

2021 PRESIDENT'S SHOWCASE of UNDERGRADUATE RESEARCH EXCELLENCE



FLORIDA STATE UNIVERSITY
DIVISION OF UNDERGRADUATE STUDIES
CENTER FOR UNDERGRADUATE RESEARCH AND ACADEMIC ENGAGEMENT

Wednesday, October 6th
5:30pm to 8:15pm



Latika L. Young
Director
Center for Undergraduate
Research and Academic
Engagement (CRE)



Alicia Batailles
Senior Associate Director



Dave Montez
Associate Director



Warren Oliver
Associate Director



David Advent
Assistant Director



Yanira Campos
Graduate Assistant

WELCOME

to the 2021 President's Showcase of Undergraduate Research Excellence!

We are delighted that you could join us tonight in celebrating outstanding undergraduate research. The students who are presenting their projects have enhanced their undergraduate experience by taking on directed research and creative activity under the supervision and mentorship of some of Florida State University's most distinguished faculty. We want to offer a special welcome to FSU President, Dr. Richard McCullough, and we look forward to many years of collaboration to come!

Hosted by FSU's Center for Undergraduate Research and Academic Engagement (CRE), this event serves as the culmination of the IDEA Grant, Tech Fellows, and iGEM summer awards, but the work these students present tonight does not end here. Many of the award recipients will continue their intellectual pursuits through honors theses, independent study projects, graduate research, and entrepreneurial and creative work, both here on our campus and beyond. Congratulations to our student winners, and thank you to all the faculty members who have volunteered their time and expertise to mentor these student researchers, as these efforts would not be possible without them.

We also want to offer our sincerest gratitude to Robert and Mary Frappier, David B. Ford, Nancy Casper Hillis and Mark Hillis, Steve Madden, Dr. Jim Lee, Scott and Ina McNichols, the family of Dr. Lisa Scott and Phi Eta Sigma for their continued financial support of our summer research awards.

If you're attending this event as a student, we hope you'll be inspired to develop your own research or creative projects. Applications for next year's awards are due February 1, 2022 and are available at cre.fsu.edu. Join us at one of our many IDEA Grant information sessions throughout the fall or writing sessions in early spring to learn more!

5:30 pm

Welcome Remarks and Recognitions

[Click here to watch this Zoom session.](#)

Dr. Richard D. McCullough, President
Florida State University

Dr. Joe O'Shea, Dean
Undergraduate Studies

Latika L. Young, Director
Center for Undergraduate Research and Academic Engagement

6:00-7:00PM

Session One

Room One

[Click here to watch this Zoom session.](#)

Jenna Johnson and Erin Murphy, *Applications of Machine Learning in NCAA Division I Beach Volleyball Training and Analysis*

Isabel Maya, *Analysis of Physiological Effects of Compression Gear on American College and Pro-Level Football Athletes*

Patricia Mehaffy, *Exploring Synthetic Routes to Nanoporous Graphene*

Anne-Marie Senatus, *Selenium Recovery from Wastewater*

Room Two

[Click here to watch this Zoom session.](#)

Luis Sanchez, *The Political Medicine of Asclepius in Plato's Republic*

Emma Davis, *Anita Newcomb McGee and the Army Nurse Corps*

Alexa Scalchunes, *The Impact of Democratic Freedoms on Religious Conflict in Postcolonial Ireland, India, and Nigeria*

David Wedderburn, *Understanding Disparities in Access to Venture Capital Funding*

PRESENTATION SCHEDULE

6:00-7:00PM

Room Three

[Click here to watch this Zoom session.](#)

Cameron Banker, *The Story of Darlene Simmons: A Documentary and Research Project on Sexual Harassment in the Navy*

Guissella E. Cruz Rodriguez, *A Study of the Experiences of Survivors of Image-Based Sexual Abuse*

Aoife Trotter, *Factors Impacting Mental Health Following Sexual Assault in LGBT Individuals*

Room Four

[Click here to watch this Zoom session.](#)

FSU Tech Fellows Program

Thalia Mendoza, *Understanding Undergraduate Perspectives on Mentorship*

Lapadre Proctor, *A SWOT Analysis of the U.S. Passenger Electronic Vehicle Market*

Shemar Charles, *The Future of Remote Work in a Post-Pandemic World*

Nicholis Perez, *How the Restaurant Industry Adapted to Pandemic Restrictions and Implications for the Industry's Future*

Room Five

[Click hereto watch this Zoom session.](#)

Creative Project Sharing Session

An opportunity for artists to further share their work.

Luke Reosti, *The Intersection of Social Work Research and Entertainment: Animated Pilot Episode Prototype*

Matthew Forrest, *Desperados*

William Rowe, *Relatively Painless*

PRESENTATION SCHEDULE

7:15-8:15PM

Session Two

Room One

[Click here to watch this Zoom session.](#)

Jenevieve Norton, *Causes and Consequences of Nest-site Fidelity in Female Lance-tailed Manakins*

Derica Parathundil, *The Effect of Family-Guided Routines-Based Intervention Strategies on Communication in Caregivers and D/deaf or Hard-of-Hearing Children*

William Zak, *Influences on COVID-19 Related Stress*

William Rowe, *Relatively Painless*

Room Two

[Click here to watch this Zoom session.](#)

Chandler Pruett and Robert Szot, *Weathering the Storm: How Cones of Uncertainty Impact Hurricane Risk and Perception*

Elizabeth Schutte, *Penguin Palooza*

Derrick Woodard, *For Your Pride: Black College Student Experiences at a Predominantly White Institution*

Rocio Diaz, *Reduction of Diarrheal Illness with Improved Hand and Oral Hygiene in Rural Honduras*

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Contribute to our Interactive Wall [here](#).

