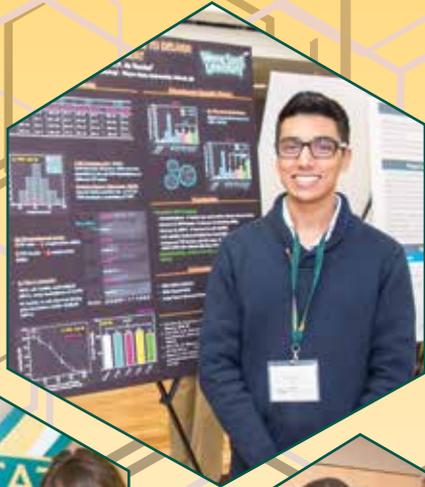




UROP

Undergraduate Research
Opportunities Program

Undergraduate Research and Creative Projects



2016 CONFERENCE
November 11 — 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. Paul Karchin
Professor, Physics

Dr. Arthur Marotti
Professor Emeritus, English

Dr. Yaddanapudi Ravindranath
Professor, Pediatrics

Dr. Seetha Shankaran
Professor, Pediatrics

Dr. Robert Sedler
Distinguished Professor,
Law Instruction

Dr. Charles Schiffer
Professor, Oncology

Dr. Gang George Yin
Professor, Mathematics

Friday, November 11, 2016

Student Center Building

- 8 a.m. **Registration** — South entrance
- 8:30 a.m. **Continental Breakfast** — Ballroom C
- 9 a.m. **Welcome** — Ballroom C
Stephen M. Lanier, Vice President for Research
- 9:30 a.m. **Oral Session I** — Multiple locations
See session pages
- 10:30 a.m. **Poster Session:**
Behavioral and Social Sciences
and Physical Sciences — Room 25
Life Sciences, Engineering, and Arts and
Humanities — Room 20
- Noon **Oral Session II** — Multiple locations
See session pages
- 1 p.m. **Luncheon** — Ballroom C
- Greeting**
Monica Brockmeyer, Associate Provost
for Student Success
- Introduction of Guest Speaker**
Matthew Orr, Program Coordinator
Undergraduate Research Opportunities Program
- Guest Speaker**
Daren Hubbard, Chief Information Officer
and Associate Vice President, Computing and
Information Technology
- 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: **The Collaborative Impulse: Experiments in Theatrical Performance**

Hilberry A

Moderator: **Carol Baldwin**

Logan Hart: *Return to Russia: Utilizing and Showcasing Stanislavski's Theatrical Legacy*

Jared Morin and Maria Simpkins: *It Takes a Lot of Audacity to Make an Utterance: Challenging Artists and Audiences With Boal and Parks*

Gaia Klotz: *Conflict Resolution and Shakespeare in Prison: Creating Her World*

Session 2: **Synthesis and Characterization of Chemical Interactions**

Hilberry B

Moderator: **Dr. Matthew J. Allen**

Adrianna Breckenridge: *Synthesis of Resin-bound Cryptands for Use in Europium and Gadolinium Separation*

Kenneth Kutschman: *Synthesis of Sulfur-containing Cryptands Using a New Synthetic Strategy*

Nicole Beller: *Influences of Methylation and the Local Environment on Glycosidic and Phosphate Ester Bond Stabilities of Cytidine-5-Monophosphate via Energy-resolved Collision-induced Dissociation Experiments*

Session 3: **Building Brains: From Cells to Systems**

Hilberry C

Moderator: **Melissa Barton**

Saige Rutherford: *Exploration of Current Fetal fMRI Methodology*

Jasmine Hect: *Diminished Neural Connectivity in Fetuses That Will Subsequently be Born Preterm*

Natasha Gupta: *Effects of Open Field Blast Overpressure on Swine Brain: An Analysis of Microglial Proliferation*

Session 4: **What's So Special About the Opportunistic Yeast Pathogen Candida Albicans?**

Hilberry D

Moderator: **Dr. Robert Akins**

Christopher Mathews and Vita Stramaglia: *Where in the World is Candida?*

Carly Malburg and Andrea Prenkocevic: *Identification of Vaginal Bacterial Species That are Mutually and Differentially Antagonistic with Strains of Candida Albican*

Farah Sattar: *Role of Regulated Chromosome Loss in Resistance and Adaptability of Candida Albicans*

Session 5: **Strategies to Visualize, Understand, and Combat Cancer**

Hilberry E

Moderator: **Dr. Christine Chow**

Griffin Calme: *Improving Immunohistochemistry Scoring Techniques for Cancer Biopsies with Computer Vision Algorithms*

Jacob Wilson: *The Maturation of Invadopodia Induced by Mechanical Stimulation is Regulated by PAK1 Kinase*

Brigid Jacob: *Structural Effects of Platinum Compounds on DNA*

Oral Session II

Noon-1 p.m.

Session 1: **Material Cultures and Texts from the Ancients to the Early Modern World** Hilberry A

Moderator: **Dr. Hans J. Hummer**

Matthew Reesman: *Material Culture and Identity within the Hunnic Empire*

Mark Sharrow: *Tracing Shakespeare: A Modern Search for Early Modern Stage Directions*

Kristin Courville: *Finding Chora: The Continuity of the Maternal Feminine in the Ancient World*

Session 2: **Society, Culture, and Close Relationships: Macro and Micro Analyses of Human Interaction** Hilberry B

Moderator: **Kathryn Rawlings**

Cheryl Baraza, Evan Barnett and Hannah Howarth: *Women and Malnutrition: A Study of How Malnutrition Affects Women in Kabale, Uganda*

Fatima Albrehi: *Victims of Social Inequality: An Insight to Historical Events and Their Effect on African Americans*

Elizabeth Diviney: *Uncertainty Within Relationships Between Resident Advisors and Residents*

Session 3: **Harmonizing Nature** Hilberry C

Moderator: **Dr. Jon Anderson**

Nicole Farley: *Creation of Species-specific Primers to Aid in the Detection and Identification of Gar Species From Environmental DNA*

Kizzmett Littleton: *Can the Food in Your Cabinet Save Your Life? A Case Study on Food as Medicine in Metro Detroit*

Tyler Hoffman: *Smart Harmony*

Session 4: **Regulation of Gene Expression** Hilberry D

Moderator: **Dr. Francesca Luca**

Ashi Arora: *Extracellular RNA Secretion as an Adaptive Response to Stress in *Candida Albicans**

Cara Mitrano: *Effect of ACTG1 Expression on Cell Migration in the Presence of Dexamethasone and Retinoic Acid*

Hannah Sitto: *Deciphering the Role of Differential Promoter Usage on Uterine Estrogen Receptor Action During Pregnancy*

Session 5: **Therapies and Technologies** Hilberry E

Moderator: **Dr. Christine Chow**

Tejeshwar Singh Bawa: *Effects of Early Versus Delayed Oral Antihypertensive Therapy in Hypertensive Acute Heart Failure*

Susan Woods: *Exploring Enzyme-linked Immunosorbent Assay Inaccuracies During Corticosterone Study*

Mukund Mohan: *Ultrasound Enhanced Catheter Directed Thrombolysis for Patients with Massive and Submassive Pulmonary Embolism Presenting to the ED*

Poster Session

Poster

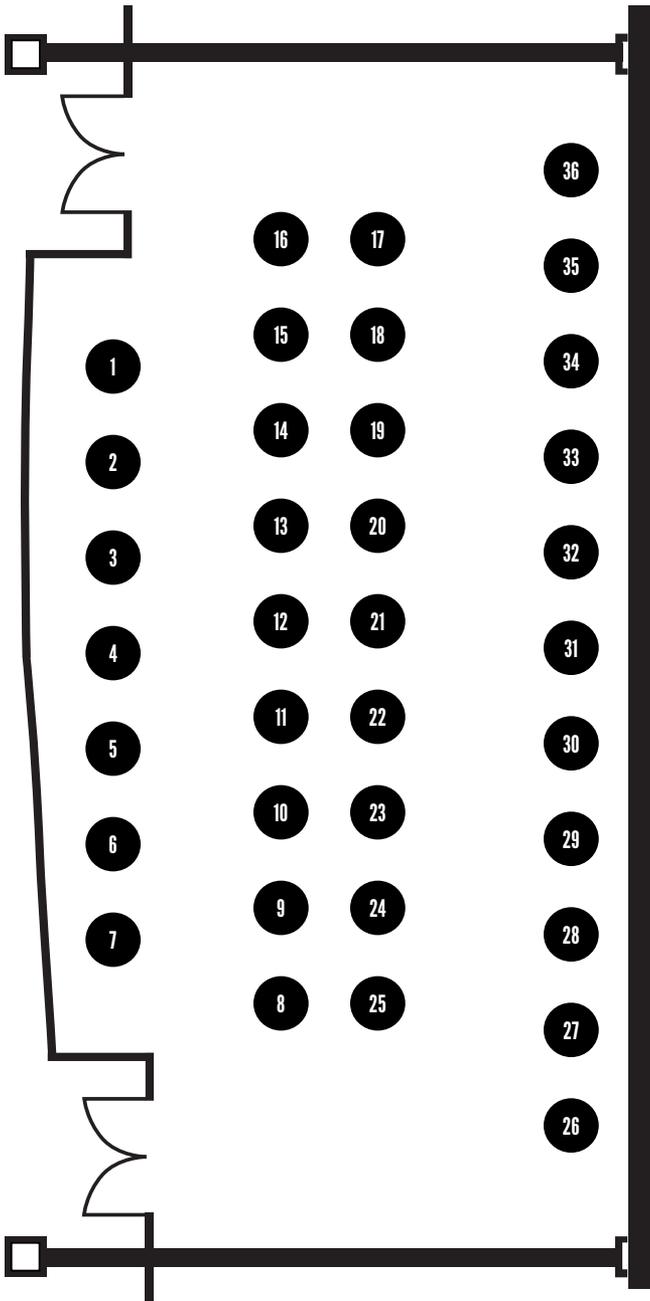
- 33 **Amer Abu-kwaik:** *Synthesis of Novel Cell-penetrating Sequences with Selective Binding to Helix 69*
- 42 **Mahnoor Ahsan:** *Age Differences in Visual Recognition Memory Are Not Influenced by Assessment Type or Stimuli Characteristics*
- 1 **Mohamed Alkhadashi:** *An Integrated Eye Recognition Methodology Utilized for Driver Fatigue Awareness*
- 35 **Nicholas Ang:** *Characterization of Midkine-a (Mdka) Function During Caudal Fin Regeneration in Adult Zebrafish*
- 44 **Hussain Atieh:** *Defining Urban American Indians in Social, Psychological, and Health Research*
- 27 **Ruwaida Baarma:** *Secrets and Stories From the Shadow to the Light: How We Communicate, Share and Discover Ourselves Through One Another*
- 53 **Dhanushya Battepati:** *Obsessive Compulsive Disorder is Associated with Increased Thalamic Modulation of Cortical and Sub-cortical Circuitry During Working Memory*
- 26 **Allan Bennetts:** *New York City Artists' Workshop with Steven Assael*
- 50 **Abbass Berjaoui:** *Health Disparities Among Arab Americans in Michigan: Results from the 2013 Behavioral Risk Factors Survey*
- 6 **Kevin Brunner:** *Ultrasonic Echolocation Device for Assisting the Visually Impaired*
- 8 **Camilla Cascardo:** *Alleles on Oxytocin Receptor Gene and Triadic Family Interactions in a Trauma-exposed Sample*
- 16 **Yasmine Elghoul:** *Effect of Combination Disulfiram-copper Treatment on ARV-7 Expression in Castration-resistant Prostate Cancer*
- 38 **Kareem Elhage:** *Distinguishing Single and Multiple Biomolecular Bonds in an Atomic Force Microscopy Experiment*
- 28 **Meggan Ellis:** *French Art Song: An Exploration*
- 2 **Patrick Erickson:** *Chondrogenesis of Encapsulated MSCs*
- 54 **Kamel Faraj:** *Restoring Ethanol Sensitization in Stress-induced Mice Using a CB1 Agonist*
- 13 **Gurveer Gill:** *Correlation of the Presence and Titer of Enterococcus Faecalis and its Cytolysin Gene with Recurrence in Bacterial Vaginosis*
- 46 **Roy Greenia:** *Effect of Gender and Instrument Choice on Music Education*
- 45 **Isabell Groves:** *Eating the Elephant One Bite at a Time: An Examination of Ethnic Identity, Eating Behaviors and Physical Activity in African American Adolescents*
- 47 **Gabriel Haas:** *Effects of Probiotic Treatment (Bifidobacterium Infantis) in Male and Female Rats Exposed to Chronic High Levels of Corticosterone*
- 39 **Irgena Hafizi:** *Dual Action Therapeutics: Optimization of Cathepsin B-Photosensitizer Conjugates*

