HONORS PROGRAM SHOWCASE

Spring 2022

April 7-8, 2022

Honors Center

LB 211

You may view the live presentations using this link:

https://purdue.webex.com/meet/fcombs

Thursday, April 7, 2022

10:00 AM **Opening remarks**, Farah Combs, Honors Program Director

10:15 AM **Welcome**, Chancellor Ronald L. Elsenbaumer

10:30 AM **Malaika Ahmed**

"Are Carotenoid Nutraceuticals capable of boosting the Immune Response?"

Major: Biology

Concentration: Microbiology and Immunology

Associate: Chemical Methods

Minor: Psychology

Faculty Mentor: Dr. Ahmed Mustafa (Biology)

11:00 AM **Alise Hale**

"Immunity Against SARS-CoV-2: Protection of Fetus and Newborn"

Major: Biology

Concentration: Microbiology and Immunology

Faculty Mentor: Dr. Elliott Blumenthal (Biology)

11:30 AM **Kayla Reidenbach**

"Barriers to Recruitment of Racial Minorities into STEM"

Major: Communication Sciences and Disorders

Minor: Linguistics, Psychology

Certificates: Gerontology, Applied Behavioral Analysis

Faculty Mentor: Dr. Naomi Gurevich (Communication Sciences and Disorders)

12:00 PM **Panashe Chakabva**

"Consolidating South African Democracy"

Majors: Political Science, Organizational Leadership

Concentration: Legal Studies

Faculty Mentor: Dr. James Toole (Political Science)

1:30 PM **Taylor Schoenefeld**

"The Effects of Nutrition on Human Fertility"

Major: Biology

Concentration: Microbiology and Immunology

Minor: Psychology

Faculty Mentor: Dr. Ahmed Mustafa (Biology)

2:00 PM **Soufanieh Pierre**

"Bioactive Effects of Marine Life Invertebrates: Focusing on Echinoderms"

Major: Biology

Concentration: Microbiology and Immunology

Associate: Chemical Methods

Minors: French, Psychology

Certificates: Biology Research Certificate, National Society of Leadership Certificate

Faculty Mentor: Dr. Ahmed Mustafa (Biology)

2:30 PM **Sierra Mullins**

"Antibiotic Properties Identified from a Soil-Derived Bacteria"

Major: Biology

Associate: Chemical Methods

Minor: Psychology

Faculty Mentor: Dr. Tanya Soule (Biology)

3:00 **Closing Remarks**

Friday, April 8, 2022

9:55 AM **Opening remarks**, Farah Combs, Honors Program Director

10:00 AM **Yilei Li**

"Predictive CT Scan Imaging: An Application of U-Nets"

Major: Computer Engineering

Minor: Mathematics

Faculty Mentor: Dr. Bin Chen (Electrical and Computer Engineering)

10:30 AM **Devansh Agrawal**

"The NeuroDrone Project"

Major: Computer Science

Concentration: Informatics

Minor: Mathematics

Faculty Mentor: Dr. Mohammadreza Hajiarbabi (Computer Science)

11:00 AM **Kashyab Ambarani**

"Towards Robustly Scalable RAN Slicing Adaptive Algorithms and Machine Learning Models"

Majors: Computer Science, Mathematics

Concentration: Software Engineering

Minor: Actuarial Science

Certificate: Research Certificate in Mathematics

Faculty Mentor: Dr. Peter Dragnev (Mathematics)

11:30 AM **Sam Emley**

"Cummins, A Strategic Case Study"

Major: Business (Finance)

Faculty Mentor: Dr. James McHann (Management and Marketing)

12:00 PM **Lydia Kiara Reuille**

"A Border Apart: Media Portrayal of Mexican Immigration in the United States"

Major: Communication

Concentration: Journalism

Minors: Spanish, Religious Studies

Faculty Mentor: Dr. Heloisa Sturm Wilkerson (Communication)

1:30 PM **Sophia Petrov**

"Impact of genetic variation on obesity in an AKHR loss-of-function model"

Major: Biology

Concentration: Microbiology and Immunology

Associate: Chemical Methods

Minor: Psychology

Certificate: Biology Research Certificate

Faculty Mentor: Dr. Rebecca Palu (Biology)

2:00 PM **Olivia Bressler**

"The Psychology and Methods behind Memorizing Music for Performance"

Major: Music Performance: Piano (BM)

Faculty Mentor: Dr. Hamilton Tescarollo (Music)

2:30 PM **Xochitl Gallegos-Garcia**

"Characteristics of the Allen County Juvenile Center"

Major: Criminal Justice

Concentration: Public Administration and Policy

Faculty Mentor: Dr. Jospeter Mbuba (Criminal Justice and Public Administration)

3:00 PM **Closing Remarks**

Malaika Ahmed

"Are Carotenoid Nutraceuticals capable of boosting the Immune Response?"

