

Fall 2024 Fiat Lux

A Celebration of Florida Southern College
Student Scholarship and Research

November 20, 2024
Becker Business Building



Sponsored by the Florida Southern College Chapter of the Honor Society of Phi Kappa Phi

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Fall 2024 Fiat Lux

A Celebration of Florida Southern College Student Scholarship and Research

November 20, 2024

Welcome!

Florida Southern College fosters an environment where students actively transition from being consumers of knowledge to becoming scholars who create new knowledge, insights, connections, and understanding. For over 20 years, our students have gathered at the end of each semester to present and discuss the scholarly work they have been doing in and beyond their courses.

The goal of Fiat Lux is twofold: to provide students with a platform for their ideas, and to provide the wider community a window into the creative and intellectual energy that pervades our campus. Today's event provides a singular opportunity to publicly share the meaning and joy of scholarly inquiry.

We encourage you to take part in as many sessions as you can! Enjoy the conversation.

Schedule

11:00am-11:15am	Welcome	Dr. Carrie Ann Hall
	Opening Remarks	Provost Tracey D. Tedder
	Schedule Overview	Dr. Kristen Carter
		Becker Business Building Lobby
11:20am-12:20pm	Presentations	Becker 111, 115, 116, 205, 209, 210

Fiat Lux at Florida Southern College

<https://www.flsouthern.edu/events-center/special/fiat-lux.aspx>

Fall 2024 Fiat Lux Presenters – By Last Name

Room	Time	First Name	Last Name	Major	Title
115	11:20-11:40	Sofia	Aras	Marine Biology	Eastern Oyster Habitat Suitability Model
111	11:40-12:00	Luci	Bermudez	Integrative Biology	Digenean Parasites of Bats from Panama and their Associations with Bacterial Endosymbionts in the Genus Neorickettsia
205	11:20-11:40	Isabelle	Bieber	Biology	Intergenerational Learning in Conservation Biology: Using Collaboration Between Generations in Environmental Education
209	11:20-11:40	Aiden	Coffey	Computer Science	Digital Pathology: The Study of AI on the Cellular Level
210	12:00-12:20	Joseph	Giannone	Art History and Museum Studies	Pigment Identification Using Multispectral Imaging Method
210	11:40-12:00	Delaney	Harris	Marine Biology	It's Raining Sharks and Rays: Investigating Spatial Ecology of Elasmobranchs in Tampa Bay
210	11:20-11:40	Molly	Kennedy	Marine Biology	Isolation and Assessment of Antibacterial Properties of Microbes Sampled from the Epidermis of Juvenile Bull Sharks, <i>Carcharhinus leucas</i> , and Cownose Rays, <i>Rhinoptera bonasus</i> , in Tampa Bay
116	12:00-12:20	Molly	Kennedy	Marine Biology	You Are What You Eat: Using Molecular Tools to Study Tapeworm Life Cycles in Young-of-the-Year Bull Sharks <i>Carcharhinus leucas</i>
111	11:20-11:40	Olivia	Migliorato	English	Exclusive Shakespeare: The Intersection of Race and Gender in Shakespeare's "Antony and Cleopatra" and "Titus Andronicus"
205	11:40-12:00	Anthony	Prancl	Computer Science	Audio Signal Isolation for Automatic Speech Recognition
115	11:40-12:00	Madeline	Sanders	Marine Biology	Moonlit Monkeys: Facial Pelage Brightness and its Role in Owl Monkey (<i>Aotus nancymaae</i>) Intraspecific Communication
209	11:40-12:00	Catherine	Sarte	Computer Science	Integrating Artificial Intelligence into Psoriasis Severity Diagnosis and Management

Fall 2024 Fiat Lux Presentations – By Room

Room 111

11:20-11:40	Olivia	Migliorato	English	Exclusive Shakespeare: The Intersection of Race and Gender in Shakespeare’s “Antony and Cleopatra” and “Titus Andronicus”
11:40-12:00	Luci	Bermudez	Integrative Biology	Digenean Parasites of Bats from Panama and their Associations with Bacterial Endosymbionts in the Genus <i>Neorickettsia</i>

