SURF 2024 Recipient Non-Technical Abstracts

Ethan Cole

Lucan's Epic Circus: Comedy and Horror in Bellum Civile

Lucan’s Epic Poem, Bellum Civile, written under the reign of Nero, retells the story of the civil war between Caesar and Pompey and includes non-historical and mythologized moments of horror and comedy: including the first Western depiction of a Zombie. This paper intends to delve into Lucan's Bellum Civile (BC) by analyzing the interplay of horror and comedy throughout the text. Lucan's conception of horror aligns with modern horror, depicting civil war as an unnatural menace which punishes its participants with horrific deaths. The central horror lies in the defilement of Rome's traditions and history, collapsing crucial moments of the civil war into a macabre theater where war loses all honor and meaning Simultaneously, Lucan's comedy subverts Rome's literary history, mapping literary dynamics onto historical characters and turning the chaos of the Roman state into a farcical replication of literature. Mocking the ruling class and defying epic motifs, Lucan transforms his heroes into "funny little freaks," challenging the entire epic canon (Johnson 111). Both his horror and comedy aim to dismantle core elements of Roman history and literature, utilizing their own cultural instruments against them. This study explores the extent of this principle in BC and its influence on the modern horror-comedy genre. Lucan's dual use of horror and comedy serves as a powerful tool to deconstruct fundamental aspects of Roman culture, presenting a distorted yet familiar version of reality that disrupts traditional narratives about the Roman state.

Erik Daquilanea

Structural and Functional Characterization of Gamma-Coronavirus and Letovirus NendoU

RNA viruses are not only a large human health concern, but also a large economic concern, due to animal infections in major industries. Infectious bronchitis virus (IBV) and Kanakana letovirus (KLeV) are enveloped single-stranded RNA viruses in the Nidovirales order. IBV significantly affects the poultry industry while KLeV infects lampreys with high cross-species transmission, potentially affecting salmon fisheries. Additionally, with IBV, high mutation rates have caused vaccine efficacy to decrease. These viruses encode a conserved protein (NendoU) that require self-association to function and cleave viral RNA, ultimately to evade host immune systems. Precise details of the structures, associative states, and function of IBV and KLeV NendoU are currently unknown. This project aims to produce pure IBV and KLeV NendoU in order to biochemically characterize their structure (via cryogenic electron microscopy) and function (via cleavage assays). Gaining an understanding of the assembly and cleavage mechanisms of these NendoU protein will help provide insight into their evolution and lay the groundwork for future drug design.

Molly Dickerson

The Lived Experiences of Youth Women and Non-Binary People with Chronic Illnesses in the SC Lowcountry

Women with chronic illnesses often report feeling misunderstood, dismissed, or cast off as hysterical, dramatic, or "crazy" in clinical encounters. To examine this phenomenon here in the SC Lowcountry, we recorded diverse illness narratives and lived experiences of women and non-binary people with chronic illnesses (ages 18-40) in a series of in-depth interviews, that were then released as podcast episodes on Buzzsprout, Spotify, and Apple podcasts in the series The Sick Gaze. Topics of discussion included accumulated loss, challenges to fulfilling social roles, and common trends of dismissal in healthcare settings; participants highlighted the emotional turmoil that came with not being believed or taken seriously by healthcare providers when living with chronic, often invisible, illnesses. They spoke about feelings of social devaluation due to disability. Using this raw data collected from the interviews, the objective of the SURF research is conduct a qualitative analysis of the lived experiences of young women and non-binary people with chronic illnesses in the SC Lowcountry, determining the main themes within disability discrimination and the gendered experiences of dismissal in healthcare. Interviews will be transcribed using TurboScribe. Researchers will then commence in vivo coding using a coding software called NVivo, by topic and theme. We hypothesize that there is a tension between the performance of gender and the performance of disability, causing turmoil and traumatization for patients.

Lilah Grace Elnaggar

Influence of Relic DNA on Molecular Characterization of Marine Microphytobenthos

The field of marine sciences hosts a variety of unique opportunities for humankind to grasp what larger factors result in the world around us. However, many overlook the perspective of the natural environment as a series of interactions between a diverse array of organisms – each relationship formed can explain broad biological and ecological occurrences and, further, grant humankind deeper insight as to how our actions impact this framework. Recently, new advances in DNA sequencing technology have revealed one such organismal relationship; Mycoplasma, a specific genus of bacteria, shares an interesting relationship with several mollusk species. It is labeled as a microbial gut symbiont, and the bacteria may provide nutrients or protection to these mollusks. By dissecting the gut tissue of the mollusks and extracting DNA material, we will observe the presence and abundance of Mycoplasma in five local Charleston mollusk species (as well as three non-mollusk species for comparison) and create a metabarcoding library. In addition, we will also conduct co-occurrence tests to see if Mycoplasma potentially inhabits the gut microbiome alongside any pathogenic bacteria, and if their relationship is deemed as a positive or negative association. This examination of Mycoplasma and its numerous relationships with other biota will enhance our comprehension of the intimate connection between bacteria and animal, while also giving context to what factors contribute to an overall dynamic and balanced ecosystem.

