category): Political Science (Oral-Behavioral & Social Sciences)

Student's Major: Political Science

With democracy decreasing around the world, more civil societies are developing. Civil society refers to the autonomous sphere of activity that is initiated, coordinated, and executed by citizens. Russia offers a unique opportunity to expand the understanding of civil society under an authoritarian-like regime in a postcommunist context. This research aims to comprehend the internal mechanisms of civil society and protests in Putin's Russia through the democratization framework and pragmatic approach while incorporating the political culture of Russian citizens. I study the effectiveness of the theoretical frameworks through a close literature reading of Alfred B. Evans Jr's work in Civil Society and Protest. I propose that as Putin's regime takes on an increasingly authoritarian character and can no longer derive legitimacy from providing services to the people, there will be an increase in demand from civil society for democratic political institutions. The democratization framework analyzes the ability of a robust civil society to create democratic political institutions versus the pragmatic approach which emphasizes the relationships between nongovernmental organizations (NGOs) and the state to provide services for the Russian people. The democratization framework presents struggles as the trends of civil society after the collapse of the Soviet Union are discouraging. The pragmatic approach offers more positive developments between the state and civil society, as there has been a recent increase in domestic funding towards NGOs. I hope to expand upon this research to further understand the prospects of civil society under Putin's regime, and apply it to other cases.

Presentation #40

The Stolen Babies of Francoist Spain

Madison Crane*
Department of History, West Virginia University, Morgantown, WV 26505

Field (Broad Category): History (Oral-Behavioral & Social Sciences)

Student's Major: History

This project examines the alleged kidnapping of thousands of newborn babies in Spain between the 1930s and 1990s. During the majority of this time, Spain was under the rule of the fascist dictator Francisco Franco, whose regime committed many crimes against humanity. When one man was told by his father that he had purchased him from a nun as a baby, the story made national headlines. Now hundreds of mothers who were told by nuns that their babies had suddenly and suspiciously died have come forward and are seeking answers to what really happened to their children. The exhumation of the graves of some of these children have found multiple coffins that contain no traces of a baby. The investigations and search for justice have been met with much resistance from the Spanish government and the Catholic church. The purpose of this project was to find evidence that supports the claim that a widespread baby trafficking network was happening in Spain during this time that involved both the Catholic Church and the federal government.

Funding:

Program/mechanism supporting research/creative efforts:
capstone course within my department

Presentation #41

Anti-Semitism Hatred

Sierra Thompson* and William Brustein
Office of Global Affairs, West Virginia University, Morgantown, WV 26506

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

Student's Major: History

The research that I am conducting with my mentor is the helping with his book on why Anti-Semitism occurred in areas that had no prior existence of said minority in the host country. The cases that I am looking at are Oliver Cromwell, Norman Jacques, and another case in Japan I believe. Oliver Cromwell was fighting for Jews to be allowed back into England however he failed to accomplish what he set out to do. "For our study, we concentrate on anti-Semitism where the majority non-Jewish population has had little or no engagement with the minority Jewish population. Historical examples abound: including Oliver Cromwell's failed attempt to bring back the Jews after nearly 400 years since expulsion from England in the face of popular resistance; the successful electoral campaigns of the Canadian Social Credit Party's Norman Jacques during the 1930s and 1940s in Alberta province; the popularity of the notorious "Protocols of the Elders of Zion" and other virulently anti-Semitic best-selling books authored by Uno Masami in Japan during the 1980s and 1990s; and the 1991 Polish national elections where so-called "Jewish influence" served as a chief campaign issue for the nationalistic right" (William Brustein)

Funding:

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

<u>**Presentation #42**</u>

Identifying the Behaviors of Mass Murderers

Matthew Q. Ellis* and Jeffrey A. Daniels

Department of Counseling and Learning Sciences, West Virginia University, Morgantown, WV 26506

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

Student's Major: Geology

Mass attacks seem to be ubiquitous on the news, but most previous research focused on the characteristics and motivation of mass murders hasn't been successfully implemented in preventing violence. Instead, it has been used to mitigate violence once it has begun. Our research focuses on a 10-stage process of direct behaviors that a grievance-motivated mass murderer is hypothesized to progress through, starting at the initial grievance, and ending at the final attack. By studying the stages a mass murderer will likely progress through, we hope to identify places where we can intervene and prevent a mass attack from occurring. To test our process, we used a Wikipedia database of rampage killers and a database from the Police Foundation of averted school shootings and conducted an initial review for cases motivated by a grievance. From this we identified 39 and 41 cases respectively. We then conducted a more thorough reading and narrowed our cases to 37 and 25 respectively. We identified the motivation, perceptions, crisis variable, indirect factors, and direct behaviors of each case. Our analysis showed three key moments in a mass murderer's progression. First, is the development of a normal grievance to a fatal grievance; second is the crisis that exacerbates said fatal grievance; and third is the 5th stage, researching, because most successful interventions take place before this stage. While it is crucial to intervene at any point possible, we have found these three key events to offer the most appropriate moments to intervene at or before.

Funding:

Presentation #43

Communication and Community Resilience in WV During COVID-19

Emma Schwartzmiller*, Julia Fraustino, Geah Pressgrove, Taylor Miller, and Hannah Belt
Reed College of Media, West Virginia University, Morgantown, WV 26505

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

Student's Major: History

The purpose of the study is to co-create communication solutions and build community resilience in two West Virginia communities grappling with the COVID-19 pandemic. A database was created to identify key informants to interview. To ensure that diverse contacts and perspectives were reached, snowball sampling was additionally used to further identify individuals. Given the community focus on this study, the authors focused on community leaders within county and city government, community organizations, businesses, religious organizations, nonprofits, healthcare and education. These individuals were selected based on their roles within their communities as well as their knowledge of the communities and how they have been impacted by the novel coronavirus SARS-CoV-2, which causes the disease COVID-19. To tap into rich knowledge of those with high community involvement, the researchers purposely chose to interview individuals who oversaw or were highly involved with community activities. Thus, most of our interviews have been conducted with government officials, community leaders, or healthcare leaders, and business owners. Interviews have been conducted throughout the winter of 2020-2021, by phone or Zoom to accommodate a geographically diverse sample and safe interview facilitation during COVID-19. All interviews are recorded and fully transcribed for analysis, which is iterative and ongoing. Using inductive and deductive themes to generate codes, initial data analysis provides insights and understanding of the role of communication in community resilience surrounding a major public health crisis.

Funding: WVU Research Scholarship and Advancement (RSA) Grant

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

WV West Virginia University®
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #44

The Concussion: How to Prevent and Properly Treat the Strangling Head Injury.

Jared Icenhower* and Scott Galster
Rockefeller Neuroscience Institute, West Virginia University, Morgantown, WV 26505

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

Student's Major: Economics

According to the University of Pittsburgh Medical Center, nearly three million people get a concussion every year from participating in recreational activities and those are just the ones that are known. Nearly half of concussions go unreported, leading to devastating consequences. Symptoms of this brain injury include headaches, concentration problems, struggles to keep balance, and lack of coordination. How do we prevent these injuries from occurring? We must understand that concussions typically occur when an athlete is impacted on the head from the side or behind, not from the front. If we train athletes' peripheral vision, the likelihood of a concussion occurring decreases. There are many technological devices in the world today that train people's peripheral vision. However, these devices are expensive and some do not prepare athletes for impact as well as others. If athletes train their peripheral vision using the most proficient technological concussion prevention device, then the number of concussions in athletics will decrease due to athletes being able to better prepare for oncoming impacts to the head. Through reading various sources and testing different technological devices such as Dynavision, Twall Interactive Touch Wall, and Moto Tiles, we can determine which device is more proficient in preventing concussions. My research is not complete yet so my results are indeterminable as the most proficient concussion prevention device due to its affordability and effectiveness in training peripheral vision.

Funding:

Program/mechanism supporting research/creative efforts:
a WVU 297-level course

Presentation #45

Replication of Munroe et. al

Peter Giacobbi and Christopher Palkon*

College of Physical Activity and Sport Sciences, West Virginia University, Morgantown, WV 26505

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

Student's Major: Finance and Accounting

Mental imagery involves the visualization of specific thoughts, feelings and behaviors in one's mind. Mental imagery in sport has narrowed down to four questions: the content, why and where they use imagery, and when. Munroe et al. (2000) produced a framework that conceptualizes imagery to consist of cognitive and motivational functions that operate on a different levels. Since the publication of this study, advancements in technology have allowed athletes to practice mental imagery in a variety of settings and with other purposes. Equally as important is that in Munroe there was only a small sample of 14 collegiate athletes, which precludes broader generalizations. The primary purpose of this study is to replicate and extend Munroe by re-examining the 4W's of imagery (where, what, when, and why athletes use imagery) with a broader same of high school, colligate and professional athletes from a more diverse sample of sports. A convivence sample of athletes that are older than 15 years will be recruited using institutional contacts. The goal is to recruit about 20 athletes from various competitive levels such as: skilled youth, collegiate, and professional athletes. Interviews will be conducted at various institutions across North America. We will use a semi-structured interview guide that will assess the 4Ws of imagery and how imagery is used before, during and after competition. All interviews will be recorded. In this study, we expect to learn ways that athletes use imagery through technology, working with coaches, sports psychologists, and their views about it affects performance.

Program/mechanism supporting research/creative efforts:
a WVU 297-level course

Presentation #46

The Right to Food in West Virginia

Carolina Rascon* and Joshua Lohnes

Food Justice Lab, Center for Resilient Communities, West Virginia University, Morgantown, WV 26506

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

Student's Major: Regents Bachelor of Arts

Article 11 of the United Nations International Covenant on Economic, Social and Cultural Rights explicitly describes the right of all people to adequate food and freedom from hunger. The United States is one of only a handful of countries that has not ratified this treaty. Scholars studying the progressive realization of the right to food highlight the critical need for states to code it into law, thus compelling public and private institutions to address food insecurity and hunger while expanding political participation in the food system. In November 2020, the West Virginia Food for All Coalition held a virtual summit that brought together scholars, activists, and community members to discuss the relationship between hunger and food systems and opportunities to progressively realize the Right to Food in West Virginia through the policy process. This research explores the evolution of this advocacy drawing on ethnographic action research methods (Tachi et. al, 2003) developing the Voices of Hunger WV platform. Specifically, it reflects on four months of scholar-activism alongside Food for All Coalition members, policy makers and food insecure individuals sharing their stories in an effort to introduce and debate a constitutional amendment for the Right to Food during the 2021 West Virginia legislative session. The analysis demonstrates the key role played by activists and policy entrepreneurs at international, national, state and local levels and the need to build solidarities and political power across geographic contexts to realize the right to food for all.

WEST VIRGINIA UNIVERSITY®
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #47

Friends of Food: How Ethical Consumerism Can Advance the Cooperative Movement for Food Sovereignty

Falon Snodgrass* and Joshua Lohnnes
Department of Geology and Geography, Morgantown, WV 26506

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

Student's Major: French and International Studies

FIRSTHAND is a student-centered coffee cooperative at West Virginia University that goes beyond Fair-Trade to cultivate a more just, shared economy based on economic cooperation and solidarity. We connect mountain communities through coffee sales, education and investments in rural community development initiatives in Nicaragua and West Virginia.. Drawing on four months of action-research with FIRSTHAND through the Geography Engagement Program during the Spring 2021 semester, I reflect on the development of a multi-stakeholder fundraising initiative to secure the 82-acre Whitlock Farm in Fayetteville, WV. Working alongside the Agrarian Trust, New Roots Community Farm and 19 Coffee company, FIRSTHAND leveraged its networks, knowledge and engagement experience to advance the land commons movement in West Virginia and beyond. Specifically, I demonstrate how the development and sale of the Commons Blossom coffee blend has reshaped consumer perspectives and engagement around land tenure questions in Appalachia and advanced FIRSTHAND's mission of fostering solidarity economies through the international cooperative movement. The research asks how consumers perceive their role in advancing work toward a Land Commons initiative in Fayetteville, West Virginia.

Program/mechanism supporting research/creative efforts:
Other
Geography Engagement Program Internship

Presentation #48

The COVID-19 Trade Collapse: How US Trade Changed Throughout the Pandemic

Shuichiro Nishioka and Tucker Miller*
Department of Economics, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Other (Oral-Behavioral & Social Sciences)

Student's Major: Mathematics

The COVID-19 pandemic has dramatically transformed the global social, political, and economic landscape, and we will continue to see it repercussions into the foreseeable future. Lockdowns resulted in a massive decline in economic activity, which in turn ushered in a massive drop in trade volume. Using the UN Comtrade database, we calculated that the value of imports and exports declined the most during April and reached its nadir in May. From March to May, overall imports and exports fell by approximately 15.5% and 32.4% respectively; the worst drop in both measures since the 2008 Financial Crisis. The trade commodities that lost the most value during collapse were automotive, medical, electronic, and aerospace items, while an eclectic variety seemed to have benefitted. What is truly surprising, however, is the rapid rate at which US trade recovered after the imposition of lockdowns. We are currently looking at ways to explain this this speedy recovery by looking at which commodities and trading partners are most responsible for the rebound.

Funding:

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

Presentation #49

How Media Affects Us All: Fiction, Reality, and Our Altered Lives

Alexander Y. Robb*, Scott Williams, and Jamie Dessart
Department of English, West Virginia University, Morgantown, WV 26506 and Waynesburg
University Department of Philosophy Waynesburg, PA 15370

Field (Broad Category): Philosophy, Ethics, & Religious Studies (Oral-Behavioral & Social Sciences)

Student's Major: Psychology

Reality has been a victim of the influence of media since people have been putting meaning to words. Whether in form of song, text, or visual arts, media has become a nigh unstoppable force regarding people's perceptions of the world around them. This series of essays seeks to explore, with a focus on television and literary media produced for the young adult demographic, how culture has taken and used these mediums for both honorable, and not so honorable purposes. From people taking inspiration from works of fiction to commit crimes, to the demonization of animals leading to their killings as a result of sensationalism in movies, the importance of introducing sensitive topics to children young to help them learn empathy, to even the effect that comedy and satire have had on our society's tolerance for bigotry, this essay looks at the potential for media to be a mover and shaker in the world for progress and change, while also examining its potential for great works of evil, especially for a generation that is increasingly involved with making their identity line up with beliefs they see and integrate from media.

Funding:

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

Presentation #50

What Factors Influence Police Discretion for Cannabis-Related Offenses?

Maria Johnston* and Jesse Wozniak
Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Forensic Biology

In 2015, the Pittsburgh City Council voted to decriminalize the possession of small amounts of cannabis. With this decriminalization, however, officers still have the discretion to either issue a citation or arrest. It has been shown that Black people and other minority groups, although possessing and using cannabis at the same frequency of White people, are more likely to be arrested for their possession or use. After about four years of the policy being taken into effect, this study aims to answer the question of whether there is a significant difference in the frequency of arrests versus citations given to minorities compared to the frequency of arrests versus citations given to White people for cannabis possession and/or use. Arrest and citation data were collected from the Pittsburgh police from August of 2016 through September of 2020. This data includes information on the offense, race and age of the offender, location and time of the arrest or citation. Our aim is for this study and its findings is to be able to contribute to the broader discussion relating to the disparities in the justice system between minorities and Whites in America.

Funding:

WestVirginiaUniversity.
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #51

Wait For Me: To Hell and Back

Cynthia Anderson, EJ Wogaman*, Ashley Knox*, Katie Martin*, Cat Gatian*, Geoffrey Madge*, Bohdan Schevchenko, Scott Bartlett, Lynn Hileman, Joshua Swiger, Jason Zeh, Dallan Halkias*, and Juwan Johnson*
Loulie, Valeria and William Canady Creative Arts Center, School of Music, West Virginia University, Morgantown, WV 26505

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

Student's Major: Music Composition

We went to hell and back before the world went to hell and hasn't come back. In March 2020, the WVU oboe studio took a trip to New York City where we saw Broadway's "Hadestown", a modern retelling of the classic Greek myth of Orpheus and Eurydice. Its message of hope is best demonstrated through these lyrics from the show: "I'm working on a song / it isn't finished yet / But when it's done and when I sing it / Spring will come again." The world changed upon return from NYC, with school moving online just days following, but "Hadestown's" message stuck with us. In January 2021, Professor Anderson approached the oboe trio about creating something Hadestown-related. Ashley, a composition major, got to work arranging. We chose the track "Wait for Me" because it is representative of our current situation, waiting for the world to return to normal. Additionally, this is Katie and Ashley's last semester in the oboe studio, and they graduate into a world of unknowns, just as Orpheus descended into the unknown. We were fortunate enough to find vocalists, Juwan and Dallan, willing to take the roles of Hermes and Orpheus. Other double reeds were happy to lend their skills and Professor Joshua Swiger and Jason Zeh recorded. In this scene, Orpheus seeks out Eurydice, who has gone to Hadestown searching for warmth. Hermes tells Orpheus it was his fault, and the only way to get her back is to take the long road to Hadestown.

Funding:

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

Presentation #52

Enough

Taylor Walker*, Yoav Kaddar, Maureen Kaddar, and General Hambrick
College of Creative Arts, Department of Theatre & Dance, West Virginia University,
Morgantown, WV 26505

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

Student's Major: Dance

The purpose of this creative performance was as a protest for the unjust system, the police brutality and the racism, that black Americans face everyday. The killing of George Floyd sparked outbursts of media attention that provoked opinions from the people, good and bad. This is not the first time this has happened with unjust killings of my brothers and sisters, but this was the breaking point of national and universal protests that wasn't unnoticed. I wanted to include myself in the movement you know as Black Lives Matter. I felt something and it was a low point where I didn't know my part in any of it, but being a black woman made me realize I had to speak ten times louder so, I constructed Enough to act as my voice in the movement. I chose the song "I Can't Breathe" by H.E.R. to provide more insight on the intensity of the situation. She speaks about oppression, slavery, civil rights and the killing of black lives. The movements I chose flowed like the blood shed and I hit isolations with integrity. I planned every movement to emulate a feeling of pain and exhaustion. Real feelings of wanting this to be over. This performance will always mean something to me and hopefully to everyone who perceives it.

Funding:

Program/mechanism supporting research/creative efforts:
Other

Presentation #53

Women in Dance: Making Noise Through Movement

Lilly Runion*

College of Creative Arts, School of Theatre and Dance, West Virginia University, Morgantown, WV 26505

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

Student's Major: Dance and Women's and Gender Studies

This creative work consists of a piece I choreographed and directed the filming of, titled "La Femme." This piece was inspired by my passion for women's issues and my studies as a Dance and Women's and Gender Studies Major. In the Fall of 2020, I conducted a research project under the guidance of Professor Maureen Kaddar. This research involved exploring the impacts of female dancers and choreographers through history, dating back to the origin of dance itself. It was throughout this research that I was inspired to choreograph a piece that would reflect the oppression and silencing of women throughout history, despite their significant roles and impact. I choreographed "La Femme" over the course of three months, drawing inspiration from both my personal experiences as woman, as well as the experiences I have learned about throughout my studies.

Due to the ongoing pandemic, I had the opportunity to adapt and take this dance that would traditionally be performed on stage, and transform it for film. I embraced this opportunity to enhance my vision through visual effects and editing. In preparation for filming "La Femme," I attended two separate online seminars to expand my knowledge of dance on film. The piece was presented on November 28, 2020 during the WVU Dance Virtual Concert.

Funding:

Program/mechanism supporting research/creative efforts:
Other
WVU Contracted Honors Course

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #54

Can Pipeline Erosion Best Management Practices Cause Accidental Source Habitats for Amphibians?

Lee Shaw*, Walter Veselka, and James Anderson
Division of Forestry and Natural Resources West Virginia University Morgantown, WV 26506

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

Student's Major: Wildlife and Fisheries

Wetlands provide important ecosystem functions, which includes providing habitats for amphibians and macroinvertebrates. Amphibian and macroinvertebrate habitat can be purposely created through mitigation of wetlands and vernal pools, but incidental creation through construction of pipeline right-of-ways and other infrastructure also may occur. Water control methods and erosion best management practices (BMPs) help reduce erosion and improve water quality along pipelines, but the same BMPs can also become a breeding ground for amphibians and macroinvertebrates. We are evaluating amphibians and wetland macroinvertebrates associated with BMPs on a pipeline right-of-way in Harrison County, West Virginia. We hypothesize that the BMPs have created a superior habitat for amphibians and macroinvertebrates when compared to the water channels in other parts of the right-of-way. The aim of this experiment is to see if the created habitat that resides in the right-of-way has become a place that amphibians have turned into a sink or source habitat. We are currently conducting amphibian call count surveys and soon will collect macroinvertebrate samples. For amphibian surveys a ranking of 1 is assigned to species with nonoverlapping calls when an exact count of individuals can be made; a ranking of 2 is for species whose calls overlap and only estimations of numbers can be made; and a 3 to species that are calling in full chorus. Core samplers will be used to enumerate macroinvertebrates. Preliminary results indicate that Spring Peepers (Pseudacris crucifer) are most abundant and that Wood Frogs (Rana sylvatica) also occur. Our results will help improve right-of-way management.

Presentation #55

Assessment of sUAS Based NDVI for Pipeline Vegetation Monitoring

Lucas Kinder*, Samuel Bearinger and Shawn Grushecky
Natural Resource Analysis Center, Davis College of Agriculture, Natural Resources & Design,
West Virginia University, Morgantown, WV 26506-6108

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

Student's Major: Environmental and Energy Resource Management

The purpose of this research project is to validate vegetation coverage remotely on an existing vegetated pipeline corridor using a high resolution, small Unmanned Aerial System (sUAS) based multispectral sensor. A DJI Matrice 200 V2 sUAS system equipped with a Sentera 6x multispectral sensor will be flown over a section of Arsenal pipeline in order to create a Normalized Difference Vegetation Index (NDVI) using the red and near-infrared spectral images captured by the sensor. Each image will be stitched together to create a Red-Green-Blue (RGB) orthophoto and an NDVI orthophoto using Pix4D photogrammetry software. The NDVI orthophoto's resolution will be 2.9 centimeter pixels with each pixel containing an associated NDVI value of -1 to 1. Polygons will be chosen in the field based on 2 visual vegetation coverages, vegetated or bare, and the coordinates to the center of each are to be captured using a Spectra Precision SP80 GPS receiver. The NDVI should allow for a remotely captured, vegetated vs. non-vegetated qualitative assessment within georeferenced polygons on the pipeline corridor.