Room 115

11:20-11:40	Sofia	Aras	Marine Biology	Eastern Oyster Habitat Suitability Model
11:40-12:00	Madeline	Sanders	Marine Biology	Moonlit Monkeys: Facial Pelage Brightness and its Role in Owl Monkey (<i>Aotus nancymae</i>) Intraspecific Communication

Room 116

12:00-12:20	Molly	Kennedy	Marine Biology	You Are What You Eat: Using Molecular Tools to Study Tapeworm Life Cycles in Young-of-the-Year Bull Sharks <i>Carcharhinus leucas</i>
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Room 205

11:20-11:40	Isabelle	Bieber	Biology	Intergenerational Learning in Conservation Biology: Using Collaboration Between Generations in Environmental Education
11:40-12:00	Anthony	Prancl	Computer Science	Audio Signal Isolation for Automatic Speech Recognition

Room 209

11:20-11:40	Aiden	Coffey	Computer Science	Digital Pathology: The Study of AI on the Cellular Level
11:40-12:00	Catherine	Sarte	Computer Science	Integrating Artificial Intelligence into Psoriasis Severity Diagnosis and Management

Fall 2024 Fiat Lux Presentations – By Room

Room 210

11:20-11:40	Molly	Kennedy	Marine Biology	Isolation and Assessment of Antibacterial Properties of Microbes Sampled from the Epidermis of Juvenile Bull Sharks, <i>Carcharhinus leucas</i> , and Cownose Rays, <i>Rhinoptera bonasus</i> , in Tampa Bay
11:40-12:00	Delaney	Harris	Marine Biology	It's Raining Sharks and Rays: Investigating Spatial Ecology of Elasmobranchs in Tampa Bay
12:00-12:20	Joseph	Giannone	Art History and Museum Studies	Pigment Identification Using Multispectral Imaging Method

Presentations

In alphabetical order by presenter's last name.

Fall 2024 Fiat Lux Presentations

Student: Aras, Sofia

Major: Marine Biology

Faculty Mentor: Lauren Griffiths

Presentation Time: 11:20-11:40

Presentation Type: Oral Presentation

Room: 115

Title: Eastern Oyster Habitat Suitability Model

Abstract: Eastern oysters are a keystone species that offer numerous ecological advantages, including providing habitat for estuarine animals like fish, crabs, and shrimp. As filter feeders, they improve the water quality by consuming algae, removing it and other pollutants such as nitrogen from the waterway. Consequently, this improves seagrass health and support additional aquatic species. Oysters also prevent the erosion of nearby shorelines and decrease wave energy. Unfortunately, oyster habitat has been in decline in recent decades due to human activity. To help aid restoration efforts, we created a habitat suitability model for eastern oysters in Sarasota County that incorporated current seagrass habitat, boat channels, and water depth in order to predict areas that would be most suitable for oyster habitat. This provides information to land managers who can use the information to inform restoration decisions to help the eastern oyster population thrive before they go extinct and changes are irreversible. An interactive map was created that allows individuals to identify areas that are most and least optimal to support oyster habitat. This project is important to show how various factors affect eastern oysters and provide a framework to aid in restoration which will help us understand how other species that are dependent on them will be affected.

Student: Bermudez, Luci

Major: Integrative Biology

Faculty Mentor: Christopher Brandon

Presentation Time: 11:40-12:00

Presentation Type: Oral Presentation

Room: 111

Title: Digenean Parasites of Bats from Panama and their Associations with Bacterial Endosymbionts in the Genus *Neorickettsia*

Abstract: Digeneans are parasitic flatworms with complex life cycles that almost always require a mollusk as the first host and a vertebrate final host. Bats are a highly diverse group of mammals with around 120 species in Panama alone. Bats are hosts for a diverse array of helminth parasites, however, the distribution and overall diversity of their digenean parasites are poorly understood. We collected 37 bats from two major regions of Panama in 2016 and 2023 that were found to be infected with digeneans. We have identified 11 unique digenean species from multiple genera. *Neorickettsia* is a genus of intracellular bacteria that infect different groups of digenean parasites but can also be transmitted horizontally to their vertebrate hosts and cause diseases. We screened all 102 DNA extractions of our digenean samples for *Neorickettsia* using real-time PCR. Six digenean samples, all of which were identified as *Ochoterenatrema* and collected from a single species of bat (*Myotis nigricans*), were found to be infected with the same species of *Neorickettsia*. Our phylogenetic analysis shows our found species to be most closely related to *Neorickettsia risticii*; a zoologically-relevant bacteria that is known to infect horses, dogs, and other large vertebrates.