- 58 **Athraa Hannawa:** *Veteran Status and Cancer Diagnosis: Exposure or Lifestyle*
- 11 **Stefanie Hilton:** *Comparing Physical Activity Monitors Against Energy Expenditure Assessed Using a Cardiovascular Fitness Test*
- 14 **Elena Hunsanger:** *Determination of Biomarkers for Autoimmune Diseases in DNA Replication and Repair and Galectin-3 Enzymes*
- 30 **Sanaya Irani:** *Neural Correlates of Spatial Navigation Ability Development*
- 12 **Shane Jackowski:** *Controlled Folding of Disulfide Rich Peptides: Progress Towards Accessing Neuroactive Conotoxins*
- 29 **Japnam Jassal:** *MYH9 Promotes Ovarian Cancer Growth and Tumor Angiogenesis Through Regulating HIF-1 α Pathway*
- 43 **Ramasahitya Karra:** *Brain Volume in Relation to Pediatric Cognitive Ability*
- 34 **Manpreet Kaur:** *Targeting Base Excision Repair to Kill B-cell Lymphoma Cells*
- 13 **Navkiranjot Kaur:** *Correlation of the Presence and Titer of Enterococcus Faecalis and its Cytolysin Gene with Recurrence in Bacterial Vaginosis*
- 57 **Maaz Kazmi:** *Transportation Access and Food-purchasing Patterns Among Low-income, African-American Families of Preschoolers Living in Detroit*
- 17 **Alexandra Lemieux:** *Effects of Estradiol and Bisphenol A on a Trophoblast Cell Line*
- 7 **Lauren Macconnachie:** *Role of Polyproline Sequences in ND10 Fusion*
- 20 **Nour Mahmoud:** *Identification of Small Molecules Activation on the Unfolded Protein Respond in Leukemia Cells*
- 10 **Nadeen Mansour:** *Brain Derived Neurotrophic Factor Genetic Variation, Insulin Resistance and Diabetes in Arab Americans*
- 24 **Maria Matta:** *Maspin Expression Correlates with Better Differentiated Breast Cancer Cells*
- 6 **Ben Mick:** *Ultrasonic Echolocation Device for Assisting the Visually Impaired*
- 51 **Maricruz Moya:** *How do Latino Children View Their Health?*
- 49 **Lauren Notoriano:** *Hardships and Needs of Persons with Heroin Dependency: A Grounded Theory of What Social Workers Need to Know*
- 41 **Hollyann Orr:** *A Killer Policy: How Animal Parks Adapt to the Changing Public Interest*
- 59 **Devon Ostermiller:** *Network Mapping of Water Crisis Governance in Flint, Michigan*
- 4 **India Owens:** *High Performance Computing Using Graphic Processing Units (GPUs)*
- 31 **Paragi Patel:** *Handedness Mediates Inter-hemispheric Network Interactions of the Human Motor Cortex During Inter-hemispheric Transfer: fMRI Evidence*
- 18 **Pattamestrige Eresha Perera:** *Effects of Tylosin and Tris(dichloroisopropyl) phosphate on Oxygen Consumption and Filtration Rate of Quagga Mussels (Dreissena bugensis)*

Poster Session (continued)

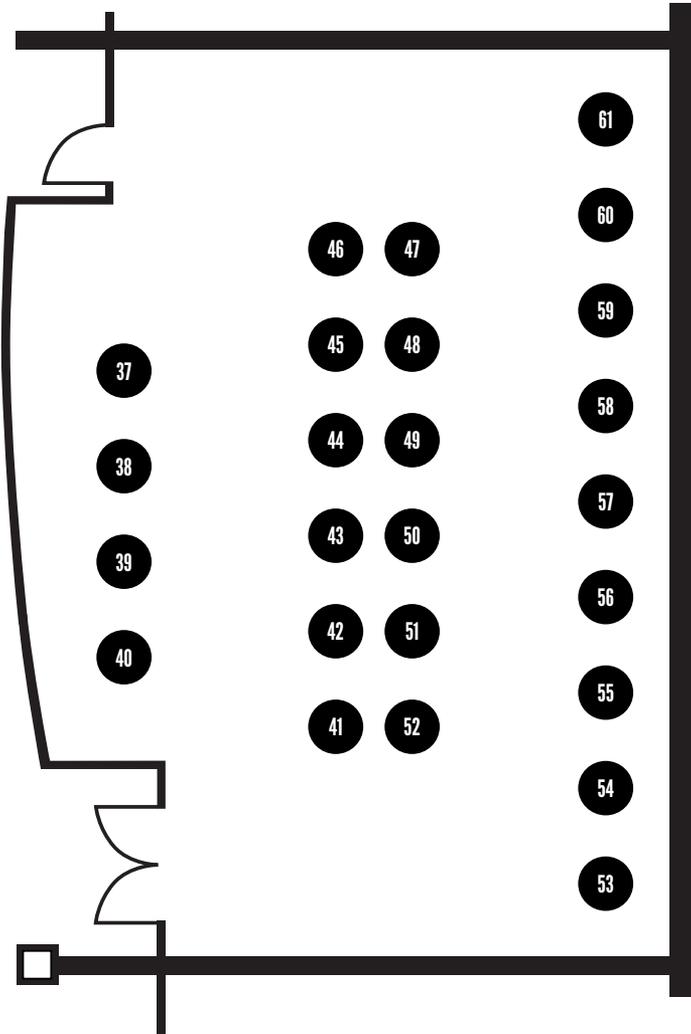
- 32 **Alexandru Pop:** *Role of Serotonin in the Initiation of Central Sleep Apnea*
- 19 **Monica Prasad:** *Histological Analysis of Nerve Regeneration in Nerve Conduits Enhanced with Growth Factors and Aligned Fibers*
- 55 **Sruthi Ramesh:** *Semantic Representation of Rapidly Presented Visual Images Across Ages*
- 6 **Nathan Reddmann:** *Ultrasonic Echolocation Device for Assisting the Visually Impaired*
- 52 **Siri Sarvepalli:** *Item and Associative Memory Development Across Age*
- 5 **Kawthar Shafiekhorassani:** *High Performance Computing Using Graphics Processing Units (GPUs)*
- 22 **Monica Shah:** *Investigations of the Role of Base Excision Repair (BER) in Down Syndrome*
- 56 **Abdul-Rahman Suleiman:** *Transgenerational Effects of Preconceptional Stress and Gestational Antidepressant Exposure*
- 21 **Solomiya Svytko:** *Investigating the Relationship Between no/cGMP and HBEGF Signaling Pathways*
- 37 **Cindy Temali:** *Differences in Brain Activation During a Working Memory Task Between Yoga Experts and Non-experts*
- 40 **Jameson Tockstein:** *Untangling Nuclear and Form Factor Effects in Neutrino-nucleon Scattering*
- 36 **Sangini Tolia:** *Characterization of miR-133 During Zebrafish Photoreceptor Development, Maintenance, and Regeneration*
- 3 **Garrett Tuer:** *Design and Implementation of a Low-cost Magnetomotive Molecular Ultrasound Imaging System*
- 9 **Mohammed Turfe:** *Age Patterns of Aggressive Endometrial Cancer Incidence in the United States*
- 25 **Daniel Varghese:** *Metformin Scavenges Methylglyoxal to Form an Imidazolinone Metabolite in T2D Patients: A Potential Therapeutic to Alleviate T2D Complications*
- 18 **Vanessa Verstraete:** *Effects of Tylosin and Tris(dichloroisopropyl)phosphate on Oxygen Consumption and Filtration Rate of Quagga Mussels (*Dreissena bugensis*)*
- 23 **Marah Wahbeh:** *Long and Short RNAs: Do They Meet in the Middle?*
- 48 **Michael Williams:** *Estimating the Prevalence of Homelessness and Precariously Housed Wayne State Students*
- 3 **Nicole Witzleben:** *Design and Implementation of a Low-cost Magnetomotive Molecular Ultrasound Imaging System*
- 15 **Nikhil Yedulla:** *Development of Quantum Dots as Biomedical pH Sensors*

Poster Display Map



Student Center Building room 20
Life Sciences, Engineering, and Arts and Humanities

Poster Display Map



Student Center Building room 25
Behavioral and Social Science, Physical Sciences

Presenters

Amer Abu-kwaik

Faculty Mentor: **Dr. Christine Chow**

“Synthesis of Novel Cell-penetrating Sequences with Selective Binding to Helix 69”

Much research has been done to combat the emerging problem of antibiotic resistance. In this research project, helix 69 (H69) — a region on the rRNA in the bacterial ribosome that is crucial to cellular function — has been studied. The main goal is to discover compounds that target H69 and are able to transverse the cellular membrane as potential therapeutic leads. To achieve this goal, a peptide with moderate binding affinity to H69 was attached to a CPP (cell-penetrating peptide) to enhance drug delivery.