Major: Biology

Concentrations: Microbiology and Immunology

Associate: Chemical Methods

Minor: Psychology

Faculty Mentor: Dr. Ahmed Mustafa (Biology)

Biography

Malaika Ahmed is an honors pre-medical student graduating from Purdue Fort Wayne in May 2022 with degrees in biology (conc. In microbiology and immunology) (B.S.), chemical methods (A.S.), and a minor in psychology. She is the founder and current president for MEDLIFE, an international chapter organization that promotes access to Medicine, Education and Development for Low Income Families Everywhere, founder and treasurer of the Muslim Student Association, secretary of Model United Nations, a student worker at the Honors Center, a summit scholar in the Chapman Scholars program, a member and leader of Tri Beta Biological Honors Society, as well as a patient care technician at Lutheran Hospital. Malaika has also been working in Dr. Ahmed Mustafa's Stress Physiology lab since freshman year and joined Dr. Rebecca Palu's genetics lab in the fall of her senior year. She is at the beginning of her medical school application process and hopes to get accepted for the 2022-2023 cycle.

Abstract

The project centers around immunology research and investigation of natural factors such as pigments on its potential immune boosting impact in animal cells. The project will contribute an alternative outlook on natural immunity boosting compounds and investigate whether carotenoid compounds, specifically Astaxanthin, will be able to enhance immune system functions proving its future use as a natural compound for immunity wellness. Astaxanthin, a natural carotenoid which is responsible for red pigmentation in fish and crustaceans, is sourced from the microalgae Haematococcus pluvialis. While it is also chemically synthesized, the natural synthesis of Astaxanthin proves to have a greater impact on the immune system than its chemical counterpart. Astaxanthin is a known anti-oxidant as it prevents free radical formation whilst also enhancing antibody production, thus contributing to decreased proliferation of cancer cells. A nutraceutical such as Astaxanthin has the potential to rise above certain pharmaceutical options with recent studies showing evidence of its anti-inflammatory and anti-oxidant impacts. Research suggest that if carotenoid pigments such as Astaxanthin show an increase proliferation of spleen T and B cell response in-vitro on melanoma cells, then carotenoid pigments will show a potential for further research as a naturally occurring immune enhancing compound

Alise Hale

"Immunity Against SARS-CoV-2: Protection of Fetus and Newborn"

Major: Biology

Concentrations: Microbiology and Immunology

Faculty Mentor: Dr. Elliott Blumenthal (Biology)

Biography

Alise Hale is an honors student graduating this May with a B.A. in Biology (conc. Microbiology and Immunology). She has also been a member of the Purdue Fort Wayne Softball team during her time at Purdue Fort Wayne University, recently receiving the Player of the Week Award through the Horizon League. She is a member and leader of the AMSA Pre-Medical Club and has been volunteering at Matthew 25 Health Clinic for two years. Alise has been the softball team's representative for the Student-Athlete Leadership Team (SALT) since her sophomore year. She has received numerous prestigious academic awards including 2019 and 2021 Easton/NFCA All-America Scholar-Athlete as well as being on the Academic Honor Roll throughout her four years. Alise plans to attend medical school to become a physician after obtaining a master's degree in Public Health.

Abstract

The COVID-19 pandemic has caused many problems for the nation as a whole. The focus of this study is to analyze the impact pregnant women contracting COVID-19 has on the safety of the fetus growing in the placenta and the protection that may be provided to them post-delivery. There is an increased risk of pregnant women becoming ill due to a weakened immune system during pregnancy. The risk of preterm delivery for women rises if they are hospitalized with COVID-19. Recent studies are addressed to look at IgG and IgM antibody levels that are spread from mother to child when infected with SARS-CoV-2 during pregnancy. Very few studies have shown vertical transmission of infection from mother to fetus even though placental infection with SARS-CoV-2 has been identified. The level of protection the mother provides the fetus during pregnancy varies depending on when infection occurs. This also appears to carry over into the length of time anti-SARS-CoV-2 antibodies are present after delivery for both mother and newborn.

Kayla Reidenbach

"Barriers to Recruitment of Racial Minorities into STEM"

Major: Communication Sciences and Disorders

Minor: Linguistics, Psychology

Certificates: Gerontology, Applied Behavioral Analysis

Faculty Mentor: Dr. Naomi Gurevich (Communication Sciences and Disorders)

Biography

Kayla Reidenbach is a senior graduating with a degree in Communication Sciences and Disorders with minors in Linguistics and Psychology and certificates in Gerontology and Applied Behavior Analysis. She is the president of the American Sign Language Club at Purdue Fort Wayne and is active in the NSSLHA chapter on campus. Outside of school, she holds a part-time job at a local coffee shop as a barista. After graduation, Kayla will be pursuing her master's degree in Speech-Language Pathology where she hopes to work within adult and minority populations.

Abstract

Diverse populations are underserved by healthcare and underrepresented in STEM professions overall, specifically in communication sciences and disorders (CSD). The lack of recruitment and retention of racial minorities into CSD has resulted in an imbalance of representation. In the U.S. racial minorities constitute over 30% of the U.S. population, while minorities who are members and affiliates of the American-Speech-Language Hearing Association (ASHA) represent only 8.3% of the over 200,000 members.