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Student: Bieber, Isabelle

Major: Biology

Faculty Mentor: Ashley Bowers-Macrandner

Presentation Time: 11:20-11:40

Presentation Type: Honors Presentation

Room: 205

Title: Intergenerational Learning in Conservation Biology: Using Collaboration Between Generations in Environmental Education

Abstract: As the human population continues to grow and deplete natural resources, modern society has significantly, and negatively, impacted the environment, both in terms of supply-and-demand for limited resources and how ecosystems function. In order to protect and conserve Earth's biodiversity, educational outreach plays a pivotal role. Traditional conservation measures in educational programming have lacked effectiveness and community participation. Intergenerational learning (IGL) is an alternative approach to help address the challenges and deficiencies in other conservation education methods. IGL represents a potential bridge between generational gaps by promoting educational interactions between younger and older individuals. IGL highlights the vital role of children in conservation initiatives. Children have creative minds and unique perspectives, which have the potential to teach and influence their parents and/or guardians. When considering that environmental issues are often divisive, this approach could be a key pathway in spreading awareness about conservation. To examine the effectiveness of IGL in conservation and environmental education, I will examine knowledge and learning in a middle school science class. Data is collected through three surveys: pre-activity and post-activity surveys to gauge the effectiveness of instruction, and a survey sent home to the parents to analyze the efficacy of IGL.

Student: Coffey, Aiden

Major: Computer Science

Collaborators: Mindy Cook, Joseph DeMarco, and Brendan Whitmire

Faculty Mentor: Hoan Ngo

Presentation Time: 209

Presentation Type: Oral Presentation

Room: 11:20-11:40

Title: Digital Pathology: The Study of AI on the Cellular Level

Abstract: Our senior project focuses on developing a web-based platform that uses advanced AI to detect thyroid cancer at the cellular level. We're building a website that can help detect thyroid cancer from cellphone images taken through a microscope. Our model analyzes these images to determine if cancer is present, making it easier and faster for healthcare providers to diagnose patients.

Student: Giannone, Joseph

Major: Art History and Museum Studies

Faculty Mentor: Jason Montgomery

Presentation Time: 210

Presentation Type: Oral Presentation

Room: 12:00-12:20

Title: Pigment Identification Using Multispectral Imaging Method

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Abstract: Utilizing multi spectral imaging techniques, I researched how pigments in oil paintings can be discerned qualitatively through the use of photographic technology and manipulation of light.

Student: Harris, Delaney

Major: Marine Biology

Collaborators: Olivia Miles, Brady Huber, and Mia Braun

Faculty Mentors: Allison Durland-Donahou and Gabriel Langford

Presentation Time: 11:40-12:00

Presentation Type: Oral Presentation

Room: 210

Title: It's Raining Sharks and Rays: Investigating Spatial Ecology of Elasmobranchs in Tampa Bay

Abstract: Elasmobranch research in Florida's Tampa Bay has been restricted in previous years, limiting our understanding of their abundance, distribution, and nursery habitats. With the use of acoustic telemetry and gill net surveys we aimed to analyze the spatial ecology of elasmobranchs (e.g. *Carcharhinus leucas* and *Rhinoptera bonasus*). Across six sampling locations, we collected data on 70 individuals (19 of whom were acoustically tagged) and saw a return in both Southern Stingrays (*Hypanus americanus*) and Atlantic Stingrays (*H. sabinus*) after a lethal red tide event in 2021 throughout Tampa Bay waters. The majority of the 70 individuals were caught in the three main locations that we sampled: 41 Bridge, Powerlines, and 75 Island. Our efforts continue to build foundational knowledge about nursery ground usage and the need for further conservation efforts. As well as giving us vital experience for our future endeavors, this research has given us critical skills in data organization, time management, and communication with a diverse team of peers and professionals. Our time as research assistants has provided us with valuable information about conservation efforts and how to spearhead scientific research in the future.