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Mahnoor Ahsan

Faculty Mentor: **Dr. Noa Ofen**

“Age Differences in Visual Recognition Memory are Not Influenced by Assessment Type or Stimuli Characteristics”

Visual recognition memory is essential to everyday life, but the developmental trajectory of this ability is not fully understood. In this study, children and adults studied images of objects or scenes, with half of the stimuli from a small set of specific categories and the other half from unique exemplars of diverse categories. Participants were then tested with a two-alternative-forced-choice (2AFC) task and an old-new recognition (O/N) task. The two recognition tasks differ primarily because of the decision-making processes, which are higher for the 2AFC task. We found that participants had higher recognition rates for objects compared to scenes, and higher recognition rate when items were more distinct than when items were all exemplars of the same category.

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Fatima Albrehi

Faculty Mentor: **Dr. Ronald Stevenson**

“Victims of Social Inequality: An Insight to Historical Events and Their Effect on African Americans”

Institutional, governmental, and societal racism and discrimination have led to the current struggles that African Americans face today in regard to unemployment and poverty, racial profiling, and negative stereotypes. Important events throughout history in the United States such as The Great Depression and WWI have had profound negative and positive effects on the lives of African Americans. Detrimental effects that The Great Depression has had on African Americans have also been combated by increased social and employment opportunities during WWI. So why are African Americans still one of the many victims of social inequality?

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Mohamed Alkhadashi

Faculty Mentor: **Dr. Lubna Alazzawi**

“An Integrated Eye Recognition Methodology Utilized for Driver Fatigue Awareness”

As the automotive industry continues to advance its technology, safety has become one the most critical and crucial aspects in assuring quality satisfaction for customers. There are lots of studies that show a significant numbers of road accidents as a result of fatigued, drowsy or sleepy drivers. These accidents can be reduced significantly if the vehicle driver had a unique warning system that would assure the driver would be alert while operating the vehicle. Using eye recognition, this system will disturb the driver using an alert and seat vibration when the vehicle operator is fatigued, drowsy or attempting to fall asleep.

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Nicholas Ang

Faculty Mentor: **Dr. Ryan Thummel**

“Characterization of Midkine-a (Mdka) Function During Caudal Fin Regeneration in Adult Zebrafish”

Zebrafish have the ability to regenerate, or regrow, many different tissues, including the retina, heart, and fins. For example, amputation of half of the tail fin results in a robust regeneration response and regrowth of the tissue within a month. This study aims at determining the role of a protein called Midkine-a (Mdka) that has never been studied during fin regeneration in zebrafish. We utilized a genetically modified zebrafish line that removes Mdka function and tracked fin regrowth over time. We found that loss of Mdka reduced the initiation of regeneration, but that outgrowth partially recovered. This study adds to our understanding of fin regeneration in the zebrafish and future studies aim to reveal the role of Mdka in the regeneration of other tissues.

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Ashi Arora

Faculty Mentor: **Dr. Robert Akins**

“Extracellular RNA Secretion as an Adaptive Response to Stress in Candida Albicans”

Candida albicans is an opportunistic fungal pathogen, causing widespread vaginal infections and life-threatening systemic infections in immunocompromised patients. In healthy humans, the first line of defense against C. albicans is generated by the innate immune system and carried out by macrophages and neutrophils. This response involves the production of toxic reactive oxygen species (ROS) by these immune cells, such as superoxide or peroxide species. The goal of this project was to determine if fungal cells under this stress can communicate a warning signal to other fungal cells so that they may mount adaptive, protective responses in advance of damage in the form of extracellular RNA, perhaps in nanovesicles.

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Hussain Atieh

Faculty Mentor: **Dr. Michelle Jacobs**

“Defining Urban American Indians in Social, Psychological, and Health Research”

This research project explores and analyzes the various ways researchers in the fields of social, psychological, and health research conceptualize “Urban American Indian” (UAI). From the research, we’ve discovered several patterns of determining who constitutes as an UAI. The most common trend for conceptualizing an American Indian among the literature is individuals self-identifying as American Indians, while “urban” was typically defined as a metro area, or unspecified in the literature. This research paper brings attention to the importance of conceptualizing UAI among these fields of research, as doing so would allow health care providers to better serve the UAI demographic should they know the exact population they’re dealing with, as well as to allow certain UAI access to resources reserved for verified UAI.

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Ruwaida Baarma

Faculty Mentor: **Dr. Marilyn Zimmerwoman**

“Secrets and Stories from the Shadow to the Light: How We Communicate, Share and Discover Ourselves Through One Another”

As a graphic design major, I was drawn to photography through my discovery of black and white darkroom practices within a class in the photo area where constellating community was emphasized. Photography provides a means for me to capture moments shared with people who I am close to and care about that are not seen by others, and provides a means to convey that memory and story. Analog photography captures the very light reflected onto a person and records their image onto the film. The act of photographing someone isolates them in the frame, bringing focused attention by the viewer onto them as homage. Their expression, environment, body language and facial expression all serve to tell their story.

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Cheryl Baraza

Faculty Mentor: **Dr. Jessica Robbins-Ruszkowski**

“Women and Malnutrition: A Study of How Malnutrition Affects Women in Kabale, Uganda”

Our research team traveled to Kabale, Uganda, in July 2016 to conduct research regarding women in rural Uganda affected by malnutrition. We conducted 12 interviews during our 26-day stay that helped our team gain insight into the daily lifestyles of these women. The data that we collected will be analyzed and used as a tool to decipher the effects that malnutrition has had on these women and their respective families.

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Evan Barnett

Faculty Mentor: **Dr. Jessica Robbins-Ruszkowski**

“Women and Malnutrition: A Study of How Malnutrition Affects Women in Kabale, Uganda”

Our research team traveled to Kabale, Uganda, in July 2016 to conduct research regarding women in rural Uganda affected by malnutrition. We conducted 12 interviews during our 26-day stay that helped our team gain insight into the daily lifestyles of these women. The data that we collected will be analyzed and used as a tool to decipher the effects that malnutrition has had on these women and their respective families.

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Dhanushya Battepati

Faculty Mentor: **Dr. Vaibhav Diwadkar**

“Obsessive Compulsive Disorder is Associated with Increased Thalamic Modulation of Cortical and Sub-cortical Circuitry During Working Memory”

Obsessive Compulsive Disorder (OCD) is an anxiety disorder that is characterized by frequent and unwanted thoughts or feelings that lead to repetitive behaviors in order to alleviate stress and anxiety. This study aims to observe the differences in the brain network interactions of the thalamus — the relay center of information in the brain — between youth with OCD and typical controls. Functional magnetic resonance imaging was used to analyze the interactions of the thalamus during a verbal working memory task.

Tejeshwar Singh Bawa

Faculty Mentor: **Dr. Phillip Levy**

“Effects of Early Versus Delayed Oral Antihypertensive Therapy in Hypertensive Acute Heart Failure”

Treatment of hypertensive acute heart failure (AHF) usually involves stabilization with intravenous (IV) therapy including diuretics and vasoactive medications. Beyond acute stabilization, guideline-directed medical therapy (GDMT) recommends multiple oral antihypertensive agents; however, data are limited on the effect on time to administration of such medications during treatment of AHF. We hypothesized that early administration of oral antihypertensive agents in patients with hypertensive AHF would be associated with a shorter hospital length of stay (LOS).

Nicole Beller

Faculty Mentor: **Dr. Mary T. Rodgers**

“Influences of Methylation and the Local Environment on Glycosidic and Phosphate Ester Bond Stabilities of Cytidine-5'-Monophosphate via Energy-resolved Collision-induced Dissociation Experiments”

Modifying the structure of an RNA nucleotide or changing the local environment that it inhabits will directly affect the stability of two important bonds within the nucleotide: the glycosidic and phosphate ester bonds. Altering the stability of these bonds can radically alter the structural and functional capabilities of this nucleotide, which may prove useful in future studies involving antibiotic resistance or drug targeting.

Allan Bennetts

Faculty Mentor: **Dr. Margi Weir**

“New York City Artists’ Workshop with Steven Assael”

This project centered on a five-day painting workshop with contemporary master painter Steven Assael in his Manhattan studio. Lectures and demonstrations explored ideas and painting techniques that blend the traditional approaches of the old masters with the unique concerns of the contemporary artist. Students put these ideas and techniques into practice working from a live model, under the supervision and tutelage of Assael. Of particular concern in this workshop were ideas about the effects of color and light on one’s subject, developing the underlying structure of a painting, the qualities and integrity of the paint surface, and how these factors contribute to the illusion of realistic representation.

Abbass Berjaoui

Faculty Mentor: **Dr. Wassim Tarraf**

“Health Disparities Among Arab Americans in Michigan: Results from the 2013 Behavioral Risk Factors Survey”

Arab Americans (AA) have been labeled as non-Hispanic whites (NHW) in most major studies addressing health disparities. While 3.5 million Arab Americans reside in the United States, it is important that studies differentiate between AA and NHW as health disparities could be overlooked when grouped together. Using data from the Arab Behavioral Risk Factors Survey and the Michigan Behavioral Risk Factors Survey, we conducted a secondary analysis to examine differences in self-reported general and mental health between Arab Americans and whites, and to investigate the contributions of predisposing, enabling and need factors to explaining differences between the groups. This project can add to the existing literature and may help implement policy change to alleviate health disparities.

Adrianna Breckenridge

Faculty Mentor: **Dr. Matthew Allen**

“Synthesis of Resin-bound Cryptands for Use in Europium and Gadolinium Separation”

Separating lanthanides from one another has been a dilemma for chemists since the discovery of these metals in the late 1700s. Current industrial techniques involve solvent extraction, which is a complicated process that is capable of producing large amounts of waste. Our goal was to simplify the separation of two useful lanthanide ions. This research focused on using oxidation states to separate europium(II) and gadolinium(III) using a ligand bound to a polymer. The ligand has selectivity for the larger europium(II) over the smaller gadolinium(III) ion, making it possible to separate these two lanthanides.

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Kevin Brunner

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

“Ultrasonic Echolocation Device for Assisting the Visually Impaired”

The overall objective of the project was to develop a sensory substitution device for visually impaired users that will gauge distances between the user and objects. An ultrasonic sensor is capable of sending out a high-frequency wave, receiving the reflected wave within a set period of time, and measuring the time interval before sending an electric signal to a microprocessor. Our design alerts the user about the acquired information of their environment with tactile feedback. This tactile feedback consists of a motor that vibrates at different intensities depending on the distance to an object. This will allow visually impaired users to regain some of the ability to detect objects in space, therefore granting them a greater level of independence in their day-to-day lives.

