



WAYNE STATE UNIVERSITY

Synthesis of Cyclopropanols via *N*-Acyl Sulfonamides

Thinh B. Hoang
Department of Chemistry, Wayne State University, Detroit, MI 48202

Introduction
Cyclopropanols are useful intermediates in organic synthesis. They can be synthesized from various ester derivatives. Multi-step cyclopropanol syntheses of esters?

Abstract
Olefin exchange-mediated vinylic using terminal olefins?

Activation
Synthesis of *N*-Acyl Sulfonamides

Formulation

Results
Olefin Exchange Cyclopropanation of *N*-Acyl Sulfonamides

Future Objectives
Extension to heterocyclic *N*-acyl sulfonamide intramolecular reactions, when it contains a terminal olefin.

References

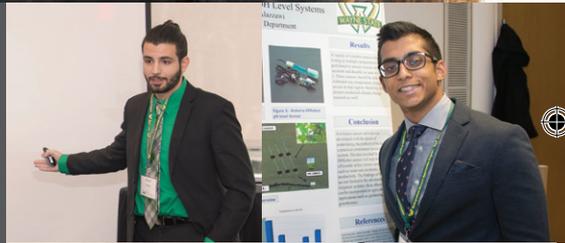
Acknowledgements

WAYNE STATE UNIVERSITY



2015

Undergraduate Research and Creative Projects Conference



November 13 — Student Center Building



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 Benjamins
Professor, Neurology

Dr. Paula Dore-Duffy
Professor, Neurology

Dr. Donald Haase
Senior Associate Dean,
College of Liberal Arts and Sciences

Dr. Gloria Heppner
Associate Vice President for Research

Dr. Paul Karchin
Professor, Physics

Dr. Harry Maisel
Professor, Anatomy

Dr. Arthur Marotti
Professor Emeritus, English

Dr. Yaddanapudi Ravindranath
Professor, Pediatrics

Dr. Sergei Voloshin
Professor, Physics

Dr. Gang George Yin
Professor, Mathematics





Friday, November 13, 2015

Student Center Building

- 8:15 a.m. **Registration** — South entrance,
Student Center Building
- 8:30 a.m. **Continental Breakfast** — Ballroom C
- 9 a.m. **Welcome** — Ballroom C
Monica Brockmeyer, Associate Provost
for Student Success
- 9:30 a.m. **Oral Session I** — Multiple locations
See session pages
- 10:30 a.m. **Poster Session:**
**Behavioral and Social Sciences, Life Sciences,
and Physical Sciences** — Room 20
Engineering and Arts and Humanities — Room 25
- Noon **Oral Session II** — Multiple locations
See session pages
- 1 p.m. **Luncheon** — Ballroom C
- Greeting**
Margaret E. Winters, Provost and Senior Vice
President for Academic Affairs
- Introduction of Guest Speaker**
Matthew Orr, Program Coordinator
Undergraduate Research Opportunities Program
- Guest Speaker**
Dr. Vaibhav A. Diwadkar, Associate Professor
Wayne State University Department of Psychiatry
and Behavioral Neurosciences
- Awards**
Introduction: Matthew Orr
Presentation: Wayne State University Libraries
Presentation: WSU Academy of Scholars
- Closing Statement**
Monica Brockmeyer





Oral Session I
9:30-10:30 a.m.

Session 1: **Biomedical and Environmental Monitoring**

Hilberry A

Moderator: **Dr. Jean Peduzzi-Nelson**

Shiby George: *Smartphone application for a miniature wearable heart rate monitor*

Asia Hightower: *Zwitterionic Materials*

Nicole McCants: *A Spatial Analysis of the Elemental Composition of Fugitive Dust within Metropolitan Detroit*

Session 2: **Public Works**

Hilberry B

Moderator: **Dr. Laura Kline**

Griffin Calme and Anne Okonowski: *Detroit Public Library Art & Architecture: Bronze Entrance Doors & Aesop's Ceiling*

Elaria Essak: *Guía del migrante mexicano: Interpellation and Ideology in Contemporary Mexican Political Literature*

Session 3: **Microbe Versus Microbe in Bacterial Vaginosis and Vaginal Candidiasis**

Hilberry C

Moderator: **Dr. Robert Akins**

Naila Baydoun: *Development of a vaginal bacterial repository and its use in identifying interspecies interactions of relevance to vaginal infections*

Carly Malburg: *Antagonism between Candida and vaginal bacterial species: roles in vaginal candidiasis and bacterial vaginosis*

Suha Syed: *Identification of probiotic Lactobacillus species that antagonize bacterial vaginosis-associated bacteria*

Session 4: **Diversity and 'Ways of Being' Students, Scholars, and Professionals**

Hilberry D

Moderator: **Dr. David Merolla**

William Alexander: *Long-Term Educational Outcomes of Sexual Minority Youths*

Dwight McDonald: *Diversity's influence on retention*

Ira Memaj: *Gendered Literacies: A Qualitative Study of Literacy Practices in an All-Female OB/GYN Clinic*

Session 5: **In Their Own Words: The Perception of Adverse and Challenging Experiences in High-Risk Groups and Influences on Later Functioning**

Hilberry E

Moderator: **Dr. Carolyn Dayton**

Mario Bueno: *Incarceration of Adolescents in Adult Prisons: Adults' recollections of their experiences and its impact on adult adjustment*

Jessica Goletz: *The Developing Parent-Infant Relationship: Understanding the Effects of Pregnancy Intendedness on Prenatal Parental Bonding*

Ann Jacobites: *Substance Abuse Among Parents and Young Adult Resiliency*

Session 6: **The Chemistry of Complexes and their Applications** Hilberry F
Moderator: **Dr. Matthew Allen**

Adrian Breckenridge: *Synthesis of Resin-Bound Cryptand for use in Europium and Gadolinium Separation*

Joshua Fischer: *Improving Matrix-Assisted Ionization-Mass Spectrometry for Poly(ethylene glycol)s*

Devin Mills: *Lanthanide-containing N-[1-(2,3-dioleloxy)propyl]-N,N,N-trimethylammonium chloride complexes and their impact on chemical exchange saturation transfer*

Session 7: **Clinical Research in Cardiovascular Diseases** Ballroom A
Moderator: **Dr. Q. Ping Dou**

Tejeshwar Bawa: *Correlates of health literacy and its impact on illness beliefs for emergency department patients with acute heart failure*

Shobi Mathew: *Functionality of TIMI score in the risk stratified management of chest pain patients in the ED*

Andrew Yan: *Adherence with outpatient follow-up, ED recidivism and the utilization of outpatient diagnostic testing post-protocol*

Session 8: **Stroke and Molecular Diagnostics** Ballroom B
Moderator: **Dr. Billicia Charnelle Hines**

Murtaza Hussain: *Diagnostic Accuracy of Stroke by Emergency Medicine Physicians versus Neurology Disposition*

Bhavana Tetali: *Utility of Platelet Reactivity to Aid in the Diagnosis of Stroke*

Ashi Arora: *Cell-Free DNA Signaling as a Possible Indicator of Fungal Infection: In Vitro Modeling*

Session 9: **Artistic Responses to Social and Cultural Experiences** Room 285
Moderators: **Dr. Caroline Maun and Dr. Mary Elizabeth Anderson**

Alexis Barrera: *To Moscow! And Back Again*

Clearie Mccarthy: *Hands On, Hands Off: Creatively Exploring Bystander Approaches to Sexual Violence Prevention*

Manal Nizam: *Living Poetry in Japanese Water*

Oral Session II

Noon-1 p.m.

Session 1: **Community-based Wayne State Projects** Hilberry A
Moderator: **Dr. Kristin O'Donovan**

Hager Alkhafaji: *The HUDA Clinic Documentary*

Nathan Christie: *Public Policy Narratives of the Detroit Water Shutoffs*

Ronda Safadi: *Creating an Effective Electric Eel Display for the Belle Isle Aquarium*

Oral Session II (continued)

Session 2: Languages and Cultures in Context

Hilberry B

Moderator: **Billicia Charnelle Hines**

Stefanie Della Porta: *Language Learning While Studying Abroad: Perceptions, Participation, and Outcomes*

Taylor Jones: *Awareness and Accessibility Through The Cycle of Theatrical Excellence*

Derek Robertson: *Principles and Politics: The Sufferings of Quakers during the Restoration*

Session 3: Candida Genotyping, Resistance, and Ecology

Hilberry C

Moderator: **Dr. Robert Akins**

Michelle Hudson: *Determining Mechanisms of Resistance in Candida Albicans to Current Echinocandin Antifungals*

Farah Sattar: *Making connections between niche tropisms of strains of Candida albicans to their genotypes and in vitro phenotypes*

Vita Stramaglia: *Where in the world are pathogenic Candida species?*

Session 4: On Foreign Soil: What We Can Learn About Murder, Medicine, and Methods of Farming by Studying Other Countries

Hilberry D

Moderator: **Dr. Laura Kline**

Karyna Sitkowski: *Serial Killers of the Former Soviet Union and Modern-Day Russia*

Ciara Lumaj: *Medical Pluralism in Ecuador*

Danielle Lumetta: *Enclosure Acts and Norfolk's Agricultural Progress from 1750-1850*

Session 5: New Perspectives on Combating Patriarchy, Historical Gaps, and Challenging Archaeological Landscapes

Hilberry E

Moderator: **Dr. Sharon Lean**

Kathryn Anderson: *What Can Improve the Daily Lives of Individual Women in Developing Countries? A Case Study of Nicaragua*

Nyree Williams: *African American Women and Lynching*

Brendan Doucet and Athena Zisis: *Piercing the Canopy: Using LiDAR Imagery to Remotely Survey the Jungles of Montserrat*

Session 6: Mathematics and Modelling of Complex Physical Systems

Hilberry F

Moderators: **Dr. Caroline Maun** and **Dr. Mary Elizabeth Anderson**

Mairon Figueiredo Marques: *Kinematic Model of a 3 DOF Scara Robot*

Zachary Elledge: *Finding Trans-Neptunian Objects Using the Dark Energy Survey*

Anna Lewenz: *Representation Rings Of Cyclic Groups Over an Algebraically Closed Field*

Session 7: **Brain Monitoring and Artificial Spinal Cord Development**

Ballroom A

Moderator: **Dr. Jean Peduzzi-Nelson**

Taania Girgla: *Use of an Artificial Spinal Cord in the Treatment of Chronic Spinal Cord Injury*

Mukund Mohan: *Predicting Return of Spontaneous Circulation Utilizing the Nonin® Equanox Cerebral Oximetry System*

Session 8: **Evolving Treatment Paradigms**

Ballroom B

Moderator: **Dr. Matthew Allen**

Reba John: *Efficacy and Safety of Bolus Enalaprilat in Acute Hypertensive Heart Failure in the Emergency Department*

Aayush Mittal: *Role of Bile Acids in Total Parenteral Nutrition-Associated Liver and Gut Injury*

Nathan Vengalil: *PTH regulation of CEBP-delta expression in MAPK phosphatase-1 (MKP-1) null osteoblasts*

Session 9: **Strategies of Composition in Text and Sound**

Room 285

Moderator: **Dr. Jon Anderson**

Angelina Cicchella: *Nine Gyres*

Ryan Woloshen: *An Analysis of Shifting Rhymes in Sura 52*

Christen Zimecki: *The Genre of Plato's Republic*

Poster Session

Poster

- 1 **Kristy Abraham:** *Involuntary interference in emotion dysregulation: Amygdala and Orbitofrontal hyper-modulation of brain networks*
- 2 **Mahnoor Ahsan:** *Do children process information differently than adults in visual recognition of objects?*
- 37 **Angela Allen:** *The Land Bridge Project: Using Unity 5.0 to Re-Create an Ancient Civilization*
- 38 **Nour Arafat:** *Combined OCT Image and Fluorescent AB Plaque Image for a More Reliable Alzheimer's Disease Diagnosis*
- 39 **Christian Oliver Avila:** *Hydrogel Characterization for Optimized Neurite Outgrowth*
- 61 **Ali Bazzi:** *Empathy Across the Career of Physician Training: A Qualitative and Quantitative Study of Premedical Students, Medical Students, and Physicians*
- 40 **Nicholas Bely:** *Low-Cost Laser-Based Optical Resolution Photoacoustic Microscopy for High Resolution Mouse Brain Imaging*
- 41 **Rachel Berlin-Allaire:** *Design and Development of Lab Apparatus & Calibration for Pressure Transducer for Measurements of Jet Fuel Force on a Control Surface*
- 51 **Kevin Brunner:** *Ultrasonic Echolocation Device for Assisting the Visually Impaired*
- 3 **Neoshua Butler:** *Tuition Waivers for Foster Care Youth*
- 15 **Andrew Camilleri:** *The Physical Impacts of Dreissenid Mussels on a Stream Benthic Community*