The aim of the current study is to identify and compare possible patterns related to recruiting minority students into healthcare fields/CSD with students already in CSD. This study looks specifically at CSD undergraduate students at Purdue University Fort Wayne and Ball State University and is a continuation of research conducted by a former student. This research will help inform future practices in promoting STEM and healthcare professions to diverse populations in the U.S., which can lead to an enhanced representation in the field to better serve the diverse populations in the country.

Panashe Chakabva

"Consolidating South African Democracy"

Majors: Political Science, Organizational Leadership

Concentration: Legal Studies

Faculty Mentor: Dr. James Toole (Political Science)

Biography

Panashe Chakabva graduated in Spring 2022 with a B.A. in political science and a B.S. in organizational leadership with a concentration in legal studies. She was a research assistant for a professor in the Department of Organizational Leadership and worked as a teaching assistant in the Department of Political Science. Panashe was an active member of Model United Nations, MedLife of PFW, and College Democrats. In addition to being a Chapman Scholar, she was awarded the Van Coufoudakis Scholarship and an Honors Program scholarship during her time at Purdue Fort Wayne. Her academic success and community engagement led Panashe to be named among Purdue Fort Wayne's Top 50 students in 2021. Panashe's passion for helping immigrant communities led her, along with her project partner, to plan and host a health resource fair for immigrants who had recently relocated to the Fort Wayne area. The event was an effort to promote and increase awareness of health services and organizations available in the community. Panashe credits her academic and personal success to the support and encouragement she has received from her family, friends, and faculty. At the time of graduation, Panashe was looking forward to continuing her studies while living and working in Fort Wayne.

Abstract

 Democratic regimes around the world have struggled to stabilize and deepen democracy internally. Using South Africa as a case study, this honors project focuses on the contemporary state of South African democracy in an attempt to outline its progress to date. The question motivating this study is how well South Africa's democracy has consolidated attitudinally, behaviorally, and constitutionally from the early 2000s until now. As such, this research study adopts the framework of democratic consolidation set forth by Juan Linz and Alfred Stepan wherein consolidation is defined as the extent to which democracy is considered "the only game in town". Attitudinally, South Africa appears to be struggling at consolidation as evidenced by a growing support for non-democratic alternatives. At the same time, South Africa succeeds in deepening democracy constitutionally through independent oversight bodies like the Constitutional Court that uphold the rule of law. Behaviorally, an increase in violent protest reflects poorly on the country's democratic prospects. This analysis highlights poverty and corruption as the two major obstacles to consolidation in the case of South Africa.

Taylor Schoenefeld

"The Effects of Nutrition on Human Fertility"

Major: Biology

Concentration: Microbiology and Immunology

Minor: Psychology

Faculty Mentor: Dr. Ahmed Mustafa (Biology)

Biography

Taylor Schoenefeld is a pre-medical student graduating from Purdue Fort Wayne in the spring of 2022. She will be graduating with a bachelor's degree in Biology with a concentration in Microbiology and Immunology and a minor in Psychology. Taylor has volunteered at A Hope Center, a local pregnancy resource center, for the past 4 years. She is employed at Lutheran Hospital as a scribe and is also head lifeguard at the Summit Natatorium. She is a student leader for Campus Ministry, a member of the MEDLIFE club, biology club, and AMSA pre-medical club, and is also a member of the Tri Beta Biological Honors Society and the Phi Eta Sigma National Honors society. She served as vice president of her sorority, Alpha Sigma Alpha for one year. Taylor has worked in Dr. Ahmed Mustafa's lab assisting in research for the past two years. She hopes to attend Indiana University School of Medicine after graduation.

Abstract

Infertility is problem that is faced by many people today. With factors such as increasing obesity rates, a higher average age at childbearing, and environmental toxins, people are at a higher risk of facing fertility problems than in the past. There are various assisted reproductive technologies such as in-vitro fertilization that serve as treatment options for people who face fertility problems; however, these treatments can be very expensive and are not often covered by insurance or easily accessed by lower income populations. Nutrition and various nutritional elements have been proven to have a significant impact on many different health problems such as diabetes, cardiovascular disease, or stroke. It is possible that nutrition also has a significant effect on reproductive health. Since nutrition is something that can be altered by the individual, it could be an easy and inexpensive treatment option for infertility. The aim of this study is to determine whether nutrition has an impact on fertility. A literature review was performed on existing data surrounding the topic of various nutritional elements in relation to fertility rates in both males and females. Several observational studies were done on men and women who presented for in-vitro fertilization. A food frequency questionnaire was completed and the success of the fertility treatment was measured. The results were analyzed to determine if any of the individual food groups on the questionnaire had a significant correlation with fertility outcomes. Based on the data, nutrition does have an impact on fertility. High processed sugar, red meat, dairy products and excessive alcohol consumption were found to have a negative impact on fertility. Whole grains, omega-3 fatty acids, fruits, vegetables, and lean meats such as chicken and fish were found to have a positive impact on fertility.