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Griffin Calme

Faculty Mentor: **Dr. Abhinav Deol**

“Improving Immunohistochemistry Scoring Techniques for Cancer Biopsies with Computer Vision Algorithms”

Immunohistochemistry (IHC) is a useful technique for identifying proteins of interest in the tumor microenvironment. Current practices largely use human pathologists to observe and analyze IHC-stained specimens. While this is an accepted practice, it is slow and time consuming to manually annotate and score microscope slides. Moreover, no two human observers will always grade samples equally. Computer automation with computer vision promises to drastically reduce the amount of monotonous counting performed by pathologists. Automation has the potential to improve reliability and reduce time spent obtaining results, as each image can be processed in a few seconds and will provide the same result if repeated. In this project, a computer vision system was developed to conduct this process.

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Camilla Cascardo

Faculty Mentor: **Dr. Francesca Luca**

“Risk’ Alleles on Oxytocin Receptor Gene and Triadic Family Interactions in a Trauma-exposed Sample”

Oxytocin, a protein produced in the hypothalamus, has been linked to behavioral outcomes between children and parents. Recently, specific single-nucleotide polymorphisms (SNPs) — variations in a base pair on a strand of DNA that occurs at a specific position in the genome, in this case the oxytocin receptor gene — have shown that there are “risk” alleles associated with less sensitive parenting. This study examined the relationship between parents and their child, while comparing observed behaviors to their genotypes on each SNP. The presence of “risk” alleles (A on SNP rs53576 and T on SNP rs1042778) were noted and ANCOVA was used to gauge significance of the presence in association with behavior.

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Kristin Courville

Faculty Mentors: **Dr. Sean Stidd and Dr. Thomas Kohn**

“Finding Chora: The Continuity of the Maternal Feminine in the Ancient World”

Plato’s dialogue “Timaeus” is laden with symbolism and metaphor as Plato attempts to describe the cosmos through a mythological creation story. As Plato writes this eloquent creation story, he uses the ancient Greek word **Χώρα**, transliterated into English as chora. Chora is a feminine noun, etymologically connected to the notion of empty space. However, chora begs for further discovery, and my research has connected Plato’s chora to The Greek Magical Papyri, ancient medicinal texts, The Nag Hammadi, the Vedas, ancient Sanskrit, and the Indus Valley River Civilization. Research on chora has shown that there are tight cultural connections between varied ancient civilizations spanning thousands of years.

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Elizabeth Diviney

Faculty Mentor: **Dr. Stephanie Tong**

“Uncertainty within Relationships Between Resident Advisors and Residents”

Uncertainty can influence how people interact with one another. If you are unsure how a person will react when you say something, aren’t you more likely to censor yourself or at least speak more carefully around that person? This research explores that phenomenon. It specifically looks at conversations between resident advisors, who are meant to serve as a resource for a university within on-campus housing, and residents, who form their own ideas about the purpose of resident advisors.

Yasmine Elghoul

Faculty Mentor: **Dr. Q Ping Dou**

“Effect of Combination Disulfiram-copper Treatment on ARV-7 Expression in Castration-resistant Prostate Cancer”

Prostate cancer displays over-expression of a hormone receptor called androgen receptor. Traditional prostate cancer treatment includes hormone therapy, either by reducing androgen levels or blocking the androgen receptor. This treatment is potent for awhile; however, prostate cancer quickly develops resistance and becomes androgen-independent. I will present a potential strategy for treating prostate cancer involving the FDA-approved anti-alcoholism drug disulfiram in combination with copper metal. Particularly, I have found that this combinational treatment can reduce androgen receptor expression and induce apoptosis in prostate cancer cells that are resistant to current therapies. Analysis shows that these effects may be correlated with proteasome inhibition.

Kareem Elhage

Faculty Mentor: **Dr. Peter Hoffmann**

“Distinguishing Single and Multiple Biomolecular Bonds in an Atomic Force Microscopy Experiment”

In this study, an atomic force microscope was used to take measurements of the force produced from breaking molecular bonds. By examining the force curves taken by the microscope, it was possible to distinguish cases in which multiple bonds were formed as opposed to single bonds, which exhibit cleaner graphs.

Meggan Ellis

Faculty Mentor: **Dr. Frances Brockington**

“French Art Song: An Exploration”

Classical art song in France, also called chanson or melodie, has a long and varied history, which has been contributed to by many important composers and performers. I traveled to France this past summer as a member of the Franco-American Vocal Academy and was immersed in this area of study. This presentation will inform viewers about the history of the French art song tradition, as well as demonstrate the experience and knowledge I attained as a result of participating in the program.

Patrick Erickson

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

“Chondrogenesis of Encapsulated MSCs”

In this study, rat mesenchymal stem cells were encapsulated within hollow, spherical microcapsules composed of various biologically active polymers. The encapsulated cells were cultured for three weeks in medium containing growth factors that cause the stem cells to differentiate into cartilage cells. Culture samples from each condition were analyzed to determine the secretions and morphologies of the cells and the matrix they produced compared to normal cartilage tissue.

Kamel Faraj

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

“Restoring Ethanol Sensitization in Stress-induced Mice Using a CB1 Agonist”

Patients who struggle with PTSD are at high risk of abusing alcohol and developing dependence. By using an animal model to study the comorbidity between PTSD and alcoholism, we are able to explore the neurobiology that drives this maladaptive behavior. We are determining the role of the cannabinoid system in the brain and behavior relationships that develop in PTSD and substance abuse with the hope that our studies will identify targets for development of pharmaceuticals to treat this comorbidity.

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Nicole Farley

Faculty Mentor: **Dr. Jeffrey Ram**

“Creation of Species-specific Primers to Aid in the Detection and Identification of Gar Species From Environmental DNA”

Gars, carnivorous freshwater fishes, have recently faced habitat destruction and overfishing, resulting in declining populations. Consequently, reintroduction and restocking efforts have been initiated as a means of restoring the gars’ historic range. Understanding the successes and failures of gar reintroduction efforts is critical in order to inform future management decisions; thus, this research project seeks to provide management agencies with a new tool for monitoring gar populations. By developing and validating DNA probes specific to four of the seven species of gar, this project makes it possible to recognize traces of gar DNA in water samples and assess gar populations noninvasively and efficiently.

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Gurveer Gill

Faculty Mentor: **Dr. Robert Akins**

“Correlation of the Presence and Titer of Enterococcus Faecalis and its Cytolysin Gene with Recurrence in Bacterial Vaginosis”

Our research focuses on the correlation of *Enterococcus faecalis* and its cytolysin gene with recurrence in bacterial vaginosis. Bacterial vaginosis (BV) is the most common vaginal infection, present in 29 percent of women. During BV, *Lactobacillus* species is displaced by a variety of other species, which cause symptoms including odor, discharge, and sexual problems, and which introduce risk factors such as elevated HIV transmission and higher rates of premature birth. The cause of the decline in *Lactobacillus* is not known.

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Roy Greenia

Faculty Mentor: **Dr. Heather Dillaway**

“Effect of Gender and Instrument Choice on Music Education”

This study consisted of a series of one-on-one interviews to discover the effect of choosing an instrument not commonly associated with one’s gender with the music education experience. The goal of this study was to identify any discriminatory practices that may occur during music education as an effect of a student choosing an instrument not normally chosen by their gender; for instance, a female tuba player or a male flautist.

Isabell Groves

Faculty Mentor: **Dr. Nutrena Tate**

“Eating the Elephant One Bite at a Time: An Examination of Ethnic Identity, Eating Behaviors and Physical Activity in African American Adolescents”

Childhood obesity is particularly problematic in African Americans, especially adolescents. Obesity is a result of the combination of decreased physical activity and high caloric and high fat intake. This study was a correlational design that allowed investigators to describe the phenomenon of obesity in African American adolescents while examining the relationship among the variables ethnic identity, physical activity, and eating behaviors. Jean Phinney’s Multi-group Ethnic Identity Measures, Kent Kowalski’s Physical Activity Questionnaire for Adolescents, and David Schlundt’s Eating Behavior Pattern Questionnaire were used to measure the variables. The SPSS Version 19.0 statistical test was used to understand and summarize the data and descriptive statistics performed.

Natasha Gupta

Faculty Mentor: **Dr. Srinivasu Kallakuri**

“Effects of Open Field Blast Overpressure on Swine Brain: An Analysis of Microglial Proliferation”

Traumatic brain injury leads to many changes in the brain tissue. These changes induce a variety of cellular responses. One of the first respondents to the injury are microglial cells. This project aims to study the microglial proliferation in swine brains that were exposed to a blast and those that were exposed to sham procedures.

Gabriel Haas

Faculty Mentor: **Dr. Susanne Brummelte**

“Effects of Probiotic Treatment (Bifidobacterium Infantis) in Male and Female Rats Exposed to Chronic High Levels of Corticosterone”

Research suggests that probiotics may have beneficial health effects, including the reduction of depressive symptoms. However, less is known about the mechanisms of probiotic-induced changes or about potential sex differences in response to probiotics. The current study investigates whether chronic administration of probiotics can alleviate depressive symptoms in a corticosterone-induced rodent model of depression.

Irgena Hafizi

Faculty Mentor: **Dr. Jeremy Kodanko**

“Dual Action Therapeutics: Optimization of Cathepsin B-Photosensitizer Conjugates”

The ultimate goal in cancer treatment is to induce toxicity to the cancer cells without causing any harm to the healthy cells. The inhibition of Cathepsin B — a cysteine protease involved in cancer progression — is a potentially selective therapeutic technique. To our advantage, Cathepsin B is displayed on the cell surface only in cancer cells. To optimize inhibition, we can combine a Cat B inhibitor with a photo-activated metal agent that will selectively release the cytotoxic compound when activated by light. This study aims to explore a valuable alternative in the treatment of cancer, and may lead to fewer side effects.

Athraa Hannawa

Faculty Mentor: **Dr. David Matthew Merolla**

“Veteran Status and Cancer Diagnosis: Exposure or Lifestyle”

The military population makes up 7 percent of the U.S. population, and current and former military personnel account for about 3 percent of all cancer diagnoses. This study will use pre-existing secondary data from the National Health Interview study to assess the association between serving in the Armed Forces and being diagnosed with cancer, and the possible factors (e.g. smoking, drinking, and mental health) that can explain this association.