Poster Session (continued)

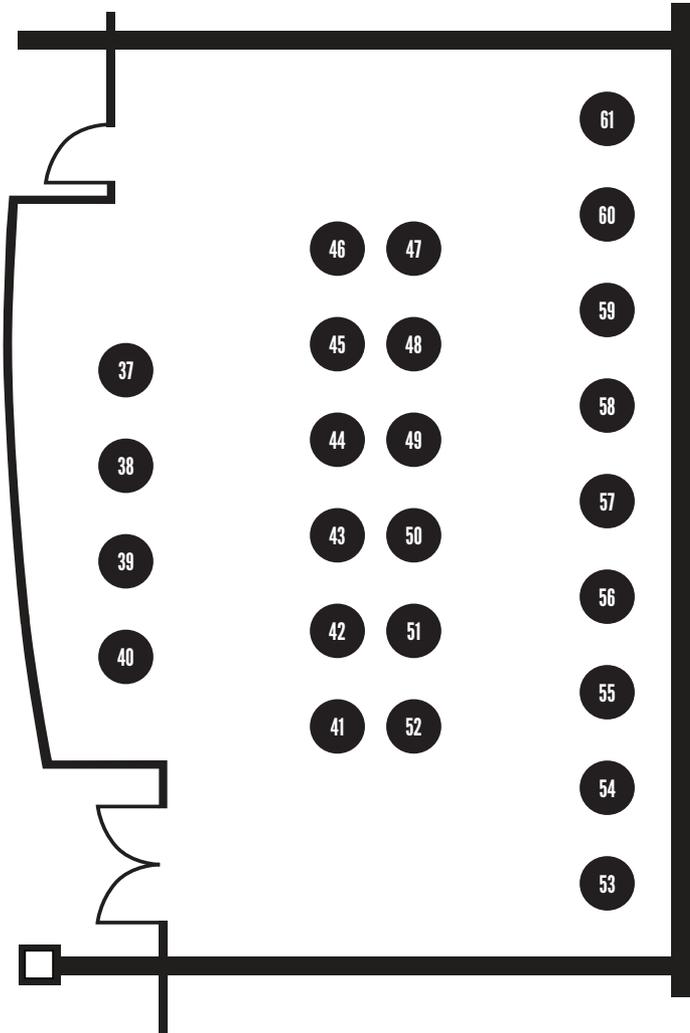
- 42 **Avik Chakravarty:** *Design and Implementation of Reconfigurable Automatic Rain-Sensitive Windshield Wiper*
- 43 **Matthew Diehl:** *Dental Forces During Direct Laryngoscopy*
- 44 **John Drabik:** *Design and Implementation of a Custom Desktop Bioreactor System*
- 45 **Patrick Erickson:** *Chitosan Fiber Reinforcement of Polymer Microcapsule Constructs for Tissue Engineering*
- 16 **Kassem Farran:** *Investigating amino acylation pathways in N.gonorrhoeae*
- 17 **Monika Franco:** *KCLASP*
- 46 **David Gatti:** *Development of Control System for Piezoelectric Diesel Injector*
- 30 **Nathaniel Hardin:** *Synthesis of Glycopeptide cisplatin analogs*
- 4 **Arman Harutyunyan:** *Traumatic stress exposure does not affect behavioral sensitization to morphine in mice*
- 10 **Jasmine Hect:** *An exploration of the developing human brain: in-utero to infancy utilizing fMRI*
- 47 **Gregory Hunter:** *MoS2 for Next-Generation Biosensors and Transistor*
- 18 **Megha Jagannathan:** *Emotional memory in borderline personality disorder patients with and without major depressive disorder*
- 5 **Nicholas Johnson:** *Language Use is Associated with Adjudicated Adolescent Outcomes in an Animal-Assisted Intervention*
- 6 **Zachary Kilgore:** *Coworking Spaces and Economic Development*
- 7 **Danielle Kloviski:** *Officer of the Year: Is it a Numbers Game?*
- 8 **Anthony Kosteki:** *Linguistic Inquiry of Formula 1 Race Car Drivers*
- 19 **Sanjana Kulkarni:** *Functional reconstitution of the insulin-secreting porosome complex in live cells*
- 20 **Veronica Lewalski:** *Light-Activated Ruthenium Compounds as a Tool for Caspase and Cathepsin Inhibition*
- 48 **Rafael Lima:** *Development of Electrocardiogram Suitable for Educational Purposes*
- 49 **Genan Ling:** *Measurement of Soot Particles in Premixed Flames*
- 21 **Samia Mazumder:** *The Effect of Cysteine Protease Inhibitors on Photodynamic Therapy of Breast Cancer Cells*
- 50 **Maryssa Mercer:** *Prediction of Unilateral Recurrent Laryngeal Nerve Palsy During Shoulder Dystocia Using Computer Simulation Model*
- 51 **Benjamin Mick:** *Ultrasonic Echolocation Device for Assisting the Visually Impaired*
- 61 **Cristian Mihaltan:** *Empathy Across the Career of Physician Training: A Qualitative and Quantitative Study of Premedical Students, Medical Students, and Physicians*
- 52 **Hamad Mirza:** *Polyamidoamine Dendrimer-TPP as a Platform to Deliver siRNA for Lung Cancer Treatment*

- 53 **Ashura Molla:** *Pressurized Metered-Dose Inhaler Formulations of Polyamidoamine/siRNA Dendriplexes for Lung Cancer Treatment*
- 31 **Robert Morgan:** *Relativistic Broadening of the Iron Emission Line from Serpens X-1*
- 11 **Jordan Mulders:** *Seeing Community Health Efforts From the Ground Up: Observing a Health and Sustainable Nutritional Practices Intervention in Kabale, Uganda*
- 22 **Lakshmi Nerusu:** *Regulation of Maternal Fetal Mucosal Immunity by HEXIM1 and Extrathymic AIRE in Pregnancy*
- 54 **Owen Pierce:** *Urban Flooding in the City of Detroit*
- 9 **Damaris Pop:** *Effectiveness of e-interventions: Does empathy matter?*
- 55 **Mehon Rahman:** *Characterization of protein release from co-axial polycaprolactone electrospun fibers*
- 51 **Nathan Reddmann:** *Ultrasonic Echolocation Device for Assisting the Visually Impaired*
- 10 **Saige Rutherford:** *An exploration of the developing human brain: in-utero to infancy utilizing fMRI*
- 24 **Aashna Sahi:** *Pregnancy at advanced maternal age disrupts the T-cell repertoire at the maternal-fetal interface*
- 8 **Mariela Sanchez:** *Linguistic Inquiry of Formula 1 Race Car Drivers*
- 25 **Aftab Shaik:** *Using a cell culture assay to identify elements of Frazzled signaling*
- 11 **Aryana Sharrak:** *Seeing Community Health Efforts from the Ground Up: Observing a Health and Sustainable Nutritional Practices Intervention in Kabale, Uganda*
- 26 **Atika Singh:** *Emergency Department Visits in Patients with Low-Acuity Conditions: Factors associated with resource utilization including transportation concerns*
- 27 **Raviteja Suryadevara:** *Immune Cell Infiltration in the Brain Following Intermittent Alcohol Exposure*
- 28 **Solomiya Svytka:** *Characterization of Trophoblast Cells Obtained by Trophoblast Retrieval and Isolation from the Cervix (TRIC) and the Exploration of Expression of Trophoblast Proteins from Overexpressed Transcripts*
- 56 **Aaron Szpytman:** *Effects of Glycosaminoglycan Surface Composition on MSC Differentiation to Valvular Lineages*
- 29 **Vipul Taxak:** *Phage endolysin and their mimetic synthetic peptides synergize with contact lens solutions to eradicate bacterial biofilms*
- 57 **Jacob Taylor:** *Efficient Algorithms for the Maximum Subarray Problem: Performance Analysis*
- 58 **David Tes:** *Skin Cancer Border Detection via Advanced Image Processing of OCT images*
- 12 **Shawn Thomason:** *Sources of conflict between non-marital and marital couples*
- 59 **Wesley Trescott:** *A User Interface for the Interactive Refinement of an Object Graph*



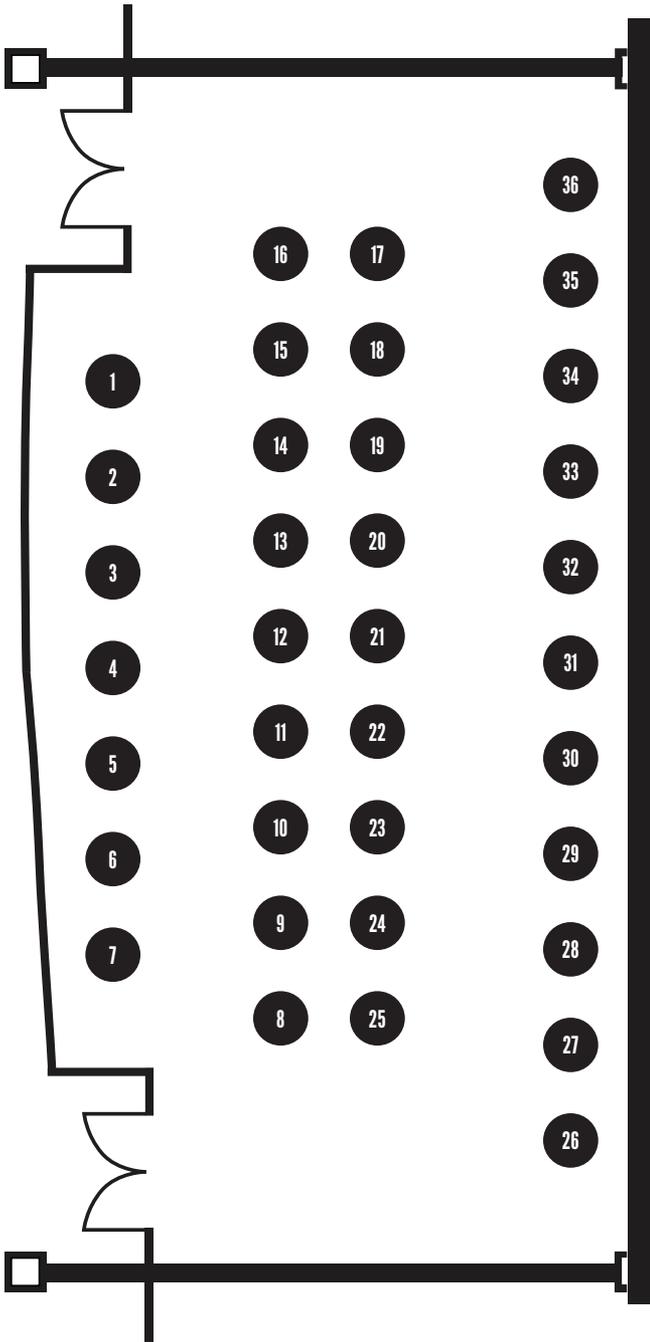
Poster Session (continued)

- 61 **Michael Vargo:** *Empathy Across the Career of Physician Training: A Qualitative and Quantitative Study of Premedical Students, Medical Students, and Physicians*
- 60 **Lais Verly:** *Parametric Trajectory modeling for Fanuc Robot Family*
- 32 **Joseph Willard:** *A mathematical perspective of financial options*
- 13 **Jill Young:** *Methodology of Returning Male Rats to Housed Pairs After Breeding*
- 14 **Clara Zundel:** *Examination of Children's Perception of Affect in Adult Neutral Facial Expressions*



Student Center Building room 25
Engineering, Arts and Humanities





Student Center Building room 20

Behavioral and Social Sciences, Life Sciences and Physical Sciences





Presenters

Kristy Abraham

Faculty Mentor: **Dr. Vaibhav Diwadkar**

“Involuntary interference in emotion dysregulation: Amygdala and Orbitofrontal hyper-modulation of brain networks”

Impulsivity in individuals with disorders of emotional dysregulation has often been related to their emotional instability, suggesting that the trait exerts a distinct influence in the context of neuropsychiatric disease. It is unclear whether effects of this trait are detectable in brain responses to emotional stimuli. This is a clinically relevant question because understanding the biological basis of impulsivity can explain how a clinically relevant trait might disrupt brain function. In particular, this might explain impairments in rational decision-making that are particularly impaired by emotional reactivity. In order to address this novel question, my work focuses on brain network analyses, attempting to probe how impulsivity disrupts brain network function in patients with Borderline Personality Disorder (BPD), a disorder strongly characterized by impulsivity and emotion dysregulation.