Student: Kennedy, Molly

Major: Marine Biology

Faculty Mentor: Gabriel Langford

Presentation Time: 12:00-12:20

Presentation Type: Honors Proposal

Room: 116

Title: You Are What You Eat: Using Molecular Tools to Study Tapeworm Life Cycles in Young-of-the-Year Bull Sharks *Carcharhinus leucas*

Abstract: Unraveling parasite life cycles is challenging under almost all conditions, even when many aspects of the host(s) and parasite can be manipulated in the laboratory. The challenge increases in marine ecosystems when studying host-parasite systems that cannot be maintained in controlled conditions. Given this limitation, it is unsurprising that the life cycles of parasites are unknown for most large marine hosts, such as sharks. Recently, studies have shown the usefulness of molecular tools as an alternative method for linking different organisms that likely serve as hosts for marine parasites. A variety of parasites, including tapeworms, are known to use Bull Sharks *Carcharhinus leucas* as their definitive host, but we know very little about the remainder of their life cycles. This study proposes to use molecular techniques to link intermediate hosts for *Cathetocephalus* sp., *Paraorygmatobothrium* sp., and another yet to be identified adult tapeworm that were collected from young-of-the-year Bull Sharks

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in the Alafia River Estuary from Tampa Bay, Florida. It is hypothesized that these sharks are primarily preying upon Hardhead Catfish *Ariopsis felis* and Striped Mullet *Mugil cephalus*; and we have collected larval tapeworms from these potential intermediate hosts that we will attempt to molecularly match to our adult worms from the Bull Shark.

Student: Kennedy, Molly

Major: Marine Biology

Faculty Mentors: Melanie Langford, Gabriel Langford, and Allison Durland-Donahou

Presentation Time: 11:20-11:40

Presentation Type: Oral Presentation

Room: 210

Title: Isolation and Assessment of Antibacterial Properties of Microbes Sampled from the Epidermis of Juvenile Bull Sharks, *Carcharhinus leucas*, and Cownose Rays, *Rhinoptera bonasus*, in Tampa Bay

Abstract: Antibiotic resistance of pathogenic bacteria has become increasingly problematic as more strains of resistant bacteria, which presents new issues to treating bacterial infections. With antibiotic resistance rising and antibiotic options becoming more limited, there is great interest in the development or discovery of new antibiotics. Shark and ray (elasmobranch) skin is composed of epidermal scales, known as dermal denticles, which allow sharks to reduce drag in the water and swim more efficiently. Elasmobranch skin is well known for its antimicrobial properties, however, its microbiome is very understudied. Therefore, we sought to study the microbial communities that are present on the epidermis of juvenile bull sharks, *Carcharhinus leucas*, and Cownose Rays, *Rhinoptera bonasus*, and their properties. During the summer of 2024, we obtained swab samples from juvenile bull sharks Bull Sharks, *Carcharhinus leucas*, and Cownose Rays, *Rhinoptera bonasus*, from Tampa Bay, FL. In the lab, we cultured bacteria from swab samples, and isolated them into pure cultures. Finally, we tested the bacterial isolates for antibiotic resistance and antibiotic production.

Student: Migliorato, Olivia

Major: English

Faculty Mentors: Catherine Eskin and Jennifer Leigh Moffitt

Presentation Time: 11:20-11:40

Presentation Type: Honors Presentation

Room: 111

Title: Exclusive Shakespeare: The Intersection of Race and Gender in Shakespeare's "Antony and Cleopatra" and "Titus Andronicus"

Abstract: Until the past decade, the discussion of the intersectionality of race and gender in Shakespeare has been avoided by scholars. Race itself has been especially controversial, with most scholars agreeing that viewing Shakespeare's works through the lens of racism was anachronistic and inappropriate to its historical context. However, recent scholarship does view Shakespeare's works through the lenses of race and gender, providing a better understanding of the plays' dramaturgical realities. Through feminist and post-colonial theory, contemporary scholars can better address the imbalance of representation. My project will look into the intersectionality of characters in two of Shakespeare's "race plays," *Antony & Cleopatra* (c. 1606) and *Titus Andronicus* (c. 1590), primarily focusing on the characters Cleopatra and Aaron. Exploring both primary materials, including

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performances, and scholarly texts, I will examine the long-term effects of white-washed casting, binary representation, and exclusive marketing geared towards a “cultured,” older, and White audience. My study will be presented in three sections: theoretical contexts, application of theory to the plays, and the embodiment (professional and existential) of characters’ intersectional identities.