Soufanieh Pierre

"Bioactive Effects of Marine Life Invertebrates: Focusing on Echinoderms"

Major: Biology

Concentration: Microbiology and Immunology

Associate: Chemical Methods

Minors: French, Psychology

Certificates: Biology Research Certificate, National Society of Leadership Certificate

Faculty Mentor: Dr. Ahmed Mustafa (Biology)

Biography

Soufanieh Pierre is a pre-medical student graduating in May 2022 with honors from Purdue University Fort Wayne. Her bachelor's degree specification is currently in Biological Sciences with a concentration in Microbiology and Immunology. She will also be receiving an associate degree in chemical methods. Furthermore, she is minoring in French as well as in Psychology. With the academic advising of Dr. Tanya Soule, she was able to progress through her undergraduate better informed and prepared. Soufanieh is also passionate about language, playing piano, and the arts. Where she is implementing some of those creative skills during remote volunteering with Elara Caring Hospice center, and soon to be with Parkview Hospice center. Particularly, she received the Excellence in Foreign Language Award in French, after being selected by Dr. Nancy Virtue of the French program. She is a member of the Tri-Beta National Biological Honor Society and a member of the National Society of Leadership and Success, where she has also earned a certificate for that. Furthermore, another credential that she will receive after graduation is the Biology Research Certificate. Soufanieh's research supervisor is Dr. Ahmed Mustafa, who she started working with beginning senior year about projects regarding echinoderm sea creatures. Under which, she has continuously aided her several graduate teammates during their rigorous acute and chronic sampling sessions. Recently she has been graciously awarded the NASA Diversity Stem grant, nominated by Dr. Mustafa, where she will be co-presenting about the "Production of Quality Biomass using Nutraceuticals in Aquaponics" and relating it to space. She is currently applying to medical school and hopes to attend Indiana University School of Medicine, after completing a one-year Purdue University Fort Wayne biology master's degree. Regarding professional plans, she hopes to focus on neuro-related issues. And of course, Soufanieh greatly thanks her mother for being her number one support and catalyst for success!

Abstract

Bioactive compounds are defined as modifiers of metabolic processes which in turn encourages healthiness though interacting at the cellular level. These chemicals go by many different names, but can all be categorized as active metabolites capable of a plethora of pharmacological and nutraceutical effects. There are multiple sources of bioactive compounds where they can be secreted such as from plants, animals, and even bacteria as an antibiotic. Most functional foods only contain bioactive compounds in small amounts. Yet, extraordinarily animal echinoderms are a special interest for studies because they naturally contain very high amounts of these bioactive compounds: especially found in their blood called coelomic fluid. The Echinodermata phylum represents a specific group that houses several marine invertebrates. In Latin, "echinos" meaning "spiny" and "dermos" meaning "skin". Primary creatures of this review's discussion include sea cucumbers (class Holothuroidea), sea stars (class Asteroidea), and sea urchins (class Echinoidea). Sea cucumbers, sea stars, and sea urchins are all ecologically valuable creatures that are very important in regulating the cleanliness of our seas though nutrient cycling and/or the overgrowth of algae, kelp, or rocky minerals dependent on the organism. Overall, with their amazing biodiversity, these sea creatures are able to accomplish numerous vital marine and even terrestrial functions.

In this framework, the present study is aimed at investigating the therapeutic, beneficial, and/or preventive activities of bioactive compounds found within these three echinoderms. Their bioactive compounds are found to have major antimicrobial, anti-neurodegenerative, anti-viral, anti-cancer, antioxidant, anti-stress, anti-inflammatory, and wound healing effects. Overall, these findings are significant to justify how seriously bioactive compounds should be incorporated into contemporary and holistic/functional medicine, thus perhaps solving many minor and life-threating diseases much more efficiently. Possible future uses though biotechnology and/or possible synergistic effects can further showcase and ameliorate the importance of these bioactive compounds.

Keywords: Bioactive compounds, Nutraceuticals, Echinoderms, Sea Cucumbers, Sea Stars, Sea Urchins.

Sierra Mullins

"Antibiotic Properties Identified from a Soil-Derived Bacteria"

Major: Biology

Associate: Chemical Methods

Minor: Psychology

Faculty Mentor: Dr. Tanya Soule (Biology)

Biography

Sierra Mullins is graduating with a Bachelor's in Biology and an Associates of Chemical Methods with a minor in Psychology and Honor's certificate. She has an Associate's in General Studies from Vincennes University and served as Vice President of Legislation in Student Government Association in Spring 2022. She served as Public Relations Committee Chair, Curriculum Committee, and as a senator in the 2021 academic year. Sierra has worked as a substitute teacher, waiter, fast food manager, and retail salesperson. She has played in the Fort Wayne Community Orchestra, intramural soccer, and intramural volleyball. She also volunteers for hospice. Sierra aspires to become a pediatric physician and hopes to go to IUPUI's Pre-Professional Program: Anatomy, Cell Biology, and Physiology. She is interested in participating in more research in the future.