.....

Mahnoor Ahsan

Faculty Mentor: **Dr. Noa Ofen**

“Do children process information differently than adults in visual recognition of objects?”

This study is intended to identify some age-related differences in visual recognition development. At its first phase, child and adult participants studied pictures of everyday objects. At its second phase, they were tested with two recognition tasks: 1) two-alternative-forced-choice (2AFC) task and 2) old-new recognition task. In the 2AFC task, the participant was shown a studied item and a non-studied item simultaneously per trial and was asked to recognize the studied one; in the old-new recognition task, studied and non-studied items were shown individually per trial and the participant was asked to recognize the studied ones. We found from the study that children are as efficient as adults in utilizing the richer information available in the 2AFC task, but poorer in the old-new task.

.....

William Alexander

Faculty Mentor: **Dr. David Merolla**

“Long-Term Educational Outcomes of Sexual Minority Youths”

The primary goal for this paper is to assess the long-term educational outcomes of sexual minority youth and to determine if their educational attainment is conditioned by mental health and victimization. By using data from the National Longitudinal Study of Adolescent Health, I improved upon that early school experiences shape eventual trajectories of educational attainment for same-sex attracted and opposite attracted youth. This research examined the long-term effects of mental illnesses and victimization on sexual minority youth overall educational attainment and gives insight to the unique experiences of different sexual minority youth.

.....



Fateha Ali

Faculty Mentor: **Dr. Robert Akins**

"Antagonism between Candida and vaginal bacterial species: roles in vaginal candidiasis and bacterial vaginosis"

The pathogenic yeast *Candida albicans* causes Vulvovaginal candidiasis (VC) in 29% of adult women, but its relationship with vaginal bacteria and bacterial vaginosis (BV) is unknown. The purpose of this study is to determine whether vaginal bacterial species exist that inhibit the growth of various strains of *Candida albicans* or, conversely, are themselves inhibited by *Candida* in vitro. Our hypothesis is that lack of or suppression of antagonistic bacterial species will be correlated with VC or a patient history of VC. Early results indicate that these bacterial species do exist. If confirmed, this offers new possibilities in managing both VC and BV.

.....
Hager Alkhafaji

Faculty Mentor: **Dr. Jeffrey Ram**

"The HUDA Clinic Documentary"

The HUDA Clinic is a free health clinic located in Detroit. It has played an integral part in the community, serving as a place where like-minded, kind individuals have come to make a shared vision a reality. Volunteers, doctors, patients, and a small staff make up what the HUDA Clinic is today. Due to the recent implementation of the Affordable Care Act, HUDA's patient load has dramatically dropped, and our resources are not being used. Our doctors sit around for hours with no one to see. The purpose of the film is to highlight all the reasons why the HUDA Clinic is still relevant today and why it is important to make sure we keep its doors opened.

.....
Angela Allen

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

"The Land Bridge Project: Using Unity 5.0 to Re-Create an Ancient Civilization"

A showcase of my re-creation of the Alpena-Amberly land bridge in Unity 5.0. The re-creation is a port of an older simulation originally created with the Microsoft XNA framework that has been used for the ongoing Land Bridge Project, jointly run by researchers at Wayne State University and the University of Michigan. Included is a detailed account of how the land bridge was modeled from 21 different regions derived from NOAA data and screenshots generated from the original simulation.

.....
Kathryn Anderson

Faculty Mentor: **Dr. Sharon F. Lean**

"What Can Improve the Daily Lives of Individual Women in Developing Countries? A Case Study of Nicaragua"

No country in the world displays perfect equality between men and women. Research has shown that women in developing countries face a disproportionate amount of daily hardships including domestic abuse and sexual violence that are directly linked to their lack of economic and educational opportunities. Male domination of women is distinctively ingrained in Latin American culture, yet Nicaragua, the second poorest country in the region, ranks among one of the most gender equal countries in the world. This project aims to understand the effects of government efforts, along with the work of nongovernmental organizations that have addressed women's issues in Nicaragua.

.....





Nour Arafat

Faculty Mentor: **Dr. Mohammad R.N. Avanaki**

“Combined OCT Image and Fluorescent AB Plaque Image for a More Reliable Alzheimer’s Disease Diagnosis”

Alzheimer’s Disease is the most common neurodegenerative disease, impairing mental abilities and causing memory loss. The current diagnostic methods of Alzheimer’s Disease are expensive, invasive, and do not allow for early treatment of Alzheimer’s. The purpose of this study is to utilize a fluorescent imaging system and optical coherence tomography to research biomarkers of Alzheimer’s Disease in the hopes of developing a better, earlier diagnostic tool for Alzheimer’s.

.....
Ashi Arora

Faculty Mentor: **Dr. Robert Akins**

“Cell-Free DNA Signaling as a Possible Indicator of Fungal Infection: In Vitro Modeling”

Cell free nucleic acid (CfNA) is an emerging field in molecular diagnostics, which looks for DNA or RNA which is released by cells in response to an abnormal or stressed condition. The impact of CfNA stems from the possibility that nucleic acids may emanate from highly localized sites, generating a robust early-warning diagnostic signal that can be monitored non-invasively and frequently in high-risk patients, saliva, blood, or urine. This project is focused on understanding whether fungal cells, specifically *Candida albicans*, when exposed to stressed conditions such as antifungal drugs, heat shock, blood, urine, and saliva, generate CfDNA as a response.

.....
Christian Oliver Avila

Faculty Mentor: **Dr. Harini Sundararaghavan**

“Hydrogel Characterization for Optimized Neurite Outgrowth”

The peripheral nervous system is vital to normal bodily functions, relaying signals from the brain to various structures and extremities in the body. Injuries to the structures in this system can be very problematic because novel repair methods have not yet been developed. Current literature shows that biodegradable polymers such as hyaluronic acid can be used to direct neurite outgrowth in a tissue engineering setting. This project focuses on characterization of hyaluronic acid-based hydrogels and fibrous scaffolds to optimize conditions for neuronal cell growth. Mechanical properties, surface properties, and chemical properties of these scaffolds will be observed to establish a better understanding of how neuronal cells interact with the scaffolds.

.....
Alexis Barrera

Faculty Mentor: **Dr. Mary Elizabeth Anderson**

“To Moscow! And Back Again”

My research focuses in on my monthlong journey to Russia, along with my two-week rehearsal process for the show I directed after my return, entitled *Gruesome Playground Injuries*. This narrative helps illustrate the experiences and discoveries I made about acting and theatre in general. I began this research with a hypothesis attempting to connect the five biological senses to the process of acting and developing a character, but what I came to realize is one cannot focus on the senses in order for a sensation to manifest. An actor must focus on what my Russian acting teacher, Ilya, likes to call “detail.”





Tejeshwar Bawa

Faculty Mentor: **Dr. Vijaya Kumar**

“Correlates of health literacy and its impact on illness beliefs for emergency department patients with acute heart failure”

Maintenance of well-being for patients with heart failure (HF) is partially dependent on appropriate self-care behaviors which, in turn, are governed by underlying illness beliefs and treatment adherence. Health Literacy (HL) is a potential modifier of the interaction between behaviors and beliefs, but the precise nature of this relationship for individuals with acute HF and their association with socioeconomic and demographic factors have been subject to limited investigation. The objective is to study the relationship between HL and socioeconomic, demographic factors and disease-specific illness beliefs among patients who present to the ED with HF.

.....
Naila Baydoun

Faculty Mentor: **Dr. Robert A. Akins**

“Development of a vaginal bacterial repository and its use in identifying interspecies interactions of relevance to vaginal infections”

Bacterial vaginosis, the most common vaginal disease, occurs in 29% of women. During BV, the normally dominant *Lactobacillus* species are replaced by other species which generate symptoms and risk factors. The causes of these changes are not known. The goal of this study is to detect species that antagonize *Lactobacillus* and thereby cause BV, and to detect species that antagonize BV-associated species, which might be useful as probiotics. ~40% of 746 vaginal samples from our repository had beta hemolytic species; 83% of these were *Enterococcus faecalis*. Testing their ability to inhibit *Lactobacillus* is underway, as are screens for probiotic *Lactobacillus* resistant to hemolysins. Studies are in progress to determine if and which vaginal bacterial species antagonize *Candida*, the second most common cause of vaginal disease.

.....
Ali Bazzi

Faculty Mentor: **Dr. Todd Eugene Meyers**

“Empathy Across the Career of Physician Training: A Qualitative and Quantitative Study of Premedical Students, Medical Students, and Physicians”

This project examines the role of physician empathy as a critical component within the medical health care system. Using qualitative and quantitative analyses, we compared empathy as viewed across three main groups including premedical students, medical students, and physicians. As a prospective physician progresses from the premature premedical stage to the developing medical student stage to, ultimately, the mature stage as a full fledged physician, empathy carries a variety of meaning and application. Empathy as a whole may be used within the medical system not only as a cognitive process but as a behavioral tool to improve physician-patient interaction.

.....





Nicholas Bely

Faculty Mentor: **Dr. Mohammadreza Nasirivanaki**

“Low-Cost Laser-Based Optical Resolution Photoacoustic Microscopy for High-Resolution Mouse Brain Imaging”

Optical Resolution Photoacoustic Microscopy (OR-PAM) is a method by which a focused ray stimulates the cells of an object of microscopic study, producing acoustic signals that are obtained and digitized in the form of an image. Current OR-PAM devices are equipped with high-power and high-cost lasers that can produce acoustic signals with ease. A device that demonstrates equivalent results with a less costly laser option would be optimal and much more desired in most labs.

.....
Rachel Berlin-Allaire

Faculty Mentor: **Dr. Marcis Jansons**

“Design and Development of Lab Apparatus and Calibration for Pressure Transducer for Measurements of Jet Fuel Force on a Control Surface”

When determining fuel economy and emissions of a diesel engine, it is important to understand the injection process through determining the fuel flow rate. One parameter for obtaining the fuel flow rate is by evaluating the pressure of fuel out of the diesel injector through measuring force of the jet fuel on a control surface. An apparatus was designed to hold a pressure transducer, used to measure the pressure and force of the jet fuel. This pressure transducer must be positioned directly perpendicular to the fuel stream, which is done through designing an apparatus to move the transducer laterally, rotationally, and angularly. Calibration of the transducer is necessary before accurate measurements of the force of the fuel can be taken.

.....
Adrian Breckenridge

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

“Synthesis of Resin-Bound Cryptand for use in Europium and Gadolinium Separation”

Europium and gadolinium are rare earth metals that are used in industrial and medical applications. These metals are found mixed together in nature and due to their similar properties, it is difficult to separate them from each other. Our research aims to overcome this challenge by using a new material that we make in the laboratory that selectively binds one of the two metals. This research is an important first step towards complete separation of these two elements.

.....
Kevin Brunner

Faculty Mentor: **Dr. Mohammadreza Avanaki**

“Ultrasonic Echolocation Device for Assisting the Visually Impaired”

Our device aims to assist the visually impaired by using ultrasonic sensors and tactile feedback. Ultrasonic sensors can be used to detect objects and determine distances. This system can be applied to medical conditions in which an individual is visually impaired by letting the user know the distance to a nearby object.





Mario Bueno

Faculty Mentor: **Dr. Valerie Simon**

“Incarceration of Adolescents in Adult Prisons: Adults’ recollections of their experiences and its impact on adult adjustment”

Thousands of adolescents serve time in adult prisons across the United States. What we do not know are the long-term implications of housing youthful offenders with the nations most notorious adult prisoners. As hundreds of youthful offenders — now adults — are being released after decades of imprisonment, we yet to understand how their experience will affect their reintegration back into society, their adjustments within their families, or how they will see themselves in relation to both. The goal of the current qualitative study was to interview four adults who were sentenced as youth to adult facilities on how the Participants felt about their experiences of incarceration, post-release transition, the impact of experiences, and their perceptions of the needs of youth in the criminal justice system.

.....
Neoshua Butler

Faculty Mentor: **Dr. Angelique Day**

“Tuition Waivers for Foster Care Youth”

My research provides critical information to begin the conversation on how to implement waivers successfully within the state of Michigan. By studying and comparing the differences in each state to draft ideas that can be pushed through legislation that will create tuition waivers within the state of Michigan. The research helps to discover who is eligible and how to apply the tuition waivers; through the research provides information on how long the money should be offered, how much money should be offered. In hopes to create a policy brief using the data collected from the research.