PRESENTATION SCHEDULE

7:15-8:15PM

Room Three

[Click here to watch this Zoom session.](#)

Luke Reosti, *The Intersection of Social Work Research and Entertainment: Animated Pilot Episode Prototype*

Matthew Forrest, *Desperados*

Carly Fulcher, Matthew Holzaepfel, and Erica Kremer, *Chamber Music Audience Engagement Initiative*

Micah Castillo and TingYi "Tina" Lu, *An Interdisciplinary Aphasia E-Choir Co-led by Undergraduate Music Therapy Students: Development and Evaluation of Participant Experiences*

Room Four

[Click here to watch this Zoom session.](#)

Alexis Cox, Ella Missey, and Florence Mumbi, *Superimposing Celiac Gut Microbiome Metabolites on Healthy Caco-2 Cells to Observe Inflammatory Effects*

Sathvik Bilakanti, *Nanobody Discovery to Facilitate the Study of an Unusual, Degenerate Eukaryotic Proteasome*

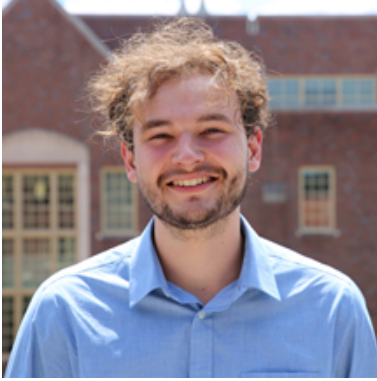
FSU iGEM, *Increasing the Shelf-life of Produce to Benefit the Food Insecure*

Presenter information in the following pages
is provided in alphabetical order by last name.

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Contribute to our Interactive Wall [here](#).



CAMERON BANKER

Supervising Professor: Prof. Ian Weir

The Story of Darlene Simmons: A Documentary and Research Project on Sexual Harassment in the Navy

Cameron Banker is a senior at FSU studying Animation at the College of Motion Picture Arts. Interested in both documentary filmmaking and 3D animation, his work is inspired by human stories, art history, and nature. Cameron is currently working on his animated thesis film with fellow classmates Nico Weaver and Erica Chow.

Nancy & Mark Hillis
Undergraduate Research Award

Abstract: In 1992, Navy JAGC Officer Darlene Simmons filed a report for sexual harassment against her supervisor Lt. Cmdr Arthur Catullo. After Simmons' chain of command refused to take action with regards to the harassment, Simmons contacted her senator. Upon discovering this her ship's command retaliated by processing her into a psychiatric holding cell. Despite opposition, Simmons sought justice for her case, the culmination of which led to Simmons testifying in front of Congress and, ultimately to an official apology from the Navy. By telling Darlene's story through this documentary and by creating a space for her to recount and reflect on her experiences, I hope to shed more light on the systemic issue of sexual harassment in the military, the status of which has sadly not changed much in the nearly thirty years since the events in this documentary took place.



SATHVIK BILAKANTI

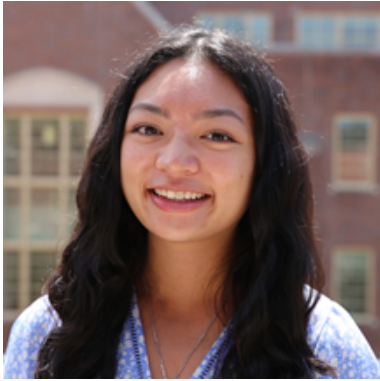
Supervising Professor: Dr. Robert Tomko

Nanobody Discovery to Facilitate the Study of an Unusual, Degenerate Eukaryotic Proteasome

Sathvik Bilakanti is a junior majoring in Health Management, Policy, and Information. In 2019, Sathvik participated in the Undergraduate Research Opportunity Program (UROP), which motivated him to continue his research work during the summer. He has been conducting research under Dr. Robert Tomko in the College of Medicine since 2019.

Scott & Ina McNichols
Undergraduate Research Award

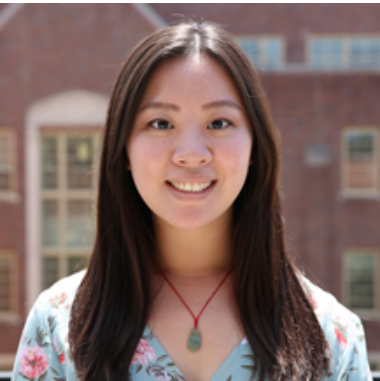
Abstract: Microsporidia are intracellular parasites that commonly infect immunocompromised people and those without access to clean water. Microsporidian infections are of increasing concern for organ transplant recipients and can even cause lethal infections in healthy individuals. However, there are no uniformly effective treatments for this dangerous parasite. The proteasome is a large energy-dependent protease inside all eukaryotic cells that acts as a recycling center for damaged or unneeded proteins. Analyses of the microsporidian genome by our group suggests that they have a highly compact and unusual proteasome compared to that of humans. Further, preliminary evidence indicates that inhibiting the activity of the microsporidian proteasome is lethal to the parasite, suggesting that the microsporidian proteasome could be a new target for developing anti microsporidian drugs. However, no tools to visualize or purify the microsporidian proteasome for further study currently exist. Toward this goal, we performed a yeast surface display screen to discover nanobodies recognizing the Proteasomal $\alpha 1$ subunit from a model microsporidian, *Encephalitozoon hellem*. This screen yielded at least three nanobody clones that recognize the $\alpha 1$ subunit. Further studies will help to characterize how each clone recognizes $\alpha 1$, and evaluate their selectivity for the parasite proteasome vs. the host cell proteasome.



MICAH CASTILLO
Supervising Professor: Dr. Rachel Goff-Albritton

An Interdisciplinary Aphasia E-Choir Co-led by Undergraduate Music Therapy Students: Development and Evaluation of Participant Experiences

Micah Castillo is a senior pursuing a Bachelor of Music degree in Music Therapy and specialized certificates in Music Entrepreneurial Studies and Interdepartmental Developmental Disabilities. Since the COVID-19 Pandemic, Micah has worked to bring music to the virtual platform, including making "Quarantine Playlists" for geriatric facilities in Florida, and most recently through the FSU Aphasia Summer E-Choir. Micah hopes to work as a Board-Certified Music Therapist before applying to grad schools.



TINGYI "TINA" LU

Tina is a senior Music Therapy major with a specialized study in Piano Pedagogy. Since participating in UROP freshman year, her research focused on individuals with Aphasia and the interdisciplinary work between Speech and Music Therapy. Her work was recognized for the 2019 E. Thayer Gaston Undergraduate Research Award at the American Music Therapy Association (AMTA) national conference. Post-graduation, she hopes to gain clinical experience as a board-certified music therapist (MT-BC) before pursuing graduate studies.