Logan Hart

Faculty Mentor: **Dr. Mary Anderson**

“Return to Russia: Utilizing and Showcasing Stanislavski’s Theatrical Legacy”

The Moscow Art Theatre School (MXAT) is widely regarded as one of the foremost theatre training centers in the world. It was here in the late 1800s that Russian director Konstantin Stanislavski developed his “system” of actor training. Since its creation, the system has become one of the most in-depth and refined methods of theatre training. This research project centered on utilizing the practices of the system learned during a month at the MXAT to develop a performance that showcased the results this particular method could lead to. In addition, the system was compared to the theatrical research of Polish director Jerzy Grotowski in an attempt to find common ground between two systems often seen as radically different from one another.

Jasmine Hect

Faculty Mentor: **Dr. Moriah Thomason**

“Diminished Neural Connectivity in Fetuses That Will Subsequently be Born Preterm”

Studies of preterm neonates and animal models have shown that preterm birth may be associated with diminished neural functional connectivity. However, these findings are confounded by the extrauterine environment and the potentially injurious experience of preterm birth. This project utilizes resting state fMRI to measure neural functional connectivity in utero of fetuses that would go on to be born preterm. Our findings provide evidence that the differences in connectivity associated with preterm birth may arise in utero.

Stefanie Hilton

Faculty Mentor: **Dr. Neha Gothe**

“Comparing Physical Activity Monitors Against Energy Expenditure Assessed Using a Cardiovascular Fitness Test”

Physical activity is critical for reducing mortality rates and preventing non-communicable disease. However, numerous adolescents and adults spend a large portion of their waking hours in sedentary behaviors. This study will compare estimates of energy expenditure and step counts from a variety of activities, monitoring low, moderate, and high intensities. These intensities were determined by measurements gas exchange on a metabolic cart during a VO2 max test. This study will help determine if these commercial activity monitors accurately predict both energy expenditure and activity levels, and if they are useful as direct measures of physical activity for meeting the recommended physical activity guidelines.

Tyler Hoffman

Faculty Mentor: **Dr. Jon Anderson**

“Smart Harmony”

Smart Harmony is an interactive music program developed by the author that generates harmonic accompaniment to melodies input by the user. The program is a creative tool that allows anyone to create a usable harmony regardless of their background in music. Smart Harmony can be utilized by educators to experiment with harmonic progressions commonly used in a variety of time periods, genres, and styles. Generating a “smart” harmony can jumpstart the creative thought process to further music production workflow. The program takes a monophonic signal from a microphone or MIDI (keyboard) input and yields a harmony based on predictive tables that, once established by the user, can be static or be modified interactively as the melody is played.

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Hannah Howarth

Faculty Mentor: **Dr. Jessica Robbins-Ruszkowski**

“Women and Malnutrition: A Study of How Malnutrition Affects Women in Kabale, Uganda”

Our research team traveled to Kabale, Uganda, in July 2016 to conduct research regarding women in rural Uganda affected by malnutrition. We conducted 12 interviews during our 26-day stay that helped our team gain insight into the daily lifestyles of these women. The data that we collected will be analyzed and used as a tool to decipher the effects that malnutrition has had on these women and their respective families.

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Elena Hunsanger

Faculty Mentors: **Dr. G. Andrés Cisneros and Dr. Gregory Dyson**

“Determination of Biomarkers for Autoimmune Diseases in DNA Replication and Repair and Galectin-3 Enzymes”

Autoimmune diseases are disorders characterized by the body’s immune system attacking its own tissues. Two relatively common autoimmune diseases are Systematic Lupus Erythematosus and celiac disease. Biomarkers — such as genetic mutations — for these diseases can be useful in their diagnosis and treatment; however, there are not many biomarkers currently known for these disorders. Single nucleotide polymorphisms (SNPs) are a kind of biomarker. SNPs are changes in a single “letter” of a gene in the DNA code that builds our bodies. If that change alters the protein for which that gene codes, it can lead to many health issues. Hunsanger will present a statistical exploration of the associations between SNPs in the selected genes and the two diseases, giving us promising new tools to fight them.

Sanaya Irani

Faculty Mentor: **Dr. Noa Ofen**

“Neural Correlates of Spatial Navigation Ability Development”

Spatial navigation is a critical ability that allows humans to effectively reach target locations in their environment. In the human brain, research in typically aging populations has found that smaller hippocampal volume is associated with more complex paths traveled to reach the target. However, the developmental trajectories of spatial navigation from childhood through adolescence and the underlying neural substrates remain unclear. This study aims to link manually traced hippocampal volumes for participants ages 5-21 with their performance on computerized spatial navigation tasks. Additionally, we tested for the age and sex effects to determine differential developmental trajectories of spatial navigation between males and females.

Shane Jackowski

Faculty Mentor: **Dr. Jennifer Stockdill**

“Controlled Folding of Disulfide Rich Peptides: Progress Towards Accessing Neuroactive Conotoxins”

The design and synthesis of cysteine (thiols) protecting groups that are removable at different rates under a single set of reaction conditions. These groups must be stable to solid phase peptide synthesis conditions including incorporation into a peptide and various cleavage conditions typical in peptide synthesis. Investigation of removal rates in model peptides is underway.

Brigid Jacob

Faculty Mentor: **Dr. Christine Chow**

“Structural Effects of Platinum Compounds on DNA”

Platinum compounds are commonly used in chemotherapy regimens. These compounds bind to specific sites along DNA — the genetic material in cells — causing structural changes such as bending. As a result of altered DNA conformations, cellular processes are negatively impacted, leading to cell death. Therefore, platinum compounds fight cancer by halting tumor growth. Since the current platinum compounds used in chemotherapy are not effective against all cancer cell lines, we sought to understand how other platinum compounds affect the structure of genetic material in cells. These effects were analyzed through a gel assay. The degree of bending caused by platination was then quantified. By comparing the results of different platinum compounds, we hope to correlate their varying structural effects with their anticancer activity.

Japnam Jassal

Faculty Mentor: **Dr. Kang Chen**

“MYH9 Promotes Ovarian Cancer Growth and Tumor Angiogenesis Through Regulating HIF-1α Pathway”

Epithelial ovarian cancer is the most common and deadly disease among gynecologic malignancies. Previous studies have shown that Myosin Heavy-Chain 9 (MYH9) is involved in tumor angiogenesis and migration, but little is known about its function in epithelial ovarian cancer. In this study, we investigate the mechanism by which MYH9 affects tumor metastasis by establishing connections between MYH9 and HIF1-α, a protein known to be upregulated in various cancers. By elucidating this mechanism, our research will serve to develop novel therapeutic approaches for EOC treatment.

Ramasahitya Karra

Faculty Mentor: **Dr. Moriah Thomason**

“Brain Volume in Relation to Pediatric Cognitive Ability”

Brain volume has often been the measure suspected to predict intelligence. In my research project, I have explored the correlation between the scores of Bayley Scales of Infant and Toddler Development (measuring cognitive, motor and language ability) and brain volume extracted using fetal MRI data, controlling for other variables such as gender and gestational ages.

Manpreet Kaur

Faculty Mentor: **Dr. Ashok Bhagwat**

“Targeting Base Excision Repair to Kill B-cell Lymphoma Cells”

Base excision repair (BER) is an elaborate mechanism used by cells to cope with DNA damage. Through this pathway, a cell can fix a damaged base and help progress its normal replication process. In BER, the damaged base is removed, creating an apurinic/apyrimidinic (AP) site. Other proteins then access the AP site and try to repair the base damage. The Bhagwat lab has synthesized an alkoxyamine (AA3) that binds to the AP sites and prevents repair and replication from progressing, resulting in toxic effects on B-cell lymphoma cell lines that have an excess of these sites. The objective of my project is to enhance the toxicity of AA3 via combination treatment with PARP inhibitors. PARP is a family of proteins involved in recruitment of other BER repair proteins. By targeting multiple components of a cancer cell’s DNA repair pathway, it is possible to use this combination for chemotherapy and reduce the need for alternate procedures such as radiation and surgery.

Navkiranjot Kaur

Faculty Mentor: **Dr. Robert Akins**

“Correlation of the Presence and Titer of Enterococcus Faecalis and its Cytolysin Gene with Recurrence in Bacterial Vaginosis”

Our research focuses on the correlation of *Enterococcus faecalis* and its cytolysin gene with recurrence in bacterial vaginosis. Bacterial vaginosis (BV) is the most common vaginal infection, present in 29 percent of women. During BV, *Lactobacillus* species is displaced by a variety of other species, which cause symptoms including odor, discharge, and sexual problems, and which introduce risk factors such as elevated HIV transmission and higher rates of premature birth. The cause of the decline in *Lactobacillus* is not known.

Maaz Kazmi

Faculty Mentor: **Dr. Elizabeth Kuhl Towner**

“Transportation Access and Food-purchasing Patterns Among Low-income, African-American Families of Preschoolers Living in Detroit”

An issue that the city of Detroit has is that there are a minimal amount of grocery stores within city limits. The commonly held perception is that because of the lack of stores, many citizens of Detroit are impacted in their food-buying patterns, and often have to rely on gas stations for food, which is both less nutritious and more expensive. The research will counter some of these commonly held ideas, as the data compiled shows that the participants were able to access food and groceries outside of Detroit without hardship.

Gaia Klotz

Faculty Mentor: **Dr. Mary Anderson**

“Conflict Resolution and Shakespeare in Prison: Creating Her World”

In order to explore the unique roles that mediation and facilitation play in the creative process, the researcher volunteered once a week for five months with the Detroit Public Theatre’s all-female Shakespeare in Prison Program (SIP) at the Huron Valley Correctional Facility in Ypsilanti, Michigan. Findings indicated that both prison theatre and conflict resolution strive to create spaces in which dialogue can occur between otherwise distant parties. Despite clear differences between both fields, there were surprising overlaps of technique that occurred in the SIP context which could inform future collaboration and further enrich both areas of study.

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Kenneth Kutschman

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

“Synthesis of Sulfur-containing Cryptands Using a New Synthetic Strategy”

Contrast agents in magnetic resonance imaging most commonly use the element gadolinium as the base. Although useful at low magnetic field strengths, they are less useful at high field strengths. Europium offers a potential solution to high field strengths. An issue with europium-based agents is that they lose an electron when exposed to air and, in doing so, lose their effectiveness. My research aims to synthesize compounds called cryptands, which bind to europium, and stabilize it. The cryptands I am synthesizing are sulfur-based due to sulfur’s demonstrated ability to stabilize europium. By using a photochemical reaction called the thiol-ene reaction, I aim to efficiently synthesize sulfur-based cryptands that can be used to stabilize europium-based agents.