Abstract

Antibiotic resistance is an advancing medical threat as increased usage results in decreased efficiency over time. Individual research projects of soil sampling and testing for antibiotic properties create a database of bacteria from diverse locations. Small World Initiative™ seeks to utilize an international program for crowdsourcing by creating a database of these individual experiments to seek new antibiotics. By diluting the sample, colonies can be collected on a masterplate. Testing against ESKAPE pathogens to see if inhibition of growth shows antibiotic properties. Proof plates done using wagon wheel methods allow these to be more directly tested for antibiotic properties. Colony PCR is done to amplify the DNA and test for purification by Nanodrop. PCR allows DNA sequencing to be looked up in BLAST and RD databases. Biochemical and organic extraction is done to distinguish between species within the genus identified by DNA sequencing. Once identification is done, additional information may be looked up to fully understand the capabilities of the bacteria.

Yilei Li

"Predictive CT Scan Imaging: An application of U-Nets"

Major: Computer Engineering

Minor: Mathematics

Faculty Mentor: Dr. Bin Chen (Electrical and Computer Engineering)

Biography

Yilei Li aims to engineer, innovate, and impact these technologies and the lives they affect. She is an international honors student from China. She is graduating from Purdue Fort Wayne in May '22 with a degree in computer engineering (B.S) and a minor in mathematics. She was listed as part of the Dean's & Semester Honors in the College of Engineering Technology and Computer Science from 2018 to 2021. Yilei was also honored to receive the Fred Zollner Foundation ETCS Scholarship in 2021 and the PFW Top 50 award in 2022.

In her time at Purdue Fort Wayne, Yilei actively engaged in various mentoring and teaching activities to help peer students succeed academically. She has been working as an undergraduate teaching assistant since 2019 and has worked as a LEAD peer mentor for one year through the ETCS Student Success Center. During the pandemic, she joined the IEEE Student Chapter as a peer tutor and helped engineering students cope with adapting to online learning by providing tutoring in various subjects. She had also served as a student worker at the IT Services, Office of Diversity and Multicultural Affairs, and the Office of International Education. After graduation, Yilei intends to pursue a master's degree with a teaching assistantship to deepen her academic view while continuing to help students succeed in their pursuits.

Abstract

Regarding the difficulties that we can encounter when using traditional image processing tools, deep learning has emerged as the primary solution in the healthcare field. The objective of this research is to investigate segmenting, modelling liver CT scans using modern image processing methods and deep learning which will allow for imaging and diagnosis of the subject's liver with minimal radiation exposure. Currently, patients undergo four different scans before a 3D image of the liver is obtained. We aim to use the data extracted from the available samples to develop a machine learning program that will predict 25%-50% of the CT volumes. The U-Net is a robust general-purpose deep learning architecture designed for semantic segmentation of medical images. An adaptation of the U-Net to output pixel-wise regression values, instead of class labels, based on multichannel input data, has been developed in the remote sensing satellite imaging research domain. In this study, we implemented a U-Net architecture that is capable of solving image estimation problems. We will compare different evaluation protocols and optimization methods and select the ones that are the best fit for our goal and improve the performance of the model.

Devansh Agrawal

"The NeuroDrone Project"

Major: Computer Science

Concentration: Informatics

Minor: Mathematics

Faculty Mentor: Dr. Mohammadreza Hajiarbabi (Computer Science)

Biography

Devansh Agrawal, a senior, is an international honors student from Nepal studying Computer Science with a specialization in Informatics and a minor in Mathematics. He was the president of the Indian Student Association and was briefly involved with the Mathematics Club. He has worked on campus in a variety of capacities, including Box Office Associate, International Student Orientation Leader, Senior IT Helpdesk Analyst, and is currently working as an Applications Developer for the IT Department. He was also a Research Assistant for Dr. Venkata Inukollu, investigating the campus's Intro to JAVA course and proposing techniques to improve future students' experiences. Devansh, along with his Capstone team is currently researching the area of Autonomous Unmanned Aerial Vehicles (UAVs), expanding on prior models, attempting improvements and conducting comparisons. As his honors project, he delivers the findings of this investigation. After graduation, Devansh will pursue a master's degree in Computer Science. He hopes to continue on his path towards becoming a Software Engineer.