Scott & Ina McNichols
Undergraduate Research Award

Abstract: Aphasia is a prevalent post-stroke language disorder that impacts one's ability to communicate by impairing language expression or comprehension in forms of speaking, reading, and writing. Speech therapists and music therapists often collaborate to provide evidence-based treatments and community support groups for people with aphasia. Research shows people with aphasia benefit from intentional musical engagement and social support found in aphasia choirs. There is currently no active aphasia choir in the state of Florida—with many organizations stifled due to the COVID-19 pandemic. This highlights the need for aphasia E-choirs as modeled by successful implementations of virtual aphasia choirs around the world. Additionally, undergraduate music therapy students will benefit from early pre-professional experiences of interacting with people with communication disorders like aphasia to prepare for clinical internships upon graduation. Therefore, this project provided a 5-week E-choir wellness program for people with aphasia led by undergraduate music therapy students and supervised by professional mentors to explore participant feedback through weekly post-session surveys and content analysis of semi-structured interviews. Findings will inform sustainable practice for maintaining an E-choir and the development of a leadership protocol manual for future music therapy students.



Helen Louise Lee
Undergraduate Research Award

ALEXIS COX

Supervising Professor: Dr. Ravinder Nagpal

Superimposing Celiac Gut Microbiome Metabolites on Healthy Caco-2 Cells to Observe Inflammatory Effects

Alexis Cox is a Biology major in her last semester at Florida State. She discovered her love of research when she joined Connecting Experimental Labs and Life Science (CELLS) freshman year and later became the Historian and Vice President of the club. She plans on pursuing a PhD in Cellular, Molecular, and Developmental Biology and wants to conduct research in bone metabolism and bone diseases.



Phi Eta Sigma
Undergraduate Research Award

ELLA MISSEY

Ella Missey is a junior Biochemistry major at Florida State University. She did research her freshman year on mathematics, but decided later to pursue research on celiac disease as she is afflicted with it. Following her undergraduate degree, Ella plans on going to medical school, pursuing a specialty in virology and infectious disease.



Helen Louise Lee
Undergraduate Research Award

FLORENCE MUMBI

Florence Mumbi is a junior studying Biochemistry at Florida State. As this is her first opportunity, she was eager to explore a subject that has affected many of her friends. After completing her bachelor's degree, Florence plans to get her MD and PhD specializing in cardiothoracic medicine.

Abstract: Celiac disease is an autoimmune disorder of the intestines affected by the consumption of gluten. Individuals with celiac disease experience many debilitating symptoms of varying severities when they ingest gluten. Despite a high prevalence in the population, the causes and mechanics of this disease are largely unknown. Due to non-mendelian inheritance patterns and dysbiosis in the intestines, many believe certain aspects of the celiac gut microbiome could be the cause of the disorder. There are numerous studies that are contradictory and draw different conclusions. The objective of the experiment was to provide more evidence about whether the gut biome is a primary cause for celiac disease. In the study, we added the metabolites from celiac and healthy gut microbiomes on differentiated Caco-2 intestinal cells. Fecal samples were collected from 5 celiac and 5 non-celiac subjects and gut microbiome metabolites extracted. Caco-2 cells were cultured then moved to wells where the metabolites were added to the cells. After 24 hours of exposure the inflammation markers $\text{TNF}\alpha$, interleukins, and $\text{IFN}\gamma$ were measured using mRNA genotyping. This project is still ongoing.



GUISSELLA E. CRUZ RODRIGUEZ
Supervising Professor: Dr. Brendan Lantz

A Study of the Experiences of Survivors of Image-Based Sexual Abuse

Guissella E. Cruz (she/her) is a fourth year student majoring in Sociology. She has been a research assistant at the Center for the Advancement of Human Rights and took part in the Undergraduate Research Opportunity Program (UROP). After UROP, Guissella continued conducting research with Dr. Brendan Lantz and Dr. Marin Wenger, investigating the relationship between Confederate memorialization and hate crimes. She is currently an Undergraduate Honors Thesis Candidate investigating the consequences of image-based sexual abuse victimization among BIPOC youth.

Abstract: Image based sexual abuse (IBSA) is the “disclosure of sexually explicit images without consent and for no legitimate purpose” (Franks 2017). IBSA, more commonly known as revenge porn, is an emerging form of sexual abuse negatively impacting the quality of life, mental health, and reputation of survivors (Eaton 2020; Franks 2015). Growing research shows IBSA is rampant among youth, women, and the LGBTQI community. This is especially harmful for BIPOC youth since they are often hypersexualized at a young age, making them more susceptible to IBSA victimization. IBSA subjects girls and LGBTQI youth to being commodified by their bodies, which is particularly harmful since victimization is taking place during adolescence where they develop their identity, self-awareness, and sense of self. This qualitative research study aims to assess the consequences of IBSA victimization among BIPOC youth. Specifically, how victimization distorts youths’ understanding of consent and whether victimized youth are vulnerable to sexual violence in the future. Preliminary findings indicate survivors were substantially impacted after victimization and may be vulnerable to sexual violence after victimization. This is an ongoing study and aims to uplift the experiences of Black and Brown survivors.



EMMA DAVIS
Supervising Professor: Dr. Kurt Piehler

Anita Newcomb McGee and the Army Nurse Corps

Emma Davis is a senior and Presidential Scholar pursuing a dual degree in History and French with minors in Museum Studies and Humanities. During her time as an undergraduate at FSU, Emma has interned with the Institute on World War II and the Human Experience and the National Cemetery Administration in the Department of Veteran Affairs, researching and commemorating the history of women’s military service.

Scott & Ina McNichols
Undergraduate Research Award

Abstract: How did American women navigate medical education, military service, and gender roles in the nineteenth century? These questions can be answered through an examination of the life and career of Dr. Anita Newcomb McGee, a physician hailing from Washington, DC and graduate of Columbian (now George Washington) University’s Medical School. With a life bookended by the Civil War and World War II, Anita Newcomb McGee lived and worked in a period of profound change for women in medicine and the military and was instrumental in the creation of the Army Nurse Corps, which created, for the first time, a permanent place for American women in the armed forces. While considerable research exists on the Army Nurse Corps in the twentieth century, very little has been written on its origin, and the woman behind it has largely been ignored. My thesis presents McGee’s life and career as a case study for the evolving role of women in both fields in the late 19th and early 20th centuries.

PRESENTERS



Scott & Ina McNichols
Undergraduate Research Award

ROCIO DIAZ
Supervising Professor: Dr Charles Fleischer

Reduction of Diarrheal Illness with Improved Hand and Oral Hygiene in Rural Honduras

Rocio Diaz is a third-year undergraduate student in the Interdisciplinary Medical Sciences degree program with a focus in Clinical Professions. Since enrolling at FSU, she has been involved in a global health research project with Tallahassee Memorial Hospital and other health partners. Her academic interests lie in public health and primary care with the career goal of attending medical school and becoming a physician.