Program/mechanism supporting research/creative efforts:
Other
National Science Foundation EPSCOR Project "Improving Water Management, Treatment, and Recovery in Oil and Gas Production"

Presentation #56

The Effects of Land Use on Habitat Fragmentation in the Allegheny National Forest

Alexander M. Lawson*, Sara M. Crayton, and Donald J. Brown
Division of Forestry and Natural Resources, West Virginia University, Morgantown, WV 26506

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

Student's Major: Wildlife and Fisheries Resources

Habitat fragmentation is the process by which large, uninterrupted tracts of land are broken up into smaller tracts by human activity. As the large tracts of land are broken up into smaller tracts of land, edge habitat is formed. While edge habitat can be important for some wildlife species, it can be harmful to the environment due to potential increases in erosion and invasive species along potential changes to water quality. Additional research is needed on this topic to better understand the effects of land use on habitat fragmentation. The purpose of this study is to determine the effects of different types of land use on the levels of fragmentation of the Allegheny National Forest in Pennsylvania. During this study, we will use GIS technology along with spatial analysis tools to quantify fragmentation due to several different land uses, including oil and gas activity, logging roads, agricultural operations, and residential development in the Allegheny National Forest. We will then look for a correlation between the different land uses and fragmentation. We expect oil and gas activity and logging roads to fragment the habitat more than agricultural operations and residential development. As the human population continues to grow, fragmentation will continue to increase due to an increased human presence.

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

Presentation #57

Which fungal friend is the best to trees at nutrient highs and lows?

Lydia Peterson*, Emel Kangi, and Edward Brzostek
Department of Biology, West Virginia University, Morgantown, WV 26505

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

Student's Major: Horticulture

Most trees form symbiotic relationships with mycorrhizal fungi to increase their ability to take up nutrients. However, it remains unknown the extent to which the growth benefit of mycorrhizal fungi differs between the two main types: arbuscular mycorrhizae (AM) vs. ectomycorrhizae (ECM). As such, our central research question was to determine under which nutrient conditions AM or ECM fungi were most beneficial to poplar trees. We used poplar trees (Populus grandidenta) because, unlike most plants, poplar uses both ECM and AM fungi allowing us to isolate mycorrhizal effects. To answer our question, we grew poplar seedlings in the greenhouse and varied the mycorrhizae (i.e., AM, ECM, or none) and the levels of nitrogen (N) and phosphorus (P). After eleven weeks, we harvested the seedlings and weighed the dry mass of leaves, wood, and roots. At high N and P, we found that the trees with no mycorrhizal fungi had the most growth. It was only at low P levels that mycorrhizae were beneficial, with both ECM and AM stimulating growth. Finally, at low N and low P levels, seedlings with ECM fungi had the greatest growth rates. Collectively, our results suggest that at high nutrient levels the cost of mycorrhizae outweighs their benefit with mycorrhizae only beneficial to plant growth when the nutrient return on investment stimulated growth.

Program/mechanism supporting research/creative efforts:
Other
First2 Network

Presentation #58

The Street Tree Diversity of Eleven Small Ohio Communities

Riley Pierce* and Gregory Dahle

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

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

Student's Major: Forest Resources Management

Biodiversity is an important factor in preventing the spread of diseases and pests, and diverse communities have improved resilience to the effects of harsh environments. One of the most harsh environments for woody plants is urban areas, where various factors can inhibit plant growth. Due to these harsh conditions, urban foresters often select tree species that can tolerate the difficult conditions. This limits the number of species that are often utilized in the urban forest, yet street tree diversity has been shown to vary across the United States. This research assesses the street tree diversity of eleven cities in Ohio. An analysis was made using municipal street tree inventories that identified the trees at the family, genus, and species level. For each of the inventories the Simpson Diversity Index, Shannon-Wiener Diversity Index, and relative abundances were compared. Additionally, the ratio of gymnosperms to angiosperms was derived. The available street tree inventories ranged from a population of 398 trees to 29,727 trees. The results indicate that the inventories included a narrow range of woody species. Furthermore, the results show, as anticipated, that the maple genus (Acer) was more abundant than any other genus. However, at the species level there are a variety of species that occur most frequently, ranging from the callery pear (Pyrus calleryana), honey locust (Gleditsia triacanthos) and silver maple (Acer saccharinum).

Funding:

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

WestVirginiaUniversity.
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #59

Recommendations for a New Water Treatment Facility based on Water Production Data

Abigail Paul* and Shawn T Grushecky.
Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV 26506

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

Student's Major: Chemical Engineering

The production of natural gas and petroleum requires and produces a substantial amount of water with some wells producing up to two million gallons of produced water a year. The water that these unconventional wells produce must be either treated, stored underground, or reused in the fracking process. Treatment of this water proves difficult because of its high salts concentration as well as other environmental toxins. The most common method to handle the produced water is to store it underground in injection wells. Data from the West Virginia Department of Environmental Protection was analyzed to determine the amount of water that each well produced from 2016 to 2019 that must be either treated or otherwise disposed of. The locations of where this water was being produced were also analyzed. Based on this information, recommendations were made on where the best location for a new water treatment facility would be. The costs associated with this treatment facility were calculated and compared to the current costs associated with trucking the water for reuse or underground storage.

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

Presentation #60

The Effect of Arbuscular Mycorrhizal Fungi on Terpene and Cannabinoid Levels in Industrial Hemp

Jonathan Morgan*, Bill Wheeler, Matt T. Kasson, and Michael Gutensohn
Davis College of Agriculture, Natural Resources & Design, West Virginia University, Morgantown, WV 26506

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

Student's Major: Horticulture

Arbuscular mycorrhizal fungi (AMF) are a type of symbiotic fungi that penetrate the cortical cells of plant roots and form specialized nutrient exchange structures called arbuscules that help capture phosphorus, nitrogen, and micronutrients. In this project, we will study the potential interaction of different AMF species with a few selected hemp varieties to determine the impact of AMF on the terpene and cannabinoid levels. Based on a general understanding of how AMF can modulate plant metabolism coupled with preliminary studies, we hypothesize that AMF will interact with hemp and have a considerable effect on the terpene and cannabinoid metabolism of the examined hemp varieties. This project has two main objectives: (1) test the interaction of up to 10 different AMF species with one industrial hemp variety, and (2) compare the interaction of one selected AMF species with different types of industrial hemp including fiber, grain, CBD, and CBG varieties. To do this, hemp plants will be inoculated with spores of AMF species at the seedling stage and subsequently cultivate until they flower. Fungal growth in roots will be studied by spore counts and root staining to quantify colonization. For the analysis of terpenes and cannabinoids, hemp flowers and leaves will be extracted with methyl tert butyl ether (MTBE) and extracts subsequently analyzed by combined gas chromatography/mass spectrometry (GC/MS). These analyses will help determine what effect AMF species has on the accumulation of terpenes and cannabinoids in different hemp varieties.

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

Presentation #61

Understanding Microplastic Accumulation in Smallmouth Bass, Micropterus dolomieu, in the Monongahela River, WV

Ayden Bailey*, Kyle Hartman, and Kaylyn Zipp
Department of Wildlife & Fisheries, West Virginia University, Morgantown, WV 26506

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

Student's Major: Forensic Chemistry

The field of microplastic study has been steadily increasing over the years as we became more aware of the possible detrimental effects on the environment. However, an examination of the published studies on microplastics as related to aquatic wildlife shows that only 4% of these studies are specific to freshwater fish (Jingyi Li et al, 2018). By analyzing the amount of microplastics found in individual riverine smallmouth bass, we hope to increase the shared understanding of the widespread presence of microplastics in freshwater fish. This in turn will lead to a greater understanding of possible measures to respond to ubiquitous freshwater microplastics. Alternatively, it may suggest that such measures are not immediately necessary. We performed dissections on Micropterus dolomieu (smallmouth bass) that fellow research group members collected for a previous project. The stomachs of the samples were of particular interest as they had the highest expectation of microplastic presence. The inorganic nature of plastic makes it more difficult to break down at the same rate of organic materials in the stomach, so the stomachs were chemically digested to reduce the organic matter. The microplastics found were categorized by size and visual identification of form (fiber, fragment, sheet, etc). We expected the stomachs of the larger fish to contain higher numbers of microplastics as a result of bioaccumulation. Preliminary analysis suggests that this hypothesis is accurate, with the stipulation that microplastics of the smallest category are most abundant across all samples.

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

Presentation #62

Analyzing Total Suspended Solids in the West Run Water Shed using method SM2540B

Samantha Williams*1,2, Jason A. Hubbart1,2, and Susan Hickman2
*1 Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV, 26506 2
Institute of Water Security and Science, West Virginia University, Morgantown, WV, 26506*

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

Student's Major: Environmental, Soil, and Water Sciences

Accurate estimates of Total Suspended Solids are important for receiving water assessments and watershed management and planning. However, differences in results between practitioners can be substantial but is often not assessed. Unchecked, these differences could lead to substantial error in land management decisions. To assess differences between personnel performing the exact same test, two replicates (SW and SH) of each of twenty-two monitoring sites (from the same sub-sample of water) were analyzed for total suspended sediment (TSS) using the National Environmental Methods Index method SM2540B. Each water sample was filtered using a vacuum pump system. The filters were dried in in the oven until samples remained within 4% or 0.5 mg mass change over time. Samples were cooled and weighed. Results indicated substantial differences between analysis results for different individuals. For example, the average TSS was 18.8 mg/L and 14.3 mg/L for SW and SH, respectively, a 31% difference. Maximum TSS was 102.0 mg/L and 93.0 mg/L, for SW and SH respectively, a 9.6% difference. Standard deviation was 25.15 and 21.41 for SW and SH, respectively, or a 17.5% difference. Collectively, study results indicate a large difference between individuals conducting this analysis, that could result in a great deal of error (depending on where the error lies) and incorrect evaluation(s) of results. This work emphasizes the need to be sure that practitioners are well trained, using identical methods, and making sure that results are statistically comparable.

Program/mechanism supporting research/creative efforts:
a WVU 297-level course
Federal Work Study

Presentation #63

Exploring Species Boundaries for Neonectria magnoliae

Hannah Petronek*, Brian Lovett, Cameron M. Stauder, and Jeff Garnas
C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biochemistry

Fungi in the Nectriaceae include important plant pathogens that cause annual and perennial canker diseases. In the central Appalachian Mountains, a recent survey uncovered Neonectria magnoliae causing perennial cankers on Fraser magnolia (Magnolia fraseri) and tulip-poplar (Liriodendron tulipifera) but in different forests at different elevations. Phylogenetic data indicate N. magnoliae may include at least two cryptic species, but more data are needed to confirm these findings. To help further resolve species boundaries, additional isolates of N. magnoliae were collected from both hosts at three locations in West Virginia. Morphological studies revealed strains from one clade (from Fraser magnolia) produced both macro- and microconidia, while isolates from a second clade (from tulip-poplar) only produced microconidia. Phylogenetic analysis of elongation factor 1-alpha (EF1) DNA sequences confirmed our previous findings: isolates from each host fell within separate lineages and together formed a monophyletic clade. Recently, an additional strain of N. magnoliae was recovered from alder and was identical to strains from magnolia. Cross-pathogenicity studies are underway to determine pathogenicity of N. magnoliae strains from both lineages on tulip-polar. These findings highlight the importance of combining phylogenetic approaches with morphological studies and host range testing to better delimit species boundaries and understand the threats these species pose.

WV West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #64

Monitoring Revegetation with NDVI and Associated Soil Composition and Microbial Biomass and Activity

Michael Fiala*, Paul Kinder, Ember Morrissey, and Walter Veselka.
Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV 26506

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

Student's Major: Environmental Microbiology

Transportation of a liquid or gas through pipelines has proven beneficial in providing fuels and resources over long distances and through landforms in a reliable and environmentally friendly manner. Although oil and natural gas production are essential to maintaining a modern society, unfortunately, these activities can also cause severe degradation to natural ecosystems. Reclamation of disturbed lands after pipeline construction is now required, and companies must show evidence of revegetation. One example of how revegetation efforts can be monitored is via drones. Drones are autonomous aircraft that collect high-resolution images used to calculate a Normalized difference Vegetation Index (NDVI) to estimate the health of green vegetation. NDVI is often used in precision agriculture by observing the distinct wavelengths of visible and near-infrared sunlight reflected by vegetation. Chlorophyll found in vegetation absorbs visible light for photosynthesis, whereas the cell structure of vegetation strongly reflects near-infrared light. Healthy vegetation growth is then associated when reflected near-infrared light wavelengths occur in a large portion. Therefore, monitoring revegetation using high-resolution imaging (NDVI) has proven successful, and linking positive NDVI values with soil health metrics could help connect aboveground recovery with belowground processes. To address this knowledge gap, we used NDVI values to identify high- and low-quality areas along an established oil pipeline and collected soil samples to measure key soil parameters (moisture percentage, pH, soil organic matter) and microbial biomass and activity. Tying soil health to NDVI data will help managers better assess ecosystems' long-term recovery along pipelines.

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

Presentation #65

Assessing the Impacts of Hydraulic Fracturing on Stream Health using Algal Diversity in Biofilms

Teagan Kuzniar*, Rachel Michaels, Kevin Eliason, Todd Petty, Michael Strager, Paul Ziemkiewicz, and Ember Morrissey
Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 26506

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

Student's Major: Environmental Microbiology

Hydraulic fracturing is a method of gas and oil extraction that involves injecting high-pressure liquids into the 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, any 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 photosynthetic eukaryotes (algae) in biofilms close to hydraulic fracturing sites. We collected biofilm samples from 26 streams in W.V. with varying levels of hydraulic fracturing within the watershed. High levels of hydraulic fracturing development were associated with reductions in the beta diversity of biofilm algae and changes in community composition. Additionally, impacted sites had a higher proportion of algae in biofilm communities, potentially due to greater stream light availability from deforestation. Our results suggest that hydraulic fracturing within a watershed affects stream biofilm microbial communities, and therefore, broader ecosystem function.

Program/mechanism supporting research/creative efforts:
Other
Paid researcher

Presentation #66

Difference in the Number of Passerine Complex Songs Between a Rural and Urban Site

Daniel Rubianto*, Christopher Rota, and Ian Perkins*
School of Natural Resources, West Virginia University, Morgantown, WV 26505-6125

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

Student's Major: Wildlife and Fisheries Resources

An increase of urban noise and regional changing climate differences can lead to different patterns in bird song as well as a change in song phenology. We conducted a study to compare the number of complex songs by northern cardinal, song sparrow, and white-throated sparrow between a rural and urban environment to better understand how singing phenology can differ due to differing levels of urban noise and climate. Audio recordings were taken from a rural and urban study site using autonomous recording units (ARUs) during sunrise times for each individual day. Recordings were analyzed to note the number of complex songs by each target species after sunrise in one ten-minute block for each day. We predict that there will be a difference in the number of complex songs for each species between the rural and urban site in the analyzed ten-minute blocks. The prediction would suggest that differing levels of noise due to urbanization and climate has some effect on complex song phenology and pattern among the target species. Further study can be taken to consider the differences in frequency and amplitude of the complex songs due to a difference in levels of urbanization.

Presentation #67

Body Condition Index of Birds Across Two Sites in Northern West Virginia

Nicholas S. Summerlin*, Christopher Rota, Hannah Clipp, and Stephanie Augustine
Division of Forestry and Natural Resources, West Virginia University, Morgantown, WV 26505

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

Student's Major: Wildlife and Fisheries Resources/Recreation, Parks, and Tourism Resources

For this study, we wanted to find the differences of body conditions of birds across urban and non-urban environments. Some differences in these environments include food resources, predators, and soundscapes, and this lead us to believe that due to these differences, the Body Condition Index (BCI) across the environments would be significantly different. Through the use of mist nets, we captured and measured a multitude of species of birds. We captured at two locations, Prickett's Fort State Park in Marion County, WV, (non-urban environment) as well as the Core Arboretum in Morgantown, WV (urban environment). With each capture of these species, we recorded data about their wings, tails, tarsus length, weight, sex, and age. There were 4 species we collected enough data for: Black-capped Chickadee (BCCH), Northern Cardinal (NOCA), Song Sparrow (SOSP), and Tufted Titmouse (TUTI). Using regressions of tarsus length and weight, we calculated the residuals, which equated to the BCI. After finding the BCI of each individual bird, we were then able to compare the data across the urban and non-urban site. Based on the data we collected, we were only able to find comparisons amongst the sites for BCCH and SOSP. For BCCH, the greater BCIs were found at the urban site, and for SOSP, the greater BCIs were found at the non-urban site. This could mean that BCI at a specific site is totally dependent on the species, but more data will need to be collected in the future to determine a correlation.

WestVirginiaUniversity®
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #68

Population Change of White-throated Sparrows (Zonotrichia Albicollis) in West Virginia During Winter season

Jisu Kim*, Christopher Rota, Stephanie Augustine, and Hannah L. Clipp
Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV 26505

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

Student's Major: Wildlife and Fisheries Resources

White-throated sparrows (Zonotrichia albicollis) are migratory birds in passerellidae family. They are generally in northeast. In summer, during breeding season, they move to Canada, the norther eastern U.S. and the northern Midwest. During their non-breeding season in winter, from December to March, they migrate to eastern and southern U.S. including West Virginia. There are some migratory birds that migrate irruptively such as common redpoll (Acanthis flammea) that migrate mostly within Canada and handle with cold climate. Lately during recent resights, there has been some decreased sights of white-throated sparrows and brought a question that would they respond or migrate same as before with different temperature? To bring it to actual finding, we are comparing the population of this specie in several hotspots in West Virginia and southern states with the population in past using eBird and other resight data. Also, we are comparing the population change of white-throated sparrow with the population of northern cardinals (Cardinalis cardinalis) as they are all-year-around birds not migrating elsewhere. By setting northern cardinals as baseline, we can observe whether there is an actual change for white-throated sparrow migration or not.

Funding: West Virginia University

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

WestVirginiaUniversity®
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #69

The Presence of Domestic Cats Near Bird Populations in Urban and Non-Urban Settings

Ian P. Perkins*, Christopher Rota and Daniel Rubianto*
Division of Forestry and Natural Resources, West Virginia University, Morgantown, WV 26506

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

Student's Major: Wildlife and Fisheries Resources

Birds face many challenges in the everchanging landscape caused by urbanization and development. Over the past century there has been a drastic decrease in bird populations across the U.S and much of this is attributed to man-made environmental changes such as loss of habitat and many other factors caused by anthropogenic activities. A major contributor to this dramatic drop in birds is the common house cat (Felis catus). Previous research has shown that cats contribute to millions of bird deaths each year. This predation has a major impact on bird populations and can be difficult to prevent. In many areas stray cats prey on birds as a source of food and house cats when let outside also hunt birds. It is important to know the effects of cats on wild bird populations in both rural and urban areas to mitigate this problem. Although data has not yet been collected, it is predicted that urban areas will see more cats present than in rural areas because of the proximity to a denser human population. To test if domestic cats are present and the different distributions between a rural and urban gradient, game trail cameras will be used to capture the presence of cats in the area, along with any other mammalian predators seen on the cameras. Once data has been collected and analyzed it can be used to determine the area most at risk and where future efforts should be focused in dealing with domestic cats.

Funding:

Presentation #70

Expression of OOSNCR1 and OOSNCR5 Within Bovine Tissue Cells

Maighan Bailey*, Jaelyn Current, and Jianbo Yao
Davis College of Agriculture, Natural Resources and Design, West Virginia University, Morgantown, WV 26506

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

Student's Major: Immunology and Medical Microbiology

Early embryonic loss is a major factor contributing to infertility in beef cattle. It is well documented that the oocyte plays an active role in various biological processes including successful fertilization and early embryonic development. To achieve developmental confidence and proper early embryonic development, the oocyte must be able to resume meiosis, cleave upon fertilization, sustain early embryonic development, activate its genome, and establish and sustain the pregnancy. Within mammals, the maternal RNAs accumulate in the oocyte to play important roles in fertilization and early embryonic development of the zygote. Based on RNAseq data, it was established that LncRNAs OOSNCR1 and OOSNCR5 were oocyte specific. The objective of the experiment was to investigate if these LncRNAs are oocyte specific in the cow. RNA isolations were performed on fifteen bovine somatic tissues collected from a local slaughterhouse. RPL19 is a housekeeping gene that was used as a control for the experiment. The results showed that OOSNCR5 is expressed in the Fetal Testis.

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

WEST VIRGINIA UNIVERSITY®
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #71

The Effects of Sensory Reward Cues on Reinforcement Learning

Molly Summers* and Mariya Cherkasova
Life Science Building, West Virginia University, Morgantown, WV 26506

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

Student's Major: Neuroscience

Reward cues, such as the bells and whistles in slot machines, can have important motivational effects. For example, such reward cues can encourage risky behavior (Cherkasova et al, 2018). However, it is currently unknown whether such cues also influence learning from experience about which actions yield rewards or reinforcement learning. Compulsive gambling despite repeated losses may exemplify failure in reinforcement learning, and previous work suggests that gamblers indeed learn about reward probabilities more slowly, i.e. have a slower learning rate (M.S.M Lim et al. 2015). This means that their present decisions aren't being properly guided by the outcomes of their past decisions. With our study, we examine if casino-inspired audiovisual reward cues will affect learning rates and other reinforcement learning parameters. Participants will need to make choices between two options that can earn them points. Participants will not know which option to choose on each trial and will have to guess this based on the outcomes of their previous choices. We are looking to see how fast the participants will learn reinforcement probabilities when the rewards are accompanied versus unaccompanied by the cues. We hypothesize that the presence of the audiovisual reward cues will lead the participants to believe that they are winning more often than they actually are and this will slow down their learning rate.