Abstract

Unmanned aerial vehicles (UAVs), or drones, are a popular choice for robotic applications given their advantages such as small size, agility and ability to navigate through remote or cluttered environments. Drones are currently being widely used for surveying, mapping with many more applications being researched such as reconnaissance, disaster management, etc. In many of these applications, the drone regularly travels to the same location(s) to collect data or drop shipments with drone navigation achieved through human operators or autonomously. The latter mode relies on onboard sensors, such as Inertial Measurement Units (IMU) and Global Positioning Systems (GPS) to autonomously navigate the drone along predefined paths. Such path-following approach typically integrates GPS localization with a closed-loop drone navigation control system using the IMU. The feedback from the IMU and GPS enables the drone to travel along certain paths and correct for any drift. However, reliance on GPS-based localization poses several issues. Being a radio signal, GPS is susceptible to signal interference from different sources. Some environments such as those surrounded by high rise buildings are GPS denied due to signal unavailability. Even when the drone is in line-of-sight with GPS satellites, the information in the remote signal can be manipulated by attackers with malicious intents, e.g., GPS spoofing. Consequently, GPS based drone navigation can suffer from sustained drift due to accumulative navigation errors. With the aforementioned shortcomings, I propose NeuroDrone, a simulation environment for autonomous object detection and path navigation within drones. Using visual information acquired from a drone mounted camera, NeuroDrone makes intelligent navigation decisions based on the current logistic objectives. Furthermore, the development of NeuroDrone will help contribute towards the future of autonomous drones through the construction of an efficient learning-based algorithmic framework realized within an intuitively designed open-source simulator. The proposed system will also be evaluated using extensive simulations and theoretical analysis, taking advantage of the latest advancements in research and development.

Kashyab Ambarani

"Towards Robustly Scalable RAN slicing Adaptive Algorithms and Machine Learning Models"

Majors: Computer Science, Mathematics | **Concentration**: Software Engineering

Minor: Actuarial Science | **Certifications:** Research Certificate in Mathematics

Faculty Mentor: Dr. Peter Dragnev (Mathematics)

Biography

Kashyab Ambarani Is an undergraduate student at Purdue University Fort Wayne pursuing a bachelor's degree in Computer Science (concentration in software engineering) and Mathematics, a research certificate in mathematics, and a minor in actuarial science. He has researched under Dr. Peter Dragnev, Dr. Tu Nguyen, Dr. Beomjin Kim, Dr. Bin Chen, and Dr. Yihao Deng since sophomore year to investigate problems within 5G network optimization, quantum entanglement routing, COVID-19 vaccine optimization, and CT-scan reduction using deep learning. This project presents some preliminary results obtained from the research conducted on building fault tolerant virtual radio access networks to bring positive impacts to researchers, internet users, service providers, and society at large.

Abstract

With the rapid growth of new services and Internet applications, traditional cellular networks are now faced with a major challenge of supporting diverse applications to expand the wireless market. Going beyond the one-type-fits-all design philosophy, the future 5G radio access network (RAN) with network slicing methodology is employed to support widely diverse applications over the same physical network. 'RAN slicing aims to logically split an infrastructure into a set of self-contained programmable RAN slices, where each slice built on top of the underlying physical RAN (substrate) is a separate logical mobile network, which delivers a set of services with similar characteristics. Each RAN slice is constituted by various virtual network functions (VNFs) distributed geographically in numerous substrate nodes. Failures may occasionally arise from substrate nodes due to reasons such as software fault occurrences, servers being powered down for maintenance, or misconfigurations of servers. This leads to malfunction and invalidation of the RAN slices that have VNFs embedded at the failed substrate nodes. To recover RAN slice functions, a RAN configuration scheme for the network is imperative to relieve VNFs from substrate node failures (remapping/re-embedding VNFs onto live substrate nodes). In this proposed research, the PI will explore a novel scheme of optimization models, adaptive algorithms, and machine learning models to enhance the robustness and scalability of RAN slicing by addressing the RAN configuration issue for slice recovery in a unified framework, referred to as RS -configuration. Specifically, the PI will perform the following research tasks: i) establishing the theoretical foundation for using RS-configuration to construct a VNF plan for RAN slice-recovery and configuration optimization; ii) developing highly scalable and adaptive algorithms, and machine learning models to enable autonomous slice recovery and self-configuration, and finally iii) applying our theoretical and algorithmic development to investigate the robustness and scalability of the RS-configuration paradigm for large-scale complex RAN. These research tasks will be carried out in a spiral fashion where practical issues and applications will further inform the development of theory and algorithms. Hence, this research on a new scheme and algorithms for RAN slicing will provide a computational basis towards building robustly scalable RAN slicing and contribute to the development of new networking technologies

Sam Emley

"Cummins, A Strategic Case Study"

Major: Business (Finance)

Faculty Mentor: Dr. James McHann (Management and Marketing)

Biography

Sam Emley was born in April of 2000, here in Fort Wayne Indiana. He was raised by Joel and Kari Emley, Kari raised Sam and as a former teacher she elected to teach Sam and his brother, Luke herself. Joel worked as a division controller at Eaton Corporation in Van Wert, Ohio. Both parents played integral roles in Sam's growth through his childhood years, particularly in the area of business, where Sam took a keen interest in the career of his father, Joel. With that interest, Sam decided at a very young age to pursue business like his father with a specific interest in the area of Finance. He was a driven student through high school, earning a high GPA and took that determination into college at Purdue Fort Wayne. Sam quickly took to the Honor's Program as a way of further improving his academic experience and fell in love with the field of Psychology as he began taking his General Education courses. This new found love for Psychology manifested itself into a minor in the field. Sam is currently pursuing his dream job with the Walt Disney Company where he plans to begin work as a Financial Analyst for the Disney parks. Sam continued this chase for his dream, spending the past semester in Florida, with his girlfriend Ryleigh Weidenhamer, who is a doctoral student of Occupational Therapy at Huntington University. Sam is graduating in the Spring and hopes to be able to use his accumulated knowledge in both the Business field and the Psychological field to help those in the mental health community in tandem with his career with Disney.