Abstract: Preventable diseases, in particular diarrheal illnesses, disproportionately impact rural and impoverished communities. These communities often do not have access to water filtration systems, sanitary latrines, or the resources to instill hygienic practices. Improvement in water quality, hand washing, and oral hygiene practices could decrease the prevalence of diarrheal illnesses. To address these problems in the village of Gracias a Dios, Honduras, a literature review was conducted to evaluate different existing intervention methods. Through a literature review of dozens publications concerning interventions completed in rural and impoverished areas around the world, it was concluded that there is no single methodology that clearly yields significantly greater results than others. To maximize the impact of a health intervention, a combination of different intervention methods should be implemented. These findings will be deployed in an educational curriculum for village health workers while training to work within the community.



Scott & Ina McNichols
Undergraduate Research Award

MATTHEW FORREST
Supervising Professor: Prof. Keith Roberson

Desperados

Matthew Forrest is a multidisciplinary artist from Tallahassee, Florida and a Senior Bachelor of Fine Arts candidate. Working under the pseudonym briteso, he examines the unspoken language of American life and culture through painting and digital media. He utilizes subject, color, composition, and abstraction to create bold visuals that are hard to look away from. In the last year, he has painted murals in Railroad Square and Gallie Allie in downtown Tallahassee.

Abstract: Tallahassee has a rich history of unique individuals who have danced to the beat of their own drum and played by their own set of rules. I set out to discover more about those people and create a piece of public art that honored one or more of these individuals. Through my research I discovered Nan Boynton. Nan founded Railroad Square Art Park in the early 1980s as a place where artists could work and find a sense of community with one another. By all accounts, Nan was a magnetic personality who brightened the day of everyone she encountered. Her children Adam and Lily now run the park which has grown over the years to become a destination for art and culture in Tallahassee. I chose to paint a mural in her honor that would be a bright and vibrant tribute to the woman who created this eclectic space. I chose to use spray paint as the medium because of its history of use in graffiti and because of the do-it-yourself mentality of street art. I wanted to create something that would grab people's attention and, hopefully, brighten the day of all who encounter it in the same way that Nan would have.

PRESENTERS



CARLY FULCHER

Supervising Professor: Dr. Greg Jones

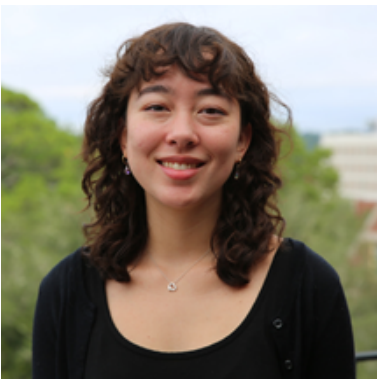
Chamber Music Audience Engagement Initiative

Carly Fulcher is a senior majoring in String Performance. She has a passion for music and a desire to learn more about what makes music meaningful to different people.



MATTHEW HOLZAEPFEL

Matthew is a 5th-year viola performance major, and he hopes to use what he has learned in the College of Music and the IDEA Grants program to help him establish a professional string quartet. As a rising classical musician, Matthew has performed with several regional orchestras and participated in chamber music festivals across the U.S. In his free time, Matthew enjoys working out and spending time with his friends.



ERICA KREMER

Erica Kremer is a senior in String Performance. She loves performing music and engaging with the public about its value to our culture.

Scott & Ina McNichols
Undergraduate Research Award

Abstract: With this project, three undergraduate string performance students aim to bring classical chamber music to diverse audiences. These students led a summer workshop series with a group of string performance students in order to study and practice audience engagement and interactive performance skills. Over the course of eight weeks, our research team featured speakers from the Robert McDuffie Center for Strings, Carnegie Mellon University, and the Juilliard School, as well as those with experience developing educational initiatives for the Philadelphia Orchestra, New York Philharmonic, Lincoln Center, Carnegie Hall, The Kennedy Center, and El Sistema USA. Each speaker has expertise in various areas of interactive performance and shared their personal experience and teachings with the group. The second part of the project will begin in the fall and will consist of a chamber music outreach concert series to bring classical music to the broader Tallahassee community. With the help of these speakers, along with supplementary books and educational materials, the group will plan and program a series of chamber music concerts in various (often unconventional) venues.



JENNA JOHNSON

Supervising Professor: Dr. Jonathan Adams

Applications of Machine Learning in NCAA Division I Beach Volleyball Training and Analysis

Jenna Johnson is a senior studying Biomedical Engineering and is also a student athlete on FSU's NCAA Beach Volleyball team. Jenna has leadership experience with the Student Athlete Advisory Council (SAAC), where she served as Recording Secretary (2020-2021) and is currently leading as President. She worked as an intern with medical devices engineering company KLS Martin over summer. After graduation, Jenna plans to attend graduate school for biomedical engineering.



ERIN MURPHY

Erin Murphy is a junior studying Computer Engineering from St Petersburg, FL. She is also an athlete on FSU's NCAA Beach Volleyball team and started research with object detection models in a previous IDEA Grant project in 2020. After graduation, she hopes to earn a Master's in data science at Florida State and continue exploring machine learning and other innovative technologies.

Abstract: This project uses footage from the FSU Beach Volleyball team's practices to analyze the efficiency of multiple object-tracking and pose estimation models. After extensive testing, the Open Pose system was selected for its ability to accurately identify player positions, quantify motion, and generate vectors to map player movements and defensive plays. Open Pose performs real-time, 2D pose estimation on multiple individuals and is ideally suited for athletic analysis. Similar work has been done in football and other heavily commercialized sports, but this project has the potential to expand machine learning techniques to a wider variety of athletic endeavors due to its ease-of-use, low cost, and accessibility. Currently, the team is exploring ways to use this data collection to help players and coaches easily identify changes in speed, arm swing mechanics, and other inefficient movements. Ultimately, this project will enhance film analysis for FSU athletics and add to the applications of machine learning algorithms that identify moving persons.



*Phi Eta Sigma
Undergraduate Research Award*

ISABEL MAYA

Supervising Professor: Dr. Meredith McQuerry

Analysis of Physiological Effects of Compression Gear on American College and Pro-Level Football Athletes

Isabel Maya is a senior majoring in Family and Child Sciences. She is originally from Medellin, Colombia with family in Weston, FL. Isabel plans to attend a Physician Assistant program with the goal of a career in sports medicine. Isabel has appreciated her research experience as it allowed her to tie her two passions together: helping others and sports.

