

THE TWELFTH ANNUAL

SUMMER UNDERGRADUATE RESEARCH SYMPOSIUM

A VIRTUAL CONFERENCE EXPERIENCE

OPENS JULY 23, 11 a.m.

INTERACTIVE JULY 23, 2-4:30 p.m.

undergraduateresearchsymposia.wvu.edu



“Virtual” Summer Undergraduate Research Symposium 2020
West Virginia University

Thursday July 23, 2020

<https://undergraduateresearchsymposia.wvu.edu>

I. Approximate Schedule of Events

Tuesday July 21, 2020

12:00 pm or before

Submission – Presenters submit audio enabled presentations to VoiceThread.

July 21-23, 2020

Presentation Links Enabled – WVU Office of UG Research (UGR) creates presentations urls and provides links on the Symposium website.

Thursday July 23, 2020

11:00 am onward

Symposium Opens – Presentations available from 11:00 am onward and for a minimum of one week. *All welcome: parents, research mentors, graduate and undergraduate students, and members of the public.*

11:00 am-2:00 pm

Presentation Judging – Judging of presentations in all categories.

2:00 pm-4:30 pm

Synchronous Commenting – Presenters will monitor and respond to questions and comments posted within their VoiceThread presentations in real-time.

Friday July 24, 2020

4:00 pm or before

Awards Announced – Top presenters in each presentation category will be posted on the Symposium website.

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II. Poster Judges

Judge	Affiliation	Category Judging
Carinna Ferguson	Learning Science and Human Development, College of Education and Human Services	<i>Human Engagement*</i>
Christina Villalon	Coaching and Teaching Studies, College of Physical Activity and Sport Sciences	<i>Human Engagement</i>
Carly Callender	Immunology & Microbial Pathogenesis, School of Medicine	<i>Science & Technology</i>
Marc Purzao	Cancer Cell Biology, School of Medicine	<i>Science & Technology</i>
Sarah Mills	Plant & Soil Sciences, Davis College	<i>Science & Technology</i>
Nima Zamani Meymian	Mechanical Engineering, Statler College	<i>Science & Technology</i>
Olayemi Adeniran	Public Health Sciences, School of Public Health	<i>Science & Technology</i>
Yuni Tang	Epidemiology, School of Public Health	<i>Science & Technology</i>
Rachel Baur	Immunology & Microbial Pathogenesis, School of Medicine	<i>Biological Sciences</i>
Ting Wong	Immunology & Microbial Pathogenesis, School of Medicine	<i>Biological Sciences</i>
Christopher Burney	Plant & Soil Sciences, Davis College	<i>Biological Sciences</i>
Jenni Kane	Environmental Microbiology, Davis College	<i>Biological Sciences</i>
Rachel Rush	Immunology & Microbial Pathogenesis, School of Medicine	<i>Biological Sciences</i>
Evan Cramer	Biochemistry & Molecular Biology, School of Medicine	<i>Biological Sciences</i>
Ganga Siva Sasanka Katreddi	Computer Science, Statler College	<i>Engineering</i>
Batishahe Selimi	Computer Science, Statler College	<i>Engineering</i>
Mahmood Khan	Civil Engineering, Statler College	<i>Engineering</i>
Samuel Abimbola Ogunfuye	Mechanical Engineering, Statler College	<i>Engineering</i>
MJ Ahmad	Computer Science, Statler College	<i>Engineering</i>
Connor Nevin	Medicine, School of Medicine	<i>Health Sciences</i>
Megan Lauris	Medicine, School of Medicine	<i>Health Sciences</i>
Alexander Crum	Medicine, School of Medicine	<i>Health Sciences</i>
Yuni Tang	Epidemiology, School of Public Health	<i>Health Sciences</i>
Haley Wahl	Physics, Eberly College	<i>Mathematics & Physics</i>
Gia Huy Pham	Biomedical Engineering, Statler College	<i>Mathematics & Physics</i>
Uthpala Herath	Physics, Eberly College	<i>Mathematics & Physics</i>
Savan Suri	Electrical Engineering, Statler College	<i>Mathematics & Physics</i>
Nora Radway	Communication Studies, Eberly College	<i>Behavioral & Social Sciences</i>
Michelle Hershberger	Communication Studies, Eberly College	<i>Behavioral & Social Sciences</i>
Colby Ott	Forensic Science, Eberly College	<i>Behavioral & Social Sciences</i>
Summer Kuhn	Sociology, Eberly College	<i>Behavioral & Social Sciences</i>

We want to take this opportunity to thank our poster 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.

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III. Undergraduate Presenters and Faculty Research Mentors

We want to take this opportunity to thank our undergraduate presenters. This year, we welcome presenters from throughout West Virginia including students from Marshall, Shepherd, and West Liberty Universities. 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.	Home Institution	Major	Faculty Research Mentor	Presentation Title
Adam Craig	1	West Virginia University	International Studies	Megan Govindan	Food Cooperatives in the Development of the West Virginia Food System
Griffin Nordstrom	2	West Virginia University	Sculpture and Art History	Dylan Collins	West Virginia Folk Art and History Reimagined from a Contemporary Standpoint
Gwendolyn Nurkiewicz	3	West Virginia University	Immunology and Medical Microbiology	Renee Nicholson	Storied Research: Alternative Writing Styles for Scientific Research
Kaley Vestal	4	West Virginia University	English	Adam Komisaruk	Judaism’s Effect on Psychoanalysis on 20th Century Critical Theory

B. Science & Technology (Oral Presentations)

Presenter Name	Present. No.	Home Institution	Major	Faculty Research Mentor	Presentation Title
Jackie Arnold	5	West Virginia University	Chemical Engineering	Cerasela-Zoica Dinu	Enzyme Immobilization within a Hyaluronic Acid Matrix for Synthetic Applications
Marryn Bennett	6	West Virginia University	Biology	Andrew Dacks	Characterizing the Post-synaptic Partners of Ascending Histaminergic Neurons in <i>Drosophila melanogaster</i>
Kelcie Britton ^a	7	West Virginia University	Immunology and Medical Microbiology	Dan Panaccione	Functional and Genetic Analysis of an Esterase Gene Involved in Synthesis of Ergot Alkaloids

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Mitchell Hall	8	Marshall University	Biology	Eugene Shakirov	Analysis of Antimicrobial activity of Extracts from the Moss <i>Physcomitrella patens</i>
Stephanie Heck	9	Shepherd University	Biochemistry	Samuel David	Determination of the Fragmentation Pattern of Benzoquinones
Shelby McCloskey	10	West Virginia University	Public Health	Danielle Davidov	Understanding How Neurobiology of Trauma Manifests into Trauma-Informed Care for Sexual Assault Victims.
Tristan Sanders	11	West Virginia University	Biochemistry	Nicole Waterland	Narrow Bandwidths of Light Alter a Plant’s Secondary Metabolism
Andrew Wall	12	Marshall University	Computer and Information Security	Cong Pu	A Duffing Map Based Lightweight Authentication Protocol for Micro Aerial Vehicles

C. Biological Sciences (Poster Presentations)

Presenter Name	Present. No.	Home Institution	Major	Faculty Research Mentor	Presentation Title
Hannah Ankrom	13	West Liberty University	Pre-Medicine	Holly Racine	Inducing Maternal Hyperthyroidism in Chicken Embryos to Study Involvement in FGFR1 Pathway
Abigail Clasgens	14	West Virginia University	Wildlife and Fisheries Resources	Joellen Stivala	Urban Development Impacts on Aquatic Benthic Macroinvertebrate Community in a Mixed-Land-Use Watershed
Carson Corrick	15	West Liberty University	Human Biology	Holly Racine	The Methodology of Determining TR α Expression in Avian Embryos Following Induced Maternal Hyperthyroidism
Seth Fields	16	West Virginia University	Agroecology	Eugenia Pena-Yewtukhiw	Assessing Soil Health Differences Between Organic Production Systems
Julia Purks	17	West Liberty University	Ecology, Evolution, and Organismal Biology	Diana Barber	Evaluating Bat Diversity in Disturbed and Undisturbed Locations of West Virginia’s Northern Panhandle
Justin Rice	18	West Liberty University	Human Biology	Deanna Schmitt	Effect of Oxygen Concentration on <i>Neisseria gonorrhoeae</i> Susceptibility to Resazomycins
Janelle Stack	19	West Liberty University	Human Biology	Deanna Schmitt	Resazomycins Alter the Expression of Outer Membrane Lipoproteins in <i>Francisella tularensis</i>
Nicholas Walker	20	West Virginia University	Biology	Blake Mertz	Studying the Structure-Function Relationship of the Platelet-Activating Factor Receptor Using Molecular Dynamics Simulations

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D. Engineering (Poster Presentations)

Presenter Name	Present. No.	Home Institution	Major	Faculty Research Mentor	Presentation Title
Abednego Abdi ^b	21	West Virginia University	Mechanical and Aerospace Engineering	David Mebane	Investigating the Grain Boundaries of a Doped Ceria Solution from a Model
Christopher Anderson	22	West Virginia University	Civil and Environmental Engineering	Emily Garner	Composition and Diversity of Microbial Communities in Drinking Water Distribution Systems
Mitchell Barna ^b	23	West Virginia University	Civil Engineering	Dimitra Pyrialakou	Identifying Transportation Disadvantage on a National Level and its Effects on Quality of Life.
Madison Haddix	24	West Virginia University	Civil Engineering	Emily Garner	Comparison of Methods for Assessing Antibiotic Resistance in Wastewater and Recycled Water Samples
Michael Howley	25	West Virginia University	Aerospace and Mechanical Engineering	Christopher Griffin	Optimal Placement of Vicon Motion Capture Markers to Maximize Asymmetry on Three-Dimensional Bodies
Melina McCabe	26	West Virginia University	Biomedical Engineering	Jessica Allen	Differences in Stepping Characteristics when Walking with Additional Task and Cognitive Demands
Savannah Sakhai	27	West Virginia University	Chemical Engineering	Fernando Lima	Simulation of Reverse Osmosis Process for the Optimal Treatment of Produced and Blowdown Waters
Markel Umphrey ^b	28	West Virginia University	Biometric Systems Engineering	Jeremy Dawson	Capturing Images of Fingerprints Using Smartphone Cameras

E. Health Sciences (Poster Presentations)

Presenter Name	Present. No.	Home Institution	Major	Faculty Research Mentor	Presentation Title
Hannah Browning	29	West Virginia University	Communication Sciences and Disorders	Jeremy Donai	Examining the Acoustic Feature Differences Between Voiced and Whispered Speech

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Michelle Coleman	30	West Virginia University	Exercise Physiology and Psychology	James Lewis	Aberrant Cortical Networks for Multi-Sensory Processing in Autism Spectrum Disorder
Madison Grigg	31	West Virginia University	Biomedical Engineering	Scott Galster	Integrating Holistic Human Performance and Sports Science Methods into Military Operational Readiness Evaluations
Morgan Osborne	32	West Virginia University	Public Health	Lindsay Allen	Neonatal Abstinence Syndrome Measured by Claims Data
Annie Ziegler	33	West Virginia University	Human Nutrition and Foods	Melissa Ventura Marra	A Telenutrition Usefulness Questionnaire: Development and Preliminary Validation

F. Math & Physical Sciences (Poster Presentations)

Presenter Name	Present. No.	Home Institution	Major	Faculty Research Mentor	Presentation Title
John Bright	34	West Virginia University	Computer Engineering	Kevin Milans	Turan Numbers For Tight Paths on Ordered Hypergraphs
Katey Burner	35	Shepherd University	Mathematics	Qing Wang	Modeling and Analyzing the Effect of a Radiation Therapy on Tumor Growth
Tate Hawkins	36	West Virginia University	Physics	Duncan Lorimer	GREENBURST: Green Bank Telescope’s FRB search system and its current findings
Gage Jackson ^b	37	West Virginia University	Chemistry	Jessica Hoover	Copper-Catalyzed Trifluoromethylation Through Benzylic C(sp ³)-H Activation
Jeremy McCloud	38	Marshall University	Mechanical Engineering	Sean McBride	Rejection Comparison of Molecular Dyes Through Non-Functionalized and Gold Nanoparticle Functionalized Polycarbonate Filters
Sumner Ranft ^b	39	West Virginia University	Chemistry	Loren Anderson	Study of Formaldehyde Gas in the Interstellar Medium of the Milky Way
Heidi Reichert	40	Shepherd University	Mathematics	Qing Wang	Equations on the Effects of Anti-CTLA-4 Antibodies on Tumor Growth

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G. Social & Behavioral Sciences (Poster Presentations)

Presenter Name	Present. No.	Home Institution	Major	Faculty Research Mentor	Presentation Title
Isabella Camerlin	41	West Virginia University	Psychology	Amy Gentzler	Parental Distress Tolerance and Adolescent Anxiety: The Mediating Effect of Adolescent Distress Tolerance
William Coleman	42	Marshall University	Computer Science	Husnu Narman	Enhancing Computer Science Education with Augmented Reality
Eric Curtis	43	West Virginia University	Finance/Economics	Erika Barker	From Blizzard Babies to Busty Babes: Porn as a Substitute for Procreation
Alia King	44	West Virginia University	Anthropology and Women's and Gender Studies	Lindsay Kahle	Assessing Risk Factors of Sexual Assault Victimization on College Campuses by Race and Ethnicity
Melanie Quick	45	West Virginia University	Psychology	Aaron Metzger	Adolescent Girls' Political Efficacy: Changes Across Time
Karsyn Wagner	46	West Virginia University	International Studies	Christina Fattore	Trump, Twitter, and Trade: Does Language Choice Reflect Trump's Hegemonic Masculinity?
Laura Yost	47	Marshall University	Psychology	Jonathan Day-Brown	Novel Method for Quantifying Facial Expression

^aResearch stipend provided by WVU's Beckman Scholars Program with funding from the Arnold O. and Mabel Beckman Foundation.

^bStipends and tuition for five SURE participants were funded through the NSF Louis Stokes Alliance for Minority Participation (LSAMP) STEM Pathways and Research Alliance Phase III (LSAMP-1826763).

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IV. Speakers at WVU’s Summer Undergraduate Research Experience (SURE) Events

Event Title	Presenter
Responsible Conduct of Research, Diversity & Fashioning Research Presentations	Michelle Richards-Babb (Professor, Chemistry & Director, Office of Undergraduate Research, WVU)
Understanding the COVID-19 Pandemic: Key to Control	Rita Rio (Professor, Biology, WVU)
Getting the Most from Your SURE Mentor	Kacee Caster (Chemistry, WVU) & Cari Ferguson (Education, WVU)
Peer Mentoring	Jessica Hogbin, Noah Spencer, & Savannah Hays (Past WVU SURE Participants)
Introduction to Search Engines	Jeffrey Werst, Jessica Vanderhoff, Alyssa Wright, Beth Royall, Virginia Desouky, and Martin Dunlap (Subject Librarians, WVU)
Resumes, Cover Letters, and Elevator Pitch & Interviewing Skills – Perform Under Pressure	Robert Barricelli (Career Development Specialist, Career Services Center, WVU)
West Virginia Science Public Outreach Team (SPOT)	Kathryn Williamson (Teaching Associate Professor, Dept. of Physics and Astronomy, WVU)
Philanthropy: Using Your Skills for Good	Katy Ryan (Professor, Dept. of English & Founder Appalachian Prison Book Project (https://appalachianprisonbookproject.org/), Jim Kotcon (Assoc. Prof., Plant Pathology, WV Sierra Club & Environmental Policy and Advocacy), Bradley Wilson (Assoc. Prof, Dept. of Geography) & Megan Govindan (Service Instructor, Center for Resilient Communities)
How to Efficiently Read Research Papers	Fabien Goulay (Associate Professor, Dept. of Chemistry, WVU) & Laura Brady (Professor, Dept. of English, WVU)
COVID-19 Journal Club - The Characterization of a Novel Virus	WVU Health Sciences Center Graduate Students & Faculty Members
Prestigious Scholarships, National Science Foundation Graduate Research Fellowship, & Writing Personal Statements - Telling your Story to Funders and Admissions Committees	Amy Cyphert, Cate Johnson & Eric Myers (ASPIRE Office, WVU)
Zotero Citation Manager	Beth Royall (Creative Arts Librarian, WVU) & Jennifer Monnin (Health Sciences Librarian, WVU)
Career Mentoring Panel	Colin Lopez (Senior Strategy Associate, Fullerton Health, Shwarzman Scholar & Fulbright Fellow), Trevor Rudy (Associate Director of Engineering, Pratt & Whitney), Bridget Hayes Russell (Director of People, ALULA), & Rachel Lee Tani Walker (Assoc. Service Fellow, NIOSH)
Basic Python Training	Nicolas Frazee (WVU Research Office)

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Graduate Life: The Real Story	Afsoon Sabet (Biology, MS Biology, Miss State), Brittany Brush (Geography, MS Civil Eng, FL State U & Waste Disposal Authority Engineer for Savannah River Remediation), Cassie Kepple (Psychology & MDS, PhD Higher Educ, FL State U), Kensley Bergdorf (IMMB, PhD Pharmac, Vanderbilt U), & Andrew Maloney (Chem Eng, PhD Chem Eng, MIT): Past SURE Participants
Virtual Adventures with Adventure WV	Tyler Lancaster (Lead Facilitator, Adventure West Virginia, WVU Outdoor Recreation Center)
Undergraduate Panel for Current Upward Bound Students	Landon Southerly (Director) & Taylor Scites (WVU Upward Bound/TRIO)
How to Develop a Research Plan	WVU HSC Office of Research & Graduate Education (Logan Miller)
Professional School Life and Careers	Emily Ernest (Ex. Phys, M.D., WVU), Avery Gookin (Biochemistry, MS Physicians Asst, Alderson-Broadbudd, current Hospitalist PAC), Randy (Ratcliff) Province (Biology & Chemistry, D.O., WVSoM), Kait Akers (Psychology, WVU College of Law), Alice Foley (Asst. Dir. Enrollment Management, WVU College of Law) Brooke Dolin (Ex. Phys., WVU School of Dentistry), Marcus Sonoga (WVU School of Dentistry) & Victoria Sanchez (Director, WVU Pre-Health Office)

Our summer programs have been enriched by the contributions of these speakers. We are deeply appreciative and want to thank all of our speakers for their time, effort, and support of summer undergraduate research experiences at West Virginia University!

V. Websites

Need more information?

- Honors College: <http://www.honors.wvu.edu/>
- Chemistry REU: <http://undergraduateresearch.wvu.edu/reu-site-research-in-chemistry-at-wvu>
- Robotics REU: <https://robotics.wvu.edu/nsf-reu-site>
- WVU’s Beckman Scholars Program: <https://undergraduateresearch.wvu.edu/research-opportunities/wvu-opportunities/beckman-scholars-program>
- Summer Undergraduate Vision Research Fellowship Program: <https://medicine.hsc.wvu.edu/eye/research/vision-research-center/summer-undergraduate-vision-research-fellowship-program/>
- WVU SURE: <https://undergraduateresearch.wvu.edu/research-opportunities/wvu-opportunities/summer-undergraduate-research-experience-sure>
- Research Apprenticeship Program: <https://undergraduateresearch.wvu.edu/research-opportunities/wvu-opportunities/research-apprenticeship-programs>
- WVU Cancer Institute Summer Undergraduate Research Fellowship Program: <http://wvucancer.org/education/undergraduate/>
- Office of Undergraduate Research: <http://undergraduateresearch.wvu.edu/>

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VI. Acknowledgements

A. Personnel

WVU SURE

Michelle Richards-Babb, Director/Educ. Coord.
Rita Rio, Co-Director
Kacee Caster, Graduate Teaching Assistant

Symposium Booklet

Michelle Richards-Babb
Kevin Walden

Virtual Symposium

Michelle Richards-Babb
Cinthia Pacheco
Kevin Walden
Paige Zalman

B. Financial Support

WVU SURE (PI: Michelle Richards-Babb; Co-PI: Rita Rio) Sponsored in part by (i) the West Virginia Research Challenge Fund through a grant from the Division of Science and Research, HEPC, (ii) WVU Office of the Provost, and (iii) the Davis College of Agriculture, Forestry and Consumer Sciences, Eberly College of Arts and Sciences, the Statler College of Engineering and Mineral Resources, the College of Business and Economics, the Health Sciences Center, the Colleges of Creative Arts and Education and Human Services, and the Departments of Chemistry and Biology.

Louis Stokes STEM Pathways and Research Alliance: KY-WV LSAMP (WV PI: David Miller) Stipends and tuition for five SURE participants were funded through the NSF Louis Stokes Alliance for Minority Participation (LSAMP) STEM Pathways and Research Alliance Phase III (LSAMP-1826763).

Beckman Scholars Program (Director: Michelle Richards-Babb) Funding provided by the [Arnold and Mabel Beckman Foundation](#).



Presentation #1

Food Cooperatives in the Development of the West Virginia Food System

Adam Craig, Megan Govindan, Amanda Marple
Center for Resilient Communities, Department of Geography

Field (Broad Category): Human Engagement (Oral Presentation)

Student’s Major: International Studies

Food cooperatives have been a driving force in the economy and food system of the United States for decades, coming into significance during the Great Depression and the Civil Rights Movement as a form of resistance to racial and economic inequities. It is critical to understand the strengths and limitations of various cooperative agricultural development models in order to apply this history to the racialized food system of West Virginia. Furthermore, the COVID-19 crisis has shed light on the fragilities of the food system and the need for supporting cooperative economies in Appalachia. The purpose of this study is to conduct a literature review to examine research on agricultural cooperatives and compare and contrast models that would be suitable for transforming West Virginia’s local food economy. These models are then directly applied to organizations like Sprouting Farms and grassroots cooperators in the Turnrow Appalachian Farm Collective, an agricultural collective in West Virginia.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #2

West Virginia Folk Art and History Reimagined from a Contemporary Standpoint

Griffin S. Nordstrom, Dylan Collins

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

Field (Broad Category): Human Engagement (Oral Presentation (Visual Arts Presentation))
Student’s Major: Sculpture and Art History

There are opportunities for contemporary artists to take inspiration from the folk arts and history of West Virginia to create unique work that connects deeper to a regional audience. This creative work celebrates the deep history and folk art of the Appalachian culture in West Virginia through the use of sculptural arts. In the art community there is little to no work discussing the interaction of this culture with contemporary society or modern art that connects with folk styles and mediums. This creative research fills those gaps by exploring folk media like quilting and salt dough art; working with it in conjunction with highly processed synthetic materials. The artwork discusses a range of West Virginian topics from artists to industries and famous histories like the Mothman legend, to lesser known stories, like the Blennerhassett Mansion. The sculptures reflect a variety of contemporary art styles; such as Pop-Art, pixel-art, and brutalism, and utilizes many creation processes, some very experimental and unique.

Funding: West Virginia SURE program, \$230

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #3

Storied Research: Alternative Writing Styles for Scientific Research

Gwendolyn Nurkiewicz*, Renee Nicholson

Honors College, West Virginia University, Morgantown, WV 26506

Field (Broad Category): Human Engagement (Oral Presentation)

Student’s Major: Immunology and Medical Microbiology

The conventions of primary scientific literature create a series of barriers to those outside of research, despite the widespread availability of information. These barriers have created a vacuum of information, allowing for misinformation to spread via movements such as anti-vaxx and climate change denial. To mitigate negative outcomes of such movements, we use an interdisciplinary approach to introduce the tools of creative writing—such as narrative and conscientious metaphor—into scientific research to create a new genre of scientific literature: Storied Research (SR). We hope to humanize and clarify research in a way that allows those outside the field to more completely engage with cutting-edge research. Here, we outline the model in which SR is generated: a series of prompts, laws, and rules creates an unrestricted space for scientists to explore the story of their research. In the future, we aim to use the SR model as a teaching tool for students in STEM fields to more intentionally learn to write and use the product of SR to engage with the community, locally and abroad.

Funding: Honors Experiential and Community Engaged Learning (EXCEL) Program

Program/mechanism supporting research/creative efforts: Other

Honors Experiential and Community Engaged Learning (EXCEL) Program

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Presentation #4

Judaism’s Effect on Psychoanalysis on 20th Century Critical Theory

Kaley Vestal, Adam Komisaruk

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

Field (Broad Category): Human Engagement (Oral Presentation)

Student’s Major: English

The purpose of this research is to examine the way the school of psychoanalysis in contemporary literary theory has been influenced by Judaism. In order to evaluate how the scholarship deals with perceptions of Jewishness, we rely on reading primary sources from Jewish psychoanalyst Sigmund Freud from the late nineteenth and early twentieth century. We then reviewed secondary sources from late twentieth-century theorists, Jay Geller, Sander Gilman, and Slavoj Žižek, to determine the way the nineteenth-century scholarship is being interpreted. For many of the theorists, the way Jewish discourse is presented in the nineteenth-century centers around using race and gender as a way to combat the antisemitic stereotypes being presented around a very antisemitic Europe. The findings suggest we rethink the way Freud’s scholarship can be defined by the way he argues against the feminization of male Jews. He agrees, however, that the Jewish people could never assimilate fully into the “aryan” culture at the time due to their innate Jewishness.

Funding: SURE Enrichment Funding; Project 10011078

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #5

Enzyme Immobilization within a Hyaluronic Acid Matrix for Synthetic Applications

Jackie R. Arnold,* Jordan S. Chapman, Cerasela Zoica Dinu

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

Field (Broad Category): Science & Technology (Oral Presentation)

Student’s Major: Chemical Engineering

Enzymes make up an integral system in the success and efficiency of biological reactions; their specific activities have been transferred from biological to synthetic environments and applied within the chemical, environmental, and biomedical industries to increase processing efficiency. There are, however, limitations to enzyme-based technologies including the fragility of the biocatalyst, user-controllability of its reaction, shelf-life, and large-scale usage. To approach such limitations, techniques involving enzyme immobilization have been reviewed. Emphasis was placed on glucose oxidase (GOx), one of the model enzymes used in biosensors and pharmaceutical applications. The reviewed literature was complemented by studies performed in our lab, in which we demonstrated that GOx can be physically adsorbed within net-like amphiphilic dodecylamine (dod)-hyaluronic acid (HA) hydrogels, biocompatible and biodegradable gels of diverse pore sizes that are able to retain both activity and stability of the entrapped enzyme. Such analyses could enhance the body of knowledge and realm of implementation of GOx immobilization in biosensing, drug delivery, and tissue engineering.

Funding: National Science Foundation 1454230

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

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Presentation #6

Characterizing the Post-Synaptic Partners of Ascending Histaminergic Neurons in *Drosophila melanogaster*

Marryn Bennett, Kaitlyn Boone, Kevin Daly, Andrew Dacks

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

Field (Broad Category): Science & Technology (Oral Presentation)

Student’s Major: Biology

Once an organism has the ability to move it must also be able to distinguish between external stimuli brought on by that motion and the external stimuli that are not. Corollary discharge circuits (CDC) allow for this distinction by comparing the two stimuli. It is hypothesized that two pairs of histaminergic neurons in the central nervous system of *Drosophila melanogaster* are part of CDCs because they receive input in motor areas, project throughout the ventral nerve cord and to sensory regions of the brain. Thus, in order to ascertain the behavioral significance of the CDCs involving histamine producing neurons in *Drosophila melanogaster* it is necessary to identify the postsynaptic partners of these neurons. Using a whole ventral nerve cord electron microscopy volume, I reconstructed postsynaptic partners of these candidate histamine producing neurons across different regions of the ventral nerve cord. The preliminary results suggest that these CDCs primarily target motor neurons and descending neurons that project from the brain to the ventral nerve cord.

Funding: USAFOSR FA9550-17-1-0117

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #7

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

Kelcie N. Britton*, **Chey R. Steen***, **Jessi K. Sampson**, and **Daniel G. Panaccione**
Division of Plant and Soil Sciences, West Virginia University, Morgantown, WV 25606

Field (Broad Category): Science & Technology (Oral Presentation)

Student’s Major: Immunology and Medical Microbiology

Ergot alkaloids represent a broad class of nitrogenous metabolites produced across a range of fungal species and have been applied as effective pharmaceutical treatments for dementia, migraines, and hyperprolactinemia. Some pathways have been studied both biochemically and genetically, but critical steps in the synthesis of lysergic acid amides remain elusive. Many of the pharmaceutically relevant ergot alkaloids are semi-synthetically derived from lysergic acid amides, making these gaps significant. Lysergic acid α -hydroxyethylamide (LAH) is the main lysergic acid amide produced by the fungus *Metarhizium brunneum*. We hypothesize a gene named *easP* encodes an esterase involved in the final step of LAH biosynthesis. To test this hypothesis, a CRISPR mutant was engineered for *easP* and checked using PCR and DNA sequencing. The quantity of LAH, as measured by high performance liquid chromatography in each strain, was normalized showing that the concentration of LAH in CRISPR-derived mutants was reduced by ~50% relative to that in the wild-type. These data indicate that *EasP* plays a significant role in producing LAH and that an additional esterase is also involved.

Funding: NIH, 2R15GM114774-02

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

Presentation #8

Analysis of Antimicrobial Activity of Extracts from the Moss *Physcomitrella patens*

Mitchell Hall,* Lia R. Valeeva, Olivia Boskovic, Eugene Shakirov.

Department of Biological Sciences, Marshall University, Huntington, WV, 25755

Field (Broad Category): Science & Technology (Oral Presentation)

Student’s Major: Biology

Mosses are ancient land plants that are characterized by the presence of many unique secondary metabolites, some of which have been shown to have significant antimicrobial activity. The main Objective of our studies is to identify and characterize secondary metabolites and secretome components with antimicrobial activity from the model moss *Physcomitrella patens*. Several *P. patens* strains collected from natural habitats across the world are used in our experiments. We extracted intracellular and secreted metabolites from these strains and used them to test for antibacterial activity. The results of several preliminary experiments showed that secreted metabolites from *P. patens* strains Gransden and Villersexel inhibited the growth of gram-positive bacteria *Staphylococcus aureus*, but not gram-negative bacteria. In our first two experiments, we were able to see a clear 12-14 mm zone of bacterial growth inhibition around paper disks containing 0.5 mg/ml metabolites from Gransden and Villersexel strains. Current experiments are underway to test metabolites from other moss strains and to extend the panel of microbial strains tested.

Funding: SURE

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #9

Determination of the Fragmentation Pattern of Benzoquinones

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Field (Broad Category): Science & Technology (Oral Presentation)

Student’s Major: Biochemistry

We are developing a new sophomore/advanced organic undergraduate laboratory experiment that enables students to self-discover mass spectral principles by operating the GCMS under varying conditions in order to discover and rationalize fragmentation mechanisms. We have chosen 2,6-dimethylbenzoquinone as an example. Quinones are a class of compounds that are widespread in living systems and play a significant role in many important medicinal and biological processes. Benzoquinones follow specific fragmentation patterns as they fragment by sequentially losing a CO or C₂H₂ or other similar moieties. Since there are numerous patterns this could allow for, the aim is to establish the fragmentation pathway for 2,6-dimethylbenzoquinone utilizing tandem Mass Spectrometry (GCMS). For example, students will determine if fragmentation occurs via the m/z 80 → m/z 52 → m/z 26 pathway, or via the m/z 80 → m/z 54 → m/z 26 pathway. Other quinones will also be analysed. Results will be published in the Journal of Chemical Education.

Funding:

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

Presentation #10

Understanding How Neurobiology of Trauma Manifests into Trauma-Informed Care for Sexual Assault Victims.

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Field (Broad Category): Science & Technology (Oral Presentation)

Student’s Major: Public Health

Neurobiology is a branch of study that examines the anatomy, physiology, and pathology of the brain. When key stakeholders who encounter victims of sexual violence are well informed on the neurobiology of trauma, they are able to better tailor their trauma-informed care. The purpose of this research is to gain a deeper understanding of the brain's response to trauma in relation to sexual violence, and explore if the findings are integrated into trauma-informed care. Key stakeholders from three organizations- sexual assault nurse examiner (SANE) nursing, university police, and Title IX- participated in in-depth qualitative interviews to discuss their role in caring for sexual violence victims. Crucial research findings include the science behind tonic shock and memory retrieval. Notable findings of the interviews included that while the individuals were aware of presented concepts, they were not always part of their initial training for their respective roles. There was a unanimous consensus that neurobiology should be a fundamental concept included in all trauma-informed care education.

Funding: West Virginia University Health Science Center, 12300771

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #11

Narrow Bandwidths of Light alter a Plant’s Secondary Metabolism

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Field (Broad Category): Science & Technology (Oral Presentation)

Student’s Major: Biochemistry

The invention of LEDs (Light Emitting Diodes) was a great achievement due to their efficient conversion of electrical energy into photons of various wavelengths. These photons are valuable light sources for indoor agriculture applications, enabling efficient local food production. The narrow bandwidths of light emission allow us to combine multiple types of LEDs to maximize crop yield and quality of crops by enhanced production of nutritional and health promoting compounds (secondary metabolites). Plants produce secondary metabolites in response to stress such as UV light, and many of these compounds have strong antioxidant or even anticarcinogenic capacity that humans can reap benefits from by consuming them. In this review the effects of major light spectra (UV, blue, green, red,) generated by LEDs on the accumulation of secondary metabolites such as phenolic compounds, glucosinolates, and terpenoids were discussed. Additionally, the possible biosynthetic pathways regulated by the light spectra mentioned above were explained. This review provides a comprehensive view of the utilization of LED lightings for improved crop production.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #12

A Duffing Map Based Lightweight Authentication Protocol for Micro Aerial Vehicles

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Field (Broad Category): Science & Technology (Oral Presentation)

Student’s Major: Computer and Information Security

Micro Aerial Vehicles (MAVs) have become a popular and important part of military and civilian applications and are used in a variety of areas, including aerial surveying and mapping, aerial surveillance and security, and aerial delivery. Meanwhile, the cybersecurity of MAVs is becoming a greater concern due to financial and strategic value involved in aerial applications. In this project, we propose a duffing map based lightweight authentication protocol, also referred to as MAVCrypto, to protect MAVs from man-in-the-middle attack, where an adversary eavesdrops on communication between Ground Station (GS) and MAV, impersonates the GS, and sends commands to sabotage the ongoing mission or take control over the MAV. The basic idea of the MAVCrypto is the MAV will only execute the new command after validating the received digital signature from the GS. If the validation of digital signature fails, the new command is rejected immediately and the Return-to-Launch (RTL) mode is initiated, forcing the MAV to return to take-off position. We plan to conduct extensive experiments to evaluate and compare performance using network simulator OMNeT++.

Funding: West Virginia Higher Education Policy Commission, Division of Science and Research

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #13

Inducing Maternal Hyperthyroidism in Chicken Embryos to Study Involvement in FGFR1 Pathway

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Field (Broad Category): Biological Sciences (Poster Presentation)

Student’s Major: Pre-Medicine

Craniosynostosis (CS) is the premature fusion of the cranial sutures. CS causes increased cranial pressure and skull deformities. Maternal hyperthyroidism is linked to the development of CS in utero, but the exact mechanism is unknown. One proposed mechanism is increased action of thyroid hormone (TH) on the fibroblast growth factor receptor 1 (FGFR1). To understand this pathway, we used an avian model to mimic maternal hyperthyroidism. Our hypothesis is that injection of TH into the fertilized chicken egg will increase expression of FGFR1 in cranial tissue. We injected chicken eggs (N=21) with saline (N=11) and TH (N=10) every other day from E4 to E18 and harvested on E19. We discovered that 100% of our TH-injected eggs did not survive the injections. However, viability of embryos injected with saline was 90%. It is suspected the embryos were not able to compensate for the excess TH since the thyroid gland does not develop until E10. Current studies are focused on developing a more efficient dosing regimen. Existing saline-injected eggs serve as controls for examining FGFR1 expression.

Funding: NASA West Virginia Space Grant Consortium, Grant # 80NSSC20M0055

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #14

Urban Development Impacts on Aquatic Benthic Macroinvertebrate Community in a Mixed-Land-Use Watershed

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Field (Broad Category): Biological Sciences (Poster Presentation)

Student’s Major: Wildlife and Fisheries Resources

As urban development continues in watersheds across central Appalachia, it is imperative to monitor the potential impacts to ensure safe water quality for all living organisms. The use of benthic macroinvertebrates (e.g. aquatic insects) has become the main method for biomonitoring water quality. In this study, benthic macroinvertebrates were used to compare the water quality of a heavily urbanized stream to a highly forested stream in a small catchment area. Benthic macroinvertebrates were collected annually from both sites across a four-year period, identified to genus, and compared using the West Virginia Stream Condition Index (WVSCI), which quantifies stream conditions on a 0-100 scale. The heavily urbanized stream scored between 30.3-52.4 and averaged 43.9, while the more forested stream scored between 42.8-54.1 and averaged 46.9. These values classified both sites as having poor stream conditions which was unexpected as we predicted that the more forested stream would score significantly higher than the developed stream. These results tell us that other factors besides land-use are important to take into consideration when evaluating stream condition.

Funding: Davis College, C100168W

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #15

The Methodology of Determining TR α Expression in Avian Embryos Following Induced Maternal Hyperthyroidism

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Field (Broad Category): Biological Sciences (Poster Presentation)

Student’s Major: Human Biology

Maternal hyperthyroidism increases bone growth in utero which can lead to the development of craniosynostosis (CS), the premature fusion of cranial sutures. The mechanism for this is unknown. To understand this pathway, thyroid hormone (TH) and saline was injected into the air space of fertilized chicken eggs from E4 to E18 and embryos were harvested on E19. Our hypothesis was that we would see an increase in TH activity following TH injections, signified by an increase of thyroid hormone receptor-alpha (TR α) expression in cranial tissue. However, our injection regimen resulted in 90% of the saline embryos surviving, whereas the TH-injected embryos had a 100% mortality rate. We speculate that the embryos injected with TH did not survive due to underdevelopment of the regulatory system at the time of injection since the thyroid gland does not develop in chicken embryos until E10. For further expansion of the study, eggs will be injected following thyroid gland development to determine the effects of the TH on cranial tissues. Existing saline-injected eggs serve as controls for examining TR α expression.

Funding: NASA West Virginia Space Grant Consortium, Grant #80NSSC20M0055

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #16

Assessing Soil Health Differences Between Organic Production Systems

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Field (Broad Category): Biological Sciences (Poster Presentation)

Student’s Major: Agroecology

Soil health is a new focus in the realm of agriculture that is hard to assess. This study was conducted to determine whether soil health indicators (hydraulic conductivity, bulk density, penetration resistance, and dry aggregation) could be used to assess soil health differences between organic production systems. The effect of grassland systems (hay, pasture), fallow, and vegetable production systems on the previously listed soil health indicators were investigated. The experiment was performed at West Virginia University’s Organic Farm. The results for grassland systems indicated a strong correlation between penetration resistance and hydraulic conductivity in ($r=-0.95$) and between aggregation and bulk density ($r=0.93$). Tillage affected the correlation of hydraulic conductivity and penetration resistance in the vegetable production systems ($r=0.89$), and it was also seen that there was an inverse relationship between bulk density and hydraulic conductivity. Soil differences strongly affected our measurements in-between production systems. The different production systems cannot be characterized by the same values of a soil health indicator, and soil health is affected by management and production system.

Funding: SURE

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #17

Evaluating Bat Diversity in Disturbed and Undisturbed Locations of West Virginia’s Northern Panhandle

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Field (Broad Category): Biological Sciences (Poster Presentation)

Student’s Major: Ecology, Evolution, and Organismal Biology

Bat populations are declining due to habitat loss and the spread of the deadly fungal pathogen, white-nose syndrome. Increased studies on wild bat populations and their diversity are necessary to ensure their survival. Bat diversity and activity levels are understudied in the Northern Panhandle of West Virginia. For our study, sixteen sites were selected (four in each county: Ohio, Brooke, Hancock, and Marshall). Using mobile infrasonic bat detectors, bat calls were detected from different species at each location while walking a 1-kilometer transect after sunset. In addition, stationary recorders were placed for a week in each county. Sites were, and still are, being evaluated based on the number of species recorded at each site. Our null hypothesis suggests that sites/transects will not show any statistical difference of bat diversity in disturbed and undisturbed locations of West Virginia’s Northern Panhandle. Our alternative hypothesis formulates that bat diversity and activity will be statistically different between disturbed and undisturbed transects. This study is on-going and data is still being collected.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #18

Effect of Oxygen Concentration on *Neisseria gonorrhoeae* Susceptibility to Resazomycins

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Field (Broad Category): Biological Sciences (Poster Presentation)

Student’s Major: Human Biology

As pathogenic bacterial species are becoming more resistant to commonly used antibiotics, it is essential for new antibiotics to be developed. A family of resazurin-based compounds, resazomycins, was discovered to be highly effective antimicrobials against *Neisseria gonorrhoeae* (Ng) in vitro. However, when these compounds were tested in a mouse model of gonorrhea, few resazomycins exhibited any therapeutic effect. These differences between in vitro and in vivo therapeutic efficacy may be due to differences in oxygen concentration. Most mammalian tissues exist at oxygen concentrations well below atmospheric levels, typically 2-5% instead of 20%. We hypothesized that decreased oxygen levels may confer resistance to resazomycins. To test this, we cultivated clinical isolates of Ng under different oxygen conditions and then determined the minimal inhibitory concentration (MIC) of various resazomycins. The resazomycin MICs for the different Ng isolates were up to 4-fold higher under 2% oxygen than 20% oxygen suggesting oxygen levels effect susceptibility to resazomycins. Further investigation is needed to determine how Ng is becoming resistant to resazomycins under low oxygen conditions.

Funding: NASA West Virginia Space Grant Consortium #80NSSC20M0055

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #19

Resazomycins Alter the Expression of Outer Membrane Lipoproteins in *Francisella tularensis*

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Field (Broad Category): Biological Sciences (Poster Presentation)

Student’s Major: Human Biology

Multidrug-resistant bacteria pose a significant threat to global public health. The development of new antibiotics is essential to combat this public health crisis. Recently, we identified a novel family of compounds, resazomycins, which exhibit antimicrobial activity against select Gram-negative bacteria including the human pathogen *Francisella tularensis* (Ft). Most of the Gram-negative bacteria that are sensitive to resazomycins possess a unique lipoprotein sorting complex (LolDF) that differs from other Gram-negative bacteria. Since the antimicrobial activity of resazomycins appears to selectively target bacteria with LolDF, we hypothesized that this sorting machinery is a potential target of these compounds. To test this hypothesis, we measured differences in the expression of the major Ft lipoprotein LpnA in the absence and presence of resazomycins. Treatment with resazomycins resulted in reduced expression of LpnA in the outer membrane of Ft suggesting improper sorting of lipoproteins by LolDF. Furthermore, Ft bacteria treated with resazomycins are more sensitive to select detergents and antibiotics likely due to increased permeability of the outer membrane correlating with reduced lipoprotein expression.

Funding: NIH Grant P20GM103434

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #20

Studying the Structure-Function Relationship of the Platelet-Activating Factor Receptor Using
Molecular Dynamics Simulations

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Field (Broad Category): Biological Sciences (Poster Presentation)

Student’s Major: Biology

The platelet-activating factor receptor (PAFR) is a G protein-coupled receptor that plays a critical role in inflammatory responses associated with asthma, chronic obstructive pulmonary disease (COPD), lung cancer, and pathogenic invasions. Drug development targeting PAFR has been a decades-long pursuit that has yet to produce any major successes. Recently an X-ray crystal structure of PAFR was solved, making it possible to carry out structure-function studies to facilitate identification of natural or synthetic antagonists of PAFR that could be used to decrease inflammatory responses and address the long-term effects of chronic inflammation. Through the use of molecular dynamics (MD) simulations, we can acquire a deep understanding of the structure-function relationship of PAFR. We carried out MD simulations of PAFR embedded in a lipid bilayer, starting from two conformations of the protein: one bound to an antagonist and one bound to an inverse agonist. Our results show how specific regions of PAFR dynamically change to adjust the binding pocket to form respective ligand-receptor complexes.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #21

Investigating the Grain Boundaries of a Doped Ceria Solution from a Model

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Field (Broad Category): Engineering (Poster Presentation)

Student’s Major: Mechanical and Aerospace Engineering

Cerium dioxide (CeO_2), commonly referred to as ceria, is a robust conductor of both ionic and electronic current due to its cubic fluorite structure and capacity to accommodate electrons as Ce^{3+} . Its mixed conductivity makes it a favorable catalyst, used in the catalytic converters in cars which oxidize harmful gases in the exhaust. The speed of these electron and oxygen “flows” have been observed to be faster within the bulk region of the crystals compared to the grain boundaries in the polycrystalline ceramic. Ionic conductivity can be induced by introducing a dopant like gadolinium oxide (Ge_2O_3) before sintering at high temperatures. Electron microscopy techniques are capable of observing concentrations of the dopant species as a function of distance from the grain boundary. A thermodynamic model developed in the Energy Systems and Materials Simulation group can predict these concentration profiles. The SURE project modified a program based on these unorthodox thermodynamic models so that it could be used to analyze transmission electron microscope data generated by collaborators at the University of California at Irvine.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #22

Composition and Diversity of Microbial Communities in Drinking Water Distribution Systems

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Field (Broad Category): Engineering (Poster Presentation)

Student’s Major: Civil and Environmental Engineering

Ensuring the safety of drinking water delivered to the consumer’s tap is paramount to maintaining public health. Despite treatment and disinfection, environmental bacteria that are well-suited to low nutrient conditions typical of drinking water can grow and colonize pipes as water travels from the treatment plant to the consumer. Hence, it is necessary for the scientific community to understand the diverse microbial environment within these distribution systems so that inferences can be made regarding how microbial community structure affects the ability for pathogens to exist in the systems. This research applies bioinformatic techniques to characterize the microbiome within water and biofilm samples collected from four municipal drinking water distribution systems. A bioinformatics software, Quantitative Insights Into Microbial Ecology 2 (QIIME2), was used to assign taxonomic classifications to raw genetic sequencing data targeting the 16S rRNA gene. Alpha and beta diversity were calculated for each sample’s microbial community. Analysis is currently ongoing and future work will focus on identifying bacterial taxa and microbial community characteristics that are associated with the occurrence of pathogens in drinking water.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #23

Identifying Transportation Disadvantage on a National Level and its Effects on Quality of Life.

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Field (Broad Category): Engineering (Poster Presentation)

Student’s Major: Civil Engineering

Transportation disadvantage occurs when the basic needs for travel and access to opportunities of disadvantaged community members are systematically not met. We hypothesize that transportation disadvantage can negatively impact an individual’s quality of life. For this research, we completed a review of the literature surrounding transportation disadvantage, and created an index based on six indicators that have been found associated with transportation disadvantage: elderly persons, those with a disability or impairment, low-income individuals, older and low-income people forced into car ownership, and those who do not drive due to lack of a license, vehicle access, or both. We used data collected from an online nationwide transportation survey. We compared survey responses of individuals across the proposed transportation disadvantage scale, focusing on variable that capture the perceived quality of life, travel patterns, and other relevant variables. The preliminary findings show a correlation between the number of indicators associated with transportation disadvantage and the quality of life as well as the number of trips taken. More statistical analysis will be conducted to confirm these and other hypotheses.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #24

Comparison of Methods for Assessing Antibiotic Resistance in Wastewater and Recycled Water Samples

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Field (Broad Category): Engineering (Poster Presentation)

Student’s Major: Civil Engineering

There is increasing interest in the water industry in monitoring antibiotic resistance in wastewater and recycled water to ensure that water treatment effectively prevents the spread of antibiotic resistant bacteria. Current monitoring methods include culture-based approaches and DNA-based methods such as metagenomic sequencing and quantitative polymerase chain reaction (qPCR) that directly quantify antibiotic resistance genes (ARGs). Little is known about how the results of these methods compare. Wastewater influent and recycled water samples were collected from four water utilities and characterized using a suite of culture and DNA-based methods. Spearman’s Rank-Order correlations were calculated using RStudio software and detection of resistance to five classes of antibiotics were compared between methods and water types. Preliminary findings indicate that selection of monitoring method can critically affect the findings of monitoring efforts for antibiotic resistance in wastewater and recycled water. The findings of this work can help utilities and researchers better select monitoring methods to quantify the presence of antibiotic resistance traits so they can prevent their spread to help maintain the effectiveness of antibiotics.

Funding: National Science Foundation CBET #1438328

Program/mechanism supporting research/creative efforts: Other
Summer Research Internship

Presentation #25

Optimal Placement of Vicon Motion Capture Markers to Maximize Asymmetry on Three-Dimensional Bodies

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Field (Broad Category): Engineering (Poster Presentation)

Student’s Major: Aerospace and Mechanical Engineering

The trajectories of unstable bodies are best studied through the use of motion-capture systems, specifically a Vicon Motion Capture system, which can track reflective markers placed on the body being studied. The rigid body created by the marker pattern allows the precise capture of the body’s position and orientation at high frequencies. Using this data, aerodynamic information can be extrapolated of the body upon which the markers are placed. In order for said aerodynamic information to be as clear as possible, an asymmetric marker distribution is essential. In this work, these markers are placed onto a simulated three-dimensional surface in MATLAB, utilizing random placement and conditional statements to determine their optimal location. Utilizing all of the points on a three-dimensional surface, points with both planar and spherical symmetry to previously placed markers can be excluded from the choices of the next marker placements, and an asymmetrical marker placement will be achieved. It is hoped that this marker placement tool will produce a repeatable method to optimize the marker placement on any shaped 3D object.

Funding: Office of Naval Research

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #26

Differences in Stepping Characteristics When Walking with Additional Task and Cognitive Demands

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Field (Broad Category): Engineering (Poster Presentation)

Student’s Major: Biomedical Engineering

Appropriate foot placement is required to maintain balance while walking. We investigated how foot placement during walking is modulated with additional task and cognitive demands. Three young adults walked overground for 6.4 meters at self-selected walking speed. To evaluate walking with additional task demands, subjects performed the Timed-Up-And-Go (TUG) test, which involves standing from a chair, walking 3m, turning, and walking back to the chair. Finally, each subject was retested through the same conditions with an additional cognitive demand (counting backwards by threes). We examined how step length, width, and their variability across steps differed between conditions. Preliminary data suggest that step length and width are smaller but more variable during TUG walking compared to overground walking. In addition, a large difference in step length and width variability was found in both overground and TUG walking when a cognitive task was added. This study shows how walking performance differs with a dual task and how challenging walking conditions cause more variable foot placement, which may contribute to a higher fall risk and more difficulty walking.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #27

Simulation of Reverse Osmosis Process for the Optimal Treatment of Produced and Blowdown Waters

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Field (Broad Category): Engineering (Poster Presentation)

Student’s Major: Chemical Engineering

Increased rates of oil and natural gas extraction have resulted in large amounts of high salinity waste known as produced water. However, current treatment techniques are often costly and inefficient. This study focuses on the synergistic combination of power plant boiler blowdown water containing mineral buildup and produced water to generate a sellable 10-lb brine by-product and decrease the economic and environmental impacts. Dow Dupont’s Water Application Value Engine (WAVE) is used to generate data sets for the formulation of a reverse osmosis (RO) model. Ratios of blowdown to produced waters fed to the RO unit are varied from 1:1 to 10:1, alongside RO parameters, such as the number of pressure vessels, water recovery, and flow factor in WAVE. The simulated RO data for a 1 stage design is imported into MATLAB for analysis and used to regress the parameters for the RO model. Simulation results indicate that increasing the number of pressure vessels allows for greater recovery and fewer stages which indicate a potential reduction in cost and increased efficiency in the overall system.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #28

Capturing Images of Fingerprints Using Smartphone Cameras

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Field (Broad Category): Engineering (Poster Presentation)

Student’s Major: Biometric Systems Engineering

Smartphone camera technology has progressed to the point where fingerprint images can be captured and used for matching. The goal of this research is to investigate whether smartphone cameras can be used in place of a National Institute of Standards and Technology (NIST) approved scanner to capture images of tenprint cards for fingerprint digitization and matching. The camera performance will be quantified using the modulation transfer function allowing for other cameras performance to be compared against it. Our approach will use an iPhone X rear camera to capture images of a dark set and a light set of tenprint cards. The datasets were generated by participants rolling their fingers in ink once and imprinting on two cards one after the other. Each captured image will be assigned a fingerprint image quality score using the NIST Fingerprint Image Quality (NIFQ) algorithm. The images of sufficient quality will then be matched with high quality digital scans of the same tenprint cards to determine if the captured images can be used for matching purposes.

Funding: National Science Foundation Grant #1650474

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #29

Examining the Acoustic Feature Differences Between Voiced and Whispered Speech

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WV 26506*

Field (Broad Category): Health Sciences (Poster Presentation)

Student’s Major: Communication Sciences and Disorders

The purpose of this study is to examine acoustic feature differences between voiced and whispered speech. Whispered speech is an aspect of the speech signal that is not readily studied. A better understanding of the acoustic properties and differences of whispered speech compared to normal speech may allow for better automated speech and speaker recognition when the speaker is whispering. In this study, we collected and analyzed audio recordings of six female and six male subjects that spoke English. Each subject read five lists of ten sentences each in a normal speaking voice and again in a whispered speaking voice. Commonly used IEEE lists for the sentences of use in the study due to the consistency seen in other similar research studies. Spectral moments and spectral center of gravity measures were obtained. Preliminary results using stepwise discriminant function analyses showed the first spectral moment (i.e., mean) was somewhat useful for classifying mode of production (voiced vs whispered) for male (77%) and female (68%) signals. Additional features are currently being explored to improve classification accuracy.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #30

Aberrant Cortical Networks for Multi-Sensory Processing in Autism Spectrum Disorder

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Field (Broad Category): Health Sciences (Poster Presentation)

Student’s Major: Exercise Physiology and Psychology

Autism spectrum disorder (ASD) typically results in impaired social and multi-sensory processing. Why this might be occurring is important for gaining earlier interventions. To better understand how the brain of someone with ASD functions, resting-state functional magnetic resonance imaging (rsfMRI) can measure changes in brain activity while a participant lies in a scanner without a task. Nineteen ASD and seventeen typically developing (TD) matched individuals were imaged at West Virginia University. An earlier analysis revealed the hypoactivation of two regions (left putamen/globus pallidus and intraparietal sulcus) in the ASD group during a simple real-world functional task of watching someone bounce a basketball. Based on this information, the present study used rsfMRI to assess how these regions of interest (ROIs) interrelated to previously published intrinsic connectivity networks at rest. The ASD group showed greater correlated activity between most of these networks. In addition, a right extrastriate body area ROI displayed significantly different connectivity path effects between groups as assessed by structural auto-regression analyses. These findings newly reveal some of the physiological differences in ASD information processing.

Funding: WVCTSI award U54GM104942-03 from NIH

Program/mechanism supporting research/creative efforts: a West Virginia SURE program
Crowdfunding donors

Presentation #31

Integrating Holistic Human Performance and Sports Science Methods into Military Operational Readiness Evaluations

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Field (Broad Category): Health Sciences (Poster Presentation)

Student’s Major: Biomedical Engineering

Improving warfighter performance and resiliency is a top priority for the United States military. The idea behind implementing a holistic performance approach is to not only consider the physiological aspects of health and performance but also the cognitive, psychomotor, and recovery elements, which often go overlooked. By training warfighters in combat relevant situations that encompass every aspect of holistic performance, we can better predict how they will react, perform, and recover in real world situations. The HITT (High Intensity Tactical Training) Championship is a highly competitive event where United States Marines compete in tactically relevant challenges to test their operational abilities as warfighters. In 2019, the West Virginia University Rockefeller Neuroscience Institute (WVU RNI) helped design and implement a noninvasive biomonitoring system, individual capability readiness assessments, and subjective queries capable of assessing the psychophysiological workload of warfighters and predicting challenge outcomes. With the data collected, we expect to identify specific training methods and psychophysiological markers that can accurately predict all sides of holistic performance and provide the most resource efficient methods for operational readiness training.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

*“Virtual” Summer Undergraduate Research Symposium 2020
West Virginia University*

Presentation #32

Neonatal Abstinence Syndrome Measured by Claims Data

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Field (Broad Category): Health Sciences (Poster Presentation)

Student’s Major: Public Health

Neonatal abstinence syndrome is a major public health concern which transpires when the mother carrying an unborn baby is abusing drugs during the pregnancy. This results in the baby undergoing withdrawal, since they are no longer receiving the drug. The focus is centered on why claims data may be inaccurately capturing NAS rates and explains the reasons for this. The purpose of this research is to measure the extent to which administrative claims data undercounts the NAS burden. This is done by Medicaid claims data from the state of WV, which then gets compared to a novel data source, the WV Birth Score Project. To assess the degree to which claims data are undercoding NAS, the rates of NAS using claims data will be calculated and plotted. Individual claims up to the month level are observed to determine the rates, whether they are steadily declining or increasing, and which counties are most affected and why.

Funding:

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

Presentation #33

A Telenutrition Usefulness Questionnaire: Development and Preliminary Validation

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Field (Broad Category): Health Sciences (Poster Presentation)

Student’s Major: Human Nutrition and Foods

Telenutrition, the delivery of nutrition care by a dietitian using videoconferencing software, has potential to increase access to nutrition care in rural areas and during Covid-19 related social-distancing. To be a sustainable mode of nutrition care delivery, patients need to perceive the service as useful. No validated usefulness questionnaire for telenutrition services exists in the literature. Thus, the study's purpose is to develop and validate a questionnaire to measure the patient-perceived usefulness of tele-delivered nutrition services. A literature search was conducted to identify key constructs and questions. Content validity was determined by assessment from a panel of experts. Reliability was assessed using Cronbach’s alpha. A 22-item telenutrition questionnaire was developed that addressed two main areas (technology and nutrition care) and four constructs (technical aspects, patient-professional interaction, patient’s feelings about consultation, and satisfaction). An Cronbach’s alpha score for the two areas of technology and patient care were 0.8379 and 0.8586 respectively, indicating high reliability. A valid questionnaire to measure the usefulness of telenutrition has been developed, providing a tool for evaluating and improving virtual nutrition visits.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #34

Turan Numbers For Tight Paths on Ordered Hypergraphs

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Field (Broad Category): Mathematics & Physical Sciences (Poster Presentation)

Student’s Major: Computer Engineering

For an r -uniform hypergraph F we define the Turán number of F on n vertices, denoted $ex(n, F)$, to be the maximum number of edges in an r -uniform hypergraph G such that F is not a subgraph of G . The Turán numbers of general hypergraphs are classical problems which remains open despite decades of research. A hypergraph is said to be ordered if its vertices are totally ordered. When F is an ordered hypergraph, we define the Turán number of F analogously. The ordered r -uniform tight path on s vertices, denoted $P^{\wedge}(r)_s$, is the hypergraph whose edges are the intervals of r consecutive vertices. In this paper, for $s \leq 2r-1$, we use a construction to find a lower bound on $ex(n, P^{\wedge}(r)_s)$ and an argument that obtains a large edge-disjoint collection of copies of $P^{\wedge}(r)_s$ to give an upper bound for $ex(n, P^{\wedge}(r)_s)$. These bounds show that $ex(n, P^{\wedge}(r)_s)$ is asymptotically $(1 - (1/2)^{s-r})nCr$. Additionally, we use an argument involving labeling pairs of vertices according to the longest tight path ending with that pair to find a non-trivial lower bound for $ex(n, P^{\wedge}(3)_6)$.

Funding: SURE

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

Presentation #35

Modeling and Analyzing the Effect of a Radiation Therapy on Tumor Growth

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Field (Broad Category): Mathematics & Physical Sciences (Poster Presentation)

Student’s Major: Mathematics

Radiotherapy (RT) is one of the most common and effective cancer treatment options, even being used in more than half of all cases to cure cancer in high income countries. Due to the need for radiation therapy, research into maximizing the effectiveness of RT is critical. Mathematical modeling and computer simulations provide powerful tools to investigate potential optimal dose and timing for tumor control. In this work, we have developed a mathematical model using a system of impulsive ordinary differential equations (IODE) to describe how RT interacts with other major players of the tumor microenvironment. Stability analysis was conducted for the tumor-free equilibrium. Future work includes analyzing ways to maximize the effects of RT using computer simulations. The objective of this study was to develop a platform to improve cancer management by manipulating dose and fractionation schedules of RT. This study is supported by NIH Grant P20GM103434 to the West Virginia IDeA Network for Biomedical Research Excellence.

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Program/mechanism supporting research/creative efforts: Other
WV INBRE Grant

Presentation #36

GREENBURST: Green Bank Telescope’s FRB Search System and its Current Findings

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Student’s Major: Physics

GREENBURST, a commensal observation search system using the Green Bank Telescope (GBT), has been searching for Fast Radio Bursts (FRBs), Galactic pulsars and rotating radio transients (RRATs) since 2018. FRBs are extragalactic radio signals of unknown origin with some that repeat but have a much longer periodicity than pulsars. GREENBURST searches continuously for signals in the 960-1920 MHz frequency range and can detect dispersion measures up to 10^4 pc cm^{-3} . Based on data collected so far that was categorized by source and confirmed through Mean Absolute Deviation (MAD) calculations, GREENBURST has detected 42 known pulsars and 1 RRAT. Even though GREENBURST has only found pulsars, it is still expected to detect FRBs and be able to every 2-3 months. With data from previous years now categorized and studied, the files are now being used to improve the artificial intelligence-based system that searches and classifies candidate signals. In addition, using the detections of known pulsars, statistics of their pulse amplitude distributions are also being investigated.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #37

Copper-Catalyzed Trifluoromethylation through Benzylic C(sp³)-H Activation

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Field (Broad Category): Mathematics & Physical Sciences (Poster Presentation)

Student’s Major: Chemistry

The C(sp³)-H activation and trifluoromethylation of aromatic and heteroaromatic compounds is of interest in agrochemical, pharmaceutical, and material sciences because trifluoromethyl arenes offer synthetic improvements and assist in further functionalization of molecules later. In the pharmaceutical industry, late-stage functionalization is currently being investigated to modify bioactive molecules with specificity and selectivity. This sub-class of functionalization changes the electrostatics of the compound and increases lipophilicity, permeability, and bioactive stability meaning that molecules will be more effective in the body. There have been recent advancements in this area of work that provide mild to excellent yields of trifluoromethyl arenes. This work will explore the use of different copper salt catalysts, trifluoromethyl acetic acid as the CF₃ source because of their wide availability, 1,10-phenanthroline and 2,2'-bipyridine ligands that will stabilize reaction intermediates and screening of oxidants such as chloramine-T that generate the benzylic radicals. Analysis of existing reaction conditions used in this type of chemistry such as ligands, oxidants, and reaction environment will be utilized to generate a standard procedure for synthesizing a wide scope of products.

Funding: National Science Foundation (NSF) Louis Stokes Alliance for Minority Participation (LSAMP-1305039)

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #38

Rejection Comparison of Molecular Dyes through Non-Functionalized and Gold Nanoparticle Functionalized Polycarbonate Filters

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Field (Broad Category): Mathematics & Physical Sciences (Poster Presentation)

Student’s Major: Mechanical Engineering

Recent advancements in separation technologies have led to innovative new materials such as ultrathin self-assembled nanoparticle monolayers that are supported by porous polycarbonate filters. The purpose of this ongoing research project is to compare the molecular dye rejection caused by a non-functionalized polycarbonate filter and compare that to the rejection of an identical filter functionalized with 4 layers of 5 nm diameter ultrathin self-assembled gold nanoparticle monolayers. In order to accomplish this, molecular dyes direct yellow 26, direct blue 14, and direct red 80 at concentrations of 50 μM , 100 μM , 500 μM , and 1 mM have been used, and a functionalized filter with 4 layers of ultrathin self-assembled gold nanoparticle monolayers has been created. The dyes are run through each filter increasing in concentration and then decreasing in concentration respectively to track signs of hysteresis in the rejection, indicating additional functionalization has occurred. Results of rejection and flow rate as a function of volume for the molecular dye series through the filters will be reported.

Funding: WV Higher Education Policy Commission, Division of Science and Research
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Program/mechanism supporting research/creative efforts: a West Virginia SURE program
NASA Student Fellowship sponsored by the WV NASA Space Grant Consortium.

Presentation #39

Study of Formaldehyde Gas in the Interstellar Medium of the Milky Way

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Field (Broad Category): Mathematics & Physical Sciences (Poster Presentation)

Student’s Major: Chemistry

The Interstellar medium is an uncontrollable environment that throws gas clouds into many different physical states. When studying these clouds, we need to know the physical state of them so that we can better understand how the Interstellar medium recycles material to create new stars. Formaldehyde is a good indicator of the physical state that a gas cloud is in. It can give important details about kinetic temperature and the density of the cloud. In addition to this, formaldehyde is found all over the Milky Way and it is very often found near HII regions, where stars are born. To get the necessary information from the clouds, we will use data that is gathered from the Green Bank telescope along sight lines to look for formaldehyde absorption. When a sight line is found, we use a program called SAOImage DS9 to see a graph of values that shows how high the absorption from formaldehyde is. In conclusion, this will reveal the source of formaldehyde absorption and the source of the absorption signal.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #40

Equations on the Effects of Anti-CTLA-4 Antibodies on Tumor Growth

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Field (Broad Category): Mathematics & Physical Sciences (Poster Presentation)

Student’s Major: Mathematics

CTLA-4 is a co-inhibitory molecule that functions to regulate T cell activation. Antibodies that block the interaction of CTLA-4 with its ligands B7.1 and B7.2 can enhance immune responses, including anti-tumor immunity. CTLA-4 blockade has demonstrated significant benefits in the treatment of metastatic melanoma, increasing overall survival rates. Prior research has found that antitumor immunity can be enhanced through the blocking of CLTA-4. More recently, efforts to combine anti-CTLA-4 antibodies with other forms of cancer treatment like radiotherapy, chemotherapy, and other forms of immunotherapy have proven to be successful. This study has thus focused on the modeling and analyzing of the effects of anti-CTLA-4 antibody therapy on tumor growth using impulsive differential equations and mathematical analysis. A basic model of how anti-CTLA-4 antibodies interact within the tumor microenvironment was created, and equations followed suit. A Jacobian matrix was then created and solved at a tumor-free equilibrium, with a stability analysis and calibration to real-world data to soon be conducted.

Funding: NIH Grant P20GM103434

Program/mechanism supporting research/creative efforts: Other
West Virginia IDEa Network for Biomedical Research Excellence.

Presentation #41

Parental Distress Tolerance and Adolescent Anxiety: The Mediating Effect of Adolescent
Distress Tolerance

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Field (Broad Category): Social & Behavioral Sciences (Poster Presentation)

Student’s Major: Psychology

Adolescence is a vulnerable time in which many teens find themselves developing symptoms of anxiety. Research shows that parents may play a part in adolescents’ development of anxiety. One parenting characteristic that may contribute to adolescent anxiety is parents’ distress tolerance (i.e., the ability to withstand physical or psychological distress). The current study investigates the relationship between parent distress tolerance and the development of anxiety in adolescents and whether adolescents’ distress tolerance explains this relationship. The study includes 299 adolescents (aged 14-17), 286 mothers, and 94 fathers who completed questionnaires measuring distress tolerance and anxiety symptoms. The results indicate that, contrary to expectations, there is not an association between parent distress tolerance and adolescent anxiety, but as expected, parental distress tolerance is indirectly linked with adolescent anxiety through adolescent distress tolerance (i.e. parents who are less able to tolerate distress have adolescents less able to tolerate distress and higher levels of anxiety). Implications for this study include applications in clinical settings for anxiety treatment and improved understanding of the development of anxiety in adolescence.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #42

Enhancing Computer Science Education with Augmented Reality

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Field (Broad Category): Social & Behavioral Sciences (Poster Presentation)

Student’s Major: Computer Science

Teaching Object-Oriented Programming (OOP) courses to students who do not have programming experience can be challenging. Therefore, there are several computer-aided techniques to help students learn OOP more effectively. However, there is little work to determine the effects of Augmented Reality (AR) on student learning of fundamental computer science concepts. Using a digital overlay to project computer-generated objects into the context of a real-world space, AR provides an engaging medium through which students may visualize and explore concepts, even abstract ones. Therefore, the primary objective of this research is to develop AR technology that will utilize AR models that demonstrate fundamental OOP concepts in a manner that increases student understanding, interest, and motivation to learn. The second objective is to test the AR technology in a classroom setting and gather feedback from students and instructors regarding their experiences. Specifically, our long-term goal is to determine how using the AR application affects student understanding, interest, and motivation regarding OOP topics compared to previously used teaching methods. The research expectation is that AR will be more effective.

Funding: WV Higher Education Policy Commission, Division of Science and Research

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

*“Virtual” Summer Undergraduate Research Symposium 2020
West Virginia University*

Presentation #43

From blizzard babies to busty babes: pornography as a substitute for sex

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Field (Broad Category): Social & Behavioral Sciences (Poster Presentation)

Student’s Major: Finance/Economics

Elasticity refers to the idea that the demand for a product will fluctuate based off of price and that products substitutes, or in this case “man’s needs” vs. “blizzard babies”. By using data on Internet speed, Google trends, and daily weather, we plan to show that porn consumption and procreation are substitutes, and that Internet access elasticizes, or lessens, the demand for sexual activity. We began by examining the trend of “blizzard babies” before and after rural areas gain Internet access. “Blizzard babies” refer to the phenomenon in which an increase of conception and eventual birth is seen after extreme weather episodes that would naturally keep couples inside. If Internet traffic increases to porn sites during a blizzard, but fewer children are born after extreme weather shocks, we have evidence consistent with the idea that access to pornography is a substitute for sexual activity. In addition to showing that sexual activity and pornography are likely substitutes, our findings suggest that internet access has helped mitigate unplanned pregnancies.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #44

Assessing Risk Factors of Sexual Assault Victimization on College Campuses by Race and Ethnicity

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Field (Broad Category): Social & Behavioral Sciences (Poster Presentation)

Student’s Major: Anthropology and Women's and Gender Studies

Research focusing on college campus sexual assault often focuses on how social context plays a role in assault pervasion. An average of 20% to 25% of women and 6% of men in college will experience some form of sexual assault. Few studies have focused on racial and ethnic differences in this context. This study utilizes the Campus Climate Survey, conducted by the Association of American Universities, to address that disparity. The data was 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 age, classification, and sex on victimization, with specific focus on the intersections of gender, sexual orientation, race, and ethnicity. Results show that citizenship, disability, females or LGBQ+ identities, and campus climate all contribute to higher odds of experiencing sexual assault. In contrast, racial and ethnic minority students were less likely to experience sexual assault than white students. Implications and suggestions for further research are discussed.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #45

Adolescent Girls’ Political Efficacy: Changes Across Time

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Field (Broad Category): Social & Behavioral Sciences (Poster Presentation)

Student’s Major: Psychology

Political efficacy is one’s believed influence on politics and trust in their government. In developed democracies, research has found that women are less politically efficacious than men. This is problematic as it relates to less political participation and public policy benefits. Prior research has looked at political efficacy cross-sectionally, but little research has been done on how it has changed over time. By looking at political efficacy in populations longitudinally, we can determine if external factors (i.e. increased female representation in politics) are actually helping increase female political efficacy at a higher rate. We studied adolescents’ (age 12-18) political efficacy from a self-reported survey across five years, while controlling for socioeconomic status. Latent growth models indicated that adolescent political efficacy increased across time. Compared to boys, girls’ average political efficacy was lower. Across time, girls’ political efficacy increased at a higher rate, though this difference was not statistically significant ($p = .197$). These results hinted at the gender gap in adolescents’ political efficacy slightly minimizing. Implications and future directions are discussed.

Funding: SURE Funding

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #46

Trump, Twitter, and Trade: Does Language Choice Reflect Trump’s Hegemonic Masculinity?

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Field (Broad Category): Social & Behavioral Sciences (Poster Presentation)

Student’s Major: International Studies

Since the 2016 election, President Trump has been highly critical of previously existing trade agreements and has prioritized more favorable deals for the United States in order to put “America First”. Trump prides himself on being a strong negotiator considering his business background and has approached diplomacy in the same way he would a business deal. Previously, all public statements made by US Presidents have been scripted and posted on the official POTUS Twitter account. Trump has continued to use his personal account through his presidency, rarely using traditionally diplomatic language, opting for language that projects strength and toughness. We expect that Trump uses tougher, more masculine language regarding the US’s trade relationship with China and the European Union because he considers them to be equals. Conversely, we expect Trump’s trade tweets to not use strong, masculine language regarding NAFTA/USMCA negotiations because the US has the upper hand in those particular relationships. We test our hypotheses using content analysis of tweets from the @realDonaldTrump Twitter account comparing language usage in tweets regarding targeted trade competitors.

Funding: WVU SURE

Program/mechanism supporting research/creative efforts: a West Virginia SURE program

Presentation #47

Novel Method for Quantifying Facial Expression

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Field (Broad Category): Social & Behavioral Sciences (Poster Presentation)

Student’s Major: Psychology

Numerous studies on hemifacial expression have established that for most, emotion is primarily controlled by the right cerebral hemisphere. Motor control being contralateral, this organization is manifested in a more expressive left hemiface. However, the organization of a left-handed individual’s brain is not so certain as most research has only been conducted with right-handed individuals. It is possible that a left-handed individual’s emotion processes might be differently organized based on the knowledge that motor control is contralateral. Prior research has focused on qualitative assessment of facial expressions; using a quantitative measurement of the distance between the corner of the eye to the corner of the mouth in both neutral and positive expressions can assist in indicating which hemiface more intensely expresses emotion. Using qualitative (chimeric imaging) plus quantitative measurements (exocanthus-chelion ratio) allow for a better understanding of the lateralization of emotion processing in left-handed individuals. This project describes a novel method for quantifying facial expressivity using virtual data collection methods, as a way of probing underlying brain organization.

Funding:

Program/mechanism supporting research/creative efforts: a West Virginia SURE program