Gael Gonzalez

Development of a CubeSat Payload Prototype for Investigating Stellar Activity

Stellar activity is crucial to understand due to the fact that stars are the fundamental units to all solar systems. Knowing a star's activities and behaviors are important for a variety of reasons, including allowing us to better understand the potential habitability of orbiting rocky planets. For example, even a relatively brief period of intense stellar activity could potentially permanently impact the atmosphere of an orbiting planet. Such insights therefore help inform our understanding of potential life in the universe. Since the majority of nearby (e.g. <15 pc) stars are bright as viewed from space, a large telescope is not needed. Indeed, larger space telescopes like Hubble are unsuitable for observing such stars, as they typically saturate the detector in the minimum exposure time. What we need is a small-telescope mission where we can have ample amounts of observing time above the atmosphere due to the fact that it is impossible to view the vast majority of ultraviolet light from the ground, and this wavelength is exactly where the majority of stellar activity is exhibited. A CubeSat is ideal for the project we plan on pursuing since after being launched into space, it can gather ultraviolet data effortlessly without the interfering phenomenon of Earth's atmosphere. My role in this research project will be to assemble and test in the lab a UV imaging system prototype designed as a payload for a future CubeSat mission. I will also carry out preparatory science of flare stars that are candidate targets for the future mission, and that have been the subject of observational investigation by the Carson research team over the last several years. The current highest priority target for the forecasted CubeSat mission is the nearby, young, M-type, binary star system AT Microscopii. This star makes an ideal target for our CubeSat science demonstration. It has an adequate brightness (V=11 mag), exhibits unusual outbursts and brightenings, and has been actively monitored for stellar activity by the Carson research team over the last several years. For these reasons, this star is attractive for follow-up, stellar activity monitoring at UV wavelengths.

Ashley Grant

Geochemical Analysis of Magma Mixing at Lassen Volcano in Northern California

Lassen volcano in Northern California last erupted in 1915-1917, and is in a unique geological setting, where both subduction of the Pacific plate and crustal extension are contributing to the area's volcanism. Subduction is the process in which oceanic crust dives into the mantle, and this produces the volcanoes in the Cascade Range along the west coast of North America. Basin and Range extension also produces volcanoes due to thinning of the continental crust. These two regional processes overlap in the Lassen area, and the lavas they produce have distinct isotopic compositions that reflect their melting processes and sources inside the Earth. Our hypothesis for this SURF study is that since these tectonic processes overlap in the Lassen area, their magmas may be mixing to produce hybrid compositions. This type of mixing is rare, and Lassen provides us with an opportunity to use isotopes to understand the processes that create these unusual lavas. To study the hybrid magmas in the Lassen region, our team will first analyze the isotopes of samples retrieved by Dr. Chadwick on previous research trips in the high-temperature geochemistry laboratory on campus, and use Magma Chamber Simulator software to model their formation. We will then travel to California to gather new samples to analyze. The laboratory

work will consist of separating key elements from the prepared lava rocks to measure their isotopic ratios. With the data, we will learn more about how the hybrid lavas formed and how volcanoes function and evolve in the Lassen area.

Rebecca Grosso

Expert Testimony Regarding Child Witnesses: Does It Sensitize Jurors to Parental Bias During Conversations with Children

Forensic investigations involving children carry heavy consequences and present immense challenges. In most child maltreatment cases, such as those involving allegations of sexual abuse, children's testimony serves as the sole piece of evidence. Often, allegations first arise during interactions between the child and a nonoffending parent. Research demonstrates (see Principe & London, 2022, for a review) that these conversations have the power to shape the formal statements that children later make when questioned by professionals. Specifically, this work shows that false information unwittingly incorporated into parents' questions not only can intrude into children's later independent accounts but also lead children to make novel reports of entire events that never happened. Because these false accounts triggered by parents' suggestions can be as elaborate and compelling as reports of true experiences, understanding laypeople's perceptions of parental influence is paramount to arriving at accurate and just conclusions in legal cases involving young witnesses. In this project, we will extend prior work by examining whether expert testimony on factors that can promote versus distort children's memories can help adults discern when a parent uses a suggestive questioning style. Participants will read exchanges modeled after those in real cases where a child makes a disclosure of sexual abuse to a parent. We will vary whether participants receive expert testimony and the suggestiveness of the parent (highly suggestive versus moderately suggestive versus nonsuggestive) and the age of the child (4- versus 10-year-old). Our findings will have implications for children's treatment in legal cases involving allegations of maltreatment.