Abstract: From 2012 to 2019, there were approximately 3,455 large scale National Football League (NFL) reported injuries including both preseason and regular season activities. These numbers include a variety of injuries such as concussions and ACL and MCL tears. In the 1950s, compression garments were invented and as the benefits became widely known, they began to be used by athletes. Girdles are compression shorts with sewn-in pads used in college and pro-level leagues. Claims of girdles include increased blood flow, maintained body warmth during exercise, reduced strain, and lower perceived exertion during exercise. There is significant lack of information, however, regarding compression garment performance in relation to the physiological effects of a male football player. Therefore, the purpose of this research was to determine the skin blood flow, skin temperature, core temperature, comfort perceptions, and sweat rate of the male human body when wearing a compression girdle. A sweating thermal manikin with active cooling channels and dynamic heat flux sensors was utilized to measure the physiological responses of a 50th percentile male when wearing football girdles in both a practice and play setting. Results indicate significant differences in skin blood flow, skin temperature, core temperature, sweat rate, and comfort and sensation perceptions when wearing compression girdles compared to boxer briefs in replicated play settings.



*Scott & Ina McNichols
Undergraduate Research Award*

PATRICIA MEHAFFY

Supervising Professor: Dr. Igor Alabugin

Exploring Synthetic Routes to Nanoporous Graphene

Patricia Mehaffy is a senior undergraduate student pursuing bachelors' degrees in Chemistry and Chinese language. She volunteers as a researcher in the Alabugin group focusing on the organic synthesis of unique molecules. In addition to an IDEA Grant, she has been awarded the Jack Saltiel Undergraduate Research Award and has co-authored two peer-reviewed scientific papers.

Abstract: The central goal of this project is to synthesize a unique pattern of graphene, which has characteristic all-bay-region edges. There are multiple ways of performing the transformations needed to create this graphene fragment, so multiple possible maps were designed and tested. The process starts with a single conjugated ring of benzene, then alkyne substituents are added to the ring to invoke radical cyclization between those alkyne substituents and the central ring to produce a cluster. This can be completed with a trisubstituted ring so that three rings are formed at once and the all-bay-region fragment is formed symmetrically. If the final precursor of the process is obtained, it will be an impressive feat. There is great potential for further study, if the synthesis process is successful. Edge modification of molecules such as graphene are highly valued since every unique pattern of it holds a unique reactivity, and the substitution patterns on each type of edge opens more and more doors for synthesis and material science.

PRESENTERS



Helen Louise Lee
Undergraduate Research Award

JENEVIEVE NORTON
Supervising Professor: Dr. Emily DuVal

Causes and Consequences of Nest-site Fidelity in Female Lance-tailed Manakins

Jenevieve Norton is a senior at Florida State University majoring in biology. She has been involved in the DuVal lab since Fall 2019 studying the behavior of lance-tailed manakins, a small tropical bird. She has been involved in the Women in Math, Science, and Engineering program (WIMSE) since 2018. Jenevieve also serves as the research outreach chair in the Environmental Service Program. Finally, she hopes to continue her research in ecology after graduation and educate others about science.

Abstract: The location of a nest is crucial to the survival of the animal and their offspring. Returning to the same area may allow parents to better avoid predators and locate resources. Investigating the factors that influence nest-site fidelity provides a useful perspective on how individuals make choices to better their chances of survival, as well as the survival of their offspring. To determine the causes and consequences of lance-tailed manakin nest fidelity within and between years, I tested the non-exclusive hypotheses that nest fidelity (1) is a response to prior success at a site, and (2) relates to subsequent female and offspring survival. Data was gathered from 245 georeferenced nests of 138 banded female lance-tailed manakins (*Chiroxiphia lanceolata*) from 2000-2018. While most females switched sites between nests, they were more likely to switch after offspring failed to fledge. However, nesting success was unrelated to whether the female had switched sites relative to a prior effort. Females that switched were no more likely to survive than females who remained in the same nest site. Though females respond to past experience, these responses do not always result in improved outcomes.



Scott & Ina McNichols
Undergraduate Research Award

DERICA PARATHUNDIL
Supervising Professor: Dr. Mollie Romano

The Effect of Family-Guided Routines-Based Intervention Strategies on Communication in Caregivers and D/deaf or Hard-of-Hearing Children

Derica Parathundil is a fourth-year student majoring in communication sciences and disorders and minoring in biomedical physics. She is conducting her honors thesis under the supervision of Dr. Mollie Romano, while assisting in ongoing research. Following graduation, she plans on obtaining her Doctor of Audiology degree focused on early intervention and/or sign language to then pursue a career as an audiologist.

Abstract: Children with hearing loss are susceptible to delays in communication development. The general reason being a lack of accessible communication models when compared to their hearing peers. A nationally accepted approach is child and family participation in early intervention (EI). This is where family members are equipped with strategies to implement on their own that will encourage communication development in D/deaf or Hard-of-Hearing (D/HH) children. While current research shows that EI is beneficial for D/HH children, there is still a significant gap in language and overall achievement in relation to hearing peers. This study investigates the use of sign in early intervention as a possible area of improvement. However, the effect, if any, of sign on a child's communication development in early intervention must be determined. This project analyzes any relationships found between communication-promoting strategies on child communication, as well as the proportion of sign to oral communication by the adult on child communication. This study also examines if there are trends in the caregivers' use of sign over time. The goal of these findings is to add to the body of research on EI in D/HH children to determine the best strategies for alleviating developmental delays in communication.



CHANDLER PRUETT
Supervising Professor: Dr. John Ahlquist

Weathering the Storm: How Cones of Uncertainty Impact Hurricane Risk Perception

Chandler Pruett is a sophomore Meteorology and Statistics dual-degree seeking student. He is also an FSU Presidential Scholar, a Phi Beta Kappa Honors Society inductee, a weathercaster, and a Hurricane Analyst for Risk Management Solutions Inc.



ROBERT SZOT

Robert Szot is a sophomore Meteorology major and Presidential Scholar. He currently engages with scientific communication as one of five producers of the FSU Weather television program and as a board member of the North Florida AMS/NWA.

*Steve Madden
Undergraduate Research Award*

Abstract: The Cone of Uncertainty (COU) is a graphic designed by the National Hurricane Center that communicates the forecast track of the center of tropical systems. The COU graphic primarily distills a forecast and its uncertainty to a single image, making redistribution of the NHC's forecast highly available to the general public. However, previous research suggests the public is confused by the COU and desires to know a storm's hazards in addition to its track. To probe this question, this study conducted an extensive survey during the summer of 2021 to understand how the public perceives the current COU and what modifications they may desire to facilitate storm preparations. Specifically, the research team designed ten graphics -- the current COU with and without the track line plus eight modifications -- based on a literature review and original concepts. These illustrations were shown to 149 in-person respondents throughout the state of Florida and 4,181 online respondents throughout the United States. By recognizing how the general public understands the current COU and potential modifications to the graphic, this study investigated if a COU redesign was necessary and what modifications would need to be included in such a redesign. Our finding is that survey respondents preferred a COU that includes threat level at landfall.