Funding:

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

Presentation #72

HSTA In College: Strengthening The Pipeline for Underrepresented Students in STEM and Health Sciences

Katherine S. Lee*; Gregory D. Epps Sr., EdD; Sean P. Freeland, MA
West Virginia University Health Sciences Center, Morgantown, WV, 26505

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

Student's Major: Immunology and Medical Microbiology

To meet a nationwide need for improved diversity in STEM at the professional level, STEM and Health Science pipeline programs find success in guiding students from underrepresented backgrounds to enter college programs in related fields. Still, persistence and retention rates within this population remain unfavorable. The literature supports the use of mentor relationships, extracurricular involvement, and living/learning communities as just a few of the initiatives that can positively impact the likelihood of underrepresented students persisting in their chosen programs of study. Incorporating meaningful opportunities for involvement contributes to an overall feeling of belonging that positively impacts students' sense of self. Laying the groundwork for future supportive programming, this project focuses on the pilot years of the Health Sciences and Technology Academy (HSTA) Ambassadors Program initiative at West Virginia University. This program engages HSTA alumni students from underrepresented backgrounds in West Virginia (minority, rural, first-generation college student, financially disadvantaged) in networking opportunities and a community that continues many supportive aspects of their high school program. Program impact is then evaluated by tracking the evolving self-identities of student cohorts using pro-academic identity surveys and qualitative feedback collected during interactions with program facilitators. The initiatives and findings of this project have broad implications for improvements to STEM and Health Science programs at universities across the country.

Program/mechanism supporting research/creative efforts:
Other
Honors EXCEL Program

Presentation #73

Police Officers in Schools - Helpful or Harmful?

Sarah Smith*
West Virginia University, Morgantown, WV 26504

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

Student's Major: Child Development and Family Studies

Little research has been done on the effectiveness of School Resource Officers (or SROs) since their position in American schools began rapidly increasing following the Columbine High School mass shooting in 1999, but almost everyone has an opinion on the necessity of their placements. Some individuals feel as though their SROs were friendly and gave them a positive experience with the police at a young age, but some found their SROs to be overbearing and making their schools feel like a pipeline directly to prison. This study aims to analyze the varying laws and policies to become a SRO in different states, how students of different ethnicities, sexualities, genders, and more had different experiences in their schools, and what is the best way to handle having police officers in our schools. The results of this study are still ongoing, but it has been found that students of historically marginalized communities typically reported less favorable experiences with their SROs, and SROs who engaged in exclusively reactive discipline instead of proactive discipline had higher rates of crime within their schools. It was also found that SROs were more likely to sexually assault children than standard police officers - seemingly indicating that some attempted to use their position to get more access to children. In my opinion, the School Resource Officer Program would benefit from a more standardized, nationwide training and application policy and more regulations specifying exactly what SROs can and cannot do.

Funding:

Presentation #74

The Effects of Different State Policies on Rising Inequality and Costs in the States

Sean van Besouw* and William Franko
Department of Political Science, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Political Science (Behavioral & Social Sciences)

Student's Major: Political Science

In the US, inequality is rising and states are taking their own measures to combat rising costs in housing, health care, child care, and education. This rising inequality created an affordability crisis for middle class Americans. Some states have done a better job than others at implementing innovative and effective policy to combat rising costs. The goal of this research is to examine new and innovative state policies on inequality and how they affect the residents living in those states. This research will look at the amount and effectiveness of policies passed to combat the rising inequality in all 50 states + Washington DC and determine which states pass the best and most effective, as well as which states have had the highest rising inequality over time. Using different means and measurements the impact of these state policies will be found and their outcomes can be seen. Next, this research will discuss how the residents of each state compare to each other in the four aspects of rising inequality, and which specific policies got the better states ahead of the lagging ones. The expected outcome is that states that passed more wide reaching redistributive policies will likely have better economic outcomes regarding inequality than states which did not pass these policies. If the expected outcome is found, this will shape state policy to include the successful policies from states that have experienced success in lowering economic inequality.

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

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #75

Trans*forming Healthcare in West Virginia

Nicolette Shaffer*, Megan E. Gandy, and James Weiss
School of Social Work, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Social Work & Human Services (Behavioral & Social Sciences)

Student's Major: Social Work

For my research project we created an advisory board committee for transgender healthcare in West Virginia. We aimed to improve the experiences and care for transgender and gender diverse (TGD) individuals within the West Virginia University healthcare system. To accomplish this goal the board committee will work between the public and West Virginia University to create the best system possible for everyone. To create the most educated and responsive board we examined existing research on the findings already in place about TGD people in rural areas. We wanted to know about their experiences in healthcare to understand where the biggest issues were. The board will enable us to connect to the community to gain members to participate in both synchronous and asynchronous focus groups. These groups will consist of transgender or gender diverse individuals to evaluate their experiences, feelings, and ideas surrounding West Virginia University's healthcare system and gender-related healthcare overall. We most likely will find, through these focus groups, several areas where the West Virginia University medical system can improve to create a safer and more accepting environment for TGD individuals. This then would lead to helping extend services and education for the healthcare system to allow these issues to be resolved. With these education tactics and improved acceptance in several areas, the TGD population using the medical system hopefully will feel comfortable and validated.

Program/mechanism supporting research/creative efforts:
a WVU 297-level course

Presentation #76

Parents' Valuing Happiness and Teen Depression: The Mediating Effect of Teens' Value of Happiness

Anna Moody*, Isabella Camerlin, and Amy L. Gentzler
Eberly College of Arts and Sciences, West Virginia University, Morgantown, WV 26506

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

Student's Major: Psychology

One-third of adolescent girls and one-fifth of adolescent boys in American are suffering with high depressive symptoms (Twenge, 2020). If the roots of these symptoms can be determined, it is possible that depressive symptoms in teens could be reduced or prevented. Research has found that excessively valuing happiness is associated with higher depressive symptoms in both adults (Mauss et al., 2011) and adolescents (Gentzler et al., 2019). Thus, it is important to determine how adolescents develop an obsession with their happiness. Because teens may be learning how to think about happiness from their parents, this study investigated if parental value of happiness is related to teens' value of happiness, and as a result, teens' depressive symptoms. This study included 288 teens (51.5% female, age 14-16), 238 mothers, and 90 fathers who completed questionnaires measuring value of happiness and depressive symptoms. The results indicated that both mothers and fathers who more excessively value their own happiness have teens who report more depressive symptoms, in part because their teens also excessively value their happiness. Implications for the study include applications in a clinical settings and prevention efforts focused on helping teens develop healthier beliefs about happiness.

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

Presentation #77

Assessing Risk Factors of Sexual Assault Victimization on College Campuses

Lindsay Kahle Semprevivo, Kathryn Burnham, and Wren King*
Department of Sociology and Anthropology, West Virginia University, Morgantown, WV 26505

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

Student's Major: Anthropology, Women's and Gender Studies, and Geography

On average, 20% to 25% of women and 6% of men in college will experience some form of sexual assault. Research focusing on college campus sexual assault often focuses on how social context plays a role in assault prevention, yet few studies have focused on identity factors in this context. We seek to consider this issue through the utilization of the Campus Climate Survey conducted by the Association of American Universities. The data were collected using a web-based survey, between April and May 2015, at 27 universities across the US. The total sample included 150,380 undergraduate, graduate, and professional students. A series of logistic regressions were utilized to test several factors, including age, classification, and sex on victimization, with a specific focus on the intersections of gender, sexual orientation, race, and ethnicity. Results show that citizenship, disability, females or LGBQ+ identities, being a woman of color, and campus climate all contribute to higher odds of experiencing sexual assault. There is little to no research on the victimization of international students and students with registered disabilities, but our findings show that it is an issue that must be addressed as these individuals are not being well-served by their institutions. Implications are discussed within the context of West Virginia and the nation at large.

Funding:

Presentation #78

Comparative Study of Social Integration Disparities Between First-Generation and Non-First-Generation STEM Students

Tyler Giorcelli* and Miriam Leary
Miriam Leary Department of Exercise Physiology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Exercise Physiology

First-generation (FG) students leave STEM fields at higher rates than non-first generation (NFG) counterparts. This study explored the role of social integration in graduates from STEM majors and compared responses between FG and NFG students. An anonymous online survey was emailed to graduating seniors in a STEM major during the last month of classes at a public 4-year land grant institution in Appalachia. Of 110 invited participants, 91 (83%) completed the survey. Twenty students (22%) self-identified as FG (85% female) and 71 (52% female) did not. FG students had a lower GPA than NFG (3.28 ± 0.28 vs. 3.5 ± 0.34, $p < 0.05$), but the percentage of Honors students were similar between groups (27% NFG, 25% FG). Fewer FG were satisfied with their social life (85% NFG, 75% FG); despite a similar sense of connectedness with other students in the major (80% NFG, 75% FG) fewer FG students felt a strong sense of connectedness with other university students (90% NFG, 75% FG). FG students were less likely to spend time with friends rather than alone (70% NFG, 45% FG) and have a strong social network at the institution by their senior year (90% NFG, 80% FG). FG students were more likely to work (39% NFG, 50%), but less likely to participate in Greek life (11% NFG, 0% FG), tutoring (35% NFG, 20% FG), and campus events (31% NFG, 20% FG). Even after successfully persisting within a STEM major to graduation, FG students show lower social integration than NFG students.

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

Presentation #79

The Effectiveness of Art therapy Interventions in Cancer Center Institutes

Joanna Rose Jacinto*, Monika Holbein1 and Annie McFarland2
1 WVU Cancer Institute Research Programs, WVU Cancer Institute, Morgantown, WV 26505; 2 Department of Art Education, WVU School of Art and Design, Morgantown, WV 20505

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

Student's Major: Art Education

With the constant battle of cancer patients for their lives, their physical and mental well-being suffer the consequences of the effects on their journey. Cancer often causes severe pain and discomfort in patients and their families; therefore, providing therapeutic support must be considered for their needs. Administering therapeutic interventions can aid by minimizing emotional and psychological hardships and possibly improve health outcomes. Art therapy is used to improve cognitive and sensory-motor functions, foster self-esteem, and self-awareness, cultivate emotionally; resilience, promote insight, enhance social skills, reduce and resolve conflicts and distress, and advance societal and ecological change (About Art Therapy, 2017). Statistically significant and positive correlations have concluded between reductions of cancer symptoms and side effects after exposure to art therapy treatments (Nainis et al., 2006). In this study, a quasi-experimental, pre-posttest, and non-equivalent group design has been utilized to measure patient distress levels before and after participation in art therapy activities at the WVU Cancer Institute. The National Comprehensive Cancer Network (NCCN) Distress Thermometer tool will provide quantitative data on patient distress levels before and after art therapy activity. This unique method will help obtain an understanding of the effectiveness of art therapy treatments within the WVU Cancer Institute.

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

Presentation #80

Associations among Pregnancy, Distress Tolerance, and Fear of Pain

Hannah E. Brown*, Cecelia I. Nelson, and Daniel W. McNeil
Department of Psychology, West Virginia University, Morgantown, WV 26505

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

Student's Major: Psychology and Communication Studies

Although distress tolerance and fear of pain have been shown to impact many negative emotional and physiological states which women experience during pregnancy (e.g., anxiety, physical discomfort), there is limited research examining the association of these variables during this critical time period. The aim of this study was to understand the associations among distress tolerance and fear of pain, and their relation to a propensity to experience anxiety (i.e., anxiety sensitivity) during pregnancy. Data were collected from 150 women (M age=32.4, SD=6.2), some of whom were pregnant and some not, via Amazon's Mturk. Participants completed the Fear of Pain Questionnaire-9, Distress Tolerance Scale, and the Anxiety Sensitivity Index-3. Results showed a nonsignificant negative correlation between distress tolerance and fear of pain ($r=-.12$, $p=.14$). Pregnancy status also did not moderate the relation between distress tolerance and fear of pain ($p=.10$). Anxiety sensitivity, however, was related to both fear of pain ($r=.24$, $p<.01$) and distress tolerance ($r=-.33$, $p<.001$). With regard to pregnancy status, a model including anxiety sensitivity and pregnancy status predicted variance in fear of pain ($R=.29$, $F(3,145)=4.57$, $p<.01$), however, pregnancy status did not reliably moderate the correlation between anxiety sensitivity and fear of pain ($p=.07$). Thus, this study establishes an association between a disposition to experience anxiety and distress tolerance and fear of pain in women, regardless of pregnancy status. Additionally, pregnancy status contributes to variance in fear of pain in the presence of anxiety sensitivity, but more research is needed to establish the nature of this association.

Presentation #81

Considering the Role of Ethnicity and Romantic Attachment Style in Understanding Parenting Stress

Gabrielle M. McDonald*, Natalie E. Watson*, Lindsay R. Druskin, Christopher K. Owen, Robin C. Han, Jane Kohlhoff, and Cheryl McNeil
Department of Psychology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Psychology

Parenting stress has been thoroughly demonstrated to impact parenting behaviors, such that higher levels of parenting stress have been linked to harsh, negative parenting behaviors (Deater-Deckhard, 1998). Thus, it is critical to understand parent-level factors associated with parenting stress to inform effective intervention strategies.

Previous research has found a correlation between poor romantic attachment and higher levels of parenting stress in new, first-time parents (Rholes et al., 2006). Additionally, higher levels of parenting stress have been reported in non-Caucasian parents (Kim et al., 2020). However, researchers have yet to examine these associations in a sample of families with toddlers clinically referred for behavioral problems.

We hypothesize that mothers with high levels of avoidant or anxious romantic attachment will have higher levels of parenting stress than mothers with low levels of avoidant or anxious romantic attachment. We hypothesize that mothers who are non-Caucasian will experience higher levels of parenting stress than mothers who are Caucasian.

Participants include 84 parents (Mage = 32.65 years) and their toddler-aged children seeking treatment in a larger study. Parents reported on their romantic attachment using the Experiences in Close Relationships Scale-Short Form (Wei et al., 2007) and parenting stress on the Parenting Stress Index-Short Form (Abidin, 2012) during the pre-treatment assessment. Independent samples t-tests will be conducted to examine group differences in parenting stress between parents with high and low levels of anxious and avoidant attachment and between Caucasian and non-Caucasian parents. Understanding ethnicity and attachment will be beneficial for future intervention research targeting parenting stress.

Funding:

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

Presentation #82

Qualitative and Quantitative Changes in Verbalizations during PCIT for Children with Autism Spectrum Disorder

Lauren Browning*, Kelsey Keen*, Robin Han, Suzi Naguib, Rachel Piper, and Cheryl McNeil
Department of Psychology, West Virginia University, Morgantown, WV 26505

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

Student's Major: Psychology

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that is growing in prevalence, from 1 in 59 in 2014 to 1 in 54 in 2020 (CDC, 2020). Around 25% of children with ASD also have a disruptive behavior disorder (Kaat & Lecavilier, 2013). Parent-Child Interaction Therapy (PCIT) is an evidence-based treatment for young children with disruptive behaviors (McNeil & Hembree-Kigin, 2010). Although PCIT was originally designed to treat children with disruptive behavior disorders, there is growing evidence that it can be used for children with autism (Masse et al., 2016). In PCIT, parents are coached to follow their child's lead during play by using positive responsive verbalizations and avoiding negative leading verbalizations. However, little research has been done to evaluate how the child's verbalizations change throughout treatment. The current study seeks to examine changes in the quality and quantity of child verbalizations during PCIT among a community-based sample.
 The sample consisted of 11 parents and their children, all of whom had a diagnosis of ASD and were referred to a community-based clinic for PCIT. During a 5-minute free-play interaction, child verbalizations were counted and coded using the Dyadic Parent-Child Interaction Coding System (Eyberg et al., 2013) at pre- and post-treatment. Paired t-tests were used to examine pre-post differences in child verbalizations. Although PCIT doesn't directly target child verbalizations, the current study seeks to examine if child verbalizations will change in quality and quantity when parents are taught to reflect children's words, describe their actions, and praise positive behaviors.

Funding:

Presentation #83

Changes in Child Compliance after Parent-Child Interaction Therapy for Children with Autism Spectrum Disorder

Emily Lafferty*, Kelsey Keen*, Suzi Naguib, Rachel Piper, Robin Han, and Cheryl McNeil
Department of Psychology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Psychology

There has been a recent uptick in Autism Spectrum Disorders (ASD) diagnosis of children so that now every 1 in 54 children are diagnosed with an ASD (CDC, 2020). Many children with ASD also report having a behavior disorder (Kaat & Lecavilier, 2013). Parent Child Interaction Therapy (PCIT) is an evidenced based treatment used with children who demonstrate disruptive disorders. PCIT is similar to ASD treatments like caregiver involvement, so clinicians are becoming more likely to refer them for PCIT (Knap 2018). PCIT is composed of two phases: Child-Directed Interaction (CDI) and Parent-Directed Interaction (PDI). In CDI, parents are instructed to go along with their child's play while using positive verbalization. In PDI, parents are taught to give effective commands and respond in a consistent manner to both child compliance and noncompliance. This study aims to examine the change in compliance for children with ASD from pre-treatment to post-treatment.
The study sample included 11 parents and their children, all of whom had been diagnosed with an ASD and had been referred to a community-based clinic for PCIT. Parent commands and child compliance to the commands were coded using the Dyadic Parent-Child Interaction Coding System (DPICS) during a 5-minute play interaction conducted at pre- and post-treatment. Child compliance to parental commands was coded as either comply, noncomply, or no opportunity to comply. Pre-post differences in child compliance codes will be examined by conducting paired sample t-tests. The effects of PCIT on the increase of child compliance will be discussed.

Funding:

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

Presentation #84

Neighborhood Dynamics and Crime: Apartment Complexes

Heather Massey* 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

This research explores the connection between community dynamics and safety in a local apartment complex. It builds on the foundation of previous research focused on understanding psychodynamic processes in communities and the relationship to instances of crime, fear of crime, and willingness to intervene. These variables impact the feeling of safety for residents within an apartment complex. While most studies on the topic are focused on single-family home neighborhoods, approaching an apartment complex will allow for a more comprehensive understanding of these relationships. The results are expected to be gathered as statistical data from survey responses by apartment complex residents. These variables are supported by previous research indicating that a cohesive community decreases fear and other issues, while a strained community has an increase in fear and crime. The survey data will provide information about residents' perspective of community (floors, buildings, or entire complex) and the dynamics within the apartment complex. Additionally, local law enforcement can gather insight about resident opinions and techniques to engage with the apartment complex community appropriately.

Funding:

Presentation #85

Age Differences In Positive Emotions

Sarah Collett*, Alexandria Ebert*, and Julie Patrick

Healthy Aging Lab, Department of Psychology, West Virginia University, Morgantown, WV, 26506

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

Student's Major: Psychology

Socioemotional Selectivity Theory (SST; Carstensen et al., 1999) includes a focus on age differences in emotionally-meaningful goals and experiences. In this study, we examined emotional reactions to YouTube videos in 130 adults (M age = 53.3 yr; SD = 15.2; range 25 – 78 yr). To test for statistically significant differences, ANOVAs were used to examine age differences in the experience of affective reactions (e.g., awe, annoyance, happiness) and positive affect in response to watching each video. Consistent with Socioemotional Selectivity Theory, a main effect for age emerged for both awe-inspiring and happiness-inspiring videos, with older adults reporting higher levels of positive emotions in both of the conditions. Moreover, age and reactions to the videos accounted for a significant variance in Negative Affect [$F_{(5, 131)}$ = 3.84, $p < .01$; R^2 = .095) and Positive Affect [$F_{(5, 136)}$ = 15.31, $p < .001$; R^2 = .37]. Ongoing and future work examines whether such videos can be used to alter emotional wellbeing.

Funding:

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

Presentation #86

What Makes an Ally? Experiences and Perceptions of LGBTQ+ Allies on a University Campus

Ben Silverberg, Bryan Silverberg, Garrett Shingler*, Angel Montanez, Wei Fang, and Kimberly Quedado
Department of Emergency Medicine, Division of Ambulatory Services, WVU School of Medicine, Morgantown WV 26505

Field (Broad Category): Diversity Studies (Behavioral & Social Sciences)

Student's Major: Exercise Physiology

Although research has been conducted about how LGBTQ+ individuals feel while on campus, there has not been extensive research on how this applies to LGBTQ+ allies. The research we began was to view how individuals came to be allies to the community and how inclusive they felt West Virginia University's campus was to LGBTQ+ youth as well as allies. We first reviewed previous literature poised towards LGBTQ+ and drew themes from these, then adapted them to apply to allies. This included region of high school attended, religious background, political ideology, sexual orientation, and gender identity. We used this data to draw inferences between how participants answered these questions. After compiling these questions, we created a survey and then coded it into Qualtrics, a web-based service that allows surveys to be distributed and issued via WVU's email service to reach all of the student body. We then reviewed the results of the 300+ responses. This research sought to draw possible conclusions between how participants answered questions about themselves and the presence or absence of LGBQ and T allyship. Significant associations were able to be drawn between LGBQ allyship and T allyship with political views, parents' religion, whether they had faced discrimination or not, and whether they had to conceal their allyship. We plan on doing further analyses on how ally and non-ally's experiences compare when exploring: LGBTQ friends/family now and before; religion - both their own and their parents'; and politics - both their own and their parents'.

Funding:

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

Presentation #87

Do OCPD Symptoms and Intolerance of Uncertainty Predict Emotions?

Julean Bender*, Kelsey Evey, Cierra Edwards, and Shari Steinman
Department of Psychology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Psychology

Intolerance of uncertainty (IU), the intense discomfort or inability to handle uncertain situations, is a transdiagnostic factor across multiple forms of psychopathology. Heightened levels of IU have been found in individuals with obsessive-compulsive personality disorder (OCPD) and have been found to significantly predict OCPD traits, such as emotional difficulties. However, no study to date has looked at the relationship between IU and experienced emotions in OCPD. The proposed study will assess at what level specific emotions occur in an unselected OCPD sample and if intolerance of uncertainty predicts emotions beyond what OCPD predicts. In order to examine this relationship, at least 72 participants from Amazon's MTurk will read and imagine themselves in hypothetical scenarios modeled after OCPD criterion. Questionnaires following each scenario will assess to what degree the participants experienced specific emotions when imagining themselves in the situation. A series of three hierarchical regressions will be conducted to determine the extent to which intolerance of uncertainty (IUS-12) predicts experienced emotions (hostility, fear, general positive affect) above and beyond what OCPD (POPS) predicts. It is hypothesized that OCPD will predict measured emotions. Additionally, it is hypothesized that IU will predict these emotions beyond what OCPD predicts.