Sam would like to thank the support of his girlfriend, Ryleigh, his parents Joel and Kari Emley, and his younger brother Luke, who is also a student at Purdue Fort Wayne.

Abstract

Cummins corporation has been a stalwart in the heavy machinery and equipment industry. For over a century Cummins has continued to drastically innovate the sources of power that we use every day not just in our vehicles, but in the equipment that helps make the world work. Through the modernization and continuous improvement of the diesel engine, Cummins has allowed its customers access to a powerful, reliable and dependable power source that gets the job done, safely and on time. As time has gone on, so have the needs of the planet and those who live on it. Cummins has worked relentlessly to improve and innovate not only their products but their company and operations as a whole. PLANET 2050 is an initiative that Cummins enacted by which they plan to have nearly zero local environmental footprint within the communities that they operate and serve. They plan to continue their history of transformative innovation by creating a line of carbon neutral products, that protect air quality. For over one hundred years Cummins has been able to innovate and recreate the landscape of the industry they work in, nearly eliminating any true direct competitors. This innovation mixed with bold endeavors has lead to Cummins being truly one of a kind in the face of an oversaturated industry. As the needs of the world changes and adapts to fit the current perils we face, Cummins is at the ready to power the future we are all trying to achieve.

Lydia Reuille

"A Border Apart: Media Portrayal of Mexican Immigration in the United States"

Major: Communication

Concentration: Journalism

Minors: Spanish, Religious Studies

Faculty Mentor: Dr. Heloisa Sturm Wilkerson (Communication)

Biography

Lydia Reuille is a PFW senior majoring in Communication with a Concentration in Journalism, and minoring in Spanish and Religious Studies. As a freshman, she was inducted into the National Society of Leadership & Success and Phi Eta Sigma, and has consistently been on the dean's list. Freshman year is also when she started freelancing with the Journal Gazette. Their leadership helped strengthen her journalistic writing skills, and after two years of freelancing, she interned with the newspaper her junior year. Lydia also worked at Costco for three years and left in the summer of 2021 to pursue a career with WANE 15, starting just before her senior year. She spends her weekends at the station, while weekdays are dedicated to the campus newsroom as the editor of PFW's digital media outlet, the Summit City Observer. Lydia is coming up on her first wedding anniversary with her husband, Zach, a northeast Indiana native who has helped her feel at home in the Fort by making sure she knows all the best local (mostly food-related) places to explore. Besides local adventures, Lydia also loves to travel, learning about cultural traditions and listening to new perspectives. After graduation in May, Lydia is honored to continue reporting in the community she loves as a digital producer at WANE 15.

Abstract

The border is a hot topic in the news, and it is an issue that has been highly politicized. Documented or undocumented, those who cross the border go through a convoluted process to reach the United States. The media has a powerful role in society, especially when covering individuals who come to the U.S. daily to start a new life. This project analyzes how the media portrays immigrants arriving to the United States from Mexico. The study uses a quantitative content analysis of news stories published and broadcast between 2016 and 2021 from the New York Times, the Associated Press, CNN and FOX to examine how specific sources, frames, and tone of coverage help shape the narrative on immigration and the border crisis. News coverage has the power to tell the truth, and the power to distort it. The goal of this study is to, first, address a trend in the way news impacts narratives of immigration from Mexico to the U.S., and second, propose ways the media can improve narratives surrounding Mexican immigrants.

<u>**Sophia Petrov**</u>

"Impact of genetic variation on obesity in an AKHR loss-of-function model"

Major: Biology

Concentration: microbiology and Immunology

Associate: Chemical Methods

Minor: Psychology

Certificate: Biology Research Certificate

Faculty Mentor: Dr. Rebecca Palu (Biology)

Biography

Sophia Petrov is an honors pre-medical student graduating with a (B.S.) in biology with a concentration in microbiology and immunology, (A.S.) in chemical methods, and a minor in psychology. Sophia has earned the Purdue Fort Wayne Top 50 Award for two consecutive years for her academic achievements and outstanding contributions to her community. She is the President of TriBeta Biological Honor Society, member of Psi Chi International Honor Society in Psychology, and member of The National Society of Leadership and Success. Sophia has also worked in Dr. Rebecca Palu's genetics research lab as an undergraduate research assistant during her junior and senior years at PFW and is an oncology patient care technician outside of school. Sophia's interest and passion for oncology will lead her to pursue a medical degree after graduation.