Scott & Ina McNichols
Undergraduate Research Award

LUKE REOSTI

Supervising Professor: Dr. Karen Oehme

The Intersection of Social Work Research and Entertainment: Animated Pilot Episode Prototype

Luke Reosti is a senior at Florida State University pursuing a Bachelor's degree in Digital Media Production with a minor in English studies. He also works as a graphic artist and editor for the Institute for Family Violence Studies at the FSU College of Social Work. While he eventually plans on working full time in film and television, he is currently applying for graduate programs in digital production and editing.

Abstract: Children ages 8-12 in the USA spend an average of 4-6 hours a day staring at a screen and teens spend up to 9 hours a day (AACAP, 2020). Humans immerse themselves into fictional worlds through television, demonstrating its power to invoke formative emotions within people. While most stories possess some moral lesson, few can have lasting educational impacts on peoples' lives. What if there was an objective way to articulate and demonstrate narratives that are crucial to the development of a child's life? This project has formed a solid research structure creating an exposition derived from psychosocial profiles, social dynamics based on Foucault's theory of Panopticism, and a narrative capable of exemplifying and addressing complex social issues. This pilot episode, while not complete in its implementation of social work interventions, has become a "Pandora's Box" of evidence-based research illustrating statistically relatable characters to increase empathy and give the viewers something to relate to on a more complex level. The episode will have a foundation of solid issues for the characters to navigate and eventually master so that young viewers may be equipped to articulate complex social observations and complaints.



Scott & Ina McNichols
Undergraduate Research Award

WILLIAM ROWE

Supervising Professor: Prof. Cosmo Whyte

Relatively Painless

William Rowe is a senior in the Bachelor of Fine Arts program with a focus in painting and figure. He works part time as a painting instructor in Tallahassee and plans on getting his Master's in Art Education at FSU after finishing his bachelor's degree.

Abstract: This is a series of paintings related to biblical and mythological beheadings. The beheading scenes in my paintings are a metaphor for the transgender experience and are inspired by Caravaggio's painting of *David with the Head of Goliath*, where Goliath's head is a self-portrait of the artist. This series will explore the consequences trans people face if they choose to transition socially and physically and will also draw attention to the ties between transgender guilt, Catholic guilt, and the idea of good versus evil. I would want this research to educate and to inspire a connection between universal feelings and specific messages, in the same way that Carravagio's *David with the Head of Goliath* felt so immediately understandable and relatable to me when I first saw it. This series will also illustrate the guilt, the prejudice, and the loss that transitioning socially and physically causes. Christian Renaissance art (especially when made by homosexual artists) is so poignant to me and other LGBT people with Christian upbringings. Christian guilt, and the expression of the artist's own emotional turmoil through the lens of Christian myth, can be so incongruous and classically beautiful.



David B. Ford
Undergraduate Research Award

LUIS SANCHEZ

Supervising Professor: Dr. Svetla Slaveva-Griffin

The Political Medicine of Asclepius in Plato's Republic

Luis E. Sanchez is a senior studying Classics and German. His research interests lie in classical philosophy, tragedy, and medicine, recently culminating in a paper titled Sophocles' Antigone and the Biological Imperative to Marry, delivered at the annual meeting of the Classical Association of the Middle West and South. He hopes to start studying Classics at the graduate level next year.

Abstract: In this project and undergraduate thesis, titled "The Political Medicine of Asclepius in Plato's Republic", I offer a systematic analysis of the use of medicine as metaphor in the *Republic*, through which Plato likens the healthy and diseased human body to the just and unjust city and, therefore, soul. For Plato, these biological, political, and psychical entities are under similar circumstances "fevered," and as such are they all able to be "cured" by the same sorts of "medicine." The doctor cures the body of fever through drugs, and the statesman cures the city of injustice through legislation, doing so just as expertly. The doctor and the statesman are both restorers of order, whether that order be the equal balance of the bodily humors, as attested by the Hippocratic Corpus, of which I argue Plato was familiar, or whether that order be the rule of the philosopher class in Plato's idealized city "Kallipolis" and, therefore, the hegemony of the rational over the spirited and appetitive in the soul. My project yields a clearer understanding of the Platonic idea of justice, considering the individual and collective relationships between the constituents of the body, city, and soul according to Plato.



Scott & Ina McNichols
Undergraduate Research Award

ALEXA SCALCHUNES

Supervising Professor: Dr. Matthew Day

The Impact of Democratic Freedom on Religious Conflict in Postcolonial Ireland, India, and Nigeria

Alexa Scalchunes is in the International Affairs program with a specific focus on development and economics. Throughout her time at FSU, she has learned the importance of ethical development and research through opportunities like Global Scholars and the Undergraduate Research Opportunity Program. Alexa is in the process of completing an honors thesis, supported by the IDEA grant, to learn more about the impacts of colonialism and democracy.

Abstract: When looking at past and current events of postcolonial countries, conflict is often apparent. As the British empire moved out of Ireland, India, and Nigeria, the newly independent states were left with issues of instability, artificial borders, and corruption. With this gap in political power, identity politics became a larger occurrence as groups aimed to improve their situation and gain government power. Through contentious politics, religious conflict became apparent in each of the countries studied. In my research, this study examines how different levels and qualities of democracy have impacted these religious conflicts. Using both mathematical data and historical analyses, the project aims to not only analyze the impact of democracy on conflict, but also the effects of the distinct qualities of democracy. A case study of each aforementioned country was completed from the year of independence through the duration of the conflict. No conclusions have been drawn at this point in the research process, but differences between democratic freedom, history, and forms of government are key variables being examined.



Robert and Mary Frappier
Undergraduate Research Award

ELIZABETH SCHUTTE

Supervising Professor: Dr. Christian Hubicki

Penguin Palooza

Elizabeth Schutte is a sophomore student at Florida State University majoring in Public Relations and Spanish. Elizabeth began her work with the Penguinengineering research team through Florida State's Undergraduate Research Opportunity Program in the fall of 2020, and she has continued working with the team as a publicist. Elizabeth founded Elizabeth M. Schutte, LLC in 2020, where she works as a content creator in the public relations and digital marketing industry.