Funding: EXCEL Program

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

Presentation #88

Depression, Anxiety, and Stress during Early Months of COVID-19 in Appalachia

Charlie Boone*, Mira Snider, Daniel Totzkay, and Shari A. Steinman
Department of Psychology, West Virginia University, Morgantown, WV 26505

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

Student's Major: Psychology

The COVID-19 pandemic began to affect the United States in March 2020. A steep increase in cases perpetuated an extensive lockdown period, in which many found themselves facing isolation and fear. This study seeks to analyze the progression of depression, anxiety, and stress over the first two months of the pandemic. Given that personal, familial, and public health risk increased and social support decreased during isolation, we hypothesized that depression, anxiety, and stress levels would increase over the course of the study. Data was collected from a sample of 718 Appalachian adults and recorded via an online survey once every two weeks for a total period of two months. This study used the Depression Anxiety Stress Scale-21 (DASS21), a self-report questionnaire with strong psychometric properties, as its primary measure. We conducted a series of three repeated measures ANOVAs testing the effect of time on depression, anxiety, and stress. Contrary to hypotheses, stress, anxiety, and depression all decreased during the duration of the study (Stress: $F(3,715)=10.51$, $p<.001$, Anxiety: $F(3,715)=5.23$, $p=.001$, Depression: $F(3,715)=3.53$, $p=.015$). Results suggest potential adjustment or habituation to distressing external events. In the future, longitudinal data could be used to further illustrate the progression of depression, anxiety, and stress throughout the pandemic as this study only examines the preliminary months. The implications of this study's results can be applied to the larger Appalachian adult population and serve to guide clinical services and health organizations in subsequent crises.

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

Presentation #89

Regional disparities in the election of women to state legislature positions

Jude Platz* and Heather Stephens

Division of Resource Economics and Management, West Virginia University, Morgantown, WV 26506

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

Student's Major: Environmental and Natural Resource Economics

Despite women constituting a majority of the United States population and achieving 57 percent of all undergraduate degrees, women are underrepresented in elected offices. As of 2019, only 28% of state legislators were female, and women made up less than 25% of the US Congress and only 18% of state governors. This study examines whether regional disparities exist in female political representation, and what other factors may be contributing to the underrepresentation of women in elected positions. Previous research indicates there is a compounding effect attributed to electing women to political positions, where previous experience with female elected officials contributes to further gains. However, there have not yet been any studies analyzing the regional disparities or any other factors that may be contributing to the progression of women in politics. Using a pooled ordinary least squares regression model with state level data from 1980-2010, it was determined that statistically significant disparities exist between regions, even after accounting for demographic characteristics such as education and unemployment. Early analysis also indicates that state legislatures in which Republicans exert bicameral control have a statistically significant positive impact on electing more women to state legislature positions. The results found from this study are useful not only for explaining the gap in female political representation, but also in suggesting methods or policies to increase representation within states.

Presentation #90

Maternal Attachment Explains Why Familial Adversity Predicts Perceived Stress Among College Freshmen

Kristen Knight*, Madison Johnston*, Kailey Basham*, 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: Music Therapy

Socioeconomic status (SES) and family structure have been known to affect stress levels during emerging adulthood. The current study aims to see if maternal attachment interferes with the relationship between early life family/SES adversity and perceived stress. The study was conducted on 769 college freshmen by an online survey. For maternal attachment and adversity measures, participants' answers to a series of related questions were averaged. For perceived stress, the Perceived Stress Scale was used, which measures the amount of stress that the person feels is placed on them. It was found that the negative impact of early life SES/family adversity can lead to both anxious and avoidant maternal attachment, ultimately leading to greater perceived stress in emerging adulthood. Anxious attachment refers to the fear of rejection and avoidant attachment refers to a lack of closeness. Without having a strong supportive relationship, the emerging adult may not have a safety net to rely on when they encounter new stressors in life. Overall, the findings in this study suggest that fostering the development of a secure attachment to a maternal figure can significantly decrease perceived stress, and that those experiencing early life adversity should be considered at risk of these long-term negative consequences.

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

Presentation #91

Generation of Cacng2a Promotor-less Mutant Line in Zebrafish Using CRISPR/Cas9 Genome Editing Technology

George "AJ" Holmes*, Samantha Hershman, and Sadie A Bergeron
Department of Biology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biology and Psychology

Eye-tracking dysfunction (ETD) is a common endophenotype of neurodevelopmental disorders like schizophrenia and autism. Several genes have been associated with the development of ETD, including calcium voltage-gated channel auxiliary subunit gamma 2 (CACNG2) which functions as a transmembrane AMPA receptor regulatory protein that facilitates cell-cell communication in the central nervous system. To determine the function of CACNG2 and its influence on visual neural circuit development and behavior CRISPR/Cas9 gene editing technology was used to knockout its zebrafish ortholog cacng2a. sgRNAs were designed using CHOPCHOP (https://chopchop.cbu.uib.no) to target ~500 basepairs upstream and downstream of the transcription start site. Transgenic zebrafish embryos that will develop to have GFP expression in neural circuits connecting the eyes to the brain were microinjected at the one-cell stage with Cas9 mRNA, sgRNA, and GFP mRNA. Injected embryos were screened for ubiquitous GFP expression at 1-day post fertilization to verify mRNA integrity, and a sample of injected, GFP-positive embryos as well as uninjected controls were lysed to extract genomic DNA. Fluorescent polymerase chain reaction amplified genomic fragments containing the sgRNA target site were used for fragment analysis to determine the efficacy of Cas9 cutting activity. Additional GFP-positive larvae were raised to adulthood and bred with wild type zebrafish to generate lines of putative carriers of cacng2a promoter mutations which will be screened. I expect to generate and perform initial genotypic and phenotypic characterization of zebrafish lacking cacng2a expression which could be used for future analysis of visual neural circuit development and function.

Program/mechanism supporting research/creative efforts:
Other
WVU Honors EXCEL

Presentation #92

Breast Arterial Calcifications as a Risk Factor for Cardiovascular Disease in Breast Cancer Patients

Maureen Cleary* and Christopher Bianco
Heart and Vascular Institute, Ruby Memorial Hospital, Morgantown, WV 26506

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

Student's Major: Biology

Breast arterial calcification (BAC) is calcific, atherosclerotic disease of the small arteries of the breasts and is seen on mammograms. Atherosclerotic cardiovascular disease (ASCVD) is a condition in which the vasculature suffers from atherosclerotic changes manifest as sclerotic or thromboembolic disease. Patients with ASCVD can experience a wide range of symptoms including anginal chest discomfort, coronary events, claudication, cerebral vascular events, decreased functional capacity, or arrhythmias. According to the CDC in 2019, 301,280 women died due to heart disease, making it the leading cause of death in women. Although not the deadliest cancer in women, 13% of American women develop breast cancer during their lives. Breast cancer combined with cardiovascular disease is a deadly combination and some cancer therapies can precipitate ASCVD events. BAC is being researched to determine if it is a risk factor or biomarker surrogate for ASCVD in breast cancer patients. If it is, detecting BAC will allow providers to deliver a treatment plan to give patients the best chance of beating cancer without ASCVD events. Currently, our research project has not gotten any concrete results, but we hope to gain preliminary results soon. We expect our results to confirm those of other studies such as Dr. Jung-Won Suh's (et al), which concluded that BAC is associated with CVD, and could be used as a risk factor in predictions. We hope that our research will be used to identify women with breast cancer who could be at a higher risk for developing cancer therapy related ASCVD events.

Funding: Heart and Vascular Institute of Ruby Memorial Hospital

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

Presentation #93

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

Alexandra Dickey*, Julie Brefczynski-Lewis, Nanda Siva, Helen Melnick, Colson Glover, and Sonia Chandi
Rockefeller Neuroscience Institute, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biology

Virtual reality (VR) is a relatively new tool. Because of its ability to immerse in inaccessible lab environments and control variables, it may become an important tool in medicine and research, especially for our lab's patented VR brain imaging system. Our goal was to compare VR delivered social stressors with a live study, where participants interacted with an actor/avatar trained to give a set of negative responses in three-minute interactions, with a hypothesis of no significant difference in VR vs. Live. We chose two different simulations – confronting a messy roommate and confronting a lazy group project member – with randomized order of VR vs. Live simulations (n=52). Systolic (SBP) and diastolic blood pressures (DBP) were measured after four points – an initial 10 minute rest (R1), the first event (E1), a second rest (R2), and the second event (E2) – with heart rate (HR) continuously monitored (not yet processed). We then compared the measurements between E1-R1, R2-R1, E2-R1, and E2-R2 for both SBP and DBP for each scenario of VR vs. Live conditions. Our main results with both scenarios combined tell us that using VR did not significantly differ from Live in evoking BP increases, confirming our hypothesis. However, caution may be needed in interpretation, as when each simulation was processed separately, the Group Project yielded a significant increase in SBP for the Live vs. VR interaction. In the future, our plan is to analyze HR and consider VR brain imager uses based on these combined results.

Funding:

Program/mechanism supporting research/creative efforts:
a WVU 297-level course

Presentation #94

Improving Knowledge about Palliative Care among Caregivers in Appalachia: A Brief
Educational Intervention

**Lauren Parsons*, Cherish Heard*, Cecelia Nelson, Jarred Gallegos, Jennifer Ludrosky,
Patrick Tomboc, Joshua Dower, and Christina L. Duncan**
Department of Psychology, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biology

Pediatric Palliative Care (PPC) teams provide comprehensive care to children with chronic illness, as well as their families. Despite increasing availability of PPC teams in U.S. hospitals, only a small percentage of pediatric patients receive these services. Misconceptions among caregivers about PPC may account for lack of utilization, especially in areas where health literacy is low. The Appalachian region and West Virginia in particular, are plagued by some of the worst health literacy and subsequent health outcomes in the United States. This study examined the influence of an educational handout on caregiver knowledge and preferences for PPC in Appalachia. A convenience sample of 37 pediatric oncology caregivers were recruited from J.W. Ruby Memorial Hospital in Morgantown, WV to participate in the pre/post quasi-experimental design study. Caregivers completed questions about their child's health, and attitudes toward and knowledge of PPC services, before and after reading a brief handout regarding PPC services. Paired sample t-tests were used to examine pre- to post-intervention change. After reading the handout, caregivers were significantly more knowledgeable ($p<.001$, $d=-1.60$) and had more favorable attitudes toward PPC ($p<.001$, $d=-0.52$). A brief educational intervention can improve caregiver knowledge and perceptions of PPC, therefore potentially enhancing family receptiveness to such services. Brief handouts are low-cost and time-efficient tools that can provide important medical information. In rural areas where health literacy may be lower and dissemination of information may be challenging, routine, targeted interventions can help overcome knowledge barriers and misconceptions about PPC.

Presentation #95

Investigating Novel MitoNEET Ligand CI987 on Oxidative Stress Protection in Models of Aging

Hanna Jandrain*, Jacob Boos, Sofhia Elad*, Sarah Faber*, and Werner Geldenhuys
Department of Pharmaceutical Sciences, West Virginia University School of Pharmacy, Morgantown, WV 26506

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

Student's Major: Biochemistry

MitoNEET (CISD1) is an outer mitochondrial membrane protein integral for mitochondrial function. The mitochondria produce the energy-rich molecule, adenosine triphosphate (ATP), primarily through a process called oxidative phosphorylation (OXPHOS). Although mitochondria produce ATP, they also produce reactive oxygen species (ROS) —superoxide free radicals being the most prominent—as byproducts of OXPHOS. Mitochondrial dysfunction can cause excess production and overaccumulation of ROS in cells, overpowering internal antioxidant defense mechanisms, thus leading to oxidative stress and ultimately cell death. MitoNEET has also been shown to be an agonist for thiazolidinedione (TZD)-class compounds, stabilizing mitoNEET which contributes to proper mitochondrial function and protection against oxidative stress as shown in models of diabetes. Unfortunately, the role of mitoNEET in the aging brain has yet to be extensively evaluated. Due to this research gap, we aim to understand the following in wild-type and mitoNEET knockout transgenic Caenorhabditis elegans models of aging: 1) the effects of the absence of mitoNEET on oxidative stress and 2) mitoNEET as an agonist for novel TZD compounds to protect against oxidative stress. This study will use adult age-synchronized populations to evaluate how the loss of mitoNEET affects basal oxidative stress levels while also understanding how our novel TZD compound protects against acute paraquat-induced oxidative stress as it is known to increase ROS formation and cause neurodegeneration. Collectively, the results in this study will help progress the field of aging research and also provide insight for the development of potential therapeutics to combat age-related neurodegenerative disorders.

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

Presentation #96

Transgenic Caenorhabditis elegans Models of Learning and Memory Dysfunction in MitoNEET-/- and Alzheimer's Disease

Sofhia Elad*, Jacob Boos, Hanna Jandrain*, Sarah Faber*, and Werner Geldenhuys
Department of Pharmaceutical Sciences, West Virginia University School of Pharmacy, Morgantown, WV 26506

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

Student's Major: Chemistry

Alzheimer's Disease (AD) is a progressive, neurodegenerative disease characterized by the presence of extracellular amyloid plaques composed of the amyloid-β42(Aβ42) protein and neurofibrillary tangles composed of the aggregated hyperphosphorylated tau microtubule protein. Both pathologies contribute to reactive oxygen species (ROS) production leading to oxidative stress, mitochondrial dysfunction, and ultimately neuronal death. MitoNEET (CISD1) is an iron-sulfur [Fe-S] cluster containing protein located on the outer mitochondrial membrane. These clusters, having been involved with redox reactions, neutralize ROS and mediates mitochondrial function. The role of mitoNEET on oxidative stress and mitochondrial function has previously been modeled in diseases including diabetes and cancer; however, the role of mitoNEET in AD has yet to be widely studied in the field. With the relationship between mitoNEET and AD not yet evaluated, we aim to investigate the loss of mitoNEET contributes to mitochondrial dysfunction compared to those observed in AD using transgenic Caenorhabditis elegans models. We hypothesized that mitoNEET knockout models will present behavioral and physiological deficits similar to those observed in AD. To understand the relationship of our hypothesis, we use transgenic C. elegans strains, expressing 1) a global mitoNEET knockout, 2) transgenic AD strain expressing the Aβ42 pathology, and 3) their wild-type controls, assessing learning and memory behaviors, oxidative stress resistance, and mitochondrial functions. Collectively, the data from this study will help progress the field of AD and aging research and provide insights on the mechanisms that mitoNEET declination may contribute to the progression of AD.

Program/mechanism supporting research/creative efforts:
Other
WVU INBRE

Presentation #97

Facilitators and Barriers of Food Journaling Measures In A Rural Weight Management Clinical Setting

Grant E. DuVall* and Treah Haggerty
Department of Family Medicine, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biology

An important health issue needing addressed in the nation and more specifically, West Virginia, is metabolic syndrome and obesity. Addressing metabolic syndrome and obesity is best done so through multidisciplinary primary care and holistic behavioral modification. Recently, technology that enables people to track their food choices has gained popularity, but very few clinical studies have been conducted on its implications in physician-assisted weight loss in Appalachia. Food journaling, when used consistently, can help patients with weight loss, choosing healthier meals, measuring portion intakes, and determining common diet trends. Self-monitoring has become an integral part of treatment interventions and lifestyle modifications that often come with clinically addressed weight loss. This is an implementation study in an academic outpatient primary care setting. The implementation site of this food journaling study serves approximately 11,000 patients per year. During their first follow-up weight loss appointment, processed patients will answer survey questions on their history and attitudes surrounding food journaling and the barriers and facilitators of its use. While this study is in its preliminary stages, the clinic is receiving promising results of survey completion and hopeful utilization of this data for photo food journaling as an option for prescribed behavioral modification. The primary purpose of this study is to evaluate food journaling behaviors within a metabolic weight loss clinic including program choices, facilitators, and barriers to consistent food journaling; secondarily, to analyze how rurality affects these factors.

Funding:

Presentation #98

Morphological and Physiological Variations Associated with Reproductive and Vegetative
Salinity Tolerance in Sorghum

Emmelia Braun*, Jennifer S. Hawkins, and Melissa Lehrer
Department of Biology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biology

Salinity stress is one of the most severe limitations on crop yield. To ensure the availability of quality grain-based products, it is imperative to identify genotypes of crop species that maintain grain yield under saline conditions. In this work, Sorghum will be used as a model to assess the relationship between vegetative and reproductive tolerance under salinity stress. The germplasm of twenty-five genotypes was analyzed to evaluate the responses to salinity stress associated with domestication. Seed color, seed diameter (mm), and seed weight (mg) were measured and compared to known tolerance data to identify patterns between seed characteristics and response to salinity stress. Further, the effects of salinity stress on both reproductive and vegetative plant tissues will be studied by exposing replicates of each genotype to control (tap water) or salt (75mM NaCl) water until resulting grain matures. Vegetative measurements will include alive and dead aboveground biomass (g), plant height (cm), growth rate (cm/day), chlorophyll content (SPAD, nmol/cm), and leaf temperature (°C); reproductive measurements will include seed color, seed weight (mg), seed diameter (mm), flowering time (days), and grain yield (mg). It is hypothesized that vegetatively tolerant accessions will also maintain reproductive traits, producing control-quality quantities of grain compared to sensitive genotypes. This research will identify genotypes with greater vegetative and reproductive tolerance in saline conditions that can grow on marginal lands and/or using saline water, increasing food availability and affordability.

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

Presentation #99

Conoideocrella luteorostrata, a potential fungal biocontrol of invasive Christmas tree pest elongate hemlock scale

Hosanna Barrett*1, Brian Lovett2, and Matt T. Kasson2
1 Department of Biology, West Virginia University, Morgantown WV, 26506; 2 Division of Plant and Soil Sciences, West Virginia University, Morgantown, West Virginia 26506

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

Student's Major: Biology

Elongate hemlock scale, or Fiorinia externa, is an invasive scale insect that infests needles of hemlock, spruce, and fir trees. Infestation is of particular concern to Christmas tree farmers since it can weaken trees and reduce their exportability. These scales are currently managed using chemical pesticides, but those interventions may hurt natural predators and ultimately increase scale populations.The goal of this project is to investigate natural fungal pathogens of elongate hemlock scale insects in the eastern U.S. for development into biocontrol agents.
 In the Summer of 2020, Fraser fir branches with elongate hemlock scales were collected from North Carolina and Virginia and examined for signs of fungal infection. Fungi infecting the crawlers and fungi in the needle microbiome were isolated and cultured, since previously identified fungal scale pathogen, Colletotrichum fioriniae, is able to live within the needles. The main fungus infecting the scales was molecularly identified as Conoideocrella luteorostrata (Clavicipitaceae, Hypocreales, Ascomycota), which is known to infect elongate hemlock scales in their natural range in Southeast Asia. C. luteorostrata was not cultured from the needle, which suggests that its lifestyle relies on the insect host. Formulation of this strain to be applied to Christmas trees as a biocontrol agent will require bioassays of C. luteorostrata strains against the various life stages of elongate hemlock scale, investigation of non-target effects of the fungus, and testing techniques for application on trees.

Funding: Christmas tree promotion board

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

Presentation #100

Stabilized Huntingtin Oligomers Used to Determine Mechanism of Lipid Membrane Binding

Emily Donley*and Justin Legleiter
C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biochemistry

There are several neurodegenerative diseases classified as protein-misfolding diseases, where rearrangement of a protein's conformation leads to aggregation. These include Alzheimer's disease, Parkinson's disease, and Huntington's disease. Huntington's disease is caused by a polyglutamine expansion in the huntingtin protein (htt), which allows htt to aggregate into different forms. These aggregates can damage a variety of membranes within cells. The first 17 amino acids of htt (Nt17) affect both aggregate formation and lipid membrane binding. Therefore, a possible method of treating Huntington's disease involves blocking htt from binding to the lipid membranes of cells. Preliminary data shows that the oligomer state of aggregation has the highest affinity for membranes, and when the lysine residues of the oligomers were crosslinked with DFDNB, they were stabilized, not forming further aggregates and losing their membrane activity. Oligomer-stabilizing htt mimic peptides with the lysine residues mutated to remove their positive charge are now being used to test whether this loss of membrane activity is due to changes in conformational flexibility or charge of the lysine residues. Preliminary results show that oligomers formed with these peptides retain their membrane interaction in a PDA assay, and atomic force microscopy showed that they are stable for up to eight hours relative to a control. This suggests that the loss of membrane activity in previous experiments is due to conformational changes, not changes in the lysine residues' charge.

Funding:

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

Presentation #101

The Plausibility of Utilizing Hibernation to Reduce Energetic Needs in Humans

Derek H. Bertrams* and Roberta Leonardi
Department of Biochemistry, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biochemistry

Hibernation is a state that allows select animals to survive harsh conditions like lack of food and harsh climate. Many individual organs, such as the heart, liver, kidney, and brain, have been analyzed for gene expression and metabolite signatures in hibernating animals. However, a broad mechanism of initiation of hibernation has not been elucidated. In this research paper, we detail what is known about hibernation at the current time and what still needs further investigation. The focus of this research paper is to evaluate the plausibility of using hibernation in humans and identify a potential cause of hibernation initiation. The review was completed using various databases and research articles. The hypothalamus is a prime driver of the hibernation state and plays a central role in the regulation of internal temperature, metabolism, and circadian rhythm. In our research, we tried to determine the relative contribution of a decrease in metabolism versus a decrease in temperature as causes of hibernation. Since metabolism controls non-shivering thermogenesis, this is a potential cause of the decrease in body temperature seen in hibernation initiation. To test if decrease in metabolic function is a cause of the hibernate state, we would need to prevent the shivering response in a known non-hibernating animal. This would allow us to determine if the decrease in metabolism could provide a hibernation state in non-hibernating animals. If hibernation in humans is possible, then this could greatly impact the medical and astrobiology fields.

Program/mechanism supporting research/creative efforts:
Other
Honors Excel Program

Presentation #102

Evaluating the Influence of Surfactant Concentration on Capillary Induced Droplet Generation

Makaela Quinn*, Bethany Fike, and Peng Li
C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biology

Point of care (POC) diagnostics is onsite, rapid testing that allows for quick, convenient results in resource- and time-limited situations. It has been widely used for rapid flu tests, pregnancy tests, and glucose monitoring for diabetes. Despite the progress, the analytical performance in existing POC tests are still far from ideal as evidenced during the COVID-19 pandemic. Digital polymerase chain reaction (dPCR) is a promising technique to offer high performance for detecting pathogens. However, dPCR performed under the POC setup has not been achieved due to the technical challenges of generating monodisperse droplets with portable set up. We hypothesized that the concentration of surfactants could affect the droplet generation process. To determine the influence of surfactants, I studied the size of droplets produced by the acoustic method. Solutions of 5%, 2%, 1%, and 0.5% of Span 80 in mineral oil were prepared. Each solution was added into wells for droplet size evaluation. Using a fluorescent microscope, the size of five droplets were taken note of for each concentration tested. The present study provided valuable information on optimizing the performance of the acoustic droplet generator, which paves the way for achieving POC dPCR.