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Alexandra Lemieux

Faculty Mentor: **Dr. Debra Skafar**

“Effects of Estradiol and Bisphenol A on a Trophoblast Cell Line”

Bisphenol A, more commonly known as BPA, is a synthetic compound manufactured in large quantities for the use of many consumer products, including plastics and thermal receipts. BPA is an endocrine disrupter that can act through estrogen receptors 1 and 2, as well as other membrane-bound estrogen receptors. Estrogen can have negative effects on human trophoblast cells; thus, it is necessary to study common compounds that may act on cells in a similar manner. We found that, like estrogen, BPA significantly decreases cell growth and increases cell death. We also investigated the compound ICI, which was shown to block the effects of both E2 and BPA.

Kizzmett Littleton

Faculty Mentor: **Dr. Yuson Jung**

“Can the Food in Your Cabinet Save Your Life? A Case Study on Food as Medicine in Metro Detroit”

There has been a growing interest in the discussion of food in which healing can occur naturally through food and supplements. This research will uncover how Detroiters are responding to this notion of “food as medicine” and challenge the assumption that pharmaceutical medicine is the ultimate solution to cure ailment. Though there is a plethora of information regarding food as medicine, the question remains to what extent people agree on this relationship and what this relationship means to their everyday practice of taking care of their health. The research is to discover the ways in which food is being portrayed in society and how Detroiters respond to information provided in popular health and medical sources, media as well as literature.

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Lauren Macconnachie

Faculty Mentor: **Dr. Haidong Gu**

“Role of Polyproline Sequences in ND10 Fusion”

Herpes simplex virus type 1 (HSV-1) is a ubiquitous virus that affects 80 percent of the world population. Infectious cell protein 0 (ICP0) is a viral protein that acts to relieve viral genome repression imposed by host anti-viral defenses. We are interested in the process by which ICP0 fuses to and disrupts host ND10 bodies, nuclear structures that repress viral genome expression. Specifically, the project aims to characterize the segments of ICP0 that drive fusion of ICP0 and ND10 bodies. Mutant HSV-1 viruses were constructed and preliminary microscopy assays were conducted.

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Nour Mahmoud

Faculty Mentor: **Dr. Andrew Fribley**

“Identification of Small Molecules Activation on the Unfolded Protein Respond in Leukemia Cells”

Our approach to improving current leukemic therapies is to identify small molecules that enforce the unfolded protein response (UPR) through upregulation of apoptotic cell death machinery in cancer cells. This study aims to identify small molecules — from a 2400 compound screen — that activate the luciferase reporter cell line K562-HCR-luc. Furthermore, to determine which compounds inhibit proliferation in a CHOP-dependent fashion.

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Carly Malburg

Faculty Mentor: **Dr. Robert Akins**

“Identification of Vaginal Bacterial Species that are Mutually and Differentially Antagonistic with Strains of Candida Albican”

The pathogenic yeast *Candida albicans* causes vulvovaginal candidiasis (VVC) in 29 percent 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 species of *Candida* or, conversely, are themselves inhibited by *Candida* in vitro. Our hypothesis is that patients that host antagonistic bacterial species will be less likely to have VVC, and that inhibition of bacteria by *Candida* may influence the likelihood of BV. Early results indicate that these interactions do exist; detecting amounts of these species among BV and healthy vaginal samples is underway. If confirmed, this offers new possibilities in managing both VVC and BV.

Nadeen Mansour

Faculty Mentor: **Dr. Kyle Burghardt**

“Brain Derived Neurotrophic Factor Genetic Variation, Insulin Resistance and Diabetes in Arab Americans”

This research project examines the gene(s) associated with Arab Americans, who are estimated to be affected by diabetes 9 to 20 percent more than the general United States population. The Brain-Derived Neurotrophic Factor (BDNF) has been identified as a regulator of glucose and insulin. We will examine this gene’s associations with insulin resistance and diabetes measures in our sample population of Arab-American DNA.

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Christopher Mathews

Faculty Mentor: **Dr. Robert Akins**

“Where in the World is Candida?”

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 percent mortality. Environmental isolates may be exposed to agricultural antifungals that induce resistance; if so, these populations could contribute to the growing instances of clinical resistance. Pathogenic species of Candida were found on 91 percent of food items tested. C. albicans was prevalent in chicken, and C. krusei in many fruits. This study aims to identify common reservoirs in the environment of Candida albicans and suggests isolates antifungal resistance stems from frequent exposure of azoles in clinical and agriculture settings.

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Maria Matta

Faculty Mentor: **Dr. Shije Sheng**

“Maspin Expression Correlates with Better Differentiated Breast Cancer Cells”

About one in eight women will develop invasive breast cancer in their lifetime (American Cancer Society). Despite technological and therapeutic advances, breast cancer accounts for over 40,000 annual deaths partially due to a lack of biomarkers. The aim of this project was to determine if Maspin, mammary serine protease inhibitor, is a potential biomarker. Our preliminary data suggests that Maspin, 42 kDa tumor suppressor gene, correlates to a better, differentiated and less invasive phenotype. In order to attribute this difference to Maspin, three different adenoviruses were used to establish isogenic cell lines of MCF10a, a high Maspin expressing normal breast cell line, SUM 149, a moderately Maspin expressing inflammatory breast cancer cell line, and SUM 159, a Maspin void anaplastic carcinoma.

Ben Mick

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

“Ultrasonic Echolocation Device for Assisting the Visually Impaired”

The overall objective of the project was to develop a sensory substitution device for visually impaired users that will gauge distances between the user and objects. An ultrasonic sensor is capable of sending out a high-frequency wave, receiving the reflected wave within a set period of time, and measuring the time interval before sending an electric signal to a microprocessor. Our design alerts the user about the acquired information of their environment with tactile feedback. This tactile feedback consists of a motor that vibrates at different intensities depending on the distance to an object. This will allow visually impaired users to regain some of the ability to detect objects in space, therefore granting them a greater level of independence in their day-to-day lives.

Cara Mitrano

Faculty Mentor: **Dr. Francesca Luca**

“Effect of ACTG1 Expression on Cell Migration in the Presence of Dexamethasone and Retinoic Acid”

Every day, we are exposed to chemicals which can influence complex traits differently depending on individual genetic variation. Preliminary studies in our lab found that retinoic acid and dexamethasone impact the rate of wound healing and cell migration in vascular endothelial cells. ACTG1 and SYNJ2 are two genes associated with cell migration and wound healing that we identified as being responsive to dexamethasone and retinoic acid depending on individual genetic variation. This study examines knock-down of the target genes ACTG1 and SYNJ2 in vascular endothelial cells and its effect on cell migration rate in the presence of dexamethasone and retinoic acid treatments. This research could shed light on inter-individual variation in wound healing and angiogenesis, processes relevant for cardiovascular health and cancer progression.

Mukund Mohan

Faculty Mentor: **Dr. Vijaya Arun Kumar**

“Ultrasound Enhanced Catheter Directed Thrombolysis for Patients with Massive and Submassive Pulmonary Embolism Presenting to the ED”

Venous thromboembolism has a 12-month mortality rate of 37.1 percent, and 12 percent of patients have a recurrent pulmonary embolism (PE) within 90 days. Ultrasound enhanced, catheter-directed thrombolysis (UECDT) combines ultrasonic clot destruction with local thrombolysis. The purpose of this study is to evaluate the effectiveness of UE CDT in the management of PE. A retrospective cohort of patients with PE from 2010-15 and treated with UECDT were included. Demographic data, complications, mortality rate and echocardiograph findings were obtained from electronic medical records. The study included 122 patients, mean age 60.4 years, 46 percent male and 73 percent African American. The total inpatient mortality was 9.8 percent, statistically significant when compared to the standard of care mortality of 23.2 percent. Our data suggest that UE CDT improves the outcomes in PE.

Jared Morin

Faculty Mentor: **Dr. Mary Anderson**

“It Takes a Lot of Audacity to Make an Utterance: Challenging Artists and Audiences with Boal and Parks”

Directing Suzan Lori Parks’ *In The Blood* while utilizing and experimenting with the techniques of Augusto Boal’s systems for agitative and therapeutic performance to create theatrical experiences that fostered effective dialogue, techniques, and catharsis.

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Maricruz Moya

Faculty Mentor: **Dr. Noel Kulik**

“How Do Latino Children View Their Health?”

The purpose of this study was to evaluate how children in the Latino population viewed their health, specifically related to healthy eating and physical activity. The study was guided by two research questions: (1) How do Latino children define attributes of health and health-related behaviors? (2) How do children interpret the single-item global health status question of self-rated health (SRH); specifically, how do everyday activities, health beliefs and actual health status influence children’s interpretation of the measure? The goal of this research was to provide data on an underserved population that explored children’s early conception of health. These health perceptions, if left unchecked, can be mirrored over time in attitudes and patterns of health behavior later in life.

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Lauren Notoriano

Faculty Mentor: **Dr. James Lister**

“Hardships and Needs of Persons with Heroin Dependency: A Grounded Theory of What Social Workers Need to Know”

Heroin dependency is an epidemic that affects people across the nation. The epidemic is having a negative impact on individuals, families, and communities in the metro Detroit region. To understand the public health crisis of heroin dependency, researchers and service providers must first gain a better understanding of the population. My journey of academic exploration had two main goals: (1) to gain an understanding of the heroin-dependent population and (2) to become familiar with clinical research. By exploring these avenues, I was able to learn about the psychosocial hardships and barriers to health equity this population encounters. I hope to share my findings with those who work with this population and those who aspire to understand the heroin-dependent population.

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Hollyann Orr

Faculty Mentor: **Dr. Alisa V. Moldavanova**

“A Killer Policy: How Animal Parks Adapt to the Changing Public Interest”

Changes in public opinion can directly affect organizational behavior. To better understand the relationship between organizations and the public, the researcher investigated two animal parks, SeaWorld and Busch Gardens, and the sudden shift in public opinion that forced the parks to adapt to the public pressure.

Devon Ostermiller

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

“Network Mapping of Water Crisis Governance in Flint, Michigan”

What is the nature the of networked relationships of actors and authority involved in the Flint water crisis? Using a shared network governance model, this project finds that a lack of political capacity and credible communication contributed to the problematic governance of the Flint water crisis.

India Owens

Faculty Mentor: **Dr. Loren Schwiebert**

“High Performance Computing Using Graphic Processing Units (GPUs)”

This study explains how a Graphic Processing Unit (GPU) can be used in conjunction with a Central Processing Unit (CPU) in order to improve overall performance of computer applications. It goes into detail as to why GPUs work well with CPUs, how to write code so that it works on a GPU, and some best practices when working with GPUs. These points are tested on an application that uses the Purdue Reactive Molecular Dynamics model, which allows us to simulate DNA molecules, in order to better understand cancer. This application, at the start, only worked on the CPU. This study recounts the efforts made to shift portions of the application to work on the GPU and progress of performance of the application.