Kora Hansen

Comparison of local with latitudinal variation in life history traits of the Eastern mud snail (Ilyanassa obsoleta)

An organism's life history describes how it uses resources at different stages of its life cycle. This pattern of resource allocation is fundamental to understanding how a species evolves in response to its environment. Traits such as egg size, number, and energy content are affected by resource allocation, and it is known that conditions of where an organism is located—primarily its latitude and temperature-- can drive optimal patterns of allocation. In a marine context, this relationship between latitude and early life history traits has been studied most in free spawning species, where an increase in egg size is expected at colder temperatures. There is little known, however, about this pattern in species that enclose eggs in capsules during early development. Although patterns of resource allocation are predicted across broad geographic scales, there is also relatively little research on local variation in response to other environmental factors. A

model organism is a species that is easy to work with and suited to answering particular questions. This project will focus on the model organism the Eastern mud snail (Ilyanassa obsoleta) and will analyze variation both in egg size and in the number of eggs per capsule in several locations around Charleston. This variation will be compared to data on latitudinal variation in I. obsoleta from a larger study in the Podolsky lab to evaluate the degree to which latitude can explain variation in these early life history traits. It is especially important to understand how temperature influences organism development and reproductive output given current warming ocean temperatures, especially for species in colder environments.

Dan Johnson

Combinatorial and Parallel Algorithms for Group Isomorphism

This project will investigate the Group Isomorphism problem, which takes as input two finite groups and asks if they are the same up to a relabeling of the elements. When the groups are given by their multiplication tables, this problem is strictly easier than the Graph Isomorphism problem. The Weisfeiler–Leman algorithm is a key combinatorial algorithm that has driven advances in the computational complexity of Graph Isomorphism for decades. Despite this, Weisfeiler–Leman has only recently been brought to bear on the Group Isomorphism problem. We will leverage recent adaptations of the Weisfeiler–Leman algorithm due to Brachter and Schweitzer [BS20], in order to make advances in the computational complexity of isomorphism testing for important families of groups, for which no efficient (polynomial-time) serial isomorphism test is known. Our goal will be to leverage the Weisfeiler–Leman algorithm to obtain an efficient parallel isomorphism test, which implies polynomial-time computation.

Madeline Keller

Expert Testimony Regarding Child Witnesses: Does It Sensitize Jurors to Parental Bias During Conversations with Children

Forensic investigations involving children carry heavy consequences and present immense challenges. In most child maltreatment cases, such as those involving allegations of sexual abuse, children's testimony serves as the sole piece of evidence. Often, allegations first arise during interactions between the child and a nonoffending parent. Research demonstrates (see Principe & London, 2022, for a review) that these conversations have the power to shape the formal statements that children later make when questioned by professionals. Specifically, this work shows that false information unwittingly incorporated into parents' questions not only can intrude into children's later independent accounts but also lead children to make novel reports of entire events that never happened. Because these false accounts triggered by parents' suggestions can be as elaborate and compelling as reports of true experiences, understanding laypeople's perceptions of parental influence is paramount to arriving at accurate and just conclusions in legal cases involving young witnesses. In this project, we will extend prior work by examining whether expert testimony on factors that can promote versus distort children's memories can help adults discern when a parent uses a suggestive questioning style. Participants will read exchanges modeled after those in real cases where a child makes a disclosure of sexual abuse to a parent. We will vary whether participants receive expert testimony and the suggestiveness of the parent (highly suggestive versus moderately suggestive versus nonsuggestive) and the age of the child (4- versus 10-year-old). Our findings will have implications for children's treatment in legal cases involving allegations of maltreatment.

Aasim Khan

Structural and Functional Characterization of Dimeric NendoUs

RNA viruses cause significant economic losses in important animal industries, as well as impact human health. The objective of this project is to determine the structure and the mechanism of action of a family of viral proteins (NendoU), which help cut up the viral RNA to avoid detection by the host's immune system. My project further focuses on the NendoU proteins found in two groups of viruses: deltacoronaviruses and arteriviruses. To study these proteins, they are overexpressed in bacteria and then purified biochemically. Once purified, the structures of the NendoU proteins are studied using cryo-electron microscopy and the functions probed with binding and cleavage biochemical assays. The NendoU proteins from these viruses have been shown to form a complex of two identical subunits. However, no studies have shown how these complexes cleave RNA at a molecular level, or fully uncovered the properties of the RNA that affect how the complex cleaves RNA. Answering both questions will provide insight into future drug development to treat animals infected by these viruses.