Abstract: This project was conducted to test the hypothesis that hands-on learning is the most effective way to teach young children. To test this hypothesis, a large-scale outreach event for families in Tallahassee was planned and hosted for families, at which children would have the opportunity to learn in a hands-on manner. The goal of this event, Penguin Palooza, was to teach young people about the environment and the importance of sustainability, with a particular emphasis on penguins as an endangered species. Event activities were inspired by a reportedly successful tactic discovered in previous research: teaching children a lesson and then immediately giving them the opportunity to put it into practice. The games were primarily created from recyclable materials, in an effort to demonstrate sustainable practices. To help promote the research team, reusable water bottles, buttons, stickers and t-shirts that featured the team's logo were all available for sale or given away as prizes during the event. The planning process for this event included designing and ordering branded materials, selecting lessons to teach at the event, creating games and activities, producing promotional materials, designing a website for the Penguinengineering team, and applying for an event permit.



Lisa Scott
Undergraduate Research Award

ANNE-MARIE SENATUS

Supervising Professor: Dr. Youneng Tang

Selenium Recovery from Wastewater

Anne-marie Senatus is a third-year student majoring in Environmental Engineering. Her interests are in water treatment, both its quality and water resources. Anne-marie currently works under Dr. Youneng Tang and his team of graduate students at the FAMU-FSU College of Engineering. In the future, she hopes to help put an end to the water crisis in developing countries by providing clean and better access to water.

Abstract: Selenium (Se) is a nonmetal chemical element commonly found in wastewater. It is known to be highly toxic and harmful to human beings when present in large amounts. If removed or recovered correctly, it can be useful to us. It can help with the production of glass, alloys, steel, and even oil. There are several known methods used to separate selenium from wastewater for recovery. But these known methods have been proven to be expensive or harmful to the environment. This research explains how a lab-scale prototype of three different water treatment units combined into one system was developed to help separate elemental selenium, treated water, and biomass residue from each other. This system is considered to be a potentially cheaper and more sustainable way to recover selenium from wastewater. The overall system consists of a biological reactor, a bacterium selenium nanoparticle (SeNP) separator, and a tangential flow ultrafiltration module (TFU).



AOIFE TROTTER

Supervising Professor: Dr. Brad Schmidt

Factors Impacting Mental Health Following Sexual Assault in LGBT Individuals

Aoife is a junior studying psychology under the guidance of Dr. Brad Schmidt. She has been focused on trauma research since her assistantship in the Schmidt lab in 2020. Upon her graduation in 2023, Aoife plans to pursue a Ph.D. in Clinical Psychology.

Scott & Ina McNichols
Undergraduate Research Award

Abstract: Recent research suggests that LGBT individuals are similarly at-risk for experiencing sexual assault when compared to heterosexual and cisgender women. In addition, they are more likely to experience detrimental psychological reactions to sexual assault such as alcohol abuse, post-traumatic stress symptoms (PTSS), and depressive symptoms. This increased distress has been explained in previous research using the minority stress model. However, psychopathology after and recovery from sexual assault in LGBT individuals remains largely unstudied. This project aims to understand how attitudes and beliefs may be linked to psychopathology in LGBT survivors of sexual assault as compared to a cisgender, heterosexual sample. Preliminary data outlines three attitudes and conditions that may be relevant to psychopathology and recovery following sexual assault: rape myth endorsement, ambivalent sexism, and world assumptions. To examine these potential associations, a sample of LGBT participants and a control group of cisgender, heterosexual participants (n=110, 40; respectively) were recruited and surveyed through Qualtrics, and exploratory analyses will be performed to identify correlates between measures of psychopathology and cognitive factors.



DERRICK WOODARD

Supervising Professor: Dr. Dawn Matthews

For Your Pride: Black College Student Experiences at a Predominantly White Institution

As a first-generation student, Derrick Woodard feels it is his duty to investigate the experiences of his peers. At college, he has overcome obstacles and discovered that he wants to study the experiences of students from similar backgrounds as himself and how they are persevering. Despite Derrick's major being Biology, he felt that his studies in life needed to encompass his everyday life. Continue to follow him on his path towards exploring the Black student experience.

Scott & Ina McNichols
Undergraduate Research Award

Abstract: Black and Hispanic students have higher college dropout rates compared to White and Asian students in the United States (Tate, 2017). Many factors play a role in college dropout rates, and these must be addressed so that minority students may be better supported and have dropout rates decline. The focus of this study is on better understanding the disconnect between students' needs and the assistance educational institutions provide, particularly how that disconnect makes vulnerable student populations, like traditionally underrepresented minorities, unable to receive the information and access to resources they need when transitioning to and remaining in college. Additional factors examined include how Black university students have experienced the uncertainty of the COVID-19 pandemic and recent social unrest. This project utilized focus groups with students to assist in the synthesis of better methods that will better serve Black students. Conclusions from this study will add not only awareness to this subject, but provide solutions to existing literature that can be further improved by other researchers.



David B. Ford
Undergraduate Research Award

WILLIAM ZAK

Supervising Professor: Dr. Brad Schmidt

Influences on COVID-19 Related Stress

William Zak is a third-year Psychology student at Florida State originally from Norfolk, Virginia. He has been involved in research since Fall of 2019. His current research interests lie in behavioral interventions and mitigation techniques for preventing the development of adverse psychological conditions. After graduation, William hopes to attend medical school and serve as a physician in the United States Navy.

Abstract: In late 2019, COVID-19 began to spread across the globe, eventually leading to widespread shutdowns and stay-at-home orders. These shutdowns led to social isolation, financial insecurity, and health-related stress for many individuals. This study sought to investigate the degree to which symptoms like anxiety and depression changed due to the pandemic, as well as how various coping strategies may serve to protect or contribute to these symptoms. Online participants living in the United States ($N = 225$) were recruited through Amazon's Mechanical Turk for two waves of data collection, four weeks apart. Data were analyzed using Pearson correlations and t-tests. It was found that there was a significant increase in anxiety ($t = 3.981, p < .001$) and depressive symptoms ($t = 4.227, p < .001$). Further, these changes were associated with different coping behaviors as predicted. It was discovered that an increase in substance use, including marijuana and alcohol, were related to worse depression and anxiety during the pandemic ($r_s < -.154, p_s < .022$). Additionally, learning new skills was correlated with greater anxiety and depression ($r_s < -.150, p_s < 0.025$). Conversely, an increase in television consumption ($r_s > .145, p_s < .031$), as well as an increase in physical exercise ($r_s > .244, p_s < .001$), was correlated with less depression and anxiety. These results add to the body of literature on pandemic impacts as well as how coping methods interact with psychopathology. These findings warrant further investigation into strategies for coping with the impacts of similar future stressors.