Paragi Patel

Faculty Mentor: **Dr. Vaibhav Diwadkar**

“Handedness Mediates Inter-hemispheric Network Interactions of the Human Motor Cortex During Inter-hemispheric Transfer: fMRI Evidence”

Handedness is an integral property of the organization of the human motor system. Approximately 90 percent of adults are right-handed and this study investigates the differences in motor cortex organization between right handers and non-right handers during inter-hemispheric transfer, signals crossing the brain’s hemispheres to successfully complete tasks. Functional magnetic resonance imaging evidence was used to analyze the brain network interactions between the motor cortices during an inter-hemispheric transfer task.

Pattamestrige Eresha Perera

Faculty Mentor: **Dr. Donna Kashian**

“Effects of Tylosin and Tris(dichloroisopropyl)phosphate on Oxygen Consumption and Filtration Rate of Quagga Mussels (Dreissena bugensis)”

Limited research has been performed on the effects of tylosin (a veterinary antibiotic) and tris(dichloroisopropyl)phosphate (a flame retardant) on the aquatic environment. Our study was conducted to examine the environmental impacts of these pollutants, specifically on quagga mussels. Quagga mussels were ideal organisms to be studied as their physiology is well understood; they are easy to collect and need low maintenance in the laboratory. The metabolic processes, oxygen consumption and filtration of chlorophyll-a in quagga mussels were observed after exposure to varying concentrations of the two chemicals. The results of our study can be used to understand the environmental effects of these chemicals and on other organisms.

Alexandru Pop

Faculty Mentor: **Dr. Jason H. Mateika**

“Role of Serotonin in the Initiation of Central Sleep Apnea”

Sleep apnea is a disorder that affects 10 percent of the population in the United States. There are two types of sleep apnea: central and obstructive. Obstructive sleep apnea is characterized by obstruction of the upper airway. Central sleep apnea is defined by a cessation of breathing that is directly linked to elimination of the respiratory rhythm. The consequences of sleep apnea include nightly exposure to intermittent periods of reduced oxygen levels that are linked to cardiovascular, neurocognitive and metabolic dysfunction. Serotonin is a known regulator of the respiratory rhythm and arousal state (i.e. sleep vs. wakefulness); therefore, the purpose of the study was to determine the role that serotonin has in the initiation of central sleep apnea over the 24-hour cycle.

Monica Prasad

Faculty Mentor: **Dr. Harini Sundararaghavan**

“Histological Analysis of Nerve Regeneration in Nerve Conduits Enhanced with Growth Factors and Aligned Fibers”

Peripheral nerve injury can cause a complete loss of functionality in the respective limb if the injured nerve improperly regenerates. The current “gold standard” is an autograft, but nerve growth conduits (NGC) have been developed to direct regeneration. In this study, we fabricate a NGC with aligned fibers and growth-factor releasing microspheres combined with exercise. Histology is used to evaluate the extent of regeneration by measuring nerve fiber density and the myelination of axons.

Andrea Prenkocevic

Faculty Mentor: **Dr. Robert Akins**

“Identification of Vaginal Bacterial Species that are Mutually and Differentially Antagonistic with Strains of Candida Albican”

The pathogenic yeast *Candida albicans* causes vulvovaginal candidiasis (VVC) in 29 percent 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 species of *Candida* or, conversely, are themselves inhibited by *Candida* in vitro. Our hypothesis is that patients that host antagonistic bacterial species will be less likely to have VVC, and that inhibition of bacteria by *Candida* may influence the likelihood of BV. Early results indicate that these interactions do exist; detecting amounts of these species among BV and healthy vaginal samples is underway. If confirmed, this offers new possibilities in managing both VVC and BV.

Sruthi Ramesh

Faculty Mentor: **Dr. Noa Ofen**

“Semantic Representation of Rapidly Presented Visual Images Across Ages”

Mental representations of visual stimuli contain both perceptual and semantic information. It is not clear how the ability to utilize semantic information in visual recognition develops. In a previous study, we have examined factors that impact semantic representation of rapidly presented images in adults and found that the length of the interstimulus interval (ISI) had no effect on the recognition of images in the short term; however, a longer ISI improved image recognition in the long term. In the present study, we extended this investigation to children and found that there was no significant difference in the pattern observed in children when compared to adults; however, as expected, the overall scores of children were lower than those of adults (main effect of age).

Nathan Reddmann

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

“Ultrasonic Echolocation Device for Assisting the Visually Impaired”

The overall objective of the project was to develop a sensory substitution device for visually impaired users that will gauge distances between the user and objects. An ultrasonic sensor is capable of sending out a high-frequency wave, receiving the reflected wave within a set period of time, and measuring the time interval before sending an electric signal to a microprocessor. Our design alerts the user about the acquired information of their environment with tactile feedback. This tactile feedback consists of a motor that vibrates at different intensities depending on the distance to an object. This will allow visually impaired users to regain some of the ability to detect objects in space, therefore granting them a greater level of independence in their day-to-day lives.

Matthew Reesman

Faculty Mentor: **Dr. Hans J. Hummer**

“Material Culture and Identity within the Hunnic Empire”

By comparing artifacts dated to the fourth and fifth centuries C.E., “Material Culture and Identity within the Hunnic Empire” identifies a distinct style of personal metalwares such as jewelry, buckles, and brooches, which developed within the Hunnic Empire. Reesman then demonstrates evidence that this was used within the empire to create a shared identity among its ethnically diverse peoples.

Saige Rutherford

Faculty Mentor: **Dr. Moriah Thomason**

“Exploration of Current Fetal fMRI Methodology”

This research project seeks to map the development of functional connections within the brain of the human fetus. We aim to understand the bridge between fetal brain development and both environmental and biological factors that impact their health and growth. Our approach utilizes resting-state functional MRI (rs-fMRI) to model brain development at the earliest possible period of development in utero. While the recent application of this imaging technique allows for investigation of neurodevelopmental disorder origins, there are unique challenges associated with fetal MRI that must be overcome. Here, we discuss the foundational methods used in acquiring this data.

Siri Sarvepalli

Faculty Mentor: **Dr. Noa Ofen**

“Item and Associative Memory Development Across Age”

Memory can be functionally differentiated into two forms: item and associative memory. To enrich our understanding of memory development, 88 participants ages 5-17 years studied image pairs that were shown one followed by two recognition tests. One showed single drawings to test item memory, and the other showed drawing pairs for associative memory. Another task tested 33 individuals ages 6-17 using words rather than line drawings. With both tests, we found that memory performance in the pair test improved to a greater extent from childhood to adolescence compared to that in the item test. This indicates that associative memory has a more protracted development from early childhood to adolescence compared to that of item memory.

Farah Sattar

Faculty Mentor: **Dr. Robert Akins**

“Role of Regulated Chromosome Loss in Resistance and Adaptability of Candida Albicans”

Candida albicans is an opportunistic pathogenic yeast that inhabits approximately 25 percent oral, gut, and vaginal environments of the population, leading to a condition called Candidiasis. Given the widespread nature of C. albicans-related ailments, we must ask: What makes the species so successful? Regulated chromosome loss may be the answer. My research aims to establish tools for rapid detection of chromosome loss, which will allow me to ask which genes and pathways are needed to regulate such losses. Doing so may then uncover a specialized mechanism frequently invoked by this yeast, ultimately offering us targets for its inhibition in vivo environments.

Kawthar Shafiekhorassani

Faculty Mentor: **Dr. Loren Schwiebert**

“High Performance Computing Using Graphics Processing Units (GPUs)”

GPUs are more commonly used for rendering graphics or gaming and can be found in platforms such as personal computers, embedded systems, robots, mobile phones, and cars. The inherent multithreaded architecture of the GPU can allow it to work in unison with the CPU to process more complex computations that require running in parallel. Processing data that deals with complex computations can be done much faster on the GPU than on the CPU. The desired outcome for a function implemented on the GPU is to reduce the latency and improve throughput. The goal of this research is to obtain significant speedup in the running time of a program by exploiting the multithreaded architecture of the GPU.

Monica Shah

Faculty Mentor: **Dr. Diane Cabelof**

“Investigations of the Role of Base Excision Repair (BER) in Down Syndrome”

Down syndrome is a disorder that occurs when an individual has a complete or partial extra copy of the 21st chromosome. With much evidence as an aging syndrome, Down syndrome is hypothesized to be linked to a DNA repair defect. This research project observes the gene expression and DNA repair correlated to the aging phenotype of Down syndrome.

Mark Sharrow

Faculty Mentor: **Dr. Jaime Goodrich**

“Tracing Shakespeare: A Modern Search for Early Modern Stage Directions”

This project began with the intention of searching for clues of Shakespeare’s authorial intent within his famous play, *Hamlet*. Although I had initially intended to cobble together stage directions from margin notes and differences between the editions, many of the intended research artifacts — namely Shakespeare’s First Folio, Second Folio, and Quartos — were, due to their rare and fragile nature, restricted. This reality of scholarly research led to the discovery of something even more precious than marginalia: a full set of stage directions in the form of a promptbook, annotated by a director who saw a production of *Hamlet* where the titular character had been given direction on the part by Shakespeare himself. The directions are noted, investigated, and analyzed through the lens of Hamlet’s sanity.

Maria Simpkins

Faculty Mentor: **Dr. Mary Anderson**

"It Takes a Lot of Audacity to Make an Utterance: Challenging Artists and Audiences with Boal and Parks"

Directing Suzan Lori Parks' *In The Blood* while utilizing and experimenting with the techniques of Augusto Boal's systems for agitative and therapeutic performance to create theatrical experiences that fostered effective dialogue, techniques, and catharsis.

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Hannah Sitto

Faculty Mentor: **Dr. Jeyasuria Pancharatnam**

"Deciphering the Role of Differential Promoter Usage on Uterine Estrogen Receptor Action During Pregnancy"

Our lab studies the functional relevance of estrogen receptor alpha with respect to giving birth, with the ultimate goal of understanding why women deliver prematurely. Preterm birth is a major problem in the United States and is the direct cause of 30 percent of all neonatal deaths. Estrogen receptor mediation action plays an important role in myometrial physiology throughout gestation, and multiple tissues in the body require estrogen signaling and function. We believe this multiple-tissue conundrum is solved through estrogen receptor alpha splice variant isoforms. Alternative splicing allows a tissue-specific response to a common stimulus, such as estrogen. My research specifically focuses on the role of differential promoter usage on uterine estrogen receptor (ER α) action during pregnancy.