Autumn Lloyd

An AI-Assisted Augmented Violin for Musicians with Motor Impairments

Our goal is to create a virtual prosthesis primarily for musicians who have a motor disability, allowing them to reconnect with their instruments. We aim to accomplish this through various technologies that capture gestures, such as cameras, accelerometers, touch panels, and motion sensors. This summer we will develop a prototype utilizing the violin since this is my instrument and this will benefit me directly. Also, I am highly motivated to be an early tester and adopter. We plan to use this gesture-capturing technology to establish an alternative or augmented way of interacting with string instruments, such as the violin. A physical instrument is an interface for musical expression at its core. Our modified violin will be an alternative digital interface that is more accessible and less physically demanding for people with motor impairments. While a traditional violin generates sound from vibration on strings, our modified violin may generate sound through sensor-interpreted gestures in conjunction with an audio-producing software, such as Ableton Live. Given the complicated nature of live performance, we aim to seamlessly blend a physical instrument and a digital environment to make the experience as user-friendly and comfortable as possible. Lately, with the rise of generative AI, there has been a major societal concern in the perception that AI may replace artists and musicians. The development of this augmented instrument will go against that trend, paving the way for future technologies to keep the human in the loop, and reclaiming lost creative power due to motor disabilities.

Emma Mathew

The Effects of an Introduced Seaweed on Microbial Communities of Easter Oysters and Intertidal Sediments

The bacteria Vibrio is commonly found in coastal waters. It has been observed to cause the potentially fatal illness vibriosis in humans upon consumption or contact with bloodstream. This bacteria has been known to proliferate in warmer water temperatures causing warnings for shellfish consumption in summer months, but another factor may also have some effect on the

bacteria's density. The introduction of the invasive red seaweed, Gracilaria vermiculophylla, in Georgia and South Carolina has been recorded and examined for the past two decades. Heightened bacterial densities in adjacent sediment have been recorded with the presence of this seaweed in comparison to when it is absent.This project will use a field survey and field manipulative experiment to assess the impact of an invasive species of seaweed Gracilaria vermiculophylla in Charleston Harbor on bacterial blooms in the environment, including within the tissues of an ecologically and economically important oyster species Crassostrea virginica. The project will focus on detecting if particular species of vibrio that cause concern for human health are present and how their relative density changes with presence of Gracilaria vermiculophylla and Crassostrea virginica.

Maya Mylott

Impacts of Freshwater Salinization on Trophic Interactions and Biomass Transfer from Algae to Amphibians

Freshwater salinization is a rising concern for many organisms due to increased flooding, climate change, and anthropogenic practices. The increase in salinity in freshwater habitats is known to affect individual organisms, but less is known about the effect it has on community structure and ecosystem function. This project will examine the effects of increased salinity on tadpoles and their trophic relationships with other organisms. Tadpoles are ecologically important due to their role in transferring nutrients and energy from their food sources to higher trophic levels. Because tadpoles are negatively impacted by salinization, we predict that this may translate into a reduction in biomass being transferred to higher trophic levels. To investigate this prediction, we will establish controlled experimental ecosystems, or mesocosms, including algae (primary producer), tadpoles (primary consumer), and dragonfly nymphs (secondary consumer) with varying levels of salinity. These mesocosms will be monitored daily for 10 weeks, during which biomass of algae, tadpoles, and dragonfly nymphs will be recorded to examine the exchange of biomass between trophic levels. Ultimately, this project will lead to a better understanding of how salinization not only affects individual organisms, but also trophic relations and nutrient and energy flow within freshwater ecosystems.

Mika Olufemi

Embedding Equitable (s, p)-Edge-Colorings of the Complete Graph

We describe the proposed project using one of its many applications. A convention organizer invites 25 guests to attend a 9 hour convention, during which every guest meets one-on-one with every other guest. Each guest will meet with other guests for 8 hours and take a break for the remaining 1 hour. Ideally the meetings will be evenly distributed throughout the day, so each guest will meet individually with (number of total meetings)/(number of hours for meetings)=24/8=3 other guests each hour excluding their 1-hour break time. After deliberation, the schedules are finalized, but at the last minute 6 more people sign up for the convention. The convention is now 11 hours to accommodate the new guests. Each participant will still meet with

(number of total meetings)/(number of hours for meetings)=30/10=3 other guests each hour excluding their 1-hour break time. Can the convention organizer create a new schedule satisfying these conditions without altering the original