The International Genetically Engineered Machine (iGEM) Competition is the premiere student competition in synthetic biology.

THE FSU iGEM TEAM

Supervising Professor: Dr. Cesar Rodriguez

Increasing the Shelf-life of Produce to Benefit the Food Insecure

The 2021 team is led by Jovey Osagie (Biology) and Associate Team Leader Colin Shea (Entrepreneurship). The Design team is made up of Jade Knight (Team Lead, Environmental Science), Chase Tarrillo (Biochemistry), Jeret McCoy (Computer Science), and Anish Shah (Biology). The Create team includes Caleb Molinari (Team Lead, Biology), Matthew Quarles (Biology), Lola Musa (Biology) and Ely Bor (Chemical Engineering). The Human Practices team, who examine the physical and ethical implications of the team's proposed intervention, are Natalie Storch (Team Lead, Cell-Molecular Biology) and Emma Kiely (International Affairs). Morgan Marisa (Digital Media Production and Khloe Henry (Information Technology) act as visual arts and software leads, respectively.

Abstract: Food insecurity is a lack of consistent access to enough safe, nutritious and socially acceptable food for an active, healthy and productive life. It can be cyclical or episodic—associated with a crisis like COVID-19.” (Second Harvest). Food insecurity is a symptom of financial, socio-economic, and geographic failures; as such, food insecurity is incredibly complex in the ways it arises and expresses itself in various communities and households. Nutrition is crucial for an individual's, thus a community's, well-being. Discrete communities contrast in their nutritional deficiencies, but in general, food insecure populations suffer from chronic diseases stemming from obesity or nutrient deficiencies in iron, vitamin A, or calcium. Providing fresh, nutritious food to food-insecure populations directly combats the health effects of food insecurity. Food pantries receive free donations of fresh foods from farms, supermarkets, or food banks, but the fresh food is typically at the end of its shelf life, making it hard for food-insecure populations to use them in that short window of time (1-2 days before it goes bad). Because of the terribly short expiration of fresh foods and their necessity for refrigeration, food pantries love to take in and distribute staples (rice, beans, potatoes, etc) and shelf-stable goods, such as canned and packaged goods.

The **FSU Tech Fellows** program exposes students to the everyday work of product development, entrepreneurship, and ecosystem building. As a fellow, students spend a dynamic summer embedded with a business incubator and work alongside startup companies. The Tech Fellows complete a qualitative or policy research project as part of the program.



Shemar Charles is currently a junior majoring in Computer Engineering. He interned with Tallahassee's Domi Station. Previously, Shemar was a participant in the **Undergraduate Research Opportunity Program (UROP)**. He has also participated in the **Florida Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP)**, which seeks to empower minority students in STEM fields to graduate and move onto graduate school. Shemar's research is focused on understanding the potential long-term impact of the COVID-19 pandemic on remote work.



Thalia Mendoza is a senior majoring in Political Science and International Affairs. In addition to her internship with StarterStudios, Thalia participated in the Global Scholars program. Her research project examines students' understanding of mentorship and its benefits. Outside of the classroom, Thalia is Chair of the College of Social Sciences and Public Policy's Student Leadership Council. In addition, she is the Communications and Community Outreach Liaison for the PeaceJam Foundation.



Nicholis Perez is a junior majoring in Commercial Entrepreneurship. His internship was with StarterStudios where he conducted research towards the development of a new agri-tech business accelerator in Central Florida. Nicholis' research focused on the tactics and strategies of Florida-based restaurants to adapt to the COVID-19 pandemic. His ambitions are to open a restaurant of his own post-graduation.



Lapadre Proctor is a second-year student majoring in Mechanical Engineering and has ambitions to innovate in the automotive industry. In addition, to his internship at Tallahassee's Domi Station, Lapadre conducted a SWOT analysis examining the consumer electronic vehicles market. Lapadre is currently involved with the National Society of Black Engineers and the American Society of Mechanical Engineers.



David Wedderburn is a junior majoring in Marketing who interned at Tampa Bay WaVe. In addition to his internship, David focused his qualitative research project on boundaries experienced by Black business owners in obtaining venture capital funding. Outside the classroom, he had been the Case Competition Strategy Team Leader for FSU's American Marketing Association and has recently founded the 501c3: Building Generational Wealth and Success.

We are so grateful for the generous donors who have sponsored the following IDEA Grants:

Robert and Mary Frappier Undergraduate Research Award:

Robert and Mary Frappier are strong supporters of FSU and undergraduate research. This award is for a student focusing on the environment and sustainability or housing.

Scott and Ina McNichols Undergraduate Research Award:

Scott and Ina McNichols are both FSU alumni who have a deep desire to support research which provides an enriching experience for the student engaged in research who wants to better the community around them. This award is open to all majors.

Nancy Casper Hillis and Mark Hillis Undergraduate Research Award:

Mark and Nan Hillis are vibrant FSU supporters who want to support undergraduate research that embodies the Unconquered Seminole spirit. This award is open to all majors.

Steve Madden Undergraduate Research Award:

Steve is an FSU graduate in Engineering who is supportive of students finding their passion in STEM fields. His award is open to students in any STEM major. (Must be a full-time FSU student in spring)

David B. Ford Undergraduate Research and Creative Activity Award:

David B. Ford of New York, New York is currently the President of DBF Associates, a private investment firm, and Senior Advisor to Gatemore Capital Management, LLC, a private wealth and institutional investment management firm. This award is open to all majors.

Phi Eta Sigma Undergraduate Research Award:

The Phi Eta Sigma Freshman Honor Society established an undergraduate research award to support the research endeavors of students who are members of the honor society. This award is for Phi Eta Sigma members in good standing. (Must be a full-time FSU student in spring)

Helen Louise Lee Undergraduate Research Award:

This award was established by Dr. Jim Lee in memory of his mother Helen who was a proponent of higher education and the ways it can help students enhance their lives. This award is for a student majoring in Biology. (Must be a full-time FSU student during the Spring semester)

Lisa Scott Endowed Undergraduate Research Award:

This award was established by in memory of Lisa Scott. This award is a 1st Generation student engaged in undergraduate research. Preference is given to Pell-eligible female students.



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