Student: Prancel, Anthony

Major: Computer Science

Collaborators: Catherine Sarte and Jose Venecia

Faculty Mentor: Matthew Eicholtz

Presentation Time: 11:40-12:00

Presentation Type: Oral Presentation

Room: 205

Title: Audio Signal Isolation for Automatic Speech Recognition

Abstract: Automatic Speech Recognition (ASR) systems are essential for various speech-to-text applications, playing a pivotal role in data processing across numerous domains. Despite advancements, achieving reliable ASR performance remains challenging, especially when dealing with noisy, real-time audio containing overlapping speech from multiple speakers. In light of these challenges, our research investigates both established and novel approaches for isolating and transcribing dominant speakers in multi-speaker audio. Our ASR pipeline combines a UNET-based de-noising model with three potential source separation techniques to enhance voice isolation: hyperbolic functions, UNET, and WaveUNET. We further leverage a speaker recognition using a LSTM neural network, and use a speaker-specific adapted speech to text model called whisper. While our current results underscore the challenges of implementing this approach, we are confident that our continued efforts and insights from existing research will enable us to overcome key limitations in ASR systems.

Student: Sanders, Madeline

Major: Marine Biology

Collaborators: Kira Peterson and Meg Holst

Faculty Mentor: Christy Wolovich

Presentation Time: 11:40-12:00

Presentation Type: Oral Presentation

Room: 115

Title: Moonlit Monkeys: Facial Pelage Brightness and its Role in Owl Monkey (*Aotus nancymaae*) Intraspecific Communication

Abstract: Visual communication in nocturnal mammals has been overlooked, despite many species exhibiting conspicuous contrasting pelage. Moonlight influences the behavior of nocturnal primates, and its reflectance off of white fur may enhance detectability of conspecifics in low-light conditions. Owl monkeys (*Aotus* spp.) are nocturnal primates with complex patterns of black and white facial pelage. We aimed to explore the potential use of these cues in communication. We scored the behavioral responses of male-female pairs of owl monkeys to images of conspecifics with normal facial markings and those with artificially brightened and dulled markings during a series of evening trials. Both male and female monkeys exhibited higher rates of vocalization and scent marking when the image contained artificially brightened facial markings compared to when these marks were average brightness or dulled.

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Further analysis will use generalized linear mixed models (GLMMs) to provide a better understanding of the data collected. Changes in behavioral responses to images of modified facial markings indicate owl monkeys are sensitive to visual cues and may use these cues in intraspecific communication.

Student: Sarte, Catherine

Major: Computer Science

Faculty Mentor: Hoan Ngo

Presentation Time: 11:40-12:00

Presentation Type: Honors Proposal

Room: 209

Title: Integrating Artificial Intelligence into Psoriasis Severity Diagnosis and Management

Abstract: Psoriasis, a chronic autoimmune skin disorder affecting approximately 2-3% of the western population (Schaap et al., 2022), requires prompt identification and accurate assessment to ensure effective management and prevent complications (Zhao et al., 2020). However, current clinical diagnostic methods often suffer from delays and inaccuracies, complicating the assessment process. To address these challenges, I propose the development of a mobile application that automates psoriasis severity indexing, physician global assessment, and body surface area tracking, utilizing an artificial intelligence (AI) model inspired by Huang et al.'s SkinTeller application (2023). This application will incorporate an image analysis module using a vision transformer (ViT) for processing and analyzing skin images, in comparison to a convolutional neural network (CNN) model. The transformer can identify specific patterns associated with psoriasis severity by capturing global contextual information across the image, thereby improving assessment accuracy. Additionally, the app will facilitate user-friendly interactions, empowering individuals to manage their condition without requiring advanced medical knowledge. By combining image inputs with supplementary data from patients and clinicians, the app aims to provide a comprehensive solution. Preliminary research suggests that this AI-based model will outperform experienced dermatologists, achieving a mean average error (MAE) significantly lower than traditional methods. The app's deployment is expected to enhance patient self-management and clinical outcomes by providing timely and accurate assessments.

Notes:

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