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Vita Stramaglia

Faculty Mentor: **Dr. Robert Akins**

"Where in the World is Candida?"

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 percent mortality. Environmental isolates may be exposed to agricultural antifungals that induce resistance; if so, these populations could contribute to the growing instances of clinical resistance. Pathogenic species of *Candida* were found on 91 percent of food items tested. *C. albicans* was prevalent in chicken, and *C. krusei* in many fruits. This study aims to identify common reservoirs in the environment of *Candida albicans* and suggests isolates antifungal resistance stems from frequent exposure of azoles in clinical and agriculture settings.

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Abdul-Rahman Suleiman

Faculty Mentor: **Dr. Susanne Brummelte**

"Transgenerational Effects of Preconceptional Stress and Gestational Antidepressant Exposure"

Recent research suggests that stress can lead to epigenetic changes that can be transmitted from parents to children and grandchildren. However, less is known about the transgenerational effects of gestational drug exposure. The current study was designed to test transgenerational effects of gestational antidepressant exposure using a rodent model of maternal depression based on giving high levels of the stress hormone corticosterone for 21 days before pregnancy. "Depressed" (corticosterone-treated) or healthy female rats then received the antidepressant sertraline on day 16 until day 21. We look forward to finalizing the results obtained from this model.

Solomiya Svytka

Faculty Mentor: **Dr. David Randall Armant**

“Investigating the Relationship Between No/Cgmp and Hbegf Signaling Pathways”

The aim of the research project was to look at molecular pathways which occur during pregnancy in the uterus and increase the survival of trophoblast cells. It has been shown that sildenafil citrate, a vasoactive drug, promotes the survival and invasiveness of human trophoblast cells. Thus, this research project looked at the pathway and intermediates of the sildenafil pathway to acquire a better understanding of the molecular processes which occur during pregnancy.

Cindy Temali

Faculty Mentor: **Dr. Jessica Damoiseaux**

“Differences in Brain Activation During a Working Memory Task Between Yoga Experts and Non-experts”

Yoga is a mind body-based physical activity that has demonstrated a variety of physiological and psychosocial benefits. Recent studies have also examined the benefits of this practice on behavioral measures of cognitive function. In the present study, using MRI, we examined differences in brain activation between yoga experts and gender and age-matched controls during the encoding phase of a working memory task. In addition, we investigated grey matter volume differences in certain subcortical regions between the two groups. Based on our findings, further exploration into the benefits of yoga practice on brain function and structure is warranted.

Jameson Tockstein

Faculty Mentor: **Dr. Gil Paz**

“Untangling Nuclear and Form Factor Effects in Neutrino-nucleon Scattering”

When studying scattering experiments, models are typically used to describe the behavior of the system. In the case of neutrino-nucleon scattering, a nuclear model and form factors are both necessary to analyze the scattering cross section. We look at the Relativistic Fermi Gas (RFG) nuclear model, which is the standard for this type of scattering experiment, and verify calculations concerning the scattering cross section. We then looked into the feasibility of implementing a different nuclear model known as the Correlated Fermi Gas (CFG) nuclear model and researched the implications of making this change. Our analysis using this new model yielded additional functions in our scattering cross section, which is the result of four possible momenta transitions that may occur during scattering.

Sangini Tolia

Faculty Mentor: **Dr. Ryan Thummel**

“Characterization of miR-133 During Zebrafish Photoreceptor Development, Maintenance, and Regeneration”

Zebrafish possess the incredible ability to regenerate, or regrow, parts of their body. For example, even after significant damage to the retina of the eye, these fish are able to regenerate the tissue and regain their eyesight. However, even though zebrafish and human retinas are very similar, humans are unable to do this and the exact mechanism of regeneration is still being studied. We know that genes are expressed to make proteins, proteins are used to rebuild damaged tissue, and that microRNAs have a role in lowering the expression of certain genes. This project aims to see if controlling gene expression via a particular microRNA has a role in early development, regeneration, and long-term maintenance of the retinal layer that is crucial for sight.

Garrett Tuer

Faculty Mentor: **Dr. Mohammad Mehrmohammadi**

“Design and Implementation of a Low-cost Magnetomotive Molecular Ultrasound Imaging System”

Magnetomotive molecular ultrasound imaging is a technique that strengthens the imaging power of ultrasound on its own. By injecting tissues with magnetic nanoparticles and applying a magnetic field that turns on and off, we can see a greater contrast between the tagged tissue versus the surrounding tissue because the tagged tissue will pulse in response to the applied magnetic field. This method is desirable because ultrasound is common and much less expensive than other medical imaging techniques and can therefore be used to reduce the typical cost of medical imaging.

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Mohammed Turfe

Faculty Mentor: **Andreana Holowatyj**

“Age Patterns of Aggressive Endometrial Cancer Incidence in the United States”

Endometrial cancer is the fourth leading cancer in women and the most common gynecological cancer in the United States. We used demographic and clinical data on patients diagnosed with aggressive endometrial cancer to assess trends in incidence by age at diagnosis and tumor type. Identification of patterns in incidence of endometrial cancer over time can contribute to our understanding of disparities and ultimately improving patient outcomes.

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Daniel Varghese

Faculty Mentor: **Dr. Serrine Lau**

“Metformin Scavenges Methylglyoxal to Form an Imidazolinone Metabolite in T2D Patients: A Potential Therapeutic to Alleviate T2D Complications”

Varghese is involved in a research project that investigates novel mechanisms by which metformin scavenges reactive dicarbonyl products derived from glycol-oxidation. We hypothesize that efficient removal of these endogenous electrophiles, which are capable of modifying critical cellular proteins, may result in the possibility of reducing complications in type-2 diabetic mellitus patients (T2DM).

Varghese is currently assisting on investigating the significance of a metformin-methylglyoxal product in the overall scheme of metformin drug efficacy and evaluating its pharmacological properties in hopes that it could be utilized as an effective aid in the reduction of diabetic complications or used as stand alone therapy for instances where metformin may be contraindicated.

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Vanessa Verstraete

Faculty Mentor: **Dr. Donna Kashian**

“Effects of Tylosin and Tris(dichloroisopropyl)phosphate on Oxygen Consumption and Filtration Rate of Quagga Mussels (Dreissena bugensis)”

Limited research has been performed on the effects of tylosin (a veterinary antibiotic) and tris(dichloroisopropyl)phosphate (a flame retardant) on the aquatic environment. Our study was conducted to examine the environmental impacts of these pollutants, specifically on quagga mussels. Quagga mussels were ideal organisms to be studied as their physiology is well understood; they are easy to collect and need low maintenance in the laboratory. The metabolic processes, oxygen consumption and filtration of chlorophyll-a in quagga mussels were observed after exposure to varying concentrations of the two chemicals. The results of our study can be used to understand the environmental effects of these chemicals and on other organisms.

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Marah Wahbeh

Faculty Mentor: **Dr. Victoria Meller**

“Long and Short RNAs: Do They Meet in the Middle?”

When considering regulation of gene expression, many think of local regulation of a single gene. But in higher organisms, including humans, regulation of expression may occur on a wider scale; for example, coordinated control of an entire chromosome. The X chromosome of many organisms is regulated in this manner. In male flies, the X chromosome is recognized and up-regulated so that gene expression is equal to that of the two female X chromosomes. This process involves long and short RNAs that act through different pathways to identify the X. Interestingly, these RNAs are produced from adjacent genes. I explored the possibility that run-on transcripts containing both RNAs coordinate the activity of the two recognition pathways.

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Michael Williams

Faculty Mentor: **Dr. Paul Toro**

“Estimating the Prevalence of Homelessness and Precariously Housed Wayne State Students”

This research estimates the prevalence of homelessness and precariously housed Wayne state students. One thousand random students will complete a brief survey about their housing experience now and in the past. Fifty of these participants will receive a more extensive interview where additional background information is required, including age, ethnicity, gender, education, stress, and interpersonal relationships. This will allow a better understanding and results of this understudy phenomenon.

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Jacob Wilson

Faculty Mentor: **Dr. Karen Beningo**

“The Maturation of Invadopodia Induced by Mechanical Stimulation is Regulated by PAK1 Kinase”

Cancer metastasis occurs when cells within the primary tumor invade into the surrounding tumor stroma and then enter the vasculature for transport to another location in the body. The process of invasion is affected by the transient tugging and pulling on the fibrous proteins of the stroma, a form of mechanical stimulation poorly characterized in its contribution to cancer progression. Cancer cells utilize specialized structures called invadopodia to promote invasion, and these structures respond to tugging and pulling forces. Invadopodia are regulated by various kinases and signaling molecules. When invadopodia mature, they increase in length and secrete more proteolytic enzymes. This study examined the importance of PAK1 kinase in the regulation of invadopodia maturation that has resulted from transient tugging and pulling forces.

Nicole Witzleben

Faculty Mentor: **Dr. Mohammad Mehrmohammadi**

“Design and Implementation of a Low-cost Magnetomotive Molecular Ultrasound Imaging System”

Magnetomotive molecular ultrasound imaging is a technique that strengthens the imaging power of ultrasound on its own. By injecting tissues with magnetic nanoparticles and applying a magnetic field that turns on and off, we can see a greater contrast between the tagged tissue versus the surrounding tissue because the tagged tissue will pulse in response to the applied magnetic field. This method is desirable because ultrasound is common and much less expensive than other medical imaging techniques and can therefore be used to reduce the typical cost of medical imaging.

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Susan Woods

Faculty Mentor: **Dr. Susanne Brummelte**

“Exploring Enzyme-linked Immunosorbent Assay Inaccuracies During Corticosterone Study”

Determining what led to errors during an enzyme-linked immunosorbent assay (ELISA) — a standard wet laboratory technique used to quantify a substance — was a rigorous process. The researcher examined errors that could have occurred before, during, and after the actual experiment. The researcher discovered the cause of error and has implemented a new lab protocol for performing ELISAs. The researcher hopes this project will aid other researchers who have encountered errors while performing ELISAs.

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Nikhil Yedulla

Faculty Mentor: **Dr. Bhanu Jena**

“Development of Quantum Dots as Biomedical pH Sensors”

Quantum dots are nanoparticles that can be used to noninvasively probe for intracellular conditions such as pH and temperature. In response to changes in the cell environment, quantum dots light up at different intensities. These quantum dots can be introduced into cells that have been stimulated in a particular manner. The quantum dots can then be further observed under a microscope to gain a better understanding of what exactly is occurring in the cell in response to the stimulus. By further understanding the properties of quantum dots, they can be used as a biomedical tool. Quantum dots can potentially be used to study the pH change associated with cellular secretion, thermometry of certain diseased cells, and many other pertinent cellular processes.

NOTES

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