.....
Griffin Calme

Faculty Mentor: **Dr. Diane Sybeldon**

“Detroit Public Library Art & Architecture: Bronze Entrance Doors & Aesop’s Ceiling”

Three other students and I conducted research on art and architecture at the Detroit Public Library to improve the Friends Foundation’s records of the selected works for public tours of the library. I conducted my research on the large bronze entrance doors that were designed by John Donnelly Sr. and later installed in 1918. I’m presenting jointly with Anne Okonowski, who researched F. J. Wiley’s ceiling paintings.

.....
Andrew Camilleri

Faculty Mentor: **Dr. Donna Kashian**

“The Physical Impacts of Dreissenid Mussels on a Stream Benthic Community”

Invasive dreissenid mussels, commonly referred to as zebra and quagga mussels, have greatly altered freshwater ecosystems. Physically, the accumulation of their shells has caused drastic changes in benthic (living at the bottom of a stream or lake) invertebrate communities. While these changes in benthic communities have been well studied in lakes, the impact on stream communities is still unknown. By allowing benthic invertebrates to colonize four different treatments containing varying gradients of mussel shells (treatment) and cobble (control) in the Huron River, Michigan, we found changes in community diversity and abundance of stream invertebrate communities in treatments dominated by mussel shells.





Avik Chakravarty

Faculty Mentor: **Dr. Lubna Alazzawi**

“Design and Implementation of Reconfigurable Automatic Rain-Sensitive Windshield Wiper”

In today’s automatic industry, many manual systems have been replaced by automatically controlled systems to provide better driving satisfaction and increase vehicle’s marketability. In this project, two separate control systems — direct and indirect control systems — have been developed to automatically control the windshield wiper system. For the direct control system, the wiper speed is controlled by controlling the wiper motor using pulse-width modulation (PWM) feature of Arduino. On the other side, a mechanical machine has been developed as part of the indirect control system, which rotates the wiper switch to different wiper modes automatically. For both of the systems, an Arduino Uno board has been used to control the windshield wiper system and a rain sensor has been used to collect information on rain condition.

.....
Nathan Christie

Faculty Mentor: **Dr. Kristin O’Donovan**

“Public Policy Narratives of the Detroit Water Shutoffs”

Actors in the policy arena tell stories to advance their position. This is an important element of the policy process, as these narratives can influence public perception and subsequent policy desires. This paper explores the way that interest groups in the Detroit water shutoffs depicted the poor, and the analysis indicates that interest groups that favor policy alternatives concerned with affordability are strongly associated with narratives that victimize the poor.

.....
Angelina Cicchella

Faculty Mentor: **Dr. Jon Anderson**

“Nine Gyres”

“Nine Gyres” is a series of etudes for cello, voice, and electronics which we composed to explore the use of electronics and extended techniques in contemporary classical music. These techniques were explored for incorporating into our larger work, an opera which we are hoping to complete in the next two years. We used a looper, max/msp jitter, and the Microsoft Kinect for the electronics in the show along with numerous extended cello techniques.

.....
Stefanie Della Porta

Faculty Mentor: **Dr. Elena Past**

“Language Learning While Studying Abroad: Perceptions, Participation, and Outcomes”

This project looks at the double-immersion style of language learning abroad used in the Wayne in Abruzzo program in Italy and how it aligns with current research in the field of foreign language learning. This study observed American and Italian program participants to document who used what language when, why, and how. It also analyzed their prospective language gains during the program and how these results align with or contrast the results seen in other study abroad programs documented in current research. After analyzing the results, the second part of this project created an orientation to prepare next year’s students with an understanding of how to approach language learning abroad.

.....





Matthew Diehl

Faculty Mentor: **Dr. John Cavanaugh**

“Dental Forces During Direct Laryngoscopy”

In order to obtain a clear view of a patient’s vocal folds and glottis to intubate the patient, anesthetists and other medical professionals are required to perform a laryngoscopy. During this procedure, an instrument known as a laryngoscope is inserted into the mouth. This tool can cause accidental damage to the patient’s teeth. My study looks at the maximum strain and strain rates generated by practitioners while performing laryngoscopies under four different conditions. A statistical comparison of these trials was then performed.

Brendan Doucet

Faculty Mentor: **Dr. Krysta Ryzewski**

“Piercing the Canopy: Using LiDAR Imagery to Remotely Survey the Jungles of Montserrat”

The Survey and Landscape Archaeology on Montserrat Project (SLAM) has been researching the Eastern Caribbean island of Montserrat’s cultural history since 2010. Montserrat’s challenging landscape required SLAM to combine remote and pedestrian survey techniques to efficiently locate archaeological sites. This report outlines the remote survey of six zones within Montserrat’s Centre Hills region using airborne Light Detection and Ranging (LiDAR) data to identify archaeological sites beneath the jungle canopy.

John Drabik

Faculty Mentor: **Dr. Mai T. Lam**

“Design and Implementation of a Custom Desktop Bioreactor System”

In an effort to develop more biologically accurate engineered organs and constructs, the ability to incubate and supply nutrients to culturing tissues in an adaptable environment is crucial. Due to space restrictions within research labs, closed perfusion systems cannot reside in incubators while ongoing cultures advance in growth. Drabik will present on the creation and evolution of a desktop bioreactor system, inexpensively produced for assisting the growth of engineered vascular grafts as well as a variety of in-lab research applications. The production of a versatile and inexpensive bioreactor system would allow for the improvement and expansion of tissue engineering knowledge while creating opportunities for easier analysis of in vitro studies and disease modeling.

Manar Edriss

Faculty Mentor: **Dr. Robert A. Akins**

“Development of a vaginal bacterial repository and its use in identifying interspecies interactions of relevance to vaginal infections”

Bacterial vaginosis, the most common vaginal disease, occurs in 29% of women. During BV the normally dominant *Lactobacillus* species are replaced by other species which generate symptoms and risk factors. The causes of these changes are not known. The goal of this study is to detect species that antagonize *Lactobacillus* and thereby cause BV, and to detect species that antagonize BV-associated species, which might be useful as probiotics. ~40% of 746 vaginal samples from our repository had beta hemolytic species; 83% of these were *Enterococcus faecalis*. Testing their ability to inhibit *Lactobacillus* is underway, as are screens for probiotic *Lactobacillus* resistant to hemolysins. Studies are in progress to determine if and which vaginal bacterial species antagonize *Candida*, the second-most common cause of vaginal disease.





Zachary Elledge

Faculty Mentor: **Dr. Edward Cackett**

"Finding Trans-Neptunian Objects Using the Dark Energy Survey"

I used the data from the Dark Energy Survey to find 16 previously found Trans-Neptunian Objects that had not been observed in more than 10 years. After a certain period of time, positional uncertainty blows up so high and they basically disappear.

Patrick Erickson

Faculty Mentor: **Dr. Howard Matthew**

"Chitosan Fiber Reinforcement of Polymer Microcapsule Constructs for Tissue Engineering"

In order to grow human tissue, cells must be able to proliferate in a three-dimensional environment. Polymer membrane microcapsules that contain cells can be produced and fused together to form constructs that act as biodegradable scaffolds for three-dimensional cell culture. However, these fused constructs have a weak tensile strength compared to relevant human tissues. Fibers of small diameter and high tensile strength can be made from chitosan polymer. These fibers can be cut and mixed with the microcapsules to incorporate them into the fused constructs. This study investigates the production and characterization of chitosan fibers as well as their effects on the tensile strength of fused constructs when incorporated with the microcapsules to make the construct strength more similar to human tissue.

Elaria Essak

Faculty Mentor: **Dr. Hernán García**

"Guía del migrante mexicano: Interpellation and Ideology in Contemporary Mexican Political Literature"

This project explores how a guide that the Mexican federal government published serves as a sample of the government's views on immigration to the United States. The guide advises Mexican citizens carefully of the most effective ways to cross over into the States. It reads as a letter and offers the reader tips on such necessities as staying hydrated should he/she decide to cross through the desert; what to do if he/she encounters Border Patrol officers; and what his/her rights are in the United States. The accompanying illustrations in the guide add dimension to the message, as they bear resemblance to drawings from popular Mexican comic books intended for the same mass audience the guide aims to serve.

Kassem Farran

Faculty Mentor: **Dr. Tamara Hendrickson**

"Investigating amino acylation pathways in N.gonorrhoeae"

All bacteria require amino acids to synthesize proteins. Some bacteria use a two-step method where the wrong amino acid is put on the tRNA first and then corrected in a second step before it is sent to be added to the protein, done by an enzyme called amidotransferase. This mechanism is being investigated in Neisseria gonorrhoeae through a gene called Ngo0682; which shares a large bit of the same sequence with a gene in Helicobacter pylori that has shown to play a role in amidotransferase activity and formation. This investigation of Ngo0682 will allow us to observe if it aids in amidotransferase formation in N.gonorrhoeae, thus expanding our understanding and aiding in future antibiotic development.





Mairon Figueiredo Marques
 Faculty Mentor: **Dr. Ana Djuric**

"Kinematic Model of a 3 DOF Scara Robot"

This paper applies robotics theory in order to model a 3DOF SCARA according to D-H parameters. The D-H parameters are used to find general equations to solve forward and inverse kinematics. The robot singularities are obtained using Jacobian matrix. All the procedure are based on MATLAB environment. The validation of the equations is showed at the end to prove the veracity of the modeling.

.....

Joshua Fischer

Faculty Mentor: **Dr. Sarah Trimpin**

"Improving Matrix-Assisted Ionization-Mass Spectrometry for Poly(ethylene glycol)s"

Mass spectrometry (MS) is a powerful and sensitive method that utilizes the interaction of ions in an electromagnetic field to characterize a variety of samples, including synthetic polymers. Linear poly(ethylene glycol) (PEG) polymers, present in a plethora of consumer goods, can be monitored with MS. The applicability of MS is limited by the ionization method, with popular methods often requiring the sample to be either in solution, e.g. for electrospray ionization, or ablated with a laser, e.g. for matrix-assisted laser desorption/ionization. Here, I report the improved utility of a novel ionization technique, matrix-assisted ionization (MAI), for use with PEG polymers by introducing different salts to promote ionization, elucidate structural features of the polymer ion using gas-phase separation techniques, and compare MAI to popular ionization methods.

.....

Monika Franco

Faculty Mentor: **Dr. Mary Kay Pflum**

"KCLASP"

The KCLASP project is one that deals with creating a tool to identify kinase substrate pairs. It uses an ATP derivative and biotinylated peptides to find the kinase substrate pairs of that peptide. The part of the project that is emphasized here is the creation of and purification of peptides for the experiments and a TFA control experiment to determine if the tool works.

.....

David Gatti

Faculty Mentor: **Dr. Marcis Jansons**

"Development of Control System for Piezoelectric Diesel Injector"

The purpose of this project is to calibrate a fuel injector for a diesel engine. Calibration refers to the process of running the injector through a series of tests under changing conditions in order to simulate the operation of an actual engine. The acquired data is then used to program the injector such that it can behave autonomously to maintain desired combustion conditions. In order to calibrate the injector, a test cart was constructed, complete with fuel pump and reservoir. A second cart was outfitted with a computer and National Instruments cRIO controller module. This module, when loaded with a user-designed LabVIEW interface, allows the user to control the injector using the computer.

.....





Shiby George

Faculty Mentor: **Dr. Amar Basu**

“Smartphone application for a miniature wearable heart rate monitor”

Chronic cardiovascular disease is one of the leading causes of death in urban populations. Remote patient monitoring (RPM) outside the clinical setting has been shown to reduce mortality and the cost of care by preventing hospital readmissions. RPM assists patients in improving their lifestyle, and also enables doctors to better diagnostics based on quantitative information. Next-generation RPM will include wearable sensor technology that can provide 24-hour monitoring with medical grade accuracy. The long-term goal of this research is to develop a heart rate sensor that can continuously monitor heart rate, in the form of a small earring. This UROP project developed an Android application that acquires the heart rate data from the sensor and uploads it to a health server.

Taania Girgla

Faculty Mentor: **Dr. Jean Peduzzi-Nelson**

“Use of an Artificial Spinal Cord in the Treatment of Chronic Spinal Cord Injury”

This project consisted of designing and engineering the matrix needed for an artificial spinal cord. This matrix used a mixture of olfactory progenitor cells, olfactory ensheathing cells, BDNF and GDNF growth factors, and Chondroitinase ABC all placed on electrospun fibers in a hydrogel made of hyaluronic acid. Lewis rats were used in this project, and a portion of the rat spinal cord from TV9-TV11 was transected and replaced with the artificial spinal cord. The rats were then tested for functional improvement and degree of axonal growth and recovery at the injury site.