Presentation #103

Dim Light at Night Dysregulates Immune Function and Exacerbates Stroke Outcome

Jacob Payne*, Jennifer A. Liu, Jacob R. Bumgarner, William H. Walker II, O. Hecmarie Meléndez-Fernández, Ning Zhang, James C. Walton, A. Courtney DeVries, and Randy J. Nelson
Department of Neuroscience, West Virginia University, Morgantown, WV, 26505

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

Student's Major: Biology

Circadian rhythms are endogenous physiological processes that have evolved, synchronizing physiology and behavior to exogenous environmental light cues such as light, to optimize function and survival. Disruption of circadian rhythms through exposure to lighting during the incorrect phase has been linked to several negative outcomes including increased neuroinflammation and altered immune function. Previous work in our lab has demonstrated that exposure to dim light at night (dLAN) increased mortality and neuronal damage following stroke, thus, aimed to investigate how exposure to dim light at night affects acute immune activation post stroke. We hypothesized that exposure to dLAN accelerates infarct progression via dysregulated gene expression related to immune activation. Male CFW mice received a right middle cerebral artery occlusion (MCAO) and were returned to normal light dark conditions (LD) or dLAN (5 lux). 24 hours post stroke, mice were collected for infarct size, determined through 2,3,5-Triphenyltetrazolium chloride (TTC) staining and found that mice in dim light at night had increased infarct sizes compared to LD. A second cohort of mice was collected after the night phase 12 hours post stroke and was assessed for neurological deficits, then the ipsilateral and contralateral hemisphere of the brain was collected for RNA sequencing. We observed that acute exposure to 12 hours of dLAN increased general deficit scores and spleen weights. These findings play a vital role in increasing our understanding of circadian rhythm disruption and its impact on stroke recovery and highlight the importance of reducing circadian disruption during cerebrovascular dysfunction.

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

Presentation #104

Dim Light at Night Accelerates Mammary Tumor Development and Progression

Madison M. Sites*, William H. Walker II, Raegan Kvadas*, A. Courtney DeVries, and Randy J. Nelson
Department of Neuroscience, Rockefeller Neuroscience Institute, and Department of Medicine, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biology

Physiology and behavior are optimally regulated via circadian rhythms that are set to precisely 24-hours by daily exposure to bright sunlight. Wide-spread adoption of electric lighting has dramatically affected the circadian organization of individuals. Artificial light at night alters circadian rhythms and negatively affects recovery and progression of medical conditions such as cancer, stroke, cardiac arrest, and mood disorders. This study investigated the effects of exposure to dim light at night (DLAN) on tumor progression and depressive-like behaviors in mice. Adult, female C3H mice received a 100 µl orthotopic injection of the breast cancer cell line FM3A into the 4th mammary gland. Tumor size and body mass were measured over 20 days in five-day intervals following tumor induction. At the end of tumor development (days 19 and 20), depressive-like (sucrose preference test and induced swim tests) and anxiety-like behaviors (open-field test) were assessed. Mice housed in DLAN displayed significantly accelerated mammary tumor development, significantly larger tumors, and gained significantly more body mass than mice housed in dark nights (LD). Tumor bearing mice housed in LD demonstrated increased anxiety-like behaviors. However, housing tumor bearing mice in DLAN normalized this behavior, suggesting DLAN may play an anxiolytic role in tumor bearing mice. There were no significant differences in depressive-like behaviors. Because 99% of the population in North America and Europe are exposed to light at night, these findings and those from future replications may prove useful in managing environmental light conditions in a way that will improve patient outcomes.

Program/mechanism supporting research/creative efforts:
a WVU 297-level course

WestVirginiaUniversity.

OFFICE OF UNDERGRADUATE RESEARCH

Presentation #105

Impact of Dental Medicaid Expansion on Oral and Overall Health in West Virginia

Aaliyah Williams* and Fotinos Panagakos
School of Dentistry, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biology

Oral health is central to overall health and well-being. In West Virginia many residents face suboptimal oral health outcomes. Approximately 300000 state residents rely on Medicaid to get dental services, but its coverage only allows recipients to obtain emergency dental services. This has led to statewide issues such as increased opioid usage and overexertion of emergency medical services. In 2020, the Governor of West Virginia signed a bill into law to give citizens access to a limited adult benefit through Medicaid (SB648). The bill allows adult Medicaid recipients to have a $1000 yearly maximum benefit on diagnostic, preventative, and restorative dental services. This study was conducted to examine the level and type of care the WVU School of Dentistry provided to Medicaid patients prior to the program initiation. This was accomplished by reviewing patient records of those who obtained emergency dental services at WVU School of Dentistry from the years 2017-2020. Simultaneously we conducted a survey to assess the current need for adult care among Medicaid patients who present for emergency treatment starting in January 2021. This will allow us to review pre-existing dental care needs of recipients and possibly estimate the utilization level of the new program. We expect to see a decrease in emergency service usage for dental issues, as well as increases in the amount of preventative and restorative care visits among this population. It is also possible that the benefit amount is not large enough to allow Medicaid recipients to get the care that they need.

Presentation #106

Determining Dental Deserts Throughout West Virginia

Brittany Gray* and Fotinos Panagakos
School of Dentistry, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biology

Dental deserts are areas that are experiencing a shortage of dentists and oral healthcare. Many areas throughout the country are considered dental deserts and these areas are especially prevalent in West Virginia. Typically, the shortages are in rural areas which can be widely found throughout West Virginia. It is important to determine if future dentists are planning to practice in these shortage areas in order to address the current oral healthcare issues. When determining these dental deserts, the ratio of population to current practicing dentists in that area must be calculated. This is done by researching the population size of different counties in West Virginia and determining the current practicing dentists in that area by examining the dental statistics for West Virginia. For this study, in order to determine if future dentists and dental hygienists are planning on practicing in a rural area, a survey was sent out to the current dental and dental hygiene students at West Virginia University School of Dentistry asking about their post-graduation plans. The results of the survey will be analyzed and reported. In order to determine the location of dental deserts within West Virginia, state dental practitioner data will also be reviewed. This research is important because it allows people to become more aware of the oral health shortage throughout both the state of West Virginia and the country, and it can hopefully help to lessen the number of dental deserts.

Funding:

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

Presentation #107

Comparison of Peritrophic Matrix-Associated Gene Expression within Tsetse Species of Varying Vector Competence

Marleah Knights*, Miguel Medina Munoz, and Rita V.M. Rio
Department of Biology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biology

Tsetse flies are the obligate vector of African trypanosomes, which cause fatality in animals if left untreated. Due to difficulties in vaccine design and the lack of pharmaceuticals, vector control remains the best option for impeding disease transmission. However, tsetse species differ in vector competence (i.e. the capacity to sustain and transmit the parasite). Therefore, it is critical to understand how vector competence is determined. Here, we compare the midgut gene expression of tsetse fly species focusing on components of the peritrophic matrix (PM). The PM is a chitinous structure that acts as a protective barrier between the blood meal and the gut epithelium. We hypothesize that tsetse species exhibit significant differences in PM-related gene expression, likely resulting in PM distinctions that will consequently impact their susceptibility to trypanosome infections. To test this hypothesis, the midguts of teneral (newly eclosed adults) G. morsitans (high vector competence), and G. brevipalpis (low vector competence) species were dissected. RNA was isolated, DNase treated, and reverse transcribed to produce cDNA libraries. These libraries, representing global midgut gene expression, were subsequently sequenced with Illumina HiSeq technology. Orthologous genes between tsetse species were identified and heat maps constructed through R. Significant differences in gene expression between species pertaining to PM synthesis and structure were identified. In understanding these genetic differences between species, we enhance our knowledge of biological factors driving vector competence which may ultimately be used in the design of novel interventions towards tsetse control.

WEST VIRGINIA UNIVERSITY
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #108

Genome Sequencing Provides Insight Into Coevolution Between an Insect Vector and Its
Microbial Partner

Noah J. Spencer*, Miguel E. Medina Muñoz, and Rita V.M. Rio
Department of Biology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biology

Symbiotic associations with microbes are common across insects, particularly dietary specialists
that benefit from microbially-derived nutrients like amino acids and vitamins. Tsetse flies —
whose obligate blood-feeding behavior is critical for the development and transmission of deadly
trypanosome parasites — have harbored beneficial bacteria known as Wigglesworthia glossinidia
in their digestive tracts for millions of years. Despite this extensive coevolutionary history, the
highly-reduced Wigglesworthia genome is remarkably conserved between symbiont isolates
from two relatively distantly-related tsetse fly species. However, some of the differences
between these lineages are related to key metabolic functions like folate metabolism, which is
thought to be important not only to the tsetse fly's physiology but also to its ability to vector
trypanosomes. Since Wigglesworthia depends on the host environment for survival and cannot
be cultured, genomic data is critical to understanding lineage-specific differences in the
symbiont's functional capabilities. Published Wigglesworthia genomes are limited to two host
species. To further understand the evolution of Wigglesworthia in different tsetse species and the
potential ramifications towards disease transmission, we sequenced the genome of
Wigglesworthia glossinidia isolated from an additional tsetse fly species, Glossina palpalis
gambiensis. Analysis of the draft genome reveals potential evidence of metabolic divergence in
key pathways, as well as the conservation of a small plasmid of unknown function. Further
genomic revelations on evolution and species-specific differences in host-symbiont interactions
have the potential to inform the next generation of vector control.

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

WEST VIRGINIA UNIVERSITY
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #109

Identifying the Cause of Protein Accumulation in Alzheimer's Disease

Matthew Rexroad*, Janelle Chuah, and David M. Smith
Department of Biochemistry, Robert C. Byrd Health Sciences Center, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biochemistry

Many neurodegenerative diseases such as Alzheimer's are typically characterized by the buildup of proteins such as amyloid-beta and tau. Accumulation of proteins occurs both intracellular and extracellular, affecting neuronal functions such as synaptic plasticity, memory formation, and ultimately loss of neuronal connections causing cell death. Normally, intracellular proteins are degraded by a molecular machine called the proteasome Within areas of the brain affected by Alzheimer's, both in clinical samples and animal models, proteasome function has found to be significantly lower compared to healthy brains. Previous in vitro studies showed that the proteasome can be impaired by neurodegenerative associated proteins such as amyloid-beta and huntingtin when they fold in a particular confirmation. The inhibitory confirmation is recognized by the A11 antibody. The purpose of this study is to develop an ELISA protocol that will eventually be used to confirm the clinical relevance of A11 impairment of the proteasome in Alzheimer's. The goal is to show proteasomes bound A11 oligomers in clinical samples. Results of this study could have implications in identifying the proteasome as a pharmaceutical target for Alzheimer's.

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

Presentation #110

The Formation and Dissolution of Kidney Stones

Madison Lilly* and Adrienne Williams
Biology Department, WVU Institute of Technology, Beckley, WV 25801

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

Student's Major: Biology

Kidney stones can be quite a painful experience and, although there is no cure for kidney stones, a variety of therapies are available to prevent and remove kidney stones. One thing that has been shown to help prevent kidney stone formation is sodium citrate. Although we know of its lessening effects on kidney stone formation, it is also important to look for other natural remedies which may show greater effect on kidney stones already in place. Pineapple (Ananas comosus) shows clinical promise for dissolution of kidney stones. In this study the goal was to create phantom kidney stones and test how to best dissolve them using pineapple extract compared to the typical sodium citrate as a control. To test this, phantom kidney stones were made using Ultracal30 with water in ratios of 1:1 and 100:38 g/mL, stirred, and then molded. Pineapple extract was created by boiling dehydrated pineapple at 95°C in distilled water for 10 minutes and then filtered. The phantom kidney stones were pre-wet, weighed, and then placed in microplate chambers and incubated in sodium chloride (negative control), sodium citrate (positive control), and the pineapple extract at 37°C and 5% CO_2 for up to 19 days. Preliminary results indicate pineapple extract shows effects on dissolution of pre-formed kidney stone phantoms. This research is important to focus on more natural medical approaches and could possibly save a lot of money and pain for people living with kidney stones.

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

WEST VIRGINIA UNIVERSITY
OFFICE OF UNDERGRADUATE RESEARCH

<u>**Presentation #111**</u>

The Role of β-Catenin in Triple-Negative Breast Cancer

Sarah Morgan*, Yehenew Agazie, Taylor Saurborn, Roy Nicoletti, and Amy Boorsx
Cancer Institute, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Biochemistry (Health Sciences)

Student's Major: Chemistry

Triple-negative breast cancer (TNBC) is a form of breast cancer whose metastasis is not caused by progesterone or estrogen receptors and does not have increased production of the HER2 protein. The absence of these factors can make it difficult to develop targeted treatment. Fortunately, there are multiple proteins that have been found to be associated with TNBC. β-Catenin is one of these proteins, whose dysregulated expression in the presence of regulated Wnt expression can result in TNBC. To test for the importance of β-catenin in TNBC, its expression was silenced by two different shRNA (small hairpin RNA) constructs. Immunoblotting of samples from control shRNA and β-catenin cells showed efficient silencing. We have used cell proliferation in 2D, colony formation in soft agar, and tumorisphere formation in suspension cultures to determine the biological significance of β-catenin silencing. The results showed that β-catenin silencing was associated with reduced tumorisphere, colony formation, and cell proliferation. These results imply that β-catenin is important for the growth and transformation of TNBC cells, and its inhibition reduces the oncogenic properties of these cells. While β-Catenin silencing appears to suppress TNBC cell phenotypes, it is unclear whether it is the main cause of cancer formation in TNBC. Even so, this knowledge makes it possible to narrow research efforts on specific proteins and their involvement with one of the more aggressive forms of breast cancer.

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

WestVirginiaUniversity
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #112

Effect of a Silverman-Andersen Respiratory Severity Score-based CPAP Weaning Algorithm on Newborn CPAP Duration

Sierra Arbaugh*, Audrey N. Miller, Alicia A. Moise, Tara N. Morder, Matthew Ezzi, Lesley Cottrell, and Stephen M. Akers
Neonatal Intensive Care Unit, Ruby Memorial Hospital, West Virginia University, Morgantown, WV 26505

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

Student's Major: Nursing

Background: Newborns who experience respiratory problems often require breathing support and admission to neonatal intensive care units (NICUs). Many of these infants are supported with continuous positive airway pressure (CPAP) devices. While initially needed, CPAP is not a benign intervention, especially when used longer than necessary. This study evaluated the impact of a weaning algorithm on the duration of CPAP use for newborns in the NICU.

Methods: We performed a retrospective chart review after implementing an algorithm to guide CPAP weaning and discontinuation based on the Silverman-Andersen respiratory severity score. Two time periods were compared to evaluate outcomes: December 2018 – June 2019 and January 2020 – June 2020. Following data analysis, a quality control audit was performed to determine correct algorithm use.

Results: There were no differences in the duration of CPAP, time to first oral feed, or length of hospital stay. There was less supplemental oxygen use and more infants returned to room with their mothers in the post-algorithm period. Quality-control audits revealed that the algorithm was followed correctly in 32% of cases with the duration of CPAP, on average, 11h less than cases when used incorrectly.

Conclusion: An algorithm to guide weaning CPAP in newborns with respiratory problems did not reduce CPAP duration. However, the algorithm was used correctly in one-third of cases. When used correctly, the algorithm may result in shorter CPAP duration and improvement in other outcomes. Moving forward, quality-control meetings will be implemented to share these findings and provide education about correct algorithm use.

WestVirginiaUniversity.
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #113

Through the Eyes of a Patient With Substance Use Disorder: Observations of Compassionate Care

Tina Antill Keener, Briana Hines*, and Zheng Daig D
School of Nursing, West Virginia University, Morgantown, WV 26506

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

Student's Major: Nursing

Background: Nurses play an extremely important role in the treatment of patients with substance use disorder (SUD), and many nurses have reported difficulties when caring for these patients. Trusting patient reports and struggling with pain management, as well as being exposed to harsh behaviors are just some of the issues nurses have reported. Many nurses working with these patients with SUD have described feelings of apathy and compassion burnout which can compromise nurse-patient relationships.

Objective: The main objective of this research is to gain perspective from SUD patients regarding compassionate care.

Methods: This study consisted of a mixed-methods approach including surveys and qualitative description.

Results: Due to the small sample size a statistical significance was not observed, but a clinical significance for higher compassionate care scores was noted for males and patients with more days in the hospital. Qualitative data were analyzed and organized into two categories with five codes in each category. The two categories were used to understand compassionate nursing care by a "way of doing" and a "way of being".

Conclusion: The findings support that many patients hold their nurses and quality of care in a high regard and many had criticisms of the quality of care they were given. Educating nurses regarding SUD is essential to improvement of patient outcomes and promoting compassionate care of patients with SUD.

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

Presentation #114

Nursing Student Attitudes and Behavioral Intentions Towards People with Mental Illness

Kaitlyn Coleman*
School of Nursing, West Virginia University, Morgantown, WV 26506

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

Student's Major: Nursing

Stigma surrounding mental illness has a significant impact on patient care. Current data indicates that there is a pronounced shortage of nurses practicing in mental health. One possible explanation for this shortage is stigma. Stigma places further stain on the already-stressed mental health care system. The current literature suggests that stigmatizing attitudes among nurses exist during undergraduate education. However, further research is needed to show from where these attitudes originate. The purpose of this study is to measure attitudes and perceptions of stigma among nursing students. Understanding these concepts is the first step in developing interventions for decreasing stigma. We hypothesize that the findings will show that stigma decreases after students take the psychiatric nursing course. This implies that stigma is learned and can be unlearned through education. Decreasing mental health stigma would have a significant impact on nursing practice. Most notably, we could expect an increase in quality of care for mental health patients. Psychiatric patients are encountered in all areas of nursing practice. This extends the benefit of this research beyond psychiatric care settings. In conclusion, these findings have the potential to increase quality, empathetic care for patients suffering from mental illness.

Funding:

Presentation #115

Chronic Stress Leads to Decreased Interest in Self-Care

Shay Babich*, Emily N Burrage , Tyler Coblentz , James Frazier , Saina Prabhu , Nate Helwig , Ryan Childers , Randy W Bryner , Jefferson Frisbee , Eric E Kelley , and Paul D Chantler
Robert C. Byrd Health Sciences Center, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Other (Health Sciences)

Student's Major: Exercise Physiology

Stress can cause many mental health issues such as depression and lack of interest in self-care. The research previously conducted in our lab has shown significant differences between the behavior of mice who have undergone stress, and mice who have not.

We examined the effects of the unpredictable chronic mild stress (UCMS) paradigm, that begins when the mice reach 18 weeks of age and continues for 8 weeks, 5 days a week. The stressors are randomized and include social stress, damp bedding, no bedding, bath and cage tilt. At the end of the 8 weeks, the mice go through behavior testing such as Sucrose Splash testing. Sucrose Splash tests are completed by placing a mouse in an empty cage, and spraying a small drop of sucrose solution on the back of the mouse, and recording their latency to lick and number of licks over 5 minutes. The sucrose causes the coat of the mouse to be dirty, thus initiating grooming. Sucrose splash data shows that mice that have experienced chronic stress have an increased latency to begin licking than the controls (13.66 ± 13.96s to 5.87 ± 7.18s respectively). Similarly, mice who have experienced chronic stress show a decreased number of licks compared to the controls (29.33 ± 23.58s to 34.13 ± 17.36s respectively).

These data suggest that chronic stress causes the loss of interest to practice self-care and grooming.

Funding: Federal Work Study

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

WestVirginiaUniversity.
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #116

Conformational Changes of Syntaxin-3B in Regulating SNARE Complex Assembly

Joshua Ferrar*, Brandon Choi, Katie Dunleavy, Giovanni Howells, Bishal Misra, and Claire Gething
Biochemistry Department, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Biochemistry (Health Sciences)

Student's Major: Biochemistry

Neurotransmitter release of synaptic vesicles relies on the assembly of the soluble N-ethylmaleimide-sensitive factor attachment protein receptor (SNARE) complex, consisting of syntaxin and SNAP-25 on the plasma membrane, and synaptobrevin on the synaptic vesicle. The formation of the SNARE complex progressively zippers towards the membranes driving membrane fusion between the plasma membrane and the synaptic vesicle. However, the underlying molecular mechanism of SNARE complex regulation is unclear. Here we study the syntaxin-3B isoform found in the retinal ribbon synapses using single-molecule fluorescence resonance energy transfer (smFRET) to monitor the conformational changes of syntaxin-3B that modulates the ternary SNARE complex formation. In comparison to syntaxin-1A located in the conventional synapses, we found that syntaxin-3B is predominantly in the closed conformation inefficiently forming the ternary SNARE complex. Interestingly, a phosphomimetic mutation (T14E) at the N-terminal region of syntaxin-3B promoted ternary SNARE complex assembly in the presence of SNAP-25 and synaptobrevin. In addition, we investigated the effect of Sec1/Munc18 (SM) protein family member, Munc18-1, which is an essential molecular chaperone regulating membrane trafficking and membrane fusion. Similar to syntaxin-1A/Munc18-1 heterodimer complex, Munc18-1 prevented the ternary SNARE complex formation by locking syntaxin-3B in an auto inhibiting closed conformation, which is released by the priming factor, Munc13.

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #117

Intersection between Fertility Treatment and Eating Behaviors

Diana Davidson* and Elizabeth Claydon,
Department of Social and Behavioral Sciences, West Virginia University, Morgantown, WV 26506

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

Student's Major: Sociology

Lifestyle choices that individuals undertake have a consequential effect on human reproduction. Infertility clinics are more likely to treat women with past or current eating disorder history. Women with a severe eating disorder often suffer from anovulatory infertility, absence of ovulation, as compared to other forms of infertility. The relevancy of parents' contribution to successful conception through in vitro fertilization has been neglected to be researched in the realm of public health. The purpose of the study is to better understand the intersection between intro vitro fertilization treatment and nutritional guidance and eating behaviors. The research is conducted through qualitative data by interviewing women either through telephone or via zoom to ask questions about the nutritional guidance they have received and/or follow, the success of how the diet has been for them, and overall reaction to how the diet made them feel. Thematic analysis will be used to uncover major and micro subthemes among the transcripts. It is predicted the results will show themes of patterns between eating habits and nutrition chosen for the sake of fertility. The results will show that there is a need for women to be referred to dieticians during the IVF treatment process so they can be provided guidance on proper nutrition to follow and knowledge about what they can do to support the success of their fertility.