Abstract

The ways the body manages nutritional content has been a topic of global interest for centuries, particularly when these are disrupted in metabolic disease, such as obesity. There is a large genetic component to the onset, severity, and progression of these diseases, but the identities and functions of those genes remains largely unknown. Drosophila melanogaster, commonly known as the fruit fly, provides a simpler model to help us better understand the synergistic contributions that genetic differences have on obesity in humans. We have employed the Drosophila Genetic Reference Panel (DGRP), a compilation of over 200 inbred Drosophila strains, as a tool to observe how genetic variation can impact complex phenotypes such as obesity and metabolic disease. We are using AKHR loss-of-function as a model of obesity. AKHR is the Drosophila version of a human receptor that binds to the hormone glucagon, which activates the breakdown of stored nutrients under fasting conditions. In its absence, fat is not broken down and the flies therefore become obese. We are reducing AKHR expression in the fat to induce obesity. In this experiment, Drosophila larvae are generated by crossing the DGRP to our AKHR loss-of-function model. We monitor larval fat content using a previously developed density assay as a proxy for obesity. After determining the concentration at which 50% of the larvae float for the different DGRP strains, we assessed our data through a preliminary genome-wide association analysis and identified several modifier genes to be further studied.

Olivia Bressler

"The Psychology and Methods behind Memorizing Music for Performance"

Major: Music Performance: Piano (BM)

Faculty Mentor: Dr. Hamilton Tescarollo (Music)

Biography

Memorizing music is a multi-faceted process that involves encoding visual, auditory, spatial, sensory, and analytical information in the brain. Performing music from memory involves recalling all this information seamlessly. With the added stress of performance anxiety, this process can be challenging. Yet memorizing is a normal, even fundamental part of every musician's career, especially for the pianist. This project will explore the methods and psychology behind music memorization in depth. How does the brain memorize music? What practice techniques lead to the most effective memory? Why does memory ultimately fail or succeed in a performance? Although many factors determine memory security, research suggests that intentionally reinforcing all aspects of the music– its visual, aural, and kinesthetic components– may be one of the most crucial.

Abstract

Olivia Bressler is graduating this semester with a Bachelor of Music in Piano Performance. She has been taking piano lessons for over 16 years and has been fortunate to study with Dr. Hamilton Tescarollo for the past four. In 2019 and 2021, she worked at the Purdue Fort Wayne Gene Marcus Piano Camp as a Practice Coach and performed solo recitals in the Festival. She was one of the winners of the 2021 Purdue Fort Wayne Concerto and Aria Competition, performing second piano in Poulenc's "Concerto for Two Pianos" with her colleague. She has also performed in masterclasses with artists such Lise de La Salle, Liu Liu, Kevin Ayesh, and Qing Jiang, and has been a frequent competitor in IMTA's Hoosier Auditions. She enjoys helping students learn and has worked as a music tutor at the University for the past few years. Olivia also plays violin and enjoys being a part of the Purdue Fort Wayne University and Community Orchestra. She hopes to teach privately after graduation.

Xochitl Gallegos-Garcia

 "Characteristics of the Allen County Juvenile Center"

Major: Criminal Justice

Concentration: Public Administration and Policy

Faculty Mentor: Dr. Jospeter Mbuba (Criminal Justice and Public Administration)

Biography

Xochitl Gallegos-Garcia graduated from Elkhart Central High School in 2019. After three years, she wraps up her last semester at Purdue University Fort Wayne graduating with a Bachelor of Science in Public Administration and a minor in Psychology. The Allen County Probation Department was grateful to have had Xochitl as an intern for the school year of 2020-2021. She now volunteers and interns at Phoenix Associates with a licensed therapist. Xochitl joined and was involved in events and organizations throughout campus. Not only was she a part of these organizations but became President for OUTspoken and Secretary for Destiny Rescue. Xochitl also participated in intramural volleyball on campus. She has been on the Dean's List and Semester Honors in the College of Professional Studies for both school years, 2019-2020 and 2020-2021. In addition, Xochitl has also been nominated for Purdue University Fort Wayne's Top 50 award for 2021 and 2022. She plans to continue her education to the doctorate level and one day become a Correctional Psychologist.

Abstract

This presentation lays out the characteristics of the Allen County Juvenile Center, also referred to as ACJC. These characteristics are what define the foundation of the facility. Some major attributes to a facility such as ACJC are the administration, the juveniles, the treatment available for the juveniles, along with the establishment itself. On top of doing research to answer the questions provided, an interview was conducted with staff throughout the facility from different departments. This gave feedback first-handedly from those who are a major structure to the foundation. Administering these interviews with staff from separate departments gives a better insight on what the characteristics of the Allen County Juvenile Center are. Being able to have such an establishment where the court house, the probation office, the detention center and more are in one facility is a major advantage that not every county has. ACJC also has two schools with licensed teachers from around the area. With an average of 65 children held in secure detention daily plus somewhere around 700 more juveniles on probation and/ or some other form of conditional release, the Allen County Juvenile Center has been ranked among one of the finest juvenile detention facilities in Indiana.

THANK YOU

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