Jessica Goletz

Faculty Mentor: **Dr. Carolyn Dayton**

“The Developing Parent-Infant Relationship: Understanding the Effects of Pregnancy Intendedness on Prenatal Parental Bonding”

The project sought to examine the ways in which mothers- and fathers-to-be develop a prenatal bond with their developing infant during pregnancy. Intendedness, or desire to become pregnant before conception, was examined as a possible risk factor that may impact how this early bond is formed. Data was collected from Wayne State University’s Baby on Board Early Parenting Laboratory under the direction of Dr. Carolyn Dayton. Questionnaires and interviews were administered to examine both mothers’ and fathers’ feelings toward the developing fetus and the level of intendedness for the pregnancy. Results revealed gender differences in the ways mothers and fathers fostered positive bonding feelings toward their baby while in utero.

Nathaniel Hardin

Faculty Mentor: **Dr. Christine Chow**

“Synthesis of Glycopeptide cisplatin analogs”

The synthesis of glycopeptides with a methionine N terminus. These short glycopeptides are then chelated to platinum via the methionine thiolate and N terminus. Different sugars will be used in order to make a small library of glycopeptide cisplatin analogs, which will be used for binding and cell studies.





Arman Harutyunyan

Faculty Mentor: **Dr. Shane A. Perrine**

“Traumatic stress exposure does not affect behavioral sensitization to morphine in mice”

Clinical research has shown that individuals with Post Traumatic Stress Disorder (PTSD) often abuse substances. Yet, the mechanism driving this co-occurrence is unknown. The treatment and diagnosis of PTSD is complicated by a number of factors, including substance abuse and dependence. In this study, we used the mouse single prolonged stress (mSPS) model of PTSD to study the effects of mSPS on the development and expression of sensitization to morphine to determine if traumatic stress exposure alters morphine-induced neuroplasticity.

Jasmine Hect

Faculty Mentor: **Dr. Moriah Thomason**

“An exploration of the developing human brain: in-utero to infancy utilizing fMRI”

This study utilizes functional magnetic resonance imaging (fMRI) of the human fetus in-utero and in infancy to provide us with novel insight regarding the processes underlying brain maturation during early life. Our research has demonstrated that these methodologies are both feasible and applicable to understanding early-life development.

Asia Hightower

Faculty Mentor: **Dr. Zhiqiang Cao**

“Zwitterionic Materials”

When a foreign object enters the body, a foreign body reaction occurs. This foreign body reaction’s a major problem because it prevents medical devices and materials from being viable long-term treatments. One solution is the use of zwitterionic material hydrogels. Zwitterionic materials are important because of their structure, which causes less fibrosis development and promotes the development of blood vessels in tissue near the implants. We are able to measure the effectiveness of the zwitterionic materials through Masson’s Trichrome and MECA-32 staining.

Michelle Hudson

Faculty Mentor: **Dr. Robert Akins**

“Determining Mechanisms of Resistance in Candida Albicans to Current Echinocandin Antifungals”

In 2011, there were an estimated 721,800 cases of bloodstream infection contracted while patients were in the hospital. Candida yeast species caused roughly 10% of these infections with a 40% mortality rate. Because Candida species are becoming resistant to fluconazole, the antifungal commonly used to treat candidiasis, we expect mortality rates to further increase. By targeting specific genes within the genome of Candida species, key mechanisms of resistance to antifungals can be understood, allowing for development of new and more effective drugs. MRR1 is one such gene. My hypothesis is that the full-length MRR1 gene leads to fluconazole susceptibility, while shortened versions cause resistance to an entirely different class of drugs. This may uncover new pathways of resistance to these drugs, the echinocandins.





Gregory Hunter

Faculty Mentor: **Dr. Leela Mohana Reddy Arava**

"MoS2 for Next-Generation Biosensors and Transistor"

The main component in modern electronics for decades has been silicon. As technology advances, there is a focus on getting greater performance out of smaller devices. Silicon has reached its limit on size vs. utility, so the objective of our research is to look into materials that can be easily fabricated in the nano/micro level while still maintaining performance. We are working on electronic devices like biosensor and thin film transistor from MoS2 (Molybdenum disulfide), a two-dimensional molecule. Due to its 2D arrangement, we believe it can achieve the same or greater performance as silicon at the nano/micro level at a cheaper cost. We have synthesized MoS2 and will fabricate 20nm resolution for free standing nano-sheet for next-level biosensors and transistors.

.....

Murtaza Hussain

Faculty Mentor: **Dr. Claire Pearson**

"Diagnostic Accuracy of Stroke by Emergency Medicine Physicians Versus Neurology Disposition"

Quick, accurate diagnosis of patients with stroke is vital for emergency department (ED) physicians and is a time-sensitive process. ED physicians risk-stratify patients based on physical exam, past medical history, and imaging. This is a complicated diagnosis due to the number of 'stroke mimics' such as migraine, paresthesia, hypoglycemia, seizures, postictal states, etc. Our aim was to assess whether ED physicians correctly diagnose stroke and transient ischemic attack (TIA) versus stroke mimics, based on initial presenting symptoms, with a high level of accuracy when compared to final neurology disposition.

.....

Ann Jacobites

Faculty Mentor: **Dr. Noel Kulik**

"Substance Abuse Among Parents and Young Adult Resiliency"

Having a parent with a Substance Use Disorder (SUD) is often a risk factor for subsequent use among children. Very little research exists that explores the key factors that promote health, wellness, and success among young adults who have been raised by a parent suffering from SUD, and even less on factors that promote resiliency among this specific at-risk population. The purpose of this study is to explore the perspectives of young adults who have grown up with parents or guardians who suffer from SUD in order to understand the key influences and events that have helped foster resiliency and a successful path in life.

.....

Megha Jagannathan

Faculty Mentor: **Dr. Vaibhav Diwadkar**

"Emotional memory in borderline personality disorder patients with and without major depressive disorder"

Emotion dysregulation is a key characteristic of psychiatric disorders including borderline personality disorder (BPD). This dysregulation has extended effects in multiple brain/behavior domains, including episodic memory. Patients with BPD experience exaggerated amygdala modulation of brain networks when encoding negative and neutrally valenced stimuli. Additionally, patients with BPD often experience a high rate of co-occurring disorders, in particular major depressive disorder (MDD). A question of interest, therefore, is whether emotional dysregulation in BPD occurs independently of, or is mediated by, the presence

of mood symptoms associated with MDD. In this study, we used an episodic memory paradigm with affective stimuli to investigate whether exaggerated amygdala modulation in BPD patients is further exaggerated in BPD patients with MDD, particularly when encoding negatively valenced stimuli.

Reba John

Faculty Mentor: **Dr. Phillip Levy**

"Efficacy and Safety of Bolus Enalaprilat in Acute Hypertensive Heart Failure in the Emergency Department"

Afterload reduction with bolus enalaprilat is used by some for management of acute heart failure (AHF) with hypertension in the emergency department (ED), but existing data on the safety and effectiveness of this practice are limited. The purpose of this study was to evaluate the hemodynamic effects and safety of bolus enalaprilat in the treatment of patients presenting to the ED with acute hypertensive heart failure (HF).

Nicholas Johnson

Faculty Mentor: **Dr. Annmarie Cano**

"Language Use is Associated with Adjudicated Adolescent Outcomes in an Animal-Assisted Intervention"

This study tested the extent to which an obedience-training program affected mood and self-regulation in youth. Participants were 34 female and 73 male youth residing in juvenile detention centers. Thirty shelter dogs were also trained across the program. The youth were randomly assigned to an intervention group that trained animals from the shelter or to a dog-walking control group in which they walked the dogs. Participants completed surveys before and after the program. Participants were also interviewed after completing the program. Language analysis software was used to measure the frequency of mood and self-regulatory language. Greater use of achievement words was associated with fewer externalizing symptoms at the program's end. Greater self-regulation language was related to more internalizing symptoms at program's end.

Taylor Jones

Faculty Mentor: **Dr. Billicia Charnelle Hines**

"Awareness and Accessibility Through The Cycle of Theatrical Excellence"

My project explores the importance and relevancy of Lorraine Hansberry's *Raisin Cycle* in today's society. To gain a deeper understanding and to broaden my knowledge of black theatrical performance, it was an honor to have the opportunity to attend the Black Theatre Network Conference and Black Theatre Festival in Winston-Salem, North Carolina. The magnitude of such an artistic environment provided me the resources necessary to network while providing better research capabilities. There I have gained more insight into the African diaspora, which has magnified the significance of Hansberry's work and beyond.

Zachary Kilgore

Faculty Mentor: **Dr. Jeffrey Horner**

“Coworking Spaces and Economic Development”

This project uses survey responses from members of coworking spaces in Detroit to explore whether social interactions within these shared workspaces have an impact on members’ economic opportunities.

Danielle Klovski

Faculty Mentor: **Dr. Charles Klahm**

“Officer of the Year: Is it a Numbers Game?”

The goal of this exploratory research project was to determine how police departments throughout the state of Michigan select officers for the award of Officer of the Year. Specifically, the project sought to determine if quantitative (i.e., number of tickets, citations, etc.) measures were the main criteria used in the selection process. It was found that most departments use quantitative data in the selection process; however, qualitative (i.e., Community support, interactions with community members, etc.) data is also given weight. Results were determined through a survey sent to a random sample of 130 police departments throughout the state of Michigan.

Anthony Kostecki

Faculty Mentor: **Dr. Annmarie Cano-Wurm**

“Linguistic Inquiry of Formula 1 Race Car Drivers”

Research has found that positive life events can cause positive and intense emotions. This study looks specifically at positive events in Formula 1 racecar drivers’ lives (i.e. coming in first, second, and third place in races over the past 10 years). Using the Linguistic Inquiry and Word Count (LIWC) software, we investigated these racers’ word usage during press conference interviews following the races. Based on the racers’ languages, we found significant differences in emotionality and racers’ final positions; word tense and racers’ final positions; pronoun usage and racers’ final positions and initial grid positions; other categories like sexual, achievement, work, and causation word usage and racers’ final and initial grid positions.

Sanjana Kulkarni

Faculty Mentor: **Dr. Bhanu Jena**

“Functional reconstitution of the insulin-secreting porosome complex in live cells”

Over 350 million people worldwide suffer from diabetes, a disease related to insulin secretion from cells. Understanding the fundamental mechanism of insulin secretion by researching the porosome complex is therefore critical. In a recent study, the porosome complex in the insulin-secreting Min-6 cell was determined, and the role of Hsp90 in its assembly and function was implicated. To further investigate the porosome’s involvement in glucose-stimulation, the Min-6 mouse insulinoma cells’ purified porosome structures were studied. A reconstitution study was conducted to determine the functionality of purified porosome structures. Elevated glucose-stimulated insulin secretion 48h post reconstitution reflects the stability and viability of reconstituted porosomes, documenting the functional reconstitution of native porosomes in live cells. These results establish a new paradigm in porosome-mediated insulin secretion in β -cells.



Veronica Lewalski

Faculty Mentor: **Dr. Jeremy Kodanko**

"Light-Activated Ruthenium Compounds as a Tool for Caspase and Cathepsin Inhibition"

Metal caging complexes are growing in popularity in their use as potential anticancer treatments with their ability to render bioactive chemicals inert until activated with light. Using this method allows for precise spacial and temporal control of drug delivery. Caspases and cathepsins are classes of enzymes that are essential to normal cell function, and their dysregulation can contribute to a number of diseases localized in different areas of the body. My project is focused on the synthesis and analysis of separate caspase and cathepsin inhibitors as a part of ruthenium complexes that can be activated by light with a high level of precision.

.....
Anna Lewenz

Faculty Mentor: **Dr. Andrew Salch**

"Representation Rings Of Cyclic Groups Over An Algebraically Closed Field"

One of the goals of representation theory is to classify the tensor product of two indecomposable representations of a group. This can be thought of as the "DNA" of the representations of the group. In our case, we calculate the Jordan canonical form for the tensor product of invertible Jordan block matrices over an algebraically closed field k .

.....
Rafael Lima

Faculty Mentor: **Dr. Mohammad Mehrmohammadi**

"Development of Electrocardiogram Suitable for Educational Purposes"

The acquisition of ECG signals is a very important part of health monitoring systems. This was the project development of hardware and software part of an electrocardiogram device. The research was fully conducted with the goal of make something that could be used by students with basic knowledge of electronics to easily understand the functionality of each of the parts of an electrocardiogram device. As result, a documentation was made describing all the steps required in the development of similar devices, as well the fully functional electrocardiogram that can be used in class or reproduced in laboratory practices by the students.