Presentation #118

High Frequency Speaker Identification Through the use of Automated Recognition Models

Jeremy Donai, Helen Boyd-Pratt, and Jillian Dodson*
Department of Communication Sciences and Disorders, West Virginia University, Morgantown, WV 26508

Field (Broad Category): Other (Health Sciences)

Student's Major: Communication Sciences and Disorders

The purpose of this speech classification study is to determine how efficient an automated recognition model, (i.e., a computer program), is at distinguishing person to person speech. More specifically the model will be using high-frequency energy at 4,000 Hz and above. Based on past research, it is hypothesized that the automated model should be able to distinguish speaker sex, identity, and understand the vowel sound that is being produced from this frequency range. The model will be given 7000 speech sounds produced by 25 male speakers and 25 female speakers. The important frequencies for identifying human speech, sounds below 4000 Hz, will be filtered out by a high-pass filter to allow for the computer to only receive a select high frequency range (at 4,000Hz and above). This experiment will use classification techniques such as kNN (k nearest neighbor) or SVM (support vector machine) in order to correctly classify the speakers. These programs are two types of supervised machines that are used to classify materials into separate groups. The finding of this study is expected to show a high correct percentage of speaker identification from the model. As well, it will show that the automated model can distinguish speech sounds without low frequencies. Implications of this study will allow for more advanced speaker identification, as well as important findings for the way humans and machines process speech.

Presentation #119

Effects of Acute Stress on Measures of Heart Rate and Heart Rate Variability

Mirissa Garchar*, Hannah Stovall, and Scott Galster
Rockefeller Neuroscience Institute, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Psychology and Neuroscience

With improvements in wearable device technology, it has become easier to observe physiological symptoms during periods of stress such as physical exercise and high intensity situations. Heart rate (HR) and heart rate variability (HRV) provide reliable measures of the state of the autonomic nervous system (ANS) which is associated with physiological states of rest and arousal. Variance from the resting state of HR and HRV can be indicative of a physiological response to stressful stimuli. In order to observe drastic changes in HR and HRV over a short period of time, stimuli such as the cold pressor can be utilized in order to induce stress response. We intend to use a 3-lead ECG which provides data which can be plotted and visualized in order to observe these physiological stress responses in six participants. We expect to observe a sharp increase in physiological symptoms at the introduction of the cold pressor stimulus followed by a slower return to resting HR and HRV after the stimulus is removed.

Funding:

Presentation #120

Incorporation of Fresh Tissue Training for General Surgery Residents

Kamil Abbas* and Daniel Grabo
Department of Surgery, Health Sciences Center, West Virginia University, Morgantown, WV
26506-9238

Field (Broad Category): Education (Health Sciences)

Student's Major: Immunology and Medical Microbiology

Due to fundamental shifts in the nature of operative trauma cases, current cohorts of general surgery residents (GSR) are at risk of completing training with deficiencies in critical open surgery skills. Along with paradigm shifts in operative trauma management, the implementation of duty hour restrictions has been associated with declines in the volume of operative trauma cases. Realistic training and simulation models were developed utilizing perfused fresh human cadavers (PFHC). To assess the effectiveness of this fresh tissue training program (FTTP), GSRs actively participated in a year-long trauma surgery skills curriculum, culminating in training and simulation sessions utilizing the PFHC. Prior to the training sessions, GSRs reviewed educational materials such as operative videos and appropriate textbooks. Additionally, conventional pre-and post- examinations were administered to determine their understanding of crucial trauma management skills. During these training sessions, the faculty assessed the competency of GSRs in key interventions and critical tasks for four major trauma operations, including neck exploration, left anterolateral thoracotomy, trauma laparotomy, and control of abdominal vascular injury and lower extremity vascular injury. Upon reviewing the pre-and post-test scores of 8 post-graduate year (PGY) 4 GSR, a significant increase in the mean score was noted. Specifically, the 2019 cohort of 4 PGY4 GSR improved the collective mean score from 68.3% to 81.7%. Similarly, in the 2020 cohort, the pre-test's initial mean score was 76.7%, which increased to 86.7%. Based on the preliminary results, FTTP affords realistic training and simulations, allowing GSR to practice and execute critical trauma skills.

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

Presentation #121

Effects of Functional Electrical Stimulation on Upper-Limb Performance in Stoke Survivors

MacKenzie Barr* (1), Ariel B. Thomas (2), and Valeriya Gritsenko (2,3)
School of Medicine, Division of Exercise Physiology (1), Rockefeller Neuroscience Institute, Department of Neuroscience (2), School of Medicine, Division of Physical Therapy (3), West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Exercise Physiology

Functional electrical stimulation (FES) is the artificial stimulation of muscles that causes muscular contractions intended to produce or assist with movement. Although it has been used for decades as a rehabilitative treatment for stroke, the performance of the hand when using FES to assist with shoulder mobility is less clear. This study aims to determine if the use of FES on the shoulder improves upper-limb performance for stroke survivors in a reach-and-grasp task. Four chronically motor impaired stroke survivors and twenty healthy control participants were recruited. Subjects completed a forward and lateral reaching task within Virtual Reality, with and without assistive FES. The anterior deltoid was stimulated during the forward reaching task (80 total repetitions) and the medial deltoid was stimulated during the lateral reaching task (80 total repetitions). Non-stimulation task trials were instructed as 40 repetitions to each forward and lateral target before and after stimulation trials. Data was collected using electromyography and motion capture of the trunk, arm, and hand. Grasping ability of the hand was analyzed and compared between stroke survivors and control subjects in FES and non-FES conditions. Preliminary electromyography data shows decreased spasticity of the muscles responsible for grasping when assistive FES is used in stroke patients. Spasticity, or continuous muscular contraction, can make movement difficult and painful. We suggest that assistive FES of the shoulder could be used to alleviate spasticity and increase grasping mobility of stroke survivors.

Program/mechanism supporting research/creative efforts:
WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course
First2 Network

Presentation #122

Quantifying Fatigue with Wearable Assistive FES Devices for the Shoulder

Annabelle P. Smith*, Ariel B. Thomas, and Valeriya Gritsenko
Rockefeller Neuroscience Institute, Department of Neuroscience, School of Medicine, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Music and Health

Functional Electrical Stimulation (FES) consists of using small electrical pulses administered through electrodes placed on the skin to elicit a muscle contraction. The uses for FES on people who have lost partial or all function in a muscle are boundless when considering developments made in wearable FES technology. With recent advancements in FES technology the question of muscle fatigue from wearable assistive use is still unanswered. We examined how the use of FES can impact muscle fatigue when used to assist with a reach and grasp task. Nine healthy subjects were put into a virtual task environment and instructed to reach and grasp various targets with and without FES to the shoulder. Upper limb muscle activity was recorded using wireless sensors, along with detailed tracking of kinematics. Before FES trials, subjects performed 80 control reach and grasp repetitions without stimulation. Next, stimulation was applied to the anterior and medial deltoid at amplitude levels adjusted to induce 30 degrees shoulder flexion or abduction, respectively. This stimulation was then triggered by the subject's movement within the VR task environment to assist the shoulder in the direction of movement with each reach (160 repetitions). After the stimulation trials, the resting stimulation and control trials were repeated. Through comparisons of the degree of abduction and flexion induced by stimulation before and after trials, we saw the presence of fatigue. This could indicate a potential hurdle in the field of wearable FES technology, highlighting the potential need to adjust stimulation amplitude during extended use.

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

Presentation #123

Nod-Like Receptor X-1 (NLRX1) is a Novel Mediator of Ozone-Induced Lung Inflammation

Jessica Amedro*, Nairrita Majumder, Sherry Xie, and Salik Hussain
School of Medicine, Department of Microbiology, Immunology and Cell Biology, Department of Physiology and Pharmacology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Immunology and Medical Microbiology

According to the World Health Organization, over 4 million deaths annually are attributed to outdoor environmental pollution. Ozone (O_3) is one of the most reactive gaseous components of air pollution and is among six criteria pollutants identified/regulated by the US Environmental Protection Agency (EPA). Both epidemiological and experimental evidence confirm the ability of a short-term acute O_3 exposure to aggravate pre-existing disorders such as asthma. We hypothesized that NLRX1, an antiinflammatory member of the Nod-like receptor (NLR) family, plays a significant role in O_3-induced pulmonary inflammation. We exposed Nlrx1+/+ and Nlrx1-/- mice to filtered air (controls) or O_3 (1 ppm) for 3 hours and euthanized the mice 24 hours post exposure. Bronchoalveolar lavage was performed to analyze cellularity and airway barrier permeability. Lung tissue were collected to measure cytokines (KC, IL-13, TSLP) gene expression (real time PCR) and protein expression (western blots/enzyme linked immunosorbent assay (ELISA)). Our studies demonstrated two to three fold increase in inflammatory cells (neutrophils) in lavage, increased inflammatory mediators gene and protein expression in Nlrx1-/- mice compared to Nlrx1+/+ mice post ozone exposure. In conclusion, we demonstrate that NLRX1 in involved in control of ozone induced inflammatory responses in the lungs. Further studies are ongoing to evaluate signaling pathways implicated in increased inflammatory response.

Program/mechanism supporting research/creative efforts:
an external internship or other type of program

Presentation #124

Expression Profiling of Epithelial Transcription Factors in Breast Cancer Cell Lines

Maria A. Voronkova, Joseph B. Addison, Morgan Johnson, James H. Fugett, Anna Alappat, Jordan Means*, Kathleen Summers*, and Alexey V. Ivanov
Department of Biochemistry and WVU Cancer Institute, West Virginia University, Morgantown, WV

Field (Broad Category): Biochemistry (Health Sciences)

Student's Major: Immunology and Medical Microbiology

Cancer metastasis is the spread of cancerous cells from primary location to other organs and is a major cause of cancer related deaths. 90% of human cancers are of epithelial origin. The Epithelial-to-Mesenchymal Transition (EMT) has been shown to promote metastasis by enabling epithelial cancer cells to acquire such mesenchymal properties as invasion, migration, and resistance to apoptosis. The study of transcription factors (TFs) can uncover the mechanisms by which EMT processes are activated and controlled. Mesenchymal to Epithelial Transition (MET) TFs help promote gene expression leading to the cellular transition of mesenchymal cells. We have previously identified a set of TFs that are downregulated during EMT and hypothesized that they are responsible for maintaining the epithelial state and suppression of EMT. We profiled their expression in a panel of epithelial (luminal and basal) and mesenchymal breast cancer cell lines using real-time qPCR. We found that OVOL1, OVOL2, GRHL1, GRHL2, GRHL3, ELF3, ELF5, and IRF6 were expressed at high levels in majority of epithelial cell lines and almost invariably not expressed in mesenchymal cell lines. In addition, ESR1, GATA3, and FOXA1 were highly expressed in luminal cell lines, as expected. These data suggest that expression of these 11 TFs is associated with the epithelial phenotype and that they could potentially suppress EMT. We plan to test if these TFs can suppress EMT in functional assay by overexpressing them in mesenchymal breast cancer cells. The identification of EMT suppressors will facilitate future efforts to inhibit EMT and metastasis in breast cancer.

Program/mechanism supporting research/creative efforts:
Other
INBRE

WestVirginiaUniversity.
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #125

Analyzing the effect of radiation-induced blood-brain barrier disruption on barrier protein expression

Morgan J. Glass*, Samuel A. Sprowls, Leland E. Earp, and Paul R. Lockman
School of Pharmacy, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biochemistry

Noninvasive treatments of brain metastases of breast cancer remain limited and pose unique challenges. Recent literature and clinical data suggest radiation therapy is capable of producing temporary integrity changes at the blood-brain barrier (BBB), allowing for increased passage of chemotherapy into metastatic brain tumors. The BBB is a protective mechanism of the brain, which prevents potentially dangerous exogenous and endogenous molecules from entering the brain through the bloodstream, including most chemotherapeutics. Interestingly, effects of radiation-induced disruption at the molecular level are not fully understood, and prolonged exposure to radiation has been linked to cognitive impairment. To better understand the effect of radiation on integral barrier proteins, such as tight junction proteins and efflux transporters, capillaries were isolated from mice with differential exposure to radiation, and proteins were measured with Western Blot Assays. Because radiation is known to damage the overall structure and function of the BBB, we predict these barrier proteins will be downregulated in groups exposed to radiation. Our recent preliminary data includes the clinical commissioning of our small animal radiation research platform demonstrating predictable dose rates and good field homogeneity. Using clinically applicable doses we were able to show increases in blood-tumor barrier permeability 24hrs post radiation therapy in both our 231Br and JIMTBr preclinical breast cancer brain metastasis models. While radiation remains a tool of growing importance for the treatment of breast cancer brain metastasis, further study of its effects on the physiological dynamics at the BBB and its potential long-term effects are crucial.

Program/mechanism supporting research/creative efforts:
Other
Honors Experiential and Community Engaged Learning (EXCEL) Program

Presentation #126

Chronic Dim Light at Night Disrupts Immune Function and Increases Mortality in Aged Females

Jordan Payton*, Jennifer A. Liu, Jacob R. Bumgarner, William H. Walker, O. Hecmarie Meléndez-Fernández, Ning Zhang, James C. Walton, A. Courtney DeVries, and Randy J. Nelson.
Robert C. Byrd Health Sciences Center, West Virginia University, Morgantown WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Psychology and Biology

Organisms have evolved endogenous rhythms that mimic the natural solar day; these internal circadian rhythms have a period of ~24 hours and synchronize physiology and behavior to precisely 24 hours in response to exogenous environmental cues such as light. Aging is considered a nonmodifiable risk factor for chronic disease and aged individuals are especially susceptible to disease and infection. Disruptions to circadian rhythms can alter aspects of the immune system including the regulation of proinflammatory cytokines, resulting in dysregulated immune activation and increased risk for disease/shortened life expectancy. Previous studies from our lab have reported that exposure to dim light at night (dLAN) disrupts immune function; thus, we tested the hypothesis that chronic dLAN exacerbates the effects of aging on immune function and mortality. Twenty month old male and female mice were monitored for 24 weeks in normal light-dark conditions or dLAN (5 lux), and immune function was tested through a cell-mediated delayed type hypersensitivity test (DTH). There was a significant decrease in life expectancy of females housed in dLAN compared to LD and males in either lighting condition. Additionally, there was an interaction effect of light and swelling response during DTH, where dLAN females had significantly impaired inflammatory response from day 3-6 of the analysis. Further, females had increased adrenal weights compared to males, and dLAN females compared to LD. Together, these data suggest that a sex difference in survival after chronic exposure to dLAN exists; females are especially susceptible to the detrimental consequences of disrupted circadian rhythms.

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

Presentation #127

E-Liquid Base Solution Used in Electronic Cigarettes Impairs Cerebrovascular Reactivity

Rachel Plants*, Sydney Nassabeh*, Emily Burrage, J. Alex Bruce, Amber Mills, Paul D. Chantler, and I. Mark Olfert

School Of Medicine, Division of Exercise Physiology; Center of Inhalation Toxicology, Robert C Byrd Health Science Center, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Other (Health Sciences)

Student's Major: Exercise Physiology

Electronic cigarettes (E-cigs) have been marketed as a safer alternative to traditional cigarettes and as a smoking cessation aid. The main components comprising the E-cig liquid are vegetable glycerin (VG) and propylene glycol (PG), but few studies have examined the chronic effects of either 100% VG or 100% PG e-cig aerosol toward cerebrovascular health. Wild type C57BL/6J mice were placed in whole-body chambers and exposed to aerosol produced from e-cigs using 5-sec puff at 17.5 W with either 100% VG or 100% PG liquid for 60 puffs/day, 5 days/week, for 4 weeks. Control group of mice were exposed to ambient air. One-day after the last exposure, the mice were sacrificed and middle cerebral artery (MCA) responsiveness to increasing concentrations of acetylcholine (ACh), phenylephrine (PE), and sodium nitroprusside (SNP) were examined via pressure myography. Maximal MCA dilation to ACh (10^{-4}M) was impaired by ~50% in both VG and PG groups compared to control mice. Max response to endothelial-independent dilator response SNP (10^{-4} M) showed 25-42% impairment with VG and PG compared to control mice. Vasoconstriction response to PE (10^{-4} M) was 15% lower with VG and 40% lower with PG compared to control mice. Mice exposed to e-cig aerosol produced solely from VG or PG show vascular reactivity impairments of up to 50% in MCA vessels. The greater deficits observed with ACh, compared to SNP, suggests significant impairment results from endothelial-dependent mechanisms, but also that endothelial-independent mechanisms may be involved.

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

Presentation #128

Influence of Oxygen Concentration on Trilineage Differentiation of Human Fetal Cells

Jhanvee Patel*, Yixuan Pei, and Ming Pei Ming Pei
Department of Orthopaedics, West Virginia University School of Medicine, Morgantown, WV 26505

Field (Broad Category): Biology (Health Sciences)

Student's Major: Journalism

Stem cell tissue engineering is a promising approach to treat tissue defects such as cartilage damage, bone loss, and breast reconstruction. In this study, we hypothesize oxygen concentration plays a critical role in human fetal stem cell based tissue regeneration. Human nucleus pulposus cells (NPCs), cartilaginous cells, and synovium-derived stem cells (SDSCs), tissue-specific stem cells for chondrogenesis (cartilage pathway), were used for in vitro trilineage evaluation: chondrogenesis, adipogenesis (fat pathway), and osteogenesis (bone pathway). Histological staining, real-timer PCR, and western plot were used for data analysis at mRNA and protein levels. The study was split in two parts. In the pretreatment study, either normal (21%) or low oxygen (5%) was used to expand cells followed by standard differentiation induction. We found low oxygen pretreatment promoted adipogenic differentiation with SDSCs having a higher capacity than NPCs. The low oxygen pretreatment did not cause significant difference in osteogenic differentiation, but SDSCs displayed higher capacity compared to NPCs. The low oxygen pretreatment promoted chondrogenic differentiation with NPCs having a higher capacity than SDSCs. In the differentiation study, cells were expanded in normal oxygen, followed by either normal or low oxygen during differentiation induction. We found low oxygen treatment promoted adipogenic differentiation with SDSCs having a higher capacity than NPCs. The low oxygen treatment caused a decrease in osteogenic differentiation, but the SDSCs displayed higher capacity than NPCs. The low oxygen treatment promoted chondrogenic differentiation with NPCs having a higher capacity than SDSCs. We concluded oxygen concentration significantly affects differentiation in a lineage-dependent manner.

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

Presentation #129

Examining the Effects of In Utero Opioid Exposure on Neonatal Immune Profiles

Nicholas W. Miller*, Brittany G. Seman, Stephen M. Akers, and Cory M. Robinson
Department of Microbiology, Immunology, and Cell Biology, West Virginia University School of Medicine, Morgantown, WV 26505

Field (Broad Category): Other (Health Sciences)

Student's Major: Immunology and Medical Microbiology

Neonatal abstinence syndrome (NAS) is a disease characterized by symptoms of withdrawal in newborns following prolonged exposure to opioids in utero. Incidence rates are elevated in the United States, especially in West Virginia, as a result of the opioid epidemic. Previous findings have characterized the effect of opioid usage on the adult immune system, but there is limited information regarding impacts on neonatal immunity, which has been shown to vary substantially from adults. This research study seeks to compare immune profiles and functional responses between healthy neonates and those exposed to opioids in utero. The latter are at risk of developing NAS. We hypothesized that opioid exposure would lead to reduced numbers of some populations of immune cells with diminished functional capabilities and an overall increased suppressive profile. We obtained umbilical cord blood from full-term pregnancies of healthy and opioid-exposed neonates at birth. Immune cell populations were enumerated, and T cell proliferation was assessed between groups using flow cytometric analysis. Preliminary analysis has demonstrated increased numbers of T cells in umbilical cord blood and corresponding proliferative potential in vitro in opioid-exposed donors. Additional planned studies will compare pro- and anti-inflammatory cytokine profiles by multiplex assay and measure the ability of monocytes to kill Escherichia coli. It is critical to understand the impact of fetal opioid exposure on the neonatal immune system to aid in the development of effective maternal, fetal, and/or neonatal intervention strategies to improve outcomes.

Program/mechanism supporting research/creative efforts:
Other
Immunology and Medical Microbiology Internship

Presentation #130

The Influence of Faith Community Nurses on Patients and Hospitals

Angel Smothers, Elizabeth Morrissey, and Eva Dolde*
*Robert C. Byrd Health Sciences Center, Department of Nursing, West Virgina University,
Morgantown, WV 26506*

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

Student's Major: Health & Well-being (Pre-Med)

A hospital readmission rate is the data collected by acute care facilities related to the rate of return of a discharged patient within 30 days of discharge. High readmission rates cost both hospitals and patients money and limit the availability of resources for others in need of acute care access. Hospitals have sought to identify methods to decrease the rate of 30-day readmissions through the use of transitional care nursing services. Faith community nurses (FCN) are licensed, registered nurses who use their nursing knowledge combined with spiritual care to provide holistic care for individuals. Faith community nurses specialize in helping community members during transitions in care. These transitions might include patients who are discharged home from the hospital, discharged to a long-term care facility, or discharged home with the hospice benefit. Faith community nurses can answer health-related questions their patients have while providing holistic care A review of the literature was completed to determine what the body of evidence shows as effective strategies for faith community nurses to promote transitions in care. The evidence demonstrated that the FCN can reduce readmission rates in their patients, thereby proving highly effective in promoting effective transitions in care.

Presentation #131

Optimizing a 3D Bioprinter for FRESH Bioprinting

Duncan McGee*, Vignesh Sivashankar*, Ryan O'Connell, Oxana Tseytlin, Andrey Bobko, and Mark Tseytlin
Department of Biochemistry and Molecular Biology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Other (Health Sciences)

Student's Major: Biomedical Engineering

Bioprinting can be used in tissue engineering to replicate human body parts like blood vessels, bones, and other natural tissues. This emerging bioengineering method provides an alternative to the animal-based drug testing approach. Bioprinted human cells, tissues, and organs are becoming valuable models during the research and development of new types of treatments. We adapted a 3D plastic printer to print with bioinks, like alginate, using the freeform reversible embedding of suspended hydrogels (FRESH) bioprinting method. The main goal is to optimize the printer settings, such as the print speed and extrusion rate, using the Ultimaker Cura 3D printing software to increase the bioprint's resolution. FRESH utilizes a gelatin support bath to hold the alginate during the printing process. The gelatin beads are in a calcium chloride solution that facilitates the polymerization of the alginate after printing. The sodium alginate forms a hydrogel through ionic cross-linking in the presence of the divalent cation calcium. After the print finishes, the gelatin support bath is heated up to body temperature to melt the gelatin leaving the finished alginate print. Using FRESH 3D-bioprinting, we successfully printed an alginate tube to model an artery. We will then image the alginate tube using the locally built electron paramagnetic resonance (EPR) imaging system. EPR permits 3D mapping of oxygen and other essential for life molecules. Changes in oxygen distribution across the tube will be imaged. As a result, we will determine the oxygen diffusion rate from inside of the tube to outside in this proof-of-concept experiment.

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

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #132

Optimal Levels of Exercise for Recovery of Traumatic Brain Injuries

Camila Romero*, Ruth Velazquez Cruz, Zachary Weil, and Kate Weil
Erma Byrd Biomedical Research Center Department of Neuroscience, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Neuroscience (Health Sciences)

Student's Major: Neuroscience

Traumatic Brain Injuries (TBI) are a common cause of disability and death in the United States. The usual recommended treatment after a TBI is prescribed rest, however, this practice has been shown to provide little to no benefit on the recovery and in some cases, has interfered with the patients' health. The aim of this study is to observe through behavioral testing what is the optimal level of exercise that could potentially promote the most functional recovery after a TBI in mice, with the hypothesis that moderate intensity exercise will promote the highest level of functional recovery. To test this hypothesis, we used a mouse model for TBI. Mice underwent a TBI, or a control (sham) injury followed by 10 days of treadmill exercise. Mice were randomly assigned low-, moderate-, or high intensity exercise or the control sedentary condition for 30 minutes per day. To assess the effect of post-injury exercise on behavioral recovery, mice were subjected to three different types of tests, Barnes Maze for learning and memory, Forced Swim Test for depressive-like behavior, and Elevated Plus Maze for anxiety-like behavior. Preliminary data indicate that moderate intensity exercise after a TBI improves cognitive function and reduces anxiety-like behavior. Importantly, neither low-intensity nor high-intensity exercise appears to provide significant benefits to behavioral outcomes. These results can provide a better understanding about the impact of exercise following a TBI and provide a guideline for physicians regarding the use of exercise as a rehabilitation option for TBI.

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

Presentation #133

Discrimination through Italian American Caricature in 19th and 20th Century Dime Novels

Michael DiBacco*, Madeline Miller*, Lillian Wright*, Allison Groves* and Nancy Caronia
Department of English, West Virginia University, Morgantown, WV 26505

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

Student's Major: English and Biology

Dime novels and associated ephemeral literature were the most popular form of American entertainment reading during the late 19th and early 20th centuries. Though modern genres such as detective fiction and Westerns can trace many of their thematic tropes back to this often dismissed medium, dime novels' characterization of ethnic minorities is troubling. Their overt racism and xenophobia speak to the historical moment during which they were written and have allowed researchers to glean a sense of the public's reactionary response to the rapid cultural diversification of their time. While analogous research projects have dissected the harmful caricatures of groups like African Americans and women contained within these stories, the prevalence of Italian Americans has regularly been discounted, despite these characters appearing, often antagonistically, in around 11% of the 568 novels which this project has so far considered. This study aims to remedy this attitude and associated knowledge gap in dime novel research by locating and characterizing instances of Italian American othering/minstrelsy in some of the period's benchmark publications like The New Nick Carter Weekly and The Wide-Awake Library. Such analysis facilitates consideration of the biases harbored by their authors' demographics as well as the origins of Italian American stereotypes propagated by American pop culture for decades afterward. This presentation discusses the ongoing work of this two-year project with emphasis on what Madeline Miller and I have discovered during our time with it. (Should be Italics on book titles. See additional document)

Funding:

Program/mechanism supporting research/creative efforts:
a WVU 297-level course

Presentation #134

Data Analytics in the Undergraduate Business Curriculum - Relevance and Practical Applications

Natalie P. Rogers* and Katherine Kopp

Department of Management Information Systems, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Interdisciplinary Studies (Human Engagement)

Student's Major: Economics

The field of business has become increasingly digitized over the years, and data analytics skills are an increasingly in-demand skill that employers seek from prospective new hires. Recent graduates who have experience in data analytics technologies and methods are not only more likely to find a job directly after graduation, but it is likely their salaries will also be higher as well. Across all business majors enrolled in West Virginia University's Chambers College of Business and Economics, students are required to take CS 101, an introductory computer science course which acquaints them with the Microsoft Office Suite. However, proficiency in only these programs are simply not enough technological experience in order to be a standout applicant for jobs after graduation, even in fields such as management and marketing. With Reynolds Hall, the Chambers College's soon-to-be new home in the coming years, nearing completion, this will surely come with new resources and opportunities for the Chambers College to be able to put into use in order to ensure that all students graduating from it have substantial data analytics experience under their belt, therefore making them more competitive job applicants. The goal of my project is to create an academic report that discusses the benefits of data analytics experience in undergraduate business students, as well as provides a proposal of a feasible plan of action that the West Virginia University Chambers College of Business and Economics could take in order to increase opportunities for data analytics education across all majors.

Funding:

Program/mechanism supporting research/creative efforts:
capstone course within my department

Presentation #135

The Preliminary National Sport Report

Kristen Dieffenbach, Christina Villalon, and Jaxon Lamb*
Center for Applied Coaching and Sport Sciences, West Virginia University,Morgantown, WV 26505

Field (Broad Category): Sports Management/Sport Exercise Psychology (Human Engagement)

Student's Major: Sport and Exercise Psychology

Currently, there are no central reports or databases that outline which sports organizations are operating in the country. The lack of insight creates an issue when stakeholders try to reform the current systems in place. This preliminary report is for coaches, administrators, national governing bodies (NGBs), and other parties of interest, to see what the sports landscape looks like. Using an applied quantitative research style, the organizations were researched, in order to see what is being offered by each one of them. The criteria examined was which sport the organization offered, what type of areas they serve, what the participants' ages are, and other critical pieces of information to sort each organization. The report allowed us to identify around 75,000 programs that have been affiliated with either a specific NGB or an acknowledged association. The overall goal of this project is to create an annual report that can be reviewed by all stakeholders to see what type of sports programs are being offered and participated in across the nation. The second goal is that once we have an accurate assessment of what organizations are active in the United States, we will be able to begin looking at who is coaching these participants and what coaching education opportunities they are engaging in. The West Virginia University Center for Applied Coaching and Sport Sciences plans to use this report to analyze the coaching education field, so that recommendations and improvements can be made and implemented to better the coaching arena, nationally.

Presentation #136

Evaluation of virtual pile-sorting as method to identify cultural perceptions of cancer/cancer care

Kailia Pua'auli*, Susanna Donaldson, and Ann Morris
Department of Anthropology, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Anthropology & Archeology (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. This project is designed to explore knowledge and perceptions of cancer among such a population. At this phase in this project our primary goal is to see if pile-sorting and ethnographic interviewing is a reasonable way to elicit this information. These methods were chosen because anthropologists have determined that pile sorting provides a rapid way to elicit cultural knowledge and perceptions. What has not yet been determined is the effectiveness of this method in a virtual, post-pandemic setting. In this phase of research, we are testing the utility of conducting interviews and collecting pile-sorts virtually – using the online tools of Zoom and flippity. Virtual interviews were conducted via Zoom and pile sort data were collected by asking participants to organize words and ideas drawn from the free list data in an online program called flippity. Preliminary results suggest that collecting data via virtual pile sorting is a reasonable way to elicit perceptions of cancer. This phase of research contributes to a broader goal of our study – to better understand cultural knowledge and perceptions of cancer and cancer healthcare with the goal of improving improve patient-doctor communication.

Funding:

Presentation #137

More Diverse than You Might Imagine: A Survey of Recent Young-adult Appalachian Literature

Allison Ball* and Rosemary Hathaway
Department of English, West Virginia University, Morgantown, WV 26501

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

Student's Major: English and Criminology

For the last several months, we have been attempting to compile a comprehensive bibliography of Appalachian young-adult books. While young-adult literature as a genre has been expanding in recent years, it is difficult to find YA books set in Appalachia--especially ones that don't conform to stereotypes. To take a closer look at this kind of literature, we have conducted a survey to determine how much YA Appalachian literature has been published over the last few decades and which books are still in print.

We discovered that little work has been done describing this literature. The only existing resource we have found for our research is Herrin and Oliver's 2010 reference book, Appalachian Children's Literature: An Annotated Bibliography. Although Herrin and Oliver's book includes many children's books describing Appalachia and its people, it doesn't specifically break out YA books separately. We are also looking into different coding systems for listing the books in the bibliography.

This poster presentation will define what we mean when we describe a YA novel as being "Appalachian," and introduce viewers to the many books we've come across that fall into this category. Compiling an extensive list and sharing it with viewers allows Appalachians to embrace the range of regional representations in these novels, allows others to see how prevalent this literature is, and debunk negative views of the region. Key to our research is including more texts that include characteristics of Appalachia while also representing diverse groups such as the LGBTQ+ community and other minority communities.

Funding:

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

Presentation #138

Combatting Negative Depictions of Appalachia by Analyzing Diversity and Inclusivity within the Region

Aerianna McClanahan* and Rosemary Hathaway
Department of English, West Virginia University, Morgantown, WV 26506

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

Student's Major: English and Women's and Gender Studies

Appalachia continues to be wrongfully depicted as a homogeneous region inhabited by backward individuals who lack proper education. Consequently, this erroneous stereotype has created an implicit bias that is detrimental to those living both inside and outside of Appalachia. In this study, interviews were conducted with people considered to be regional activists, identifying as both Appalachian and staunch advocates for their communities. Questions about diversity and inclusivity in the region were asked in addition to inquiring about what work can still be done. The mutual consensus amongst the participants was that - although there will always be progress to be made - one cannot discredit the economic and cultural diversity that exists here, nor can they erase the rich demographic diversity of our region because there are a multitude of individual Appalachians who belong to a range of sexual minority, racial and ethnic groups - just to name a few. This study is significant because identifying and compiling a network of activists who are affecting change serves as a catalyst for a positive portrayal of the region. This network can now expand and be shared with others in hopes that a more accurate representation of Appalachia can be curated and maintained.

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

Presentation #139

Starting College Online: Strategies for Academic Success in STEM Freshman

Skylar Watson*, Randy Bryner, Brian Leary, and Miriam Leary
Division of Exercise Physiology, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Exercise Science & Nutrition (Human Engagement)

Student's Major: Exercise Physiology

In STEM programs, starting college with successful academic strategies can improve retention and persistence to graduation. The incoming freshman of fall 2020 experienced an unprecedented transition to college in an almost exclusively online learning environment. By understanding their expectations and intentions for college faculty could better prepare future incoming freshman with the academic skills and strategies necessary for scholastic achievement. Written responses of STEM freshman's online learning and academic success strategies were collected and independently coded for major and minor themes using Grounded Theory for the whole group (n=266), Honors (n=47), Retention (low incoming math scores, n=74), and First Generation (n=49) groups. Overall, students had experience and familiarity with online learning, but preferred in-person courses. They expected to manage online but worried about the quality of teaching and navigating the new learning management systems. For study skills, all students indicated they would use a planner or white board to make a schedule in order to study and stay on top of due dates. Differences between groups suggested Honors students were concerned about not meeting other students and professors due to the online learning and planned to attend tutoring as an academic success strategy. Important study strategies were only minor themes including putting away phones, finding a quiet place to study, using study groups, going to office hours, and even attending class. These are key areas for intervention in future cohorts starting college with online courses.

Funding:

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

Presentation #140

Exploring Pre-Columbian Owl Iconography: Harbingers of Bad Omens, Death, and Successful Hunts

Samuel Hensley*, Blaire Phillips*, and Megan Leight
Art History Department, School of Art and Design, College of Creative Arts, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Art History & Visual Arts (Visual & Performing Arts)

Student's Major: Art History

Owls are often linked with darkness due to their crepuscular (twilight) or nocturnal predatory hunting practices and nearly silent flight patterns. This makes owls mysterious and ominous creatures, and their mythological roles among ancient Mesoamerican cultures is complex. They are viewed as negative auguries since they are special messengers to the gods of the Underworld. The owl is commonly represented alongside merchants and God L as companions to travelers and in scenes associated with darkness or nighttime. They are seen as portents of ill-fated omens and impending death, particularly when their vocalized cry is heard or an owl is near a home. The one positive aspect of owls is from hunters, who view noises from owls as an important indicator of a successful hunt. This paper explores the complexity of visual representations of owls across Mesoamerica, focusing on the iconography and mythology of owl imagery. The paper will consider representations and myths associated with owls from other regions of the Americas, particularly among the Moche of South America. The goal of this study is to better understand the strange and compelling depictions of owl figures in Pre-Columbian art.

Funding:

Program/mechanism supporting research/creative efforts:
Other
Mesoamerican Art History Course

Presentation #141

WVU Dance Archiving: Creating a Community of Memories

Olivia McCarty*, Maureen Kaddar, and General Hambrick
Elizabeth Moore Hall, Dance Department, West Virginia University, Morgantown, WV, 26505

Field (Broad Category): Dance (Human Engagement)

Student's Major: Dance and Psychology

During the 1900's dancers at WVU were unable to pursue dance as a major but dedicated much of their free time to dance by participating in the group "Orchesis". The work that began the West Virginia University Dance Archive Project has involved scanning and documenting files, including images, posters, programs, and tickets from the mid-late 20th century. This documentation has led us to be able to preserve the history of the group that helped lead WVU to creating a dance major in 2014. This research has also led us to be able to create a large alumni list that we are actively compiling to reach out to and make plans for reunions in the near future. Creating a strong relationship among alumni will aid in future opportunities for the dance program in aspects of funding, and potential employment for current students in the program. Maureen and I are working to inform and encourage underclassmen to participate in the project so it can be ongoing after I graduate this May. The continuation of this project is essential for the outreach efforts, and to create a community with those who have been a part of dancing at West Virginia University. Dance at WVU has been taking place in the studio above E. Moore Hall for over 90 years. The dance program is continuing to grow and improve each year; it is important for us to also pay tribute to those who worked in the same studio we use years before us.

Funding:

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

Presentation #142

Dual Enrollment - Review of Literature Abstract

Laura Pyzdrowski and Yaronn James Arciaga*
Department of Mathematics, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Education (Human Engagement)

Student's Major: Mathematics

Students enrolled in dual-enrollment courses earn both high school and college credit. The project in this study offers a sequence of four dual-enrollment courses: Algebra, Trigonometry, and Calculus with Pre-Calculus I and II that are implemented using a facilitator model. In this model a high school teacher serves as the instructor of record at the high school and a professor serves as the instructor of record at the University. To earn University credit, students must pass the course taught (remotely) by the University professor. High school teachers provide additional resources allowing for student success in addition to any additional curriculum needed to award high school credit. Courses are offered using a blended model where some activities are performed face-to-face. These are facilitated by the high school teachers who also proctor exams. In this model 90% of the grading is done by the University. Research shows that project DFW rates are typically below 10% and students do as well as on-campus counterparts when taking the next courses on-campus. A DFW rate is the percentage of students in a course who earn a "D","F", or "W" in the course. A literature review reveals significant research that pertains to student success and motivation while enrolled in dual-enrollment courses. However, there has been limited research conducted with respect to the preparedness and motivation of high school teachers involved in such courses. Future study will investigate the preparedness and motivation of high school teachers involved in the facilitated model of a dual enrollment program.

Funding:

Presentation #143

Peer Learning Communities Effectiveness on Work-Life Balance

Lauren Gould* and Leslie Tower
Women's Resource Center, West Virginia University, Morgantown, WV 26505

Field (Broad Category): Social Work & Human Services (Human Engagement)

Student's Major: Social Work

This study focuses on how a peer learning community may affect the work/life balance of new faculty in higher education. Greenblatt (2002) defines work/life Balance as satisfaction and good functioning at work and at home with a minimum role conflict. Studies have shown many higher education faculty struggle to manage work and personal life (Pasque, 2011). Studies have also shown positive outcomes associated with successful socialization including increased job satisfaction, organizational attachment, higher job performance, organizational citizenship, productivity, retention, achieving tenure (Fleming, Goldman, Correli, & Taylor, 2016). We created a community of new faculty who went monthly on Zoom. Before each meeting, we asked participants to participate in a 2-item eJournaling survey. Item 1 used a 7 item scale to ask the participants how much they agreed or disagreed with the statement, "I am able to balance my personal/family life with my work demands." Item 2 asked the participants to explain their answer to the first question. We used grounded theory to examine participants' ability to manage work and personal life and what was having positive and/or negative effects on their work life balance, over time. Some of the participants reported improvement in their ability to manage work and personal life. We also found that COVID-19, working from home and lack of boundaries have all had negative effects on work life balance. We conclude that peer learning communities may positively impact work life balance in higher education faculty.

Funding:

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

Presentation #144

Differences in Reactive Muscle Recruitment Between Standing and Sit-to-Stand Perturbations

Alyssa H. Reeves* and Jessica L. Allen
Neuromechanics of Mobility Lab, Department of Chemical and Biomedical Engineering, West Virginia University, Morgantown, WV 26505

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

Student's Major: Biomedical Engineering

When standing or walking in day-to-day life, our bodies keep us balanced. Sometimes the disturbance in our balance is too great, causing us to stumble and we have to recruit our muscles to prevent a fall to the ground. How we should recruit our muscles depends on how off-balance the stumble puts us and what we were doing when we stumbled. We can examine the relationship between these stumbles and muscle recruitment in a controlled manner by perturbing people in the lab. In this study, we focused on perturbations while standing and arising from a chair (or sit-to-stand) that made people stumble forwards. The question we seek to answer in this study is: what are the differences between the two in terms of the muscles that prevent a fall? We analyzed three young, healthy subjects from a previously collected dataset that included muscle activity recorded from four muscles on the front and back of the lower leg. Using MATLAB, we calculated reactive muscle recruitment, or RMR, which is the muscle activity immediately following the perturbation. Our preliminary results demonstrate that Lateral Gastrocnemius was recruited the most after standing perturbations and Vastus Lateralis has significantly less activity in the sit-to-stand perturbations, with all muscle activity increasing as the stumble difficulty increased. This study will help us understand how we stay balanced depending on the situation and help us target a specific muscle if a patient is struggling with gait or arising from a chair.

Funding:

Presentation #145

Encapsulation of Manganese Oxide Nanoparticles to Maximize MRI Signal Intensity

Mara Looney-Sanders*, Celia Martinez de la Torre, Andrey Bobko, and Margaret Bennewitz
Department of Chemical and Biomedical Engineering, West Virginia University, Morgantown, WV 265062 and Department of Biochemistry, West Virginia University, Morgantown, WV 26506

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

Student's Major: Engineering

Breast cancer is one of the most common cancers affecting women worldwide. To detect breast cancerearly, magnetic resonance imaging (MRI) currently uses gadolinium (Gd) chelatesas the main contrast agent. However, Gd chelatesdo not differentiate between malignant and benign tumors, which leads to false positives (misdiagnosed benign breast tumors),and cancer may be missed (false negatives). Manganese oxide (MnO) nanoparticles (NPs)have superior MRI signalsand show potential in targeting malignant tumors using pH sensitivity, where the contrast willturn "ON" after internalization by the cancer cells. The ultimate goal of ourresearchis to develop a contrast agent to reduce falsepositive and falsenegative imaging results associated with current breast MRI. Two methods were tested to make the MnO NPs hydrophilic: 1) MnO NPs were encapsulated with poly(lactic-co-glycolic) acid (PLGA) polymer using an oil-in-water emulsionprocedure or 2) MnO NPs were coated with phospholipid micelles. Based on transmission electron microscopy (TEM),dynamic light scattering (DLS), and Fourier transform infraredspectroscopy (FTIR), PLGA encapsulation resulted in smaller NP diameters. As smaller particles have a higher surface-area-to-volume ratio, they were expected to dissolve faster in low pH conditions. PLGA MnO NPswere incubated at three pHs over 24hrincluding pH 7.4 (blood pH), 6.5 (pH of tumor extracellular space), and 5 (endosome/lysosome pH). Significant MRI contrast and reduced$T1$values wereonly observedat pH 5, meaning that PLGA MnO NPsneed to be targeted inside cancer cellsto create a robust bright signal.

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

Presentation #146

Astro-Data Distributed Computing

Robert Coleman* and Tom Devine
Lane Department of Computer Science and Electrical Engineering, West Virginia University,
Morgantown, WV 26505

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

Student's Major: Computer Science

The volume of data collected through astronomical observation has prompted data scientists to research ways to classify space objects. The need to process data meant building a network of computers with high scalability, security, etc. has become normal. Distributed computing environments (DCE) take a system of distributed computers and feed data through to yield a result. Scientists use the power of DCEs to help identify and categorize objects, like pulsars. Pulsars result from massive stars dying. They emit electromagnetic radiation from their magnetic poles and spin at incredibly fast rates, some as fast as 700 rotations per second. Measuring the attributes of pulsars is conducted by studying their emissions that reach earth. The PRESTO suite records this data for observers. All-sky surveys using extremely sensitive instruments have produced petabytes of observational data, and experts find it very difficult to locate pulsars because many recorded measurements are Radio Frequency Interference. DCEs can process pulsar data and determine which potential candidates are likely pulsars and should be observed. This is important because it eliminates manual labor of locating pulsar candidates to study. Scientists use pulsars as giant regular clocks in space that enable us to measure distances between galaxies, detect gravitational waves, and study extreme physics. To accomplish radio pulsar candidate classification, we will locally emulate a DCE and use it as a development environment for distributed machine learning algorithms. Our aim is to further test and develop distributed semi-supervised learning algorithms that have shown promise for radio pulsar candidate classification.

Funding:

Presentation #147

Perspective: Decontamination of Chemical and Biological Warfare Agents Using Green Technologies

Rushik Y. Patel* and Cerasela Zoica Dinu
Department of Chemical and Biomedical Engineering, West Virginia University, Morgantown, WV 26506

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

Student's Major: Biomedical Engineering

Chemical and biological warfare agents such as mustard gas and hydrogen cyanide have posed a threat to humanity since the 1930s. Current methods of decontamination are through chemical hydrolysis, the breaking of bonds within the molecule, and/or high temperature incineration. However, such methods are detrimental to the environment as large amounts of greenhouse gases are often released into the air or byproduct resulted from such compounds degradation pose logistical burden. There is a need for a safer, more effective alternative that could reduce economic and environmental burden.

Enzymatic decontamination has been proposed as a viable alternative that could allow "green" degradation of synthetic and natural compounds that normally have deleterious effects. The implementation of analysis such as Polymerase Chain Reaction (PCR), a process that is used to multiply DNA and RNA samples, and computational design has improved enzymes' ability to break down a variety of chemical agents such as sarin or chemical warfare agents that contain a phosphorus group. Enzymes that are used in such decontamination strategies include phosphotriesterase (PTE) and acetyl cholinesterase (AChE). Additionally, a broad-range resequencing pathogen microarray (RPM) has been developed to detect biothreat agents that are undetected by PCR; RPMs screen fine particles and air dust samples for harmful chemical and biological molecules.

This literature review analyzes current methods of detecting and decontamination of chemical and biological warfare agents using enzymatic approaches. Possible future research and novel strategies on what are the challenges posed by enzyme implementation are also discussed.

Presentation #148

Contrast Agents and Their Use in MRIs

Logan McFadden* and Brian Dolinar
C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

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

Student's Major: Chemistry

Contrast agents are a major part of MRIs and are used to help doctors better process and understand images taken. Typically these agents are made using gadolinium which is a heavy metal and these agents are injected into a vein in your arm and excreted through the kidneys. Gadolinium is a heavy metal which means it is hard on your body to excrete and if used too often on a person can cause kidney damage. The goal of my research is to create new contrast agents that are easy on a person's body and easier to excrete from the body. Inside the lab, I have been creating lanthanide salts and organic compounds that will be used in the process of creating new contrast agents. These compounds once made are used by other members of the lab in their research to help create these new contrast agents. So far no results have been reached with the progress made in the lab. I predict that new compounds will be made in the future that can be used as MRI contrast agents as well as being easier on the human body. These predicted results could lead to even more contrast agents being made that continue to become healthier and safer.

Funding:

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

Presentation #149

Organ-based Visual Classification for Plant Analysis

Cole Henderson*, Meghana Kovur, Ram Jitendrabhai Zaveri*, Matthew Keaton, and Gianfranco Doretto
Lane Department of Computer Science and Electrical Engineering, West Virginia University, Morgantown, WV 26506

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

Student's Major: Computer Science and Computer Engineering

The great amount of biodiversity on our planet makes it difficult to have complete, accurate datasets that are readily available to experts in the field. Often, even if an expert is knowledgeable about a certain species, it can be difficult to identify samples with a high degree of accuracy. Current computer vision approaches allow for repeated, accurate identification of species, but only from specially prepared samples, like herbarium sheets. They often use attention-based feature learning, which works well on most datasets, but loses effectiveness when applied to plants. To be truly useful, an approach needs to be able to handle data collected from the wild in varying levels of quality and distribution of features. Our approach attempts to solve this issue by using an object detector to direct attention-based learning. We take an image of a plant, then break it into its subsequent organs using a detector. The individual organs are then sent to one of a host of species classifiers, each of which is specialized to classify the plant species given a particular organ. These predictions are then fused together to generate the final output prediction. We have developed a neural network species classifier based on a dataset of images that we have curated and are currently evaluating different techniques for optimizing its prediction accuracy.

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

Presentation #150

Antibiotic Resistant Microorganisms and their Genetic Determinants in Recycled Water: A systematic Review

Marisa Organiscak*, Emily Garner, Kerry Hamilton, Lucien Dieter*, Sayalee Joshi, Madison Haddix*, Carley Shingleton*, Amy Pruden, Nicholas Ashbolt, and Gertjan Medema

Department of Civil & Environmental Engineering West Virginia University, Morgantown, WV 26506; School of Sustainable Engineering and the Built Environment, Arizona State University, Tempe, AZ 85281; and The Biodesign Institute Center for Environmental He

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

Student's Major: Chemistry

As water stress is increasing in many parts of the U.S., the use of recycled water derived from highly treated wastewater is growing, and it is becoming increasingly important to consider all health risks that may be associated with its use. There are many types of bacteria that can be found in recycled water that can potentially cause serious health problems. Human pathogens conferring antibiotic resistance are of particular concern, given that resistance to antibiotics results in increased morbidity and mortality associated with human infections by these organisms. The objective of this research project was to conduct a systematic literature review to compile concentration and prevalence data for antibiotic resistant bacteria of relevance to human health in recycled water from past scholarly publications. For this review, a systematic keyword search strategy was used to identify candidate papers and manual review was used to assess each publication's relevance to the project. The results of this work include extracted concentration and prevalence data for a range of antibiotic resistance genes and antibiotic resistant bacteria and have been summarized in tabular form. Preparation of a manuscript summarizing this data and its relevance to the field is ongoing. This research leverages data analysis of results from previous publications to find the ultimate impact of the use of recycled water, and the results will be used to conduct risk assessment aimed at identifying "safe" levels of these organisms in recycled water.

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

Presentation #151

Interfacing an Embedded Wireless Sensor Network for Monitoring the Temperature of Coal Gasifiers

Malik Mukdadi*, Alex DiLello, Steven Andryzcik, and David Graham
Lane Department of Computer Science and Electrical Engineering, West Virginia University, Morgantown, WV 26506

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

Student's Major: Electrical and Computer Engineering

Coal gasification is the process of producing synthetic gas (syngas) from coal, water, and air and/or oxygen through intense heating: the produced syngas is more efficient than traditional natural gas for electricity generation. However, the byproducts from the intense heating cause degradation of the gasifier. Currently, there is a greater need for more electric consumption efficiency of battery-powered electronics due to the increase in popularity for Internet-of-Things through wireless protocols such as WiFi, 5G, and Bluetooth. The objective of this work was to connect a low-power wireless sensor system with refractory bricks to model and design a "smart-brick" that reliably collects data to monitor the temperature of the gasifier to prevent degradation. The brick was embedded with a thermally sensitive resistor, which results in numerical outputs. A resistive-sensing circuit was designed utilizing solely a traditional Wheatstone bridge and two operational amplifiers. As the smart brick's resistance changed with temperature, a change in voltage was measured through an analog-to-digital converter (ADC). This resulted in transmittable data between the smart brick and a base station. Data was collected and analyzed using multiple Arduino Nano 33 IoTs which supports the Internet-of-Things and Bluetooth Low Energy. The Arduinos successfully transmitted data that was utilized to monitor significant temperature changes of the gasifier. However, the built-in ADC of the Arduino limited the precision of the transmitted data. This work contributed to the development of an alarm system while monitoring the health of the smart bricks in the coal gasifiers.

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

Presentation #152

Manufacturing of Polymer Composites by Recycling Discarded Thermoset Polymer Composites through Partial Solvolysis

Najat Albarakati, Rakesh Gupta, Hota GangaRao, and Hunter Hardway*
West Virginia University, Morgantown, WV 26506

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

Student's Major: Chemical Engineering

Within the last century, plastics have grown into one of the most widely used materials in every sector including construction, clothing, transportation, and aeronautics. Plastic production in the United States has exceed 70 billion lbs/year. So called "single-use plastics" such as grocery bags and water bottles contribute greatly to waste, however, due to being "thermoplastics" they can be shredded and recycled. Another class of plastics, "thermosets", are used as the basis for the fiber reinforced plastics found in cars, airplanes, and wind turbine blades to name a few. While easy to collect, these are difficult to recycle due to their cured nature that will not melt but only degrade under excess heat. This research is dedicated to recycling these plastics by partially degrading them and then reshaping them. Preliminary testing has shown that glass fiber reinforced plastics mixed with appropriate solvents and subjected to heat are able to be softened and reshaped. Mechanical and thermal properties are attractive. Current testing is focused on finding the optimal solvent, pressure, and temperature to lower reaction time in small samples. In time, research will be scaled up to bigger samples and more practical components. Research began in August 2020 and is expected to conclude in July 2023.

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

WEST VIRGINIA UNIVERSITY
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #153

Nickel-Catalyzed Nitration of 8-Benzamidoquinoline

Jacob B. Smothers*, Andreas Baur, and Jessic M. Hoover
C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV 26506

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

Student's Major: Chemistry

C-H functionalization is an important technique for making compounds that would otherwise be difficult to make using other methods. In the case of 8-benzamidoquinoline, there are a number of C-H bonds that can be functionalized by addition of a nitro substituent. This means that there would be multiple different positions that could potentially be nitrated using traditional methods of nitration. In addition, traditional methods tend to rely on reactions conditions that are relatively harsh: a mixture of both nitric acid and sulfuric acid. Both of these are strong acids that have little to no selectivity, and therefore, it is necessary to develop catalysts for selective functionalization reactions for compounds like 8-benzamidoquinoline that also do not involve conditions that are particularly harsh. The focus of this research project is to explore nickel compounds as catalysts for the selective C-H nitration of the C5 position of an 8-aminoquinoline derivative. 8-aminoquinoline is an important starting point in the synthesis of many natural products, pharmaceuticals, and pesticides and selective functionalization of 8-aminoquinoline derivatives will hopefully lead to the development of new methods for synthesizing biologically and industrially important compounds. This poster will describe the synthesis of the 8-benzamidoquinoline starting material and the catalytic nitration reactions. Preliminary data suggest that nickel is important for both the efficiency and regioselectivity of the nitration reaction.

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

Presentation #154

Evaluating Acid Mine Waste as a Soil Amendment

Ethan Wimer* and Leslie Hopkinson

Wadsworth Department of Civil and Environmental Engineering, Statler College of Engineering and Mineral Resources, West Virginia University, Morgantown, WV 26506-6103

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

Student's Major: Civil and Environmental Engineering

There is potential to use Acid Mine Drainage (AMD) as a tool for reclamation of disturbed areas. The objective of this research is to test the usefulness of a processed form of AMD as a soil amendment. First, AMD waste samples were evaluated for toxicity taking into consideration the Rule of 20. Common characteristics of healthy soils were compiled. A small-scale growth study will be performed by monitoring separate plant growth with different levels of the processed AMD added. Ground cover and stem height will be measured weekly, and biomass will be measured at the end of the growth period. Results of the toxicity characterization indicated that levels of Arsenic, Barium, Calcium, Chromium, Lead, Mercury, Selenium and Silver met regulatory limits, suggesting potential for land application of AMD waste. Future work for this research includes testing the effectiveness economically and in application of AMD compared to commercial soil amendments, and testing what types of soil AMD is most beneficial to.

Funding:

Presentation #155

Determining the Water Flowrate using an Airlift Approach in Geothermal Wells

Nathan McFall* and Terence Musho

Mechanical & Aerospace Engineering Department, West Virginia University, Morgantown, WV 26506

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

Student's Major: Mechanical Engineering

The goal of this project was to experimentally quantify the performance of an airlift concept for geothermal fluid extraction. Geothermal wells, a green technology that utilizes the earth's temperature to generate electricity and provide heat, are used to extract geothermal fluids. In order to utilize this technology on a large scale, access of fluids thousands of feet underground is required; however, at this depth, it can become extremely difficult to extract the fluids using existing approaches. Thus, one such technology is being developed to provide a solution—an airlift approach. This approach injects air within the well, causing the rising bubbles to impart momentum on the geothermal fluids, bringing them to the surface. In this project, a geothermal test rig, constructed of an acrylic tube and a 3D-printed sparger head, was assembled. From here, a series of experimental measurements was taken to determine the water flowrate at varying depths. It was determined that the well's flowrate of water increases as the depth of the sparger head increases. It was also found that the well's flowrate of water increases as the flowrate of air into the well increases. In the future, this data could significantly aid industries seeking to utilize airlift approach technology for improved, geothermal fluid extraction.

Funding: Department of Energy

Program/mechanism supporting research/creative efforts:
a WVU 297-level course

Presentation #156

Dopamine Reward Pathway in Cocaine Addiction

Jessica Underwood*

C. Eugene Bennett Department of Chemistry, West Virginia University, Morgantown, WV, 26505

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

Student's Major: Chemistry

Substance abuse uproots and claims the lives of thousands of people every day. Many individuals suffer from substance abuse in West Virginia and the greater Appalachia region, in particular, therefore, finding out more information for the members of our own neighborhoods will aid public health and rebuild communities that have been destroyed by drugs. Using a literature review methodology, multiple sources are used to synthesize the idea that dopamine, a common neurotransmitter, has been implicated as the root of addiction. Increased amounts of dopamine causes a feeling of pleasure or high. Cocaine, in particular, is a drug that interacts with the dopamine reward pathway to create a reward that is very addictive in a short period of time. The similar structures of cocaine and dopamine allow for the drug to bind with the dopamine transporters disrupting the brain's natural reward center. With a rush of dopamine and nowhere for the dopamine to go, it floods the brain and pleasure centers creating intense happiness. A reward this powerful can lead to sadness once the dopamine concentration decreases, and the individual will strive to receive the reward again. In order to lessen the dependency associated with cocaine, blocking the dopamine transporter would result in a decrease in overall concentration, which would lead to a less dependent, healthier individual. A possible method of lowering dopamine concentration would be supplementing tryptophan and 5-HTP. Similar to tyrosine beginning dopamine synthesis, tryptophan acts as the precursor to serotonin and 5-HTP, both of which delete excess dopamine.

Funding:

Program/mechanism supporting research/creative efforts:
capstone course within my department

Presentation #157

System Configuration Study of Free-Piston Stirling Engine with Additive Design Components

Songgang Qiu and Joshua Caswell*
Benjamin M. Statler College of Engineering Department of Mechanical and Aerospace Engineering, West Virginia University, Morgantown, WV 26505

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

Student's Major: Aerospace and Mechanical Engineering

A Free-Piston Stirling Engine (FPSE) is a reliable, efficient, and quiet engine that would be ideal in situations where maintenance is a major factor. In the construction of an FPSE, various configurations, manufacturing techniques, and materials are crucial to its performance. FPSE's are driven by variations in internal pressure. It is a closed system that relies on external combustion which can be facilitated by fuels like solar, biogas, natural gas, and waste gas. The key components of an FPSE are as follows: a heater head, which must withstand high heat and pressure; a regenerator, which improves efficiency; a displacer, which drives the cyclic motion; and heat exchangers. Major design factors considered were the benefits of additive manufacturing to complex components of the engine. This allowed the engine to be more reliable and have increased thermal conductivity where it was important.

Large scale power generation can be achieved with multiple engines working simultaneously. This is called modular upscaling and the resulting power output will be increased, depending on the number of engines. The various configurations of these systems are catered towards the spatial constraints afforded by the project at hand and serve for redundancy and stability.

Presentation #158

3D-Printed Membranes For Hypersaline Produced Water Treatment

Michael Ferrebee* and Oishi Sanyal

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

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

Student's Major: Chemical Engineering

This project works to develop membranes for hypersaline-produced water treatment using an unconventional additive manufacturing technique. A new platform that involves the layering of alternately charged polymers, is expected to lead to suitable membranes and is the current focus of our work. The traditional method of this layering process is typically time-consuming and therefore poses challenges to large-scale manufacturing. To overcome this challenge, an unconventional direct ink-writing technique developed by Prof. Kostas Sierros' research group (WVU Mechanical and Aerospace Engineering) for low-viscosity inks is being utilized. This presentation represents the initial phase of membrane development. The initial studies focusing on the morphology and porosity of the resulting thin film is being carried out by printing alternate layers of oppositely charged polyelectrolytes on glass slides. Such 3D-printed films are analyzed and compared against traditional dip-coated films using scanning electron microscopy (SEM). In our poster presentation, we will focus on analyzing these results and detail how these preliminary data guide us towards high-performance membrane development. This undergraduate research was funded by the National Science Foundation EPSCOR project "Improving Water Management, Treatment, and Recovery in Oil and Gas Production."

Funding: National Science Foundation

Program/mechanism supporting research/creative efforts:
WVU's Research Apprenticeship Program (RAP) & accompanying HONR 297-level course
2021 Energy & Water Scholars Program

Presentation #159

Designing Advanced Membrane Materials for Produced Water Treatment

Rebecca Erwin*, Km Prottoy Shariar Piash, and Oishi Sanyal
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

This research aims to develop a membrane separation process for hypersaline produced wastewater. Treatment of such streams by conventional wastewater treatment processes is challenging; membranes could play an important role to address this issue. Membrane separation is significantly more energy efficient than thermally driven separation processes; however, further development of membrane technology is necessary to compete with the efficiency of commercial processes for difficult separation problems, such as hypersaline wastewater. Forward osmosis (FO) is one of the preferred tools for hypersaline water desalination since reverse osmosis fails to perform at such high salinity levels. However, the development of new membrane materials is necessary for this FO process. Thus, this work aims to develop membranes for forward osmosis (FO) membrane separation by means of dip-coating. Through the process of dip-coating, oppositely charged polymers are layered, treated with an acidic solution, and rinsed with DI water to develop a porous membrane. The performance of dip-coated membranes is compared with commercial membranes under forward osmosis separation. This undergraduate was funded by the National Science Foundation EBSCOR project "Improving Water Management, Treatment, and Recovery in Oil and Gas Production".

Program/mechanism supporting research/creative efforts:
an external internship or other type of program

West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #160

Efficacy of Hyperspectral Imaging in Identifying Latent Trace Signatures

Sarah Mosinski* and Jacqueline Speir
Department of Forensic and Investigative Science, West Virginia University, Morgantown, WV 26505

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

Student's Major: Forensic Chemistry

Interactions between electromagnetic radiation and matter can be harnessed as a means of gathering quantitative and qualitative information about a target. Hyperspectral Imaging (HSI) is a subcategory of spectral imaging that combines spectroscopy and digital imaging with the aim of collecting spatial and spectral information for complex scenes. Unlike traditional RGB cameras - which earned the RGB moniker because they can be used to generate three-color channel images (red, green and blue) - HSI can divide a larger swath of the electromagnetic spectrum into smaller spectral samples. This process generates a datacube comprised of 100's of channels, with a resulting increased spectral resolution. The focus of this study was to test the efficacy of HSI in a forensic setting for the purposes of identifying latent trace signatures. Research into this topic required the completion of three major objectives. First, spectral reference databases consisting of blood, wood, paints, and tile were captured. Second, orthogonal subspace projection (OSP) was employed as a means of spectral unmixing. Finally, a double-blind experiment was conducted to test the overall efficacy of HSI and OSP at identifying the presence of unknown and latent trace signatures. Preliminary results indicate that the technique can identify blood targets at an abundance as low as 25%, with the overall success varying as a function of the background interference.

Funding:

WestVirginiaUniversity.
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #161

Bioprinter Construction Using an Open-Source 3-D printer

Vignesh Sivashankar*, Duncan McGee*, Oxana Tseytlin, Ryan O'Connell, Andrey Bobko, and Mark Tseytlin
Department of Biochemistry and Molecular Biology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Electrical Engineering

A 3-D bioprinter can fabricate biological tissues and organs from a substrate, bio-ink. Tissues printed by bioprinters are used for research and drug discovery, removing the need for live-animal testing. Until now, the chemical microenvironment of 3-D printed tissues has not been monitored. The bioprinter being built in this project will have the capability of printing tissue constructs with chemical probes that enable oxygen concentration to be monitored. Commercially available bioprinters lack the flexibility to change bioink consistency, printing parameters, and bioprinting methodology. This research aims to design a flexible bioprinter by modifying an open-source extruder 3-D printer. The open-source nature of the printer allows for unlimited freedom in the modification of the bio-inks, the introduction of imaging agents, and the modification of cross-linking strategies. The plastic extruder of the 3-D printer was replaced with a linear actuator and a syringe that holds and releases the bio-ink. The bed heating parameters were altered to support biomaterials and extrusion heating was disabled. The firmware of the 3-D printer was reprogrammed to accommodate the movement and extrusion of the syringe and to optimize the syringe needle movements on the bed. Several bioprinting methodologies were tested using the 3-D bioprinter. The printed models were imaged using a functional electron paramagnetic resonance imaging system to confirm the presence and distribution of the chemical probes, and thereby to demonstrate its capability of printing tissues whose microenvironment can be monitored.

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

WEST VIRGINIA UNIVERSITY®
OFFICE OF UNDERGRADUATE RESEARCH

Presentation #162

Is the Diagramming Neural Network OpenPose Ready for Widespread Use?

Jason Plants* and Sergiy Yakovenko
Division of Exercise Physiology, West Virginia University, Morgantown, WV 26506

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

Student's Major: Exercise Physiology

OpenPose is a tool built with an artificial neural network (ANN) approach to extract human body posture from images. ANN approach has many applications ranging from software for self-driving cars to measuring joint angles in orthopedic surgery. The challenge is that the computation performed with ANN has to be precise, efficient, and accurate. To assess whether OpenPose is ready for widespread use in body posture estimation, the focus of this project is to determine this network's accuracy. Twenty pictures from the internet were gathered ranging from a single person fully in frame to a crowd of people spread all across the image. These pictures were entered into OpenPose following the steps demonstrated by the MathWorks workshop Estimate Body Pose Using Deep Learning [1]. The images were analyzed to extract body posture. To be eligible for scoring, pictured individuals had to be 75% visible and reasonably discernable by the human eye. This subjective process resulted in a 61.1% accuracy rate for those unobstructed and/or directly facing the camera and a 39.7% accuracy rate for those partially obstructed and not directly facing the camera. These results indicate that OpenPose works well in ideal situations, but may not be accurate in most real-world situations. Partial obstruction and posture variations must be overcome if this ANN approach is to be utilized in widespread applications.

[1] Estimate Body Pose Using Deep Learning. MathWorks.
https://www.mathworks.com/help/deeplearning/ug/estimate-body-pose-using-deep-learning.html#EstimateBodyPoseUsingDeepLearningExample-3

Funding: