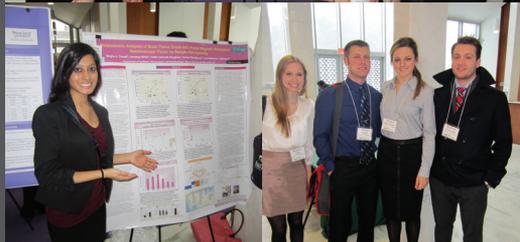




2013

Undergraduate Research  
and Creative Projects Conference



November 15 — McGregor Memorial Conference Center

## The Academy of Scholars

The WSU Academy of Scholars was founded in 1979 to promote and recognize sustained excellence in scholarship and creative achievement. The academy provides support to promising young scholars and periodically hosts special programming for the campus community.

Election to the Academy of Scholars is the highest recognition that may be bestowed upon a Wayne State University faculty member by his or her colleagues. Membership in the academy is for life.

The Undergraduate Research Opportunities Program (UROP) would like to thank the following members of the Academy of Scholars for their participation as judges:

**Dr. Joyce Benjamin**

Professor, Neurology

**Dr. Robert N. Frank**

Professor, Ophthalmology

**Dr. Donald Haase**

Associate Dean,  
College of Liberal Arts and Sciences

**Dr. Gloria Heppner**

Associate Vice President for Research

**Dr. Paul Karchin**

Professor, Physics

**Dr. David Kessel**

Professor, Pharmacology

**Dr. C.P. Lee**

Distinguished Professor Emerita,  
Biochemistry

**Dr. Harry Maisel**

Professor, Anatomy

**Dr. Robert A. Sedler**

Distinguished Professor, Law

**Dr. Gang George Yin**

Professor, Mathematics

## Additional Judges

**Dr. Hilary Ratner**

Vice President for Research

**Dr. Margaret E. Winters**

Provost

**Dr. Geoffrey Nathan**

Professor, English

**Dr. Freda Giblin**

Director of Inter-Institutional Initiatives

**Dr. Phil Cunningham**

Assistant Vice President for Research  
Compliance

Friday, November 15, 2013  
McGregor Memorial Conference Center

- 8:15 a.m.     **Registration and Continental Breakfast** — Atrium
- 9 a.m.        **Welcome** — Room B/C  
Monica Brockmeyer, Associate Provost  
for Student Success  
  
Margaret E. Winters, Provost
- 9:30 a.m.     **Oral Session I** — Multiple locations;  
listed on session pages
- 10:30 a.m.    **Oral Session II**
- 11:30 a.m.    **Poster Session** — Atrium
- 12:30 p.m.    **Luncheon** — Room L/M  
  
**Greetings**  
Monica Brockmeyer  
  
**Introduction of Guest Speaker**  
Matthew Orr, Coordinator,  
Undergraduate Research Opportunities Program  
  
**Guest Speaker**  
Randal Charlton, President of Everist Health,  
Canada and Director of Everist Genomics, Inc.  
  
**Awards**  
Introduction: Matthew Orr  
**Presentation:** *WSU Academy of Scholars*  
  
**Closing statement**  
Monica Brockmeyer

# Oral Session I

9:30-10:30 a.m.

## Session 1: Visual and Performing Arts

Room B/C

Moderator: **Dr. Mary Elizabeth Pratt Cooney**, Lecturer, Theatre

**Katelyn Foster**: *A Russian Theatre Experience*

**John Kalogerakos**: *Bartlebe to Le: Repurposing a Great Work of Fiction*

**Jessica Wildman**: *Restrictive Interior Paintings*

## Session 2: Other Sciences

Room E

Moderator: **Dr. Stanislav Groyzman**, Associate Professor, Chemistry

**Johntell Tutton**: *Synthesis of Zinc Oxide Nanowires Grown on Hexagonal Nano-rods*

**David White**: *Di-Nickel and di-Copper Complexes Featuring a Dinucleating Bis(iminopyridine) Ligand and Their Reversible Binding of Oxalate*

**Alyssa Wilkins**: *Comparison of Topology based Pathway Analysis Tools Implemented In R*

## Session 3: Cultures and Creativity

Room F

Moderator: **Dr. Janine Lanza**, Associate Professor, History

**Sidra Ali**: *Exploring Creativity: Developing the Ideal Orphanage*

**Nishanth Alluri**: *Gorovodu Medicine Amongst the Ewes of Ghana and Togo*

**Robert Pfaff**: *Benjamin Franklin: Diplomacy, Legacy, and France 1776-1778*

## Session 4: Algorithms

Room G/H

Moderator: **Dr. James Woodyard**, Associate Professor, Electrical and Computer Engineering

**Vilma Koclari**: *Optimization of Gondola Collections at an Automotive Assembly Plant*

**David Warnke**: *The Design of Reality Games: The Land Bridge Game Design Project*

**Kenneth Thomas**: *Breast Cancer Detection Using Diffuse Optical Imaging*

## Session 5: Media and Identity (Part I)

Room I

Moderator: **Dr. Liette Gidlow**, Associate Professor, History

**Dennis Black**: *The Libidinal Object of the War on Terror: A Post-Colonial Historical Discursive Analysis on State Violence and Torture*

**Devon Holland**: *The Fantasy of the Other: Echoes of Colonialism in Popular Fiction*

**Sakeena Fatima**: *Ads of Identity: Trends in African American Beauty Advertisements 1934-1980*

## Session 6: Drug Delivery

Room J

Moderator: **Dr. Judith Whittumn-Hudson**, Professor, Immunology and Microbiology

**Shapnil Bhuiyan**: *Development of Bead-Based Assays for RNA-Ligand Discovery*

**Tayson Lin**: *Folate-Functionalized Nanoparticles Targeted Anti-Chlamydial Drug Delivery*

**Christopher McPharlin**: *Treatment of Chlamydia-Infected Monocytes with Antibiotic-Loaded Nanoparticles: A Transcript Analysis*

Oral Session II  
10:30-11:30 a.m.

Session 1: **Gene Expressions**

Room B/C

Moderator: **Dr. Robert Akins**, Associate Professor, Biochemistry

**Jonathan Maksabo:** *Gene Expression Analysis in Absence Epilepsy Using Monozygotic Twin Design between Affected and Unaffected Discordant Twin Pairs: Implications for Contemporary Treatment Methods*

**Nathan Vergalil:** *Sequencing Lactate Dehydrogenase A (LDHA) and Analyzing its Adaptive Evolution among Primates*

**Jasmine Vickery:** *Investigation of Mechanisms of Antifungal Resistance in Candida Albicans*

Session 2: **Health**

Room E

Moderator: **Dr. Patrick Mueller**, Associate Professor, Physiology

**Lisa Benmiller:** *Nurse Perspectives of Nurse-Led Algorithmic Approach to Terminal Mechanical Ventilation Withdrawal*

**Maxwell Laws:** *Physical (In)-activity-induced Changes in Tonic Excitation and Inhibition in the Rostral Ventrolateral Medulla*

**Aaron Sabel:** *The Effect of Folate Restriction on mTOR Signaling Network and Aging*

Session 3: **Physical Chemistry**

Room F

Moderator: **Dr. Parastoo Hashemi**, Assistant Professor, Chemistry

**Adam Crowe:** *GDIII-EUI-Containing Heterobimetallic Complex as a Potential Universal Field Contrast Agent*

**Joshua Fischer:** *Synthesis of a New Chiral Precatalyst for the Mukaiyama Aldol Reaction*

Session 4: **Media and Identity (Part II)**

Room G/H

Moderator: **Matthew Orr**, Program Coordinator, UROP

**Chelsea Miller:** *Exploration of the Current Employment Situation for Urban Chinese Women*

**Chad Van De Wiele:** *The Uses and Gratifications of Grindr*

Session 5: **Mental Health**

Room I

Moderator: **Dr. Vaibhav Diwadkar**, Associate Professor, Psychiatry

**Kristin Galik:** *Comparing Antidepressant Effects on Electrochemically Detected Serotonin in Vivo*

**Carol Noronha:** *Task-based fMRI in Childhood-Onset Schizophrenia During Simple Motor Control: Effects of Antipsychotic Medications*

Session 6: **Health and Disease Mechanisms**

Room J

Moderator: **Dr. Judith Whittumn-Hudson**, Professor, Immunology and Microbiology

**Lahib H. Douda:** *Metabolic and Cellular Elasticity of Adipose Tissue*

**Yousif Younan:** *The Contribution of Oxidative Stress to the Development of Cisplatin Resistance in Epithelial Ovarian Cancer*

## Poster Session

11:30 a.m.

- Kristy Abraham:** *Amygdala Modulation During an Affective Go-No-Go Paradigm: Effects of Emotion on Cognition in Borderline Personality Disorder*
- Nikhil Adapa:** *Developmental Differences in Implicit Learning of the Serial Reaction Time Task*
- Alia Ahmed:** *Inhibition of TAK-1 Leads to Deregulated Expression of miR-10 and miRNA-143 in Pancreatic Cancer*
- Ahsan Akram:** *Automated Testing Device for Live-Dead Analysis of Ballast Water Organisms*
- Nicholas Ancona:** *Ruthenium Caging Complexes and Their Therapeutic Potential by Inhibition*
- Linda Arrabi:** *Comparing Two Methods for Detection of Sepsis Pathogens: Roll Plate versus Direct RT-PCR*
- Samantha Arzola:** *Research on Underrepresented Non-indigenous Minorities in Colombia*
- Feven Berhane:** *Plasma Lactate Levels Increase During Hyperinsulinemic Euglycemic Clamp and Oral Glucose Tolerance Test*
- Rohan Bhalla:** *Dynamic Causal Modeling Reveals Distinct Working Memory Networks in Fetal Alcohol Spectrum Disorders*
- Arthur Bowman:** *Infrared Filtering via Sub-Wavelength Gratings for Hyperspectral Imaging*
- Amber Buchholz:** *Perceived Control Over Pain and Quality of Life in African American Patients With Cancer Pain*
- Ashley Carbery:** *Convergent Validity of the IVA+ Plus CPT*
- Sarah Daoud:** *Hyperglycemia-induced Changes in Mitochondrial Membrane Polarization (MMP) State and Reactive Oxygen Species (ROS) in Endothelial Cells*
- Khari Dickey:** *Physical Activity Prevalence in Detroit African American High School-aged Youth*
- Ajay Eapen:** *Adenylyl Cyclases 1 and 8 Contribute to Neuronal Calcium-Channel Activity*
- Tarick El-Baba:** *Matrix Assisted Ionization Vacuum-Mass Spectrometry: Characterization of Synthetic Materials Including Polymers, Additives, and Inorganic Catalysts*
- Angela Elias:** *Determining Residue Effects on DNA Polymerase Fidelity By Molecular Dynamic Simulations*
- Robert Flinn:** *Childhood Development of the Hippocampus: Subfield Volumes Differentially Account for Variability in Regional Morphometry*
- Zachary Fragoso:** *Promoting Engagement, Mitigating Burnout: Autonomy Master and Purpose in EMS*
- Alexander Gagliardi:** *Modular Tissue Engineering: Chitosan-GAG Fibers Formed from an Ionic Complex*

- Robert Gastineau:** *Dislocation Dynamics in Non-Equilibrium Material Systems of Hexagonal Symmetry*
- Fariha Ghazi:** *Electron Tomographic Analysis of the Lipid Droplet-Mitochondrial Interface in Cardiomyocytes*
- Emily Glick:** *Are Children With Type I Diabetes Happy With Their Physician? Examining the Relationship between Diabetes Outcomes and Satisfaction with the Physician*
- Paul Goodrich:** *Roaming Publication*
- Darcy Goolsby:** *The Correlates of Wrongful Convictions: An Empirical Study of the National Registry of Exonerations Data*
- Arman Harutyunyan:** *Traumatic Stress Exposure Does Not Affect Behavioral Sensitization to Morphine in Mice*
- Enida Huremovic:** *The Effects of Oxytocin on the Male Zebra Finch Behavior and Brain*
- Dovie Jenkins:** *Here There Be Monsters: The Myth of the Modern Horror Movie*
- Merdijana Kovacevic:** *Turning Point: Understanding the Associations of Significant Events, Social Disclosure, and Well-Being*
- Joshua Kovoov:** *Probe Protein and Its Hydration Water Dynamics on Nanodiamond Surface by QENS*
- Sanjana Kuljarni:** *Role of Cholesterol on the Chemistry of the Brain Function: Implications to Brain Function*
- Renee Ludlam:** *X-Ray Properties of Intermediate Mass Black Holes in Dwarf Active Galaxies*
- Corinne Lutomski:** *Characterization of Fragile Ganglioside Lipids by Matrix Assisted Ionization Vacuum Using Ion Mobility Spectrometry Mass Spectrometry and Tandem Fragmentation*
- Tonya Lutz:** *Demystifying Lustre Glazes*
- Aditya Mathiarasu:** *Immunoregulatory Functions of B Cells in Pregnancy and Preterm Birth*
- Rachael Merritt:** *Comparison of Field Galaxies and Supernova Host Galaxies in Stripe 82*
- Xiaofan Mi:** *Salivary Cortisol: Implications In Clinical Health Outcomes of Children With Chronic Asthma*
- Kayla Monhollen:** *Human-Animal Interaction and its Effects on At-Risk Adolescent Dog Bonding between Human and Animal*
- Jacob Oblak:** *Chemokine Receptor CXCR2 In Endothelial Progenitor Cell Functions*
- Aaron Panicker:** *Brain Connectivity Changes Following Anti-Depressant Treatment in Major Depressive Disorder*
- Anant Patel:** *Dendrimer-siRNA Conjugates for Gene Silencing*
- Chandni Patel:** *Cloning of Synthetase Enzyme "IleRS" in H. Pylori*

## Poster Session Continued

**George Paul:** *Imaging Intracellular Fatty Acids in Brown Adipocytes*

**Joseph Piechocki:** *Synthesis and Testing of Histone Deacetylase Inhibitors Based on SAHA*

**Damaris Emily Pop:** *Analysis of Monoamine Levels in the Brain Reward Neurocircuitry Following Single Prolonged Stress Exposure In Rats*

**Craig Profant:** *The Tale of Two Churches: The Process Of Establishing A Research Relationship With Leaders of Two Detroit Churches*

**Bharat Sampathi:** *Does MKP-1 Play A Role In Bone-Fat Connection?*

**Sean Shepard:** *Insulin-Like Peptides that Regulate C. elegans Physiology in Response to Food Types*

**Destiny Stroman:** *Associations of Spirituality and Adolescence Health Outcomes*

**Audrey Sulkanen:** *Stabilizing Nafion for In-Vitro Fast Scan Deposition Stripping Voltammetry*

**Navya Talluri:** *Effect Of Mother's Medical Conditions, Medications, and Recreational Drug Exposure During Pregnancy On Cytokines in Human Breast Milk*

**James Taylor:** *Electrochemical Characterizations of Tyrosine Kinase Inhibitors*

**Monica Thipparthi:** *Pain Behavior: How Is It Influenced By Anger Suppression and Expression?*

**Roberta Ukavwe:** *Youth Perspectives on Proposed Medication Adherence for Interventions for Youth Living With HIV*

**Anita Vasudevan:** *Omega-3 Fatty Acid Synergizes With Conventional Chemotherapy: A Potential Therapeutic Strategy for Recurrent Colon Cancer*

**Anshu Wadehra:** *Effect of Coating on The Heating Properties of Magnetic Nanoparticles*

**Adam Waller:** *Designing New Ligan Architectures for Ruthenium Caging Complexes*

**Daniel Woodall:** *Matrix Assisted Ionization Vacuum (MAIV): A Simple Method for Ionizing Active Ingredients of Drug Tablets and their Metabolites by Mass Spectrometry*

**Enxhi Xhafa:** *Molecular Design of a Solid Oxide Electrolysis Cell for Co-electrolysis of CO<sub>2</sub> and H<sub>2</sub>O to Produce Synthesis Gas*

## Presenters

### **Kristy Abraham**

Faculty mentor: **Dr. Vaibhav Diwadkar**

*“Amygdala Modulation During an Affective Go-No-Go Paradigm: Effects of Emotion on Cognition in Borderline Personality Disorder”*

Borderline Personality Disorder is characterized by emotional instability and impulsive behaviors; the amygdala is a structure within the limbic system that is associated with emotion. The target of the project was to observe the amygdala modulation of other brain regions involved in impulsivity in patients with BPD. Faces of varying emotions flash across a monitor using a Go-No-Go paradigm to determine reactivity in an fMRI. Preliminary results observed BPD patients undergoing substantially more signaling by the amygdala in the negative and neutral condition, making them more vigilant to such factors than a healthy control. As a result, there was much greater emotional interference on cognition, creating a state of hyper arousal.

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### **Nikhil Adapa**

Faculty mentor: **Dr. Noa Ofen**

*“Developmental Differences in Implicit Learning of the Serial Reaction Time Task”*

This poster presentation looks at the activations in the Striatum/MTL during the SRT task and how differences in these activations correlate to learning.

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### **Alia Ahmed**

Faculty mentor: **Dr. Fazlul H. Sarkar**

*“Inhibition of TAK-1 Leads to Deregulated Expression of miR-10 and miRNA-143 in Pancreatic Cancer”*

Inhibition of the oncogenic protein, TAK-1, can lead to deregulated expression of different microRNAs in pancreatic cancer. The purpose of this study is not only to discover the extent to which TAK-1 regulates the expression of various microRNAs, but also to determine the effects of natural agents in pancreatic cancer in comparison to commercially available drugs targeting TAK-1 and agents that target miRNAs.

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### **Ahsan Akram**

Faculty mentor: **Dr. Jeffrey L. Ram**

*“Automated Testing Device for Live-Dead Analysis of Ballast Water Organisms”*

The primary goal of this research project was to construct a small-scale automated device that could rapidly detect the presence of living organisms in ballast water samples. The importance of this project stems from the possibility that foreign invasive species may be introduced into new environments by transportation through ballast tanks. Although ballast tank treatment methods are outlined for ships, there is no efficient method to test whether the kill treatment was effective. Therefore, it is necessary to develop an automated system that can assess the efficacy of ballast water kill treatments prior to release. A fluorescent chemical assay using fluorescein diacetate (FDA) in the prototype automated device has shown the ability to detect the presence of live organisms in given water samples.

**Sidra Ali**

Faculty mentor: **Dr. Saeed Khan**

*“Exploring Creativity: Developing the Ideal Orphanage”*

Recently, countries such as Israel, Taiwan, China, Singapore, South Korea, India and other Asian countries have begun to reform their curriculums in efforts to emphasize creativity development in primary and secondary schools. From this, the exploration integrating creativity and self-expression in orphanages through education and medicine is of great value and discovery. This research proposes methods for which creativity and self-expression may be integrated into education for youth in impoverished areas. Research was conducted locally in Detroit Public Schools and internationally in Istanbul, Turkey and San Lorenzo, Honduras.

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**Nishanth Alluri**

Faculty mentor: **Dr. Eric Montgomery**

*“Gorovodu Medicine Amongst the Ewes of Ghana and Togo”*

Western medicine is beginning to pay more attention to indigenous systems of plant medicine throughout the world. Most of this attention has been focused in Asia, but Africa is also worthy of further investigation. When biomedicine does investigate traditional medicine, it does so through a Western lens and rarely takes into account local meanings and contexts. Also, clinical trials attempt to isolate the properties of certain plants and also ignore local meanings and the importance of ritual. Ritual plays a very important role in the healing process. On the other hand, anthropologists focus on traditional systems of healing but rarely delve into the biochemical properties of plants. This research bridges these informal divides: Western/Traditional, Global/Local and Allopathic/Indigenous. It explores the medical-religious healing practices that are followed by Gorovodu and describes how spiritual and natural forces help in the process. In addition, it analyzes how the botanical and biochemical properties of the indigenous plants are used in Gorovodu healing and religion’s role in the healing process.

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**Nicholas Ancona**

Faculty mentor: **Dr. Jeremy Kodanko**

*“Ruthenium Caging Complexes and Their Therapeutic Potential By Inhibition”*

Research groups are always looking for improved mechanisms to control disease. Ruthenium caging complexes can be used to cage an inhibitor and be selectively released within the human body to affect the function of a protein. Legumain is a protein associated with inflammatory diseases such as stroke and cancer. Legumain’s impact in these diseases makes it an inviting target for therapeutic research. Human patients with breast, colon and ovarian cancer have upregulated expression of legumain in tumors leading to lower survival rates. The goal of my research is to synthesize a polypeptide that is a potential inhibitor for legumain. This inhibitor can be bound to a ruthenium caging complex and used to selectively treat human disease.

**Linda Arrabi**

Faculty mentor: **Dr. Emily Toth Martin**

*“Comparing Two Methods for Detection of Sepsis Pathogens: Roll Plate versus Direct RT-PCR”*

Roll plate broth cultures are typically used to detect the specific bacterial organism in peripheral venous blood culture and on the lumen of catheter tips from patients with sepsis. Using RT-PCR has the potential to enable the detection within a shorter time and may be more sensitive. RT-PCR takes up to 2 hours and 45 minutes for complete amplification and detection of the bacteria and to help suggest a treatment to the infection. Using the blood sample and the saline solution containing the catheter tip of patients admitted to the DMC known to have one of the known specific bacteria, we tested the validity of RT-PCR for identification of the bacteria. This assay may be used in the future to shorten the time to identifying the best treatment for catheter-related blood stream infection.

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**Samantha Arzola**

Faculty mentor: **Dr. Timothy Carter**

*“Underrepresented Non-indigenous Minorities in Colombia”*

The structural and institutional racism exemplified in the mining situation in La Toma, Columbia, and the policy making specifically, affect the Afro-Columbian community of the region. In analyzing the effect of government intervention on non-indigenous minority groups that are unrepresented in the government of Columbia, it was discovered that the extent of the discrimination was not as wide, nor as systematically based, as once implied by prior research. It was found that the discrimination was largely reserved to the more rural areas of the country, where the poverty level was lowest.

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**Lisa Bensmiller**

Faculty mentor: **Dr. Margaret Campbell**

*“Nurse Perspectives of a Nurse-Led Algorithmic Approach to Terminal Mechanical Ventilation Withdrawal”*

Examining the perspectives of nurses on the feasibility of a nurse-led algorithmic approach to terminal mechanical ventilation withdrawals.

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**Feven Berhane**

Faculty mentor: **Dr. Berhane Seyoum**

*“Plasma Lactate Levels Increase During Hyperinsulinemic Euglycemic Clamp and Oral Glucose Tolerance Test”*

This data presents changes in lactate levels in two different tests dealing with insulin resistance. The hyperinsulinemic euglycemic clamp causes hyperinsulinemia, while the oral glucose test simply gives fasting glucose. The results seem to suggest a relationship between increased lactate and insulin resistance.

**Rohan Bhalla**

Faculty mentor: **Dr. Vaibhav Diwadkar**

*“Dynamic Causal Modeling Reveals Distinct Working Memory Networks in Fetal Alcohol Spectrum Disorders”*

Fetal Alcohol Syndrome (FAS) is a pattern of both mental and physical defects that develop in a fetus in response to high levels of maternal alcohol consumption during pregnancy. FAS can cause permanent central nervous system damage. Developing brain cells can be malformed, causing a wide range of cognitive and functional disabilities such as poor memory, attention deficits and impulsive behavior in the child. Using functional MRI during a simple working memory task and dynamic casual modeling, we are able to investigate disordered working memory related network interactions across the spectrum of the FAS disorder as well as identify the presence or absence of modulation of the dorsal anterior cingulate efferent connections.

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**Shapnil Bhuiyan**

Faculty mentor: **Dr. Christine S. Chow**

*“Development of Bead-Based Assays for RNA-Ligand Discovery”*

Small molecule binding to the helix 69, or H69, region of the ribosome could lead to inhibition of protein synthesis, an essential process in all organisms. Many antibiotics are already known to target ribosomes, including the helix 69 region; however, due to the overuse of current antibiotics and development of antibiotic resistance in bacteria, there is a growing need for the discovery of alternative antimicrobial molecules. This study focuses on developing visual assays and methods of quantification to help identify small molecules that can bind to H69.

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**Dennis Black**

Faculty mentor: **Dr. Kelly Young**

*“The Libidinal Object of the War on Terror: A Post-Colonial Historical Discursive Analysis on State Violence and Torture”*

Practices of torture inside of Guantanamo Bay Detention Center have been justified and re-coded by the government of the United States. Post 9/11, exceptions were made that preemptively suspended the rule of law for primarily brown and or Muslim bodies who were, at the same time, constructed as threats by government and mass media. This paper will argue that these exceptions are traced back to the colonial foundations of the New World and are not exceptions at all, but rather a continuation of the norm. This paper seeks to illuminate the violent history of the state and to argue that exceptions will continue to be made for as long as they are seen as exceptional acts and not politics as usual.

**Arthur Bowman**

Faculty mentor: **Dr. Sean Gavin**

*“Infrared Filtering via Sub-Wavelength Gratings for Hyperspectral Imaging”*

Hyperspectral techniques are needed to advance to the next generation of thermal imaging systems. A hyperspectral image contains the electromagnetic spectrum for every point in an imaging plane, providing a fingerprint for different objects. These fingerprints improve object discrimination, which is useful in a wide array of applications including satellite analysis of climate change, military surveillance, and biological and chemical sensing. Hyperspectral images are formed from intensity acquired at each wavelength, which requires narrowband filters such as interference-based Fabry-Perot cavity filters. A Fabry-Perot cavity is composed of two parallel reflectors separated by a set distance, and transmits light when a standing wave can be established between the two mirrors. To ensure highly efficient and selective filters, the reflectors must exhibit very high reflectance and be non-absorbing. In this work we designed, fabricated and characterized a low-loss reflector using a high-contrast grating.

**Amber Buchholz**

Faculty mentor: **Dr. Stephanie Myers Schim**

*“Perceived Control Over Pain and Quality of Life in African American Patients With Cancer Pain”*

This study looked at African American patients with cancer pain. Generally, this group is underrepresented in cancer pain research. This small sample looked more specifically at the association between quality of life versus perceived control over pain. We found that greater perceived control over pain is associated with better quality of life.

**Ashley Carbary**

Faculty mentor: **Dr. Jeffrey Kuentzel**

*“Convergent Validity of the IVA+ Plus CPT”*

This study’s focus is to establish convergent validity for the IVA+Plus, a computerized test of attention designed to aid in diagnosing ADHD, by correlating adult scores on the test with MMPI-2 items. Making use of the 18 characteristics of ADHD listed in the BAARS-IV rating scale, we selected 35 MMPI items that closely resemble these features for use in this study. The validity of IVA+Plus scores was examined using archival data collected from clinical records at the Wayne State University Psychology Clinic. Preliminary findings indicate that several MMPI-2 items that resemble ADHD features were significantly correlated with primary IVA+Plus scores.

**Adam Crowe**

Faculty mentor: **Dr. Matthew J. Allen**

*“GdIII-EU11-Containing Heterobimetallic Complex as a Potential Universal Field Contrast Agent”*

Contrast agents, when coupled with magnetic resonance imaging, allow for enhanced imagining of an area of interest. While GdIII-1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid improves imaging, it is limited at some useful field strengths. The synthesis of a heterobimetallic complex, as proposed in my project, shows an encouraging future due to its effectiveness at low and high magnetic field strengths. This discussion will describe the synthesis, purification and measurements of the proposed heterobimetallic complex, along with future areas of study for the projected system.

**Sarah Daoud**

Faculty mentor: **Dr. Mahendra Kavdia**

*“Hyperglycemia-induced Changes in Mitochondrial Membrane Polarization (MMP) State and Reactive Oxygen Species (ROS) in Endothelial Cells”*

This research project works to understand the relation between increased glucose concentrations in human body cells (diabetes) with mitochondrial dysfunction that leads to cellular dysfunction. It also uses a new fluorescent dye that is specialized to enter the mitochondria and change its conformation upon changes in the mitochondrial membrane polarization, and this goes back to the basics of the study.

**Khari Dickey**

Faculty mentor: **Dr. Qin Lai**

*“Physical Activity Prevalence in Detroit African American High School-aged Youth”*

This presentation presents information suggesting the existence of specific factors that plague African American high school-aged adolescents in Detroit. Cultural and gender differences are present that suggest it would be feasible and beneficial to identify factors that influence activity level and activity choice in Detroit adolescents. The presentation highlights statistical analysis data comparing Michigan high school-aged youth with Detroit African American youth of the same age range.

**Lahib H. Douda**

Faculty mentor: **Dr. James G Granneman**

*“Metabolic and Cellular Elasticity of Adipose Tissue”*

Fat tissue includes both brown adipocytes (BA), which promote fat burning, and white adipocytes, which promote fat storage, were studied. Understanding what regulates the abundance of beneficial BA cells might lead to new treatments for obesity and related diseases, like diabetes. We hypothesized that the level of sympathetic innervation may explain depot and strain-dependent variations in BA number. We tested the hypothesis by measuring levels of tyrosine hydroxylase (TH), a specific marker of sympathetic nerves, in various fat pads. We found that TH levels were greater in subcutaneous fat, which has more BA. However, variations TH levels did not predict strain (genetic) differences in BA number.

## Ajay Eapen

Faculty mentor: **Dr. Alana Conti**

*“Adenylyl Cyclases 1 and 8 Contribute to Neuronal Calcium-channel Activity”*

This study aimed to assess differences in neuronal activity between WT mice and DKA (lacking adenylyl cyclases 1 and 8) mice utilizing manganese-enhanced Magnetic Resonance Imaging (MEMRI) technology. Previous studies have indicated a role for adenylyl cyclases in sensitivity to certain drugs of abuse, memory information, chronic pain and certain developmental processes. Results show a significantly higher degree of neuronal activity in WT mice compared to DKO mice. These findings indicate adenylyl cyclases 1 and 8 play an important role in contributing to neuronal activity.

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## Tarick El-Baba

Faculty mentor: **Dr. Sarah Trimpin**

*“Matrix Assisted Ionization Vacuum-Mass Spectrometry: Characterization of Synthetic Materials including Polymers, Additives, and Inorganic Catalysts”*

Mass spectrometry is an analytical tool used in the physical sciences to measure an atom or molecule mass that is intrinsic to it. Since mass spectrometry measures ions, molecules must be efficiently and readily converted to ions. As such, many ionization sources and methods exist that are commercially available and can be equipped to a mass spectrometer. Matrix assisted ionization vacuum is a novel method used to produce ions in mass spectrometry which utilizes no laser, extraction voltages or extensive heat, which are common with conventional methods. Matrix assisted ionization vacuum operates by combining the analytes of interest with an organic matrix and exposing it to the vacuum of a mass spectrometer. Since all mass spectrometers come equipped with a vacuum, matrix assisted ionization vacuum can be applicable to seemingly any mass spectrometer with little or no instrument modifications. With this method, both small and large molecules can be analyzed directly from the solid state. Here, a range of synthetic materials including polymers, their additives and inorganic catalysts are analyzed using the MAIV method with the matrix 3-nitrobenzonitrile.

## Angela Elias

Faculty mentor: **Dr. G. Andres Cisneros**

*“Determining Residue Effects on DNA Polymerase Fidelity by Molecular Dynamic Simulations”*

Every living organism contains DNA. DNA molecules are copied by enzymes in the process of replication. In the event that the replication contains a mistake, the protein may malfunction or even cause cell death. One of the enzymes responsible for these replications is called DNA Polymerase I. Recent studies have proposed that Polymerase I performs a double-check to insure higher fidelity rates. In this study, we use computational methods to observe how the replicating fragment of the DNA Polymerase I bonds with the DNA in *Thermus aquaticus*. For example, how do the bonds of correctly replicated DNA compare with the bonds of incorrect replications? Are these differences consistent across different species of bacteria?

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**Sakeena Fatima**

Faculty mentor: **Dr. Liette Gidlow**

*“Ads of Identity: Trends in African American Beauty Advertisements 1934-1980”*

The Civil Rights Era and the Black Power Movement heralded a new era in America for a variety of reasons. Their calls for an end to discrimination and “Black is Beautiful” had a profound impact on the African American beauty industry. Prior to these movements, products that did not support natural African beauty, such as skin whiteners and hair straighteners, were common in popular African American newspapers such as the Atlanta Daily World. In 1968, a few years after the Civil Rights Act and during the Black Power Movement, no ads of this sort were found in the Atlanta Daily World. Furthermore, in *Ebony*, a prominent African American magazine, the same companies who promoted the aforementioned products were now espousing the same products as highlighting natural African beauty. Such trends bespeak of a change in African American identity and a greater emphasis on racial pride.

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**Joshua Fischer**

Faculty mentor: **Dr. Matthew Allen**

*“Synthesis of a New Chiral Precatalyst for the Mukaiyama Aldol Reaction”*

Presentation of the synthesis of a new chiral Eu3+ complex that was tested as a chiral precatalyst for the Mukaiyama aldol reaction. The Mukaiyama aldol reaction forms I<sup>2</sup>-hydroxy ketones with up to two chiral centers, and these groups are found in many bioactive compounds. Additionally, a luminescent study of how enantiomers bind differently, creating different chiral environments, was performed.

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**Robert Flinn**

Faculty mentor: **Dr. Noa Ofen**

*“Childhood Development of the Hippocampus: Subfield Volumes Differentially Account for Variability in Regional Morphometry”*

The hippocampus is known to contribute to memory function, but it is unclear what role the hippocampus has in childhood memory development. We have created a novel and rigorous method to study the development of the hippocampus structure. Individual variability in regional volumes is partially explained by differences in the underlying anatomy that have known functional differences. Specifically, we found differences in a region known for complex memory functions accounts for individual variability in total hippocampal regional volumes.

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**Katelyn Foster**

Faculty mentor: **Dr. Mary Anderson**

*“A Russian Theatre Experience”*

This presentation will inform the audience about the work of the contemporary artist and theatre-maker Dmitry Krymov and the intriguing productions that he has created and directed in Russia. Having studied theatre in Russia this summer as part of the Month in Moscow program, I will describe Krymov’s unique rehearsal process and use of design elements. I will then present a set of acting tools I brought back to the U.S. with me that I learned from the productions I saw while in Moscow. Finally, I will bring all of this information into context and explain how artists can benefit from studying Krymov’s work.

**Zachary Fragoso**

Faculty mentor: **Dr. Alyssa McGonagle**

*“Promoting Engagement, Mitigating Burnout: Autonomy Mastery, and Purpose in EMS”*

Emergency Medical Services (EMS) workers are vulnerable to burnout due to job demands inherent to the industry. Yet these workers are also capable of experiencing engagement and intrinsic motivation. We expected to see positive relationships between demands and burnout, and between autonomy, mastery, and purpose and engagement. Additionally, we proposed that high levels of autonomy, mastery and purpose would moderate (buffer) the positive relationships between demands and burnout. We conducted a paper-and-pencil survey of EMS workers for a private EMS company in the metropolitan Detroit area. Results revealed certain job resources related to engagement and demands to burnout. Additionally, high levels of purpose buffered the effects of job demands on burnout levels. This evidence suggests working to increase workers’ sense of autonomy, mastery and purpose would be beneficial to an organization.

**Alexander Gagliardi**

Faculty mentor: **Dr. Howard W. T. Matthew**

*“Modular Tissue Engineering: Chitosan-GAG Fibers Formed from an Ionic Complex”*

Modular tissue engineering is a capable and relatively new technology that can help solve current regenerative medicine issues. This technology involves using a small cellular construct and assembling it into a module. This module is the building block for a larger tissue structure. Chitosan is a material of interest for this technology. Fibers can be made from this material, which can be used to encapsulate cells, assemble modules and eventually lead to engineered tissues. These fibers are promising candidates for future tissue-engineering applications.

**Kristin Gallik**

Faculty mentor: **Dr. Parastoo Hashemi**

*“Comparing Antidepressant Effects on Electrochemically Detected Serotonin In Vivo”*

Investigation on the effects of various antidepressants on serotonin release in the mouse model. Results show a correlation to clinical rankings of antidepressants. This data could be used for future antidepressant development as well as improving current treatment of patients using antidepressants.”

**Robert Gastineau**

Faculty mentor: **Dr. Zhi-Feng Huang**

*“Dislocation Dynamics in Non-Equilibrium Material Systems of Hexagonal Symmetry”*

Presentation of an analytical approximation to the motion of a Penta-Hepta defect and the mathematics behind it.

**Fariha Ghazi**

Faculty mentor: **Dr. James Granneman**

*“Electron Tomographic Analysis of the Lipid Droplet-Mitochondrial Interface in Cardiomyocytes”*

This presentation will be about the accumulation of fatty acids in the body and how it affects the heart and its role in metabolic development. It has been proven that excessive fatty acids can lead to obesity and diabetes, thus resulting in heart disease. My poster shows various electron microscopic images of differences in heart tissue based on three different treated mice. The electron microscopic images were also turned into 3-D images using electron tomography for further analysis, and that will also be shown on the poster.

**Emily Glick**

Faculty mentor: **Dr. April Idalski Carcone**

*“Are Children With Type 1 Diabetes Happy With Their Physician? Examining The Relationship Between Diabetes Outcomes and Satisfaction With The Physician.”*

This research looked at children with type one diabetes’ satisfaction of their health care provider in relation to their diabetes health outcomes and their diabetes management behavior. We obtained subjective measurements of the children’s satisfaction levels, and the children’s self-reported adherence to their diabetes-management tasks. We obtained objective measurements of their diabetes-management tasks by downloading the patients’ meters and averaging the amount of blood glucose testing they did per day. We also recorded the patient’s hemoglobin A1c as an indicator of their diabetes health outcomes. The hypothesis in this study was partially supported. A significant relationship was found between satisfaction and health outcomes, and a marginally significant relationship was found between satisfaction and the subjective measure of illness management behavior.

**Paul Goodrich**

Faculty mentor: **Dr. Danielle Aubert**

*“Roaming Publication”*

The Roaming Publication investigates the ways places work and how people react to said place. This first issue explores the theme of the working class and investigates the town of Ravenswood, West Virginia. We lived here for nearly three weeks, gathering information about the town and its people, and printed a small edition of publications on a Risograph printer we brought along with us. We became tramp printers and documentarians in a sense.

**Darcy Goolsby**

Faculty mentor: **Dr. Yuning Wu**

*“The Correlates of Wrongful Convictions: An Empirical Study of the National Registry of Exonerations Data”*

The National Registry of Exoneration’s data set currently lists over 1,000 exonerated individuals. By implementing a social science approach to analyzing this data, we examined the factors correlated to wrongful conviction in a precise and systematic way. This study documented the general patterns of the causes of wrongful conviction and dissected such causes by race, time periods, type of crimes and DNA versus non-DNA evidence. Quantitative data analysis methods, including frequency distribution and cross-tabulation, were used.

**Arman Harutyunyan**

Faculty mentor: **Dr. Shane Perrine**

*“Traumatic Stress Exposure Does Not Affect Behavioral Sensitization to Morphine In Mice”*

Individuals with post-traumatic stress disorder (PTSD) often abuse substances. This study investigated the mechanism of the co-occurrence by using the mouse model of PTSD, in which mice were subjected to traumatic stress exposure. The goal was to determine if traumatic stress exposure had any effect on the behavioral actions of morphine and associated neuroplasticity.

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**Devon Holland**

Faculty mentor: **Dr. Lisa Maruca**

*“The Fantasy of the Other: Echoes of Colonialism in Popular Fiction”*

Analysis of fantasy fiction regarding the presentation of fictional categories of human and non-human peoples. Why do writers fantasize about worlds with human-like yet non-human monsters and races? How does the imagination of these non-human or pseudo-human peoples and the construction of fantasy races relate to constructions of race, gender, sexuality and class, as well as culture, ethnicity and encounters with the Other in the real world? Engaging with theorists including Edward Said and Homi Bhabha, writers analyzed include Tolkien, C.S. Lewis and Philip Pullman. To what extent do these writers reproduce racially essentialist fantasies that have their parallel, and perhaps their origin, in colonial racial narrative?

**Enida Huremovic**

Faculty mentor: **Dr. Michelle Tomaszycycki**

*“The Effects of Oxytocin on the Male Zebra Finch Behavior and Brain”*

Social disorders affect many people worldwide, and in an effort to alleviate social anxiety, researchers have discussed the use of Oxytocin as a possible treatment option. While human fMRI studies show promise, we aim to better understand the outcomes of OT treatment and if and how it may affect the brain. Due to their social nature, our study consisted of 24 male Zebra Finches, which were separated into one of three treatment groups: OT, OT Antagonist or Control. We have found significant results when testing their social behavior; we are currently in the process of examining the neural effects of these treatments on OT mRNA in the brain.

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**Dovie Jenkins**

Faculty mentor: **Dr. Stephen Chrisomalis**

*“Here There Be Monsters: The Myth of the Modern Horror Movie”*

The myths about horror movies are well known: women are primary victims, African American characters die first, and they are related to what is perceived as an increasingly violent society. Though most know the myths, few know much about the content of the genre as a whole. Are women the primary targets of violence in horror films? Have horror films grown more violent? If so, how much more violent are they? What relationship does symbolic violence have to real life violence, and what does the dialogue about horror films mean in American culture? This study explores conventional notions about horror movies and seeks to answer these questions by tracking the demographic characteristics of horror movie victims over the course of 100 films.

**John Kalogerakos**

Faculty mentor: **Dr. Jim Nawara**

*“Bartlebe to Le: Repurposing a Great Work of Fiction”*

The process of creating a new narrative with visual art onto each page of the *Bartlebe: The Scrivener* by Herman Melville.

**Vilma Kocllari**

Faculty mentor: **Dr. Evrim Dalkiran**

A real-life vehicle-routing application based on recycling gondola collection problem faced by an automotive manufacturing facility. The General Motors Lake Orion Assembly Plant uses gondolas for collecting cardboard and trash throughout the plant. The gondolas are picked up and dropped off to the depot to be emptied, and then returned to their original locations by three tugger vehicles.

**Merdijana Kovacevic**

Faculty mentor: **Dr. Annmarie Cano**

*“Turning Point: Understanding the Associations of Significant Events, Social Disclosure and Well-Being”*

Turning points are personally significant events that alter an individual’s developmental course, which may influence one’s sense of self, expectations of others, or overall worldviews. The present study examined turning point themes and the association between event interpretation, disclosure, and well-being. Results showed that most participants experienced a turning point, which were characterized by new opportunities for growth and transitions. Furthermore, rating one’s turning point as currently positive was associated with greater depths of meaning-making ( $t(135) = 2.09, p = .039$ ), lower depressive symptoms ( $t(139) = -2.56, p = .011$ ), and positive feelings as a result of sharing.

**Joshua Kovoov**

Faculty mentor: **Dr. Xiang-Qiang Chu**

*“Probe Protein and its Hydration Water Dynamics on Nanodiamond Surface by QENS”*

This research presentation is about the study of proteins and water associated with nanodiamonds. There is no systematic literature on the effects of proteins attached to nanodiamonds. If nanodiamonds are to become used for drug delivery one day, this information is vital to have. By understanding how proteins interact with nanodiamonds, medicine might be attached to diamonds and properly delivered to diseased locations. Our study focuses on how the dynamics of proteins are modified as they undergo Quasi Elastic Neutron Scattering at various temperatures. Through this we can conclude how effective specific proteins bind to the diamonds and ultimately how practical these diamonds are.

**Sanjana Kulkarni**

Faculty Mentor: **Dr. Bhanu Jena**

*“Role of Cholesterol on the Chemistry of the Brain Function: Implications to Brain Function”*

Cholesterol is a lipid present in the cell membrane of brain cells. The focus of this poster presentation is to investigate how changing the amount of cholesterol in a rat brain affects the protein-protein interaction in the tissue. This investigation observed the effects on the protein-protein interaction in the brain after adding more cholesterol. In addition, this study also examined any changes in the protein chemistry in the rat brain after cholesterol was removed. This was studied by examining the protein profile in a sucrose gradient after the alterations were made to the brain sample. Finally, the presentation will assess the implications of these findings, so that it can be used to further investigate the role of cholesterol on brain chemistry.

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**Maxwell Laws**

Faculty mentor: **Dr. Patrick J. Mueller**

*“Physical (in)-activity-induced Changes in Tonic Excitation and Inhibition in the Rostral Ventrolateral Medulla”*

While there is a general consensus that exercise improves cardiovascular health, it is not generally understood how this occurs within the brain. This presentation will examine how physical (in)-activity alters neurotransmission within a vital cardiovascular center, the Rostral Ventrolateral Medulla (RVLM). The RVLM is responsible for driving tonic sympathetic activity (SNA) to the heart and peripheral blood vessels. As a key junction for sympathoexcitation, the RVLM receives numerous excitatory (glutamatergic) and inhibitory (GABAergic) inputs from corresponding brain regions. Previous findings within our laboratory have shown that sedentary animals have heightened sensitivity to exogenous glutamate, particularly in regards to SNA. I will present my ongoing study examining the effects physical (in)-activity on endogenous neurotransmission of glutamate and GABA within RVLM.

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**Tayson Lin**

Faculty mentor: **Dr. Judith Whittum-Hudson**

*“Folate-Functionalized Nanoparticles for Targeted Anti-Chlamydial Drug Delivery”*

Our studies demonstrate the increased efficacy of Folate-targeted Nanoparticles for delivering Azithromycin and Rifampicin drug combinations to chlamydia-infected cells in vitro. The use of targeted nanoparticles significantly reduced chlamydial inclusion size, numbers and transcripts of the chlamydial 16S rRNA gene, demonstrating an increased drug efficacy when compared to non-targeted antibiotic treatments at the same concentrations. These results support fundamental savings in public health costs and will help facilitate effective anti-chlamydial treatments worldwide. Furthermore, Folate-targeted nanoparticles are highly effective in treating persistent chlamydial infections which are very refractory to free drugs in soluble form.

**Renee Ludlam**

Faculty mentor: **Dr. Edward Cackett**

*“X-ray Properties of Intermediate Mass Black Holes in Dwarf Active Galaxies”*

There are two families of black holes: stellar mass black holes that are close to the mass of our sun and supermassive black holes that reside at the center of galaxies. There is a region of mass between the two that has yet to be thoroughly explored. We present a sample of 13 intermediate mass black holes in dwarf active galaxies. The objects in our sample lie within the mass range of 100,000 to 1,000,000 solar masses. We analyze their X-ray spectral properties and variability and compare the results to their more massive counterparts. The result is that these IMBHs properties are consistent with being scaled down versions of supermassive black holes.

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**Corinne Lutomski**

Faculty mentor: **Dr. Sarah Trimpin**

*“Characterization of Fragile Ganglioside Lipids by Matrix Assisted Ionization Vacuum Using Ion Mobility Spectrometry, Mass Spectrometry, and Tandem Fragmentation”*

Mass spectrometry is an important tool used in analytical chemistry to characterize a range of compounds, including biological materials, by the detection of inherent masses of the molecules of interest. Matrix assisted ionization vacuum (MAIV) is a novel ionization method in mass spectrometry that produces abundant multiply-charged ions directly from the solid state without the use of voltage, laser or additional heat, contrary to traditional ionization methods. Through the formation of abundant multiply charged ions, isomeric ganglioside lipids are ionized by this soft method without undesired fragmentation or salt adduction.

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**Tonya Lutz**

Faculty mentor: **Dr. Joe Zajac**

*“Demystifying Lustre Glazes”*

This research focuses on ceramic glaze. On-site research was conducted in four countries. We combined two historic glazes; European iridescent and Persian lustre, to be the first surface treatment of its kind.

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**Jonathan Maksabo**

Faculty mentor: **Dr. Senthil K. Sundaram**

*“Gene Expression Analysis in Absence Epilepsy Using A Monozygotic Twin Design Between Affected and Unaffected Discordant on Twin Pairs: Implications for Contemporary Treatment Methods”*

This presentation focuses on the analytical methods of genetics – specifically genetic expression and microarray data to identify target genes and their impact on patients who suffer from epilepsy in the form of absence seizures. Knowledge gained from this analysis may help to overcome some of the shortfalls present in the current clinical environment of treating all patients with the same drug, ethosuximide, rather than tailoring the treatment according to the gene expression abnormalities. Looking forward, novel treatment methods may be identified using the clinical and scientific knowledge obtained from this analysis.

**Aditya Mathiarasu**

Faculty mentor: **Dr. Kang Chen**

*“Immunoregulatory Functions of B Cells in Pregnancy and Preterm Birth”*

Preterm birth is the leading cause of mortality and morbidity of newborns. Many maternal autoimmune conditions that predispose to preterm birth involve the dysregulation of auto reactive B cells that contribute to disease pathogenesis. Despite the fundamental roles of B cells as effectors and regulators of immunity, their functions in pregnancy are poorly understood. We found that human B cells undergo activation, class switching, memory and plasmacytoid differentiation in the decidua in situ.

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**Christopher Mcpharlin**

Faculty mentor: **Dr. Judith Whittum-Hudson**

*“Treatment of Chlamydia-Infected Monocytes with Antibiotic-Loaded Nanoparticles: A Transcript Analysis”*

Sexually transmitted chlamydial infections are a major public health concern. If the infection shows no symptoms, or treatment is ineffective, chlamydia can cause infertility and reactive arthritis. Chlamydia can move through the body and reversibly change into a persistent form that causes these more serious diseases. We have made a new drug delivery system that uses antibiotic-loaded nanoparticles to target folate receptors on cells that are chlamydia-infected and have shown improved targeting and efficacy in cells and mice. This project expands those studies to human blood monocytes, as opposed to lab cell lines. Here, we show preliminary results that suggest a superior efficacy of our drug-loaded nanoparticles in a monocyte model of chlamydia infection.

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**Rachael Merritt**

Faculty mentor: **Dr. David Cinabro**

*“Comparison of Field Galaxies and Supernova Host Galaxies in Stripe 82”*

Stars that experience thermonuclear supernovae and stars that experience core collapse supernovae have different properties. Thus, we expect that different types of supernovae have different surroundings. We expect the host galaxies of thermonuclear supernovae will be redder, older galaxies with lower star formation rates, while core collapse supernovae hosts will be bluer, younger galaxies with higher star formation rates. We also expect that the properties of field galaxies should fall between the properties of the supernova host galaxies. Using data from the Sloan Digital Sky Survey, we compare a sample of both types of supernova host galaxies and a sample of field galaxies to test these expectations.

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**Xiaofan Mi**

Faculty mentor: **Dr. Richard Slatcher**

*“Salivary Cortisol: Implications In Clinical Health Outcomes of Children with Chronic Asthma”*

Recent studies have established a link between cortisol and negative health effects. Here, we provide a novel consideration of cortisol as a biological marker for asthma morbidity and clinical asthma symptoms. Sixty-eight asthmatic adolescents provided three saliva samples per day across four days. Results revealed that higher salivary cortisol output and diurnal slope predict greater asthma morbidity and daily asthma symptoms across baseline and daily symptom reports. These results are the first to our knowledge to demonstrate that salivary cortisol is associated with clinical health outcomes in adolescent children.

**Chelsea Miller**

Faculty mentor: **Dr. Alexander Day**

*“Exploration of the Current Employment Situation for Urban Chinese Women”*

An exploration of the current employment situation for urban Chinese women and its relationship with the Chinese government-controlled media.

**Kayla Monhollen**

Faculty mentor: **Dr. Annmarie Cano**

*“Human-Animal Interaction and its Effects on At-Risk Adolescent Dog Bonding between Human and Animal”*

This research study assesses the effects of human-animal interaction on adolescents residing in two juvenile detention centers in Southeast Michigan. My main hypothesis is that adolescents who work closely with a dog will exhibit greater bonding and attachment to the dog, which will explain improvements in adolescent psychosocial functioning. Participants were randomly assigned to a dog-training (intervention) or dog-walking (control) group. Participants completed assessments prior to the program and after the program, and were observed during the program for dog bonding behaviors. Using t-tests and analyses of variance, I hope to find support for my hypothesis and provide evidence arguing for the use of animals in future clinical practice and research settings.

**Carol Noronha**

Faculty mentor: **Dr. Vaibhav Diwadkar**

*“Task-based fMRI in Childhood-Onset Schizophrenia During Simple Motor Control: Effects of Antipsychotic Medications”*

Childhood-Onset Schizophrenia (COS) is a very rare and serious form of schizophrenia that is debilitating in nature and exhibits a rapid progression. Onset of symptoms in COS occurs before a patient’s 13th birthday, and antipsychotic medications are almost always essential to treat these symptoms. In this study, we aim to assess if COS patients evince differential activity during a motor control task relative to control groups, and to investigate if differences in activation are attributable to anti-psychotic dose-related fMRI response.

**Jacob Oblak**

Faculty mentor: **Dr. Tiffany Matthews**

*“Chemokine Receptor CXCR2 in Endothelial Progenitor Cell Functions”*

The signaling mediated by the chemokine receptor CXCR2 plays important roles in promoting the progression of many cancers and it has been reported that chemokine receptor CXCR2 and its cognate ligands mediate endothelial progenitor cells (EPC) recruitment and angiogenesis. BM-derived EPCs circulate in the blood and migrate to target areas, and then differentiate into mature endothelial cells forming new vessels at the areas of injury in response to a variety of growth factors and cytokines. The characterization of the cytokines or signaling molecules may provide a further understanding and manipulation to enhance response of EPCs to targeted injury sites. Of importance for this project are the isolation, characterization and functional validation of BM derived mouse EPCs to determine the potential role of a chemokine receptor CXCR2 signaling cascade in EPC functions.

**Aaron Panicker**

Faculty mentor: **Dr. Vaibhav Diwadkar**

*Brain Connectivity Changes Following Anti-Depressant Treatment in Major Depressive Disorder*

Major Depressive Disorder (MDD) is a common and recurrent condition characterized by changes in mood, bringing about sadness or irritability. Disordered reactivity of core regions of the limbic system such as the amygdala (the emotion processing center of the brain) have been implicated as a result of this illness. This experiment seeks to understand the effect of Citalopram and Quetiapine XR (anti-depressant treatment) on patients with MDD. We examined the relationship between treatment and limbic-frontal connectivity using fMRI.

**Anant Patel**

Faculty mentor: **Dr. Sandro R. P. daRocha**

*“Dendrimer-siRNA Conjugates for Gene Silencing”*

Small interfering RNA (siRNA) molecules have been identified to intermediate gene silencing in mammalian cells. However, the efficient siRNA delivery to the cell cytosol is a major limitation for the success of the RNAi process. The use of siRNA condensed into nanoparticles by cationic polymers – polyethyleneimine (PEI) and poly-L-lysine (PLL) for instance – has been shown to be effective to provide gene silencing to certain level. However, this approach brings several disadvantages, such as the relatively large size (~100-200 nm) and high polydispersity of the nanoparticles, high positive surface charge that may hinder physiological transport, and high level of cytotoxicity and immunogenicity. To overcome these disadvantages, we propose here the use of conjugates between siRNA and amine-terminated generation four PAMAM dendrimers (G4NH2).

**Chandi Patel**

Faculty mentor: **Dr. Tamara Hendrickson**

*“Cloning of Synthetase Enzyme “IleRS” in H. Pylori”*

It is estimated that approximately 60 percent of the world’s population harbor the bacterium *Helicobacter pylori* (*H. pylori*) within their upper gastrointestinal tracts. This infection can result in inflammation of the stomach mucosal lining, leading to ulcer formation. *H. pylori* has also been classified as a human carcinogen because it causes gastric cancer and lymphoma. We are interested in novel aspects of *H. pylori* metabolism that promote the viability of this human pathogen.

**George Paul**

Faculty mentor: **Dr. James G. Granneman**

*“Imaging Intracellular Fatty Acids in Brown Adipocytes”*

My presentation will showcase my work with understanding how fatty acids traffic in a cell. This presentation will display multiple microscope images over a time course for different drug treatments I designed. To go more in depth, I will also include graphs that statistically analyze these microscope images.

**Robert Pfaff**

Faculty mentor: **Dr. Janine Lanza**

*“Benjamin Franklin: Diplomacy, Legacy, and France 1776 – 1778”*

This project is an in-depth analysis of the diplomatic role and methods employed by Benjamin Franklin in the context of his early years in France as an Colonial Commissioner between 1776 and 1778. During this time, Franklin was responsible for securing a military alliance with France, but his success was inhibited by numerous political, social, economic, militaristic, and logistical factors. In addressing these challenges the American delegation had to navigate complex transnational relationships, and exploit the geopolitical aims of France, Spain, and the Netherlands. The role played by Benjamin Franklin during this crucial period of American history ultimately secured instrumental aid from France, and solidified the framework for later diplomacy that impacted not only the outcome of the American Revolution, but also Franklin’s legacy as a diplomat and politician.

**Joseph Piechocki**

Faculty mentor: **Dr. Mary Kay H. Pflum**

*“Synthesis and Testing of Histone Deacetylase Inhibitors Based on SAHA”*

Histone deacetylase (HDAC) enzyme overexpression leads to genes responsible for cell death to have altered expression. This leads to the overproduction of cancerous cells. Histone deacetylase inhibitors (such as a drug called Vorinostat) are good anti-cancer therapy agents because they do not target healthy cells, only the cancerous ones. However, they have many side effects. Having highly potent and selective inhibitors are ways to target certain cancers, minimize the side effects and provide a better anti-cancer therapy agent. Here, new HDAC inhibitors have been synthesized for their potency and selectivity to the HDAC isoforms.

**Damaris Emily Pop**

Faculty mentor: **Dr. Shane Alan Perrine**

*“Analysis of Monoamine Levels in the Brain Reward Neurocircuitry Following Single Prolonged Stress Exposure In Rats”*

According to the United States government, approximately 30 percent of individuals who return from deployment experience the symptoms associated with posttraumatic stress disorder (PTSD), and approximately 9 percent of the general population that experience a traumatic event develop PTSD. PTSD is an anxiety disorder in an individual who has experienced a traumatic event, and continues to experience the heightened emotions in the absence of the stimulus. Substance Use Disorder (SUD) is characterized by an individual’s abuse and subsequent dependence on drugs or other chemicals that contribute to the loss of the individual’s physical and mental wellbeing. SUD pathology and associative behavioral symptoms have shown a high co-occurrence with PTSD, oftentimes leading to poor diagnosis and treatment. This study used single prolonged stress (SPS), an animal model of PTSD, to study the neurochemical levels of the brain’s reward pathway, an area responsible for feelings of motivation, reward, and behavior.

**Craig Profant**

Faculty mentor: **Dr. Sherylyn Briller**

*“The Tale of Two Churches: The Process of Establishing a Research Relationship with Leaders of Two Detroit Churches”*

This project is an anthropological pilot study of African American men’s attitudes and perceptions of preventive health services. I will be working with men’s groups from two Detroit churches to better understand social networks of men there and how these can be used to help address disparities in preventive care. This presentation details the process of building rapport and establishing relationships with community leaders and their local churches. First, I introduce a set of general issues related to designing and implementing community engaged research. Then, I describe my process of building these partnerships in summer 2013. Finally, I conclude with a self-reflection about lessons I learned so far in this ongoing research project.

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**Aaron Sabal**

Faculty mentor: **Dr. Ahmad Heydari**

*“The Effect of Folate Restriction on mTOR Signaling Network and Aging”*

Folic acid, or folate, is one of the many essential nutrients to humans. Primarily, it serves for single-carbon chemical reactions in many biochemical pathways. After many months of mouse observation, I am led to believe that folate restriction leads to greater health span and lifespan in mice. I noticed a reduction in colorectal cancer. On top of that, these animals showed increased physical activity, increased resistance to carcinogens, as well as shinier coats of fur.

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**Bharat Sampathi**

Faculty mentor: **Dr. Nabanita Datta**

*“Does MKP-1 Play A Role In Bone-Fat Connection?”*

Osteoporosis is scrutinized for its potential relationship with obesity. The general postulation is that an increase in adiposity may occur in conjunction with bone degeneration. Based on the previous observation from our laboratory that MKP-1 knock out (KO) female mice develop osteopenia, we hypothesize that deletion of MKP-1 causes increased adiposity, deregulated adipocyte gene expression and adipocytokine production, leading to decreased osteoblastogenesis and PTH action. To test this hypothesis, we isolate bone marrow stem cells from mice. These stem cells are induced into adipocytes or bone cells through various reagents. Then, to determine if a relationship exists, we use staining techniques unique for adipocytes and osteoblasts.

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**Sean Shepard**

Faculty mentor: **Dr. Joy Alcedo**

*“Insulin-like Peptides that Regulate C. elegans Physiology in Response to Food Types”*

Due to Caenorhabditis elegans’ molecular and developmental similarities to mammals, they have served as simple tools in the understanding of complex human diseases. In light of this, C. elegans physiology, which includes its lifespan, is affected by different food sources, just like with mammals, through the activation of the DAF-2 receptor via insulin-like peptides (ILPs). Thus, in this work, we aim to show that some of the 40 C. elegans ILPs are only active on certain food sources, thereby influencing the physiology of the animal.

**Destiny Stroman**

Faculty mentor: **Dr. Jeffrey Kuentzel**

*“Associations of Spirituality and Adolescents’ Health Outcomes”*

This study is concerned with determining the relationship of adolescents who measure high on measures of spiritual involvement and practice and their healthy lifestyle behaviors. Little prior research has been done on this subject. In addition to psychosocial adjustment, our study focuses on physical outcomes such as whether the youth are eating a nutritious diet, exercising regularly and maintaining good sleeping hygiene. One hundred adolescents, recruited from Children’s Hospital of Michigan, are being administered questionnaires that measure spiritual or religious significance in their lives, as well as health behavior status. Preliminary results for 36 participants did not indicate significant associations between spiritual inclination and healthy lifestyle. Possible explanations for these findings will be explored.

**Audrey Sulkanen**

Faculty mentor: **Dr. Parastoo Hashemi**

*“Stabilizing Nafion for In-Vitro Fast Scan Deposition Stripping Voltammetry”*

The central focus of this project was the development of a method to selectively measure copper concentrations in both aqueous and biological systems. We employed an electrochemical technique known as Fast Scan Cyclic Voltammetry to rapidly measure trace amounts of copper in solution. This technique’s sensitivity is further increased by the use of a negatively charged coating, which helps to repel interfering species. By measuring the real-time copper concentrations in an aqueous or biological systems, we can gain a better understanding of copper activity in nature and its roles in the brain.

**Navya Talluri**

Faculty mentor: **Dr. Nitin Chouthai**

*“Effect of Mothers’ Medical Conditions, Medications, and Recreational Drug Exposure During Pregnancy on Cytokines in Human Breast Milk”*

This project is a study conducted on the breast milk of mothers. There is a special interest in the mother’s medical conditions, medications and her exposure to recreational drugs during pregnancy and how these factors affect the cytokine levels in her breast milk.

**James Taylor**

Faculty mentor: **Dr. Tiffany Matthews**

*“Electrochemical Characterizations of Tyrosine Kinase Inhibitors”*

The purpose of this project was to electrochemically characterize tyrosine kinase inhibitors and to better understand the electron kinetics in these molecules.

**Monica Thipparthi**

Faculty mentor: **Dr. Mark Lumley**

*“Pain Behavior: How is it Influenced by Anger Suppression and Expression?”*

Emotional regulation plays several critical roles in our daily lives, and it is therefore essential to understand the therapeutic value of emotions. By analyzing videos of patients with chronic back pain who underwent an anger-induced activity, we have elucidated the impact of anger suppression in patients who suffer from constant pain. This study determines the relationship between emotional regulation and physical pain behaviors. In the future, the results of this study can be extended to help patients effectively manage various chronic pain-related disorders.

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**Kenneth Thomas**

Faculty mentor: **Dr. James Woodyard**

*“Breast Cancer Detection Using Diffuse Optical Imaging”*

It is estimated there are annually about 232,000 new cases of breast cancer that result in 40,000 deaths in the United States. Early detection of breast cancer is known to increase the survival rate. The standard methods used to detect breast cancer include X-ray mammography, ultrasound, and Magnetic Resonance Imaging. This project is exploring a diffuse optical imaging (DOI) method, which is based on the diffusion and absorption of infrared radiation in breast tissue. It is known that the optical properties of cancer-free and cancerous tissue are different in the near-infrared spectrum. A model of the breast with cancer-like nodules has been fabricated and studied using an infrared light source, photon detector, imaging software and computer-controlled apparatus. The results of the DOI studies suggest that the method can be used for the early detection of breast cancer.

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**Johntell Tutton**

Faculty mentor: **Dr. Jian Zhu**

*“Synthesis of Zinc Oxide Nanowires Grown on Hexagonal Nano-rods”*

Our research was the synthesizing of Zinc Oxide (ZnO) nanomaterials and tempting to discover a unique morphology for them. Several experiments were conducted to produce the Zinc Oxide materials, with samples being obtained at various reaction times. The samples then had their nanostructures examined with equipment such as the Scanning Electron Microscope (SEM), X-Ray Diffraction (XRD), and Electronic Data Sheet (EDS), to determine their structures. Once a structure was found that was sufficiently unique, the reaction time of the experiments was shortened to match its data. From there more experiments were completed, without other parameter changes, to confirm that the morphology observed was a consistent outcome of the experiment.

**Roberta Ukavwe**

Faculty mentor: **Dr. Angulique Y. Outlaw**

*“Youth Perspectives on Proposed Medication Adherence Interventions for Youth Living with HIV”*

Young people between the ages of 15-24 represent a number of new HIV infections. Current HIV medication adherence studies focusing on youth suggests adherence patterns that are not adequate to manage the disease. Non-adherence leads to drug resistance and ultimately treatment failure, and these individuals are more likely to transmit drug-resistant strains of virus. My presentation provides youths’ perspectives on HIV medication adherence for behaviorally infected youth living with HIV. It explores youths’ prescriptive on the type of interventions needed to increase adherence.

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**Chad Van De Wiele**

Faculty mentor: **Dr. Stephanie Tong**

*“The Uses and Gratifications of Grindr”*

Using the uses and gratifications framework, this research explores the user-directed motivations for accessing the all-male mobile dating application Grindr. Moreover, this research identifies both sought and obtained gratifications from Grindr, including both positive and negative byproducts of its use.

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**Anita Vasudevan**

Faculty mentor: **Dr. Adhip Majumdar**

*“Omega-3 Fatty Acid Synergizes with Conventional Chemotherapy: A Potential Therapeutic Strategy for Recurrent Colon Cancer”*

This study examines the potential of Omega-3 fatty acids as a potential therapeutic agent for recurrent colon cancer, which is often characterized by resistance to conventional chemotherapy. By combining Omega-3 fatty acids with the existing chemotherapy, it may be possible to develop a more effective strategy to treat recurrent colon cancer.

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**Nathan Vengalil**

Faculty mentor: **Dr. Derek Wildman**

*“Sequencing Lactate Dehydrogenase A (LDHA) and Analyzing its Adaptive Evolution Among Primates”*

In this project, we investigated how torpor, or hibernation, affects the nucleotide sequences of the gene Lactate Dehydrogenase A (LDHA) in various primates. In our previous research about LDHA, we noticed non-synonymous changes within the strepsirrhine family of primates. We hypothesized that these were due to a greater rate of evolutionary changes in LDHA sequence among hibernating primates compared to their non-hibernating counterparts, as the LDHA enzyme plays an essential role in metabolism. However, what we discovered was that a factor other than hibernation may play a key role in the gene’s rapid evolution in primates.

**Jasmine Vickery**

Faculty mentor: **Dr. Robert Akins**

*“Investigation of Mechanisms of Antifungal Resistance in Candida Albicans”*

Opportunistic fungi are the cause of life-threatening infections in intensive care patients. Resistance of these fungi to antifungal drugs is an increasing problem, but the main cause of failed responses is from regulatory reprogramming of fungal expression, making them resistant. I explored this idea by transfecting multiple copies of cloned regulatory genes of *Candida albicans* back into the wild type host. I found that a specific zinc finger protein caused resistance to only one class of antifungals, called echinocandins. Sequencing of the cloned gene showed that it had undergone a deletion to make a truncated protein. This gene was previously shown to regulate fluconazole resistance, not echinocandin resistance. I will offer a testable model for how this truncated protein alters susceptibility to an antifungal class that is not influenced by the full length gene.

**Anshu Wadehra**

Faculty mentor: **Dr. Ratna Naik**

*“Effect of Coating on the Heating Properties of Magnetic Nanoparticles”*

Magnetic nanoparticles are small-sized particles which dance in an alternating magnetic field releasing energy as heat. This property of magnetic nanoparticles can be useful in providing therapeutic benefits to cancer patients. If the local temperature of tumor tissues is elevated to 42°C-45°C, cancerous growth is arrested. Temperature elevation is caused by the flip of the internal magnetic moment of the nanoparticles and by the physical rotation of the nanoparticles in the suspended media. We investigated the effects of different coatings on the nanoparticles heat generation.

**Adam Waller**

Faculty mentor: **Dr. Jeremy Kodanko**

*“Designing New Ligand Architectures for Ruthenium Caging Complexes”*

A primary goal of research in the Kodanko laboratory has been to achieve spatial control of cysteine and serine proteases in vivo. This research project proposed the investigation of tetra-dentate ligand properties for the ruthenium caging group. The nature of ligand architecture dictates the biological and chemical properties of ruthenium complexes and multi-dentate ligands for ruthenium have been under-investigated in these systems. The goal of the laboratory is the development of a library of multi-dentate ligands for ruthenium, allowing the wavelengths of inhibitor release and the biological properties of the complexes to be tuned. This offers a promising pathway to the discovery and characterization of new compounds.

**David Warnke**

Faculty mentor: **Dr. Robert G. Reynolds**

*“The Design of Reality Games: The Land Bridge Game Design Project”*

The Alpena-Amberly Ridge is an ancient land bridge that connected Michigan’s lower peninsula with Ontario from approximately 10,000 to 7,500 B.P. Artifacts left by prehistoric caribou hunters were discovered on this land bridge at the bottom of Lake Huron. However, searching a vast underwater area for possible sites was not feasible. Therefore, Dr. Reynolds and a group of his students at Wayne State University have designed a virtual world to model what the Land Bridge looked like at the time of these ancient hunters. They modeled caribou herd paths, and positively predicted locations of artifacts. However artifacts have been discovered in unpredicted locations. We use a socially motivated algorithm to predict all artifact locations.

**David White**

Faculty mentor: **Dr. Stanislav Groysman**

*“Di-Nickel and di-Copper Complexes Featuring a Dinucleating Bis(iminopyridine) Ligand and Their Reversible Binding of Oxalate”*

The effective sensing of oxalate is of importance in biological processes and various aspects of food chemistry. We sought to design a system that would intramolecularly bind oxalate and allow for the recycling of the chemosensor, unlike many of the systems currently under study. Toward this end, we investigated di-Nickel and di-Copper complexes featuring a dinucleating bis(iminopyridine) to accomplish our goal. Upon oxalate binding, we notice a drastic color change of the solution, making this a notable oxalate sensor. Additionally, with use of calcium bromide, we are able to recycle our chemosensor. UV-vis spectroscopy and X-ray crystallography data supports this binding and removal of oxalate from our complex.

**Jessica Wildman**

Faculty mentor: **Dr. Evan Larson-Voltz**

*“Restrictive Interior Paintings”*

An active and ongoing investigation into traditional painting, which challenges this ancient artistic medium and the expectations of its viewers.

**Alyssa Wilkins**

Faculty mentor: **Dr. Sorin Draghici**

*“Comparison of Topology-based Pathway Analysis Tools Implemented in R”*

The comparison of common pathway analysis tools using five mouse data sets. Results collected are run through false discovery rate to determine how well the tool did compared to the known significant pathways found in the diseases of the five data sets.

**Daniel Woodall**

Faculty mentor: **Dr. Sarah Trimpin**

*“Matrix Assisted Ionization Vacuum (MAIV): A Simple Method for Ionizing Active Ingredients of Drug Tablets and their Metabolites by Mass Spectrometry”*

Mass spectrometry is a tool used in analytical chemistry to analyze the chemical composition of a sample by identifying the molecular mass of the compound in relation to its overall ionic charge (m/z). Matrix Assisted Ionization Vacuum is a novel method of creating ions from a solid state sample, for detection by mass spectrometry. This technique is an efficient alternative to the often costly, more dangerous methods involving lasers, high voltages, and heat that are currently used in the field. This study focuses on applying this method to analyze the composition of drug tablets as well as the biological metabolites produced after these drugs are administered. Preliminary results suggest the potential for using this method in pharmaceutical research as a way to map the action of drugs in the body, as well as quality control in industry.

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**Enxhi Khafa**

Faculty mentor: **Dr. Eranda Nikolla**

*“Molecular Design of a Solid Oxide Electrolysis Cell for Co-electrolysis of CO2 and H2O to Produce Synthesis Gas”*

This project was to develop a thermodynamically and economically efficient way to harness electrical energy (from solar power, wind power, etc.) and store it in chemical form. The goal is development of an efficient Solid Oxide Electrolyser (SOE) system that will allow for the co-electrolysis of CO2 and H2O to produce synthesis gas (syngas), a precursor for the synthesis of liquid fuel. I will be presenting synthesis methods, testing methods, results obtained thus far and goals for the future.

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**Yousif Younan**

Faculty mentor: **Dr. Ghassan M. Saed**

*“The Contribution of Oxidative Stress to the Development of Cisplatin Resistance in Epithelial Ovarian Cancer”*

Epithelial ovarian cancer (EOC) is the most lethal gynecologic disease today. Oxidative stress is caused from an imbalance among the production of reactive oxygen species and the biological system’s ability to readily detoxify the reactive intermediates or easily repair the resulting damage. If there are changes in the normal redox state, toxic effects such as free radicals can damage the entire cell. The goal of this study was to determine the mechanisms by which oxidative stress, specifically inducible nitric oxide synthase (iNOS), contributes to the development of cisplatin resistance in EOC.

# Notes

# Notes

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