.....
Genan Ling

Faculty Mentor: **Dr. Marcis Jansons**

"Measurement of Soot Particles in Premixed Flames"

Soot is produced in fuel-rich parts of flames as a result of incomplete combustion of hydrocarbons. In order to comprehend the mechanism of the soot emission reduction, different characteristics of soot need to be understood. The motivation of this project is to study the fundamentals of soot particles and emission-reduction mechanisms during combustion process. This project will investigate soot formed in premixed flat flames: soot sizing and morphology with scanning electron microscope (SEM), carbon/hydrogen (C/H) ratio with FTIR, and refractive index with in-situ laser scattering techniques.





Ciara Lumaj

Faculty Mentor: **Dr. Barry J. Lyons**

"Medical Pluralism in Ecuador"

"Medical Pluralism in Ecuador" is a compilation of anthropological research investigating the multiple health care systems within Ecuador. Within Ecuador, one has the option to choose between Western biomedicine, traditional medicine, and alternative forms of medicine. This research investigates how and why this society has adapted the different systems through a holistic viewpoint. With knowledge and understanding, it can reap benefits like attracting interests in residents and overall satisfying care for all patients.

Danielle Lumetta

Faculty Mentor: **Dr. Eric Ash**

"Enclosure Acts and Norfolk's Agricultural Progress from 1750-1850"

Between 1750 and 1850, there was an effort by Parliament to privatize or enclose the common land holdings of England, with the end goal being the increased efficiency and production of farmland. The outcome of these efforts has been debated since, and this project was designed to compile a brief micro-history of the county of Norfolk in order to look closer at a small piece of England's larger history of agricultural improvement. This research observes the changes brought about by enclosures and whether they benefitted or harmed those affected, as well as the innovative new farming techniques implemented throughout Norfolk as a means of adapting to the ongoing changes of enclosures.

Carly Malburg

Faculty Mentor: **Dr. Robert Akins**

"Antagonism between Candida and vaginal bacterial species: roles in vaginal candidiasis and bacterial vaginosis."

The pathogenic yeast *Candida albicans* causes Vulvovaginal candidiasis (VC) in 29% of adult women, but its relationship with vaginal bacteria and bacterial vaginosis (BV) is unknown. The purpose of this study is to determine whether vaginal bacterial species exist that inhibit the growth of various strains of *Candida albicans* or, conversely, are themselves inhibited by *Candida* in vitro. Our hypothesis is that lack or suppression of antagonistic bacterial species will be correlated with VC or a patient history of VC. Early results indicate that these bacterial species do exist. If confirmed, this offers new possibilities in managing both VC and BV.

Shobi Mathew

Faculty Mentor: **Dr. Vijaya Kumar**

"Functionality of TIMI score in the risk-stratified management of chest pain patients in the ED"

Risk stratification of CP patients presenting to the Emergency Department (ED) has not been universally accepted. The Thrombolysis in Myocardial Infarction (TIMI) risk score uses the sum of seven independent variables that share a positive correlation with increased risk for death or major cardiac occurrences. Differences in clinician interpretation of positive TIMI variables has been seen in the past, the most common being the determination of >2 anginal episodes within 24 hours and aspirin use within seven days. The objective of this study was to assess the functionality of TIMI risk score used in stratifying patients with chest pain in the ED and to identify physician compliance and discrepancies in risk stratification.



Samia Mazumder

Faculty Mentor: **Dr. Bonnie Sloane**

"The Effect of Cysteine Protease Inhibitors on Photodynamic Therapy of Breast Cancer Cells"

Inflammatory breast cancer (IBC) is the most aggressive form of breast cancer, with a five-year survival rate of only 34%. The conventional methods of treatment, including surgery, radiation therapy, or chemotherapy are not highly effective due to the complex structures IBC makes in the human body. Photodynamic Therapy (PDT) is an alternative treatment that can be used to treat cancer cells. This study examines the efficiency of small molecule cysteine protease inhibitors (such as E64d and PepstatinA) on PDT using BPD a common photosensitizer.

Nicole McCants

Faculty Mentor: **Dr. Shawn P. McElmurry**

"A Spatial Analysis of the Elemental Composition of Fugitive Dust Within Metropolitan Detroit"

The exacerbation of environmental factors to be reported in this study related to asthma are: legacy contaminants and particulate matter. The design was to understand soil and lead resuspension rates, one's exposure to lead in the soil, and exposure to lead from outdoors kicked up and brought indoors. The concentration of lead in elements such as the dust in street sediments and materials was hypothesized, as well as the measurement of both values visual difference in composition. It was determined that industrial areas would naturally have higher Pb concentrations due to the lack of foliage, making these areas less likely places for playgrounds and schools due to health risks from traffic exposure due to busy roads. This was only an approximation of real exposure.

Clearie Mccarthy

Faculty Mentor: **Dr. Mary Anderson**

"Hands On Hands Off: Creatively Exploring Bystander Approaches to Sexual Violence Prevention"

In this talk, I will discuss the issues college campuses are facing in regard to sexual violence as well as present my findings from working within my applied theatre class here at Wayne State. I will talk about why using theatre as a tactic to address an issue as sensitive as sexual violence has potential to yield illuminating results. I will provide details of the research I undertook and the process I employed during the creation of my devised piece.

Dwight McDonald

Faculty Mentor: **Dr. Donyale Padgett**

"Diversity's influence on retention"

My project analyzes what influences the retention rate of African American males on Wayne State University's campus.



Ira Memaj

Faculty Mentor: **Dr. Nicole Varty**

“Gendered Literacies: A Qualitative Study of Literacy Practices in an All-Female OB/GYN Clinic”

This study focuses on literacy theory as proposed by New Literacy Study scholars (James Gee’s Discourse Communities) and on gender theory of performativity. Although much research has been done on these two fields, none have focused on linking them together. This study proposes that gender performativity is a literacy practice. This claim is supported through field observations and interviews conducted at an all-female OB/GYN clinic.

Maryssa Mercer

Faculty Mentor: **Dr. Michele Grimm**

“Prediction of Unilateral Recurrent Laryngeal Nerve Palsy During Shoulder Dystocia Using Computer Simulation Model”

Shoulder dystocia occurs during the birth process when the infant’s shoulder becomes trapped behind the maternal pubic bone, while the head and neck continue to advance down the birth canal due to maternal and clinician-applied forces. As a result, significant stretch can occur to the nerves located in the neck of the infant. The unilateral recurrent laryngeal nerve, which supplies the voice box, is paralyzed in approximately 0.6% of newborns, yet no significant clinical data currently exists to explain how or why this injury occurs. By using a dynamic 3D computer simulation model, we can predict the amount of stretch in the RLN during an obstructed delivery in order to determine if paralysis can occur as a result of potential rupture injury during shoulder dystocia.

Benjamin Mick

Faculty Mentor: **Dr. Mohammadreza Avanaki**

“Ultrasonic Echolocation Device for Assisting the Visually Impaired”

Our device aims to assist the visually impaired by using ultrasonic sensors and tactile feedback. Ultrasonic sensors can be used to detect objects and determine distances. This system can be applied to medical conditions in which an individual is visually impaired by letting the user know the distance to a nearby object.

Cristian Mihaltan

Faculty Mentor: **Dr. Todd Eugene Meyers**

“Empathy Across the Career of Physician Training: A Qualitative and Quantitative Study of Premedical Students, Medical Students, and Physicians”

This project examines the role of physician empathy as a critical component within the medical health care system. Using qualitative and quantitative analyses, we compared empathy as viewed across three main groups including premedical students, medical students and physicians. As a prospective physician progresses from the premature premedical stage to the developing medical student stage to, ultimately, the mature stage as a full fledged physician, empathy carries a variety of meaning and application. Empathy as a whole may be used within the medical system not only as a cognitive process but as a behavioral tool to improve physician-patient interaction.





Devin Mills

Faculty Mentor: **Dr. Matthew Allen**

"Lanthanide-containing N-[1-(2,3-dioleoyloxy)propyl]-N,N,N-trimethylammonium chloride complexes and their impact on chemical exchange saturation transfer"

Magnetic resonance imaging using specialized contrast agents has been an expanding field in recent years as higher strength magnets are becoming more readily available. The metal complexes that I am synthesizing are expected to provide contrast enhancement that is orthogonal to currently available contrast agents and to be impactful at high field strengths.

.....
Hamad Mirza

Faculty Mentor: **Dr. Sandro daRocha**

"Polyamidoamine Dendrimer-TPP as a Platform to Deliver siRNA for Lung Cancer Treatment"

Development of a successful RNAi technology, a reliable post-transcriptional gene-silencing mechanism, has been hindered due to the lack of nanocarriers that can effectively deliver short interfering RNA (siRNA) intracellularly. In this work, we investigate the in vitro gene knockdown ability of siRNA complexed with amine terminated generation 4 poly(amidmine) dendrimer (G4NH2 PAMAM) modified with triphenylphosphonium (TPP), a mitochondrial targeting agent, as a function of N/P ratio (5, 10, 20, 30) and TPP density (0, 4, 8,12) within eGFP expressing lung alveolar epithelial (A549) cells. An increase in TPP density and N/P ratio led to an increase in gene knockdown in vitro with the G4NH2-12TPP/ siRNA complex at N/P ratio 30 demonstrating the highest in vitro gene knockdown of all groups.

.....
Aayush Mittal

Faculty Mentor: **Dr. Ajay Jain**

"Role of Bile Acids in Total Parenteral Nutrition-Associated Liver and Gut Injury"

Total Parenteral Nutrition is a lifesaving form of nutrition given to many patients. However, it is unfortunately associated with impaired gut function and can lead to liver disease. There are no proven therapeutic treatments available for this complication despite its wide use. Our lab is using a piglet model to assess possible reasons for these complications and possible treatments.

.....
Mukund Mohan

Faculty Mentor: **Dr. Brian O'Neil**

"Predicting Return of Spontaneous Circulation Utilizing the Nonin® Equanox Cerebral Oximetry System"

The AHA 2010 guidelines recommend ETCO2 for monitoring the quality of CPR and detecting ROSC. However, reduced detection of ETCO2 has been observed in patients with pulmonary embolus, severe airway obstruction, and pulmonary edema. Unlike ETCO2, cerebral oximetry does not rely on pulse, is unaffected by aspirated gastric contents and sodium bicarbonate, and is less affected by vasopressors. Cerebral oximetry noninvasively and continuously monitors the regional oxygen saturation in the frontal lobes using near-infrared spectroscopy. Historically, cerebral oximetry has been used intra- and post-operatively and has shown to be an early indicator of cerebral hypoperfusion. The objective of this study is to determine if cerebral oximetry can be used to predict ROSC during CPR.





Ashura Molla

Faculty Mentor: **Dr. Sandro da Rocha**

“Pressurized Metered-Dose Inhaler Formulations of Polyamidoamine/siRNA Dendriplexes for Lung Cancer Treatment”

Lung cancer accounts for the highest number of cancer-related deaths for both men and women in the United States. Traditional treatment methods result in strong adverse systemic effects; therefore, a more efficacious and tolerable therapy must be developed in lung cancer treatment. Small interfering RNA is able to directly target the affected cells when complexed with dendrimer nanocarriers by silencing the expression of a gene in a post-translational manner. Delivery via oral inhalation methods results in a high deposition of the drug to the deep lungs and diminishes systematic side effects.

Robert Morgan

Faculty Mentor: **Dr. Edward Cackett**

“Relativistic Broadening of the Iron Emission Line from Serpens X-1”

Serpens X-1 is a neutron star, which is an object that can be left behind after a large star explodes. To study these objects, physicists observe the light that is coming from the object and, based on the shape and distortions in the light, draw conclusions about events occurring near the surface of the star. For my project, I observed the light coming from the star, specifically focusing on the iron emission line. By modeling the spectrum, I was able to set a limit on the maximum radius of the neutron star and provide evidence that relativistic effects were influencing the shape of the spectrum.

Jordan Mulders

Faculty Mentor: **Dr. Todd Meyers**

“Seeing Community Health Efforts From the Ground Up: Observing a Health and Sustainable Nutritional Practices Intervention in Kabale, Uganda”

Aryana Sharrak and Jordan Mulders traveled to the community of Nangara in the Kigezi region of southwest Uganda to observe the factors that cause high malnutrition rates. Community health interventions were implemented for the 33 families of the community that had the lowest health standards. These interventions included vertical kitchen gardens, deworming pills, and multivitamin supplements. The impact of these interventions was evaluated with interviews, field notes, surveys, and BMI measurements. This is an ongoing project, so for the upcoming year a new health intervention of rabbit-breeding projects will be included and the families will be re-evaluated. Once a comprehensive method to combat malnutrition has been identified, the health interventions can be expanded into the surrounding rural communities.

Lakshmi Nerusu

Faculty Mentor: **Dr. Kang Chen**

“Regulation of Maternal Fetal Mucosal Immunity by HEXIM1 and Extrathymic AIRE in Pregnancy”

The female reproductive mucosal immune system not only protects the host against infections, but also adapts to a spectrum of physiological events, such as menstrual cycles, fertilization, and implantation. The molecules and mechanisms mediating immunological regulation in the female reproductive membrane have remained understudied compared to various other mucosal areas. This study aims to identify the regulation of immunological factors within the control of maternal-fetal immunity during pregnancy.





Manal Nizam

Faculty Mentor: **Dr. Caroline Maun**

“Living Poetry in Japanese Water”

Using a multimedia representation of my chapbook length volume of poetry through the use of video, text, and audio, I will highlight the water ecology of Japan through the eyes of a study abroad student studying environmental sciences in Japan. I was that student, who lived on the shore of Lake Biwa — Japan’s largest freshwater lake that beats life into the heart of the country. My poems relate to water whether they mention a drink of green tea in a Buddhist tea ceremony or the call of nature. In my poems, I explore the social, economical, political, and religious functions water serves in Japan. I do this through unique forms and representation as fluid, and full of life, as water itself.

Anne Okonowski

Faculty Mentor: **Dr. Diane Sybeldon**

“Detroit Public Library Art & Architecture: Bronze Entrance Doors & Aesop’s Ceiling”

During winter semester 2015, we, as students of the Irvin D. Reid Honors College, researched various points of interest within the Detroit Public Library to help the newly created tour program.

Owen Pierce

Faculty Mentor: **Dr. Michael Howard Schrader**

“Urban Flooding in the City of Detroit”

Flooding has been an issue in the city of Detroit for many years, and this report looks to examine one of the main causes, impervious surfaces. Pavement is one such surface, and water is prevented from going through it and back into the ground. The research performed in this report looks to affirm the fact that if more pavement is removed from the roads and replaced with grass, then the chance of flooding, specifically in Detroit, will be significantly reduced.

Damaris Pop

Faculty Mentor: **Dr. Emily Grekin**

“Effectiveness of e-interventions: Does empathy matter?”

The National Survey on Drug Use and Health estimates that while 19.3 million individuals age 12 and over met criteria for an alcohol use disorder in the past year, fully 87.4% of who neither received any treatment in the past 12 months nor wanted it. Recognition of this tremendous gap has led to efforts in designing and implanting the use of proactive screening and brief interventions for alcohol use. Previous research has shown that this type of intervention has been effective in reducing drinking. This study used the Multiphase Optimization Strategy, an efficient method for optimizing intervention content in which empathy, positive regard, use of voice, and use of an animated narrator were used to study the effects of alcohol outcomes.



Sharmi Purkayestha

Faculty Mentor: **Dr. Robert Akins**

"Antagonism between Candida and vaginal bacterial species: roles in vaginal candidiasis and bacterial vaginosis."

The pathogenic yeast *Candida albicans* causes Vulvovaginal candidiasis (VC) in 29% of adult women, but its relationship with vaginal bacteria and bacterial vaginosis (BV) is unknown. The purpose of this study is to determine whether vaginal bacterial species exist that inhibit the growth of various strains of *Candida albicans*, or conversely are themselves inhibited by *Candida* in vitro. Our hypothesis is that lack of or suppression of antagonistic bacterial species will be correlated with VC or a patient history of VC. Early results indicate that these bacterial species do exist. If confirmed, this offers new possibilities in managing both VC and BV.

Mehon Rahman

Faculty Mentor: **Dr. Harini Sundaraghavan**

"Characterization of protein release from co-axial polycaprolactone electrospun fibers"

Proteins have found usage in many treatments, such as those for peripheral nervous system injuries. Delivering these proteins to a targeted area is therefore a subject that has garnered a large amount of research into accomplishing. One method of achieving this is through the use of electrospun fibers as containers and releasers of these proteins. These micro-scale fibers are able to be constructed from polymer solutions, which provide the ability to create fiber scaffolds from biocompatible materials. In particular, polycaprolactone (PCL) has been shown to be both biocompatible and easily fashioned into fibers. Using hollow PCL fibers, impregnated with proteins, it will be possible to characterize the fibers in human body conditions.

Nathan Reddmann

Faculty Mentor: **Dr. Mohammadreza Avanaki**

"Ultrasonic Echolocation Device for Assisting the Visually Impaired"

Our device aims to assist the visually impaired by using ultrasonic sensors and tactile feedback. Ultrasonic sensors can be used to detect objects and determine distances. This system can be applied to medical conditions in which an individual is visually impaired by letting the user know the distance to a nearby object.

Derek Robertson

Faculty Mentor: **Dr. Eric Ash**

"Principles and Politics: The Sufferings of Quakers during the Restoration"

This project is a piece of historical literature regarding the persecution of the Quaker, a religious minority in England during the reign of King Charles II. It explores the motivation behind that religious persecution, the forms which it took, and the insights that can be gained into English political history through its examination. Through the use of contemporaneous archival documents including Quaker correspondences, legal records, and court diaries, this paper makes the case that the relentless manner in which the Quakers were persecuted by the government of Charles II was a direct reflection of the reactionary and short-sighted political climate in which they existed.



Saige Rutherford

Faculty Mentor: **Dr. Moriah Thomason**

“An exploration of the developing human brain: in-utero to infancy utilizing fMRI”

This study utilizes functional magnetic resonance imaging (fMRI) of the human fetus in-utero and infants to provide us with novel insight regarding the processes underlying brain maturation during early life. Our research has demonstrated that these methodologies are both feasible and applicable to understanding early-life development.

.....
Ronda Safadi

Faculty Mentor: **Dr. Jeffrey Ram**

“Creating an Effective Electric Eel Display for the Belle Isle Aquarium”

Entertaining, interacting, and educating are three aspects visitors should experience at exhibits. At the Belle Isle Aquarium in Detroit, the goal was to incorporate the public with all three aspects at the electric eel exhibit. By creating and developing a user-interface and hands-on electronics, visitors will interact with the electric eel display, enjoy their time at the electric eel exhibit, and leave with more information about electric eels. To test the effectiveness of the exhibit, anonymous surveys were given to the public before entering and after exiting the Belle Isle Aquarium.

.....
Aashna Sahi

Faculty Mentor: **Dr. Nardhy Gomez-Lopez**

“Pregnancy at advanced maternal age disrupts the T-cell repertoire at the maternal-fetal interface”

Older women are at a higher risk of developing pregnancy-related complications such as neonatal mortality and longer labor times. We investigated the effects of advanced maternal age on the immune system of mothers and on fetal weights in comparison to young mothers. To measure the immune response, we obtained fetuses and harvested maternal tissues from euthanized pregnant mothers prior to delivery and then recorded fetal weights and measured immune cell populations.

.....
Mariela Sanchez

Faculty Mentor: **Dr. Annmarie Cano-Wurm**

“Linguistic Inquiry of Formula 1 Race Car Drivers”

Research has found that positive life events can cause positive and intense emotions. This study looks specifically at positive events in Formula 1 racecar drivers’ lives (i.e. coming in first, second, and third place in races over the past 10 years). Using the Linguistic Inquiry and Word Count (LIWC) software, we investigated these racers’ word usage during press conference interviews following the races. Based on the racers’ languages, we found significant differences in emotionality and racers’ final positions; word tense and racers’ final positions; pronoun usage and racers’ final positions and initial grid positions; other categories like sexual, achievement, work, and causation word usage and racers’ final and initial grid positions.





Farah Satta

Faculty Mentor: **Dr. Robert Akins**

"Making connections between niche tropisms of strains of Candida albicans to their genotypes and in vitro phenotypes."

Candida albicans is an opportunistic pathogenic yeast which inhabits approximately 25% of oral, gut, and vaginal environments of the general population, leading to a condition called Candidiasis. There are two variant genotypes, C. africana and C. dublineinsis, which are known to be restricted to vaginal and oral environments, respectively. However, my early data shows that there are more genotypes of uncertain consequence. This research project aims to determine which genetic markers directly correspond to niche and virulence mechanisms. By uncovering genetic markers, we may be able to further categorize variants within the C. albicans super-family, allowing us to draw conclusions which will be clinically significant when choosing routes of treatment for individuals diagnosed with Candidiasis.

.....
Aftab Shaik

Faculty Mentor: **Dr. Mark VanBerkum**

"Using a cell culture assay to identify elements of Frazzled signaling"

After birth, neurons must extend axons over long distances to establish communication with target cells. They do so by responding to external guidance cues and regulate the processes underlying axon extension and steering. To examine this signaling process, we developed a cell culture assay where the signaling initiated by the guidance receptor Frazzled alters the flat S2 cell into a 'hairy ball'. Aftab's work confirmed that hairy ball formation requires Frazzled and is using two proteins known to regulate actin dynamics. We are now using this assay to identify other signaling proteins involved in Frazzled-dependent hairy ball formation. Ultimately, fly genetics will assess the role of these candidates during axon outgrowth in the embryo.

.....
Aryana Sharrak

Faculty Mentor: **Dr. Todd Meyers**

"Seeing Community Health Efforts from the Ground Up: Observing a Health and Sustainable Nutritional Practices Intervention in Kabale, Uganda"

Aryana Sharrak and Jordan Mulders traveled to the community of Nangara in the Kigezi region of southwest Uganda to observe the factors that cause high malnutrition rates. Community health interventions were implemented for the 33 families of the community that had the lowest health standards. These interventions included vertical kitchen gardens, deworming pills, and multivitamin supplements. The impact of these interventions was evaluated with interviews, field notes, surveys, and BMI measurements. This is an ongoing project, so for the upcoming year a new health intervention of rabbit-breeding projects will be included and the families will be re-evaluated. Once a comprehensive method to combat malnutrition has been identified, the health interventions can be expanded into the surrounding rural communities.

.....
Atika Singh

Faculty Mentor: **Dr. Claire Pearson**

"Emergency Department Visits in Patients with Low Acuity Conditions: Factors associated with resource utilization including transportation concerns"

The objective is to identify health beliefs in patients with low acuity conditions and how resource utilization is affected including ambulance. We performed a



prospective, observational study of a convenience sample of patients 18 years or older who presented to the emergency department (ED) with a triage level of 4 or 5. Understanding patient perceptions of illness and other barriers to receiving care is imperative to modifying behaviors.

Karyna Sitkowski

Faculty Mentor: **Dr. Laura Kline**

"Serial Killers of the Former Soviet Union and Modern-Day Russia"

"Serial Killers from the Former Soviet Union and Modern-Day Russia" examines four serial killers from different parts of the Soviet Union and its successor states. These biographies and analysis bring to light what caused these individuals to kill and how the government's lack of acceptance of Western psychology and criminology allowed them to kill for extended periods of time.

Vita Stramaglia

Faculty Mentor: **Dr. Robert Akins**

"Where in the world are pathogenic Candida species?"

Among the thousands of fungal species on the planet, dozens are known opportunistic pathogens in humans. Most species are Candida; over half are Candida albicans. Candida species colonize human skin, bloodstream and mucosal membranes of the mouth, intestines and vagina; systemic infections have up to 40% mortality. This study aims to identify the common reservoirs in the environment of Candida albicans. Pathogenic species of Candida were found on 91% of food items tested. C. albicans was prevalent in chicken; C. krusei in many fruits. Genotype comparisons of environmental strains with those of local human colonizers will indicate if these populations intermingle. Environmental isolates may be exposed to agricultural antifungals that induce resistance; if so, these populations could contribute to the growing instances of clinical resistance.

Raviteja Suryadevara

Faculty Mentor: **Dr. Prahlad Parajuli**

"Immune Cell Infiltration in the Brain Following Intermittent Alcohol Exposure"

This project is a study that investigates the relationship between intermittent alcohol abuse and its relationship with the degeneration of the nervous system, specifically the brain. We use a mouse model to replicate alcohol abuse and show that this abuse does lead to specific immune responses that may be analogous to degenerative diseases such as Alzheimer's and Parkinson's disease.

Solomiya Svytka

Faculty Mentor: **Dr. David Armant**

"Characterization of Trophoblast Cells Obtained by Trophoblast Retrieval and Isolation from the Cervix (TRIC) and the Exploration of Expression of Trophoblast Proteins from Overexpressed Transcripts"

The proper identification of fetal cells that are isolated from the cervix during 5-20 weeks of gestation provides clinical significance for predicting obstetric disorders. Moreover, the proteins expressed by fetal cells can serve as biomarkers for the onset of pathologies during pregnancy; proteins abnormally expressed by fetal cells have a high chance of being involved in critical processes of pregnancies, such as invasion. Thus, the goal of this research project was to acquire a better understanding of the fetal cells isolated from the cervix by exploring the expression of the fetal proteins.



Suha Syed

Faculty Mentor: **Dr. Robert Akins**

"Identification of probiotic Lactobacillus species that antagonize bacterial vaginosis-associated bacteria"

Bacterial vaginosis (BV) is a complex disease affecting 29% of otherwise healthy women. Treatments are usually effective initially, but a majority of women recur within a year. These long periods of abnormal vaginal bacterial profiles impose risks for preterm birth at many vaginal disorders. My project focuses on using a variety of different experiments to identify and isolate bacterial species from non-vaginal sources that are resistant to BV-associated bacteria and may prove useful as probiotics. It is an initial step in the long process to finding an effective long-term cure for bacterial vaginosis.

.....

Aaron Szpytman

Faculty Mentor: **Dr. Howard Matthew**

"Effects of Glycosaminoglycan Surface Composition on MSC Differentiation to Valvular Lineages"

Congenital heart defects are the number one birth defect in the world. In this project, chitosan-collagen-glycosaminoglycan (GAG) — a natural type of carbohydrate found in the body — materials are being used to develop scaffolds for pediatric heart valve tissue engineering. The objectives were to determine the effect of surface GAG composition on the growth of mesenchymal stem cells (MSCs) and to characterize MSC differentiation to valvular cell types on chitosan-collagen-GAG surfaces.

.....

Vipul Taxak

Faculty Mentor: **Dr. Ashok Kumar**

"Phage endolysin and their mimetic synthetic peptides synergize with contact lens solutions to eradicate bacterial biofilms"

Bacterial biofilm on contact lens surfaces can easily go untreated through the use of contact lens solutions, which may lead to ocular disease. Formed bacterial biofilms are unaffected by contact lens solution treatment. To further improve the efficacy of contact lens solutions, we have supplemented them with phage endolysins and their mimetic synthetic peptides.

.....

Jacob Taylor

Faculty Mentor: **Dr. Daniel Grosu**

"Efficient Algorithms for the Maximum Subarray Problem: Performance Analysis"

The maximum subarray problem (MSP) is a two-dimensional variation of the one-dimensional maximum sub-sequence sum problem. The goal of the MSP algorithms is to locate the largest subsection of a given array or matrix. These algorithms have important applications in big data analysis, genomic sequencing, and computer vision. We implement several sequential and parallel MSP algorithms and perform an extensive experimental analysis of their performance.

.....

David Tes

Faculty Mentor: **Dr. Mohammad R.N. Avanaki**

"Skin Cancer Border Detection via Advanced Image Processing of OCT images"

Optical coherence tomography (OCT) is an established medical imaging technique that uses light to capture micrometer-resolution, three-dimensional images from within a tissue. Recently, OCT has become a popular modality for

skin tumor diagnosis and assessment of tumor size and margin status. In this study, we attempt to demonstrate a quantifiable relationship of the changes in tissue due to neoplasm and its effects on the optical properties of skin. For this purpose we examined granular cell tumor (GCT), a rare and relatively uncommon lesion that demonstrates significant morphological changes compared to healthy tissue. A swept-source optical coherence tomography system was utilized for imaging, and abrupt changes in architectures of the dermal and epidermal layers in the GCT lesion were investigated.

Bhavana Tetali

Faculty Mentor: **Dr. Claire Pearson**

“Utility of Platelet Reactivity to Aid in the Diagnosis of Stroke”

Rapid and accurate diagnoses of patients with symptoms of stroke is vital for ED physicians to facilitate timely delivery of treatments such as tPA or vascular intervention and to avoid these therapies in patients with transient ischemic attacks (TIA) or stroke mimics. Increased platelet reactivity is reportedly a predictor of adverse events in stable cardiovascular disease and may assist in discerning patients with acute coronary syndrome (ACS) vs. non-cardiac chest pain. Our aim was to determine whether early assessment of platelet reactivity was associated with a diagnosis of stroke, TIA, or stroke mimic.

Shawn Thomason

Faculty Mentor: **Dr. Glenn Weisfeld**

“Sources of conflict between non-marital and marital couples”

This study sought to understand the differences in conflict between couples in the United States.

Wesley Trescott

Faculty Mentor: **Dr. Marwan Abi-Antoun**

“A User Interface for the Interactive Refinement of an Object Graph”

A significant problem in software engineering is the large time factor involved in program comprehension. To mitigate this issue, ownership object graphs (OOGs) group software objects into ownership domains to impose hierarchy and reduce complexity. OOGs are extracted from software code and displayed in a graph interface. This project improves the graph interface by adding interactivity, allowing users to modify the graph through drag-and-drop operations and thus enabling them to refine the OOG to fit their design intent.

Michael Vargo

Faculty Mentor: **Dr. Todd Eugene Meyers**

“Empathy Across the Career of Physician Training: A Qualitative and Quantitative Study of Premedical Students, Medical Students, and Physicians”

This project examines the role of physician empathy as a critical component within the medical health care system. Using qualitative and quantitative analyses, we compared empathy as viewed across three main groups including premedical students, medical students, and physicians. As a prospective physician progresses from the premature premedical stage to the developing medical student stage to, ultimately, the mature stage as a full fledged physician, empathy carries a variety of meaning and application. Empathy as a whole may be used within the medical system not only as a cognitive process but as a behavioral tool to improve physician-patient interaction.

Nathan Vengalil

Faculty Mentor: **Dr. Nabanita S. Datta**

"PTH regulation of CEBP-delta expression in MAPK phosphatase-1 (MKP-1) null osteoblasts"

Osteoporosis afflicts millions of people worldwide and results from the decline in the activity of bone-forming cells (osteoblasts) relative to the activity of bone-destroying cells (osteoclasts). Parathyroid hormone (PTH) controls bone homeostasis and bone development. This study investigated the role of MAPK phosphatase-1, underlying the bone forming activity of PTH, for novel therapeutic interventions to promote bone formation. Insulin-like growth factor-1 (IGF-1) plays an important role in PTH anabolic action. CEBP-delta, a transcription factor, is an upstream regulator of IGF-1. Using osteoblasts from wild type and MKP-1 knock-out mice, our results suggested involvement of additional mechanistic pathway/s, in addition to CEBP-delta, in the absence of MKP-1 on PTH/IGF-1 regulation, sexual dimorphism and bone homeostasis.

Lais Verly

Faculty Mentor: **Dr. Ana Djuric**

"Parametric Trajectory modeling for Fanuc Robot Family"

This work presents a methodology for how to create a parametric trajectory for the Fanuc Robot Family. The trajectory can be created using the Teach Pendant or simulation and off-line programming software. Sometimes there are safety problems when men and robots have to share the same workspace. This is the reason why the parametric trajectory needs to be created. To achieve our goal, we created an experiment with the small Fanuc LR Mate 200 iD robot and big Fanuc S430 iW robot. In the experiment, we made the same trajectory with both robots and by comparison we created parametric trajectory for both of them. The results are validated and will be used for future factory automation.

Joseph Willard

Faculty Mentor: **Dr. George Yin**

"A mathematical perspective of financial options"

This project focuses on the math aspect of option pricing. This is a cumulation of the necessary vocabulary in both a finance and math perspective as well as an in-depth look into the theory behind some of the most important results in the field, such as the Black-Scholes method. Alongside my presentation, I provide computer code to simulate calculations to help provide more insight into the differences between the pricing method for certain options.

Nyree Williams

Faculty Mentor: **Dr. Kidada Williams**

"African American Women and Lynching"

The project that will appear at the conference in two parts: a short oral presentation explaining the project, and a short documentary containing the information obtained throughout my research.



Ryan Woloshen

Faculty Mentor: **Dr. Vanessa De Gifis**

"An Analysis of Shifting Rhymes in Sura 52"

The chapters (suras) in the Qur'an are periodized as early, middle, and late Meccan and, lastly, Medinan. Many early Meccan suras are characterized by blocks of verses with identical end rhymes that treat a coherent theme, with shifts in end-rhyme corresponding to shifts in theme. However, some early Meccan suras display frequent shifting end rhymes that do not clearly correspond to shifting theme, which raises questions about why such rhyme shifts occur, how they relate to theme, and what implications they have for the development of the sura as a textual unit. My paper offers a close analysis of Sura 52, which exemplifies apparent aberrations in rhyme, in order to argue for a coherent pattern of rhyme shifting that I tentatively call ring-structured rhyme.

Andrew Yan

Faculty Mentor: **Dr. Vijaya Kumar**

"Adherence with outpatient follow-up, ED recidivism and the utilization of outpatient diagnostic testing post-protocol"

Patients presenting to the emergency department (ED) with chest pain (CP) are often admitted to the hospital; however, this is an inefficient use of resources, as a majority end up not having acute coronary syndrome (ACS). To improve upon this, our institution initiated an evidence based ACS protocol, a principal component of which involves discharge of low-risk CP patients from the ED. The objectives are to evaluate adherence with outpatient follow-up, ED recidivism, and the utilization of outpatient diagnostic testing post-protocol.

Jill Young

Faculty Mentor: **Dr. Susanne Brummelte**

"Methodology of Returning Male Rats to Housed Pairs After Breeding"

The standard operating procedure for housing male rats after breeding is to single-house them from that point forward. This avoids the possibility of them getting into a fight upon reintroduction and potentially harming each other, as male rats show increased signs of aggression toward each other after mating with a female. But rats are very social animals and single-housing them is a known stressor. This project developed a method to safely re-pair these breeder males.

Christen Zimecki

Faculty Mentor: **Dr. Joshua Wilburn**

"The Genre of Plato's Republic"

Plato's *Republic* possesses literary elements that one would find present in Greek tragedy, epic, and comedy. My research is an attempt to discover whether Plato intended for readers to interpret *Republic* as one of those genres in particular. The results show that Plato uses more elements that belong to tragedy than epic or comedy, which may mean that Plato wrote *Republic* as a tragedy.





Athena Zissis

Faculty Mentor: **Dr. Krysta Ryzewski**

“Piercing the Canopy: Using LiDAR Imagery to Remotely Survey the Jungles of Montserrat”

The Survey and Landscape Archaeology on Montserrat Project (SLAM) has been researching the Eastern Caribbean island of Montserrat’s cultural history since 2010. Montserrat’s challenging landscape required SLAM to combine remote and pedestrian survey techniques to efficiently locate archaeological sites. This report outlines the remote survey of six zones within Montserrat’s Centre Hills region using airborne Light Detection and Ranging (LiDAR) data to identify archaeological sites beneath the jungle canopy.

.....
Clara Zundel

Faculty Mentor: **Dr. Moriah E. Thomason**

“Examination of Children’s Perception of Affect in Adult Neutral Facial Expressions”

The ability to correctly assess emotions from faces is an important evolutionary skill that develops early in life. Neutral facial expressions are emotionally ambiguous and some individuals have a tendency to perceive neutral faces as being negative. A strong “negativity bias” has been reported in children perceiving neutral adult faces. In our study, we assessed brain responses and negativity ratings of angry, happy, and neutral faces of both adults and children in a sample of 36 children (ages 8-17). Our findings suggest that the negativity bias observed in children is exaggerated for neutral adult faces relative to neutral faces of children, which may suggest that neutral faces are not emotionally neutral and may not be an appropriate baseline for brain or behavioral studies.

.....





NOTES



Special thanks to:

Dr. Margaret E. Winters
Provost

Dr. Monica Brockmeyer
Associate Provost for Student Success

Dr. Vaibhav A. Diwadkar
Associate Professor,
Department of Psychiatry and Behavioral Neurosciences

Matthew Orr
Program Coordinator, Undergraduate Research Opportunities Program (UROP)

Christa Balow
Student Assistant, Undergraduate Research Opportunities Program (UROP)

Jackie Frank
Event Manager, Special Events and Services

Christa Clark Raju
Creative Director, Marketing and Communications

Jo Click
Senior Graphic Designer, Marketing and Communications



UROP
Undergraduate Research
Opportunities Program

uop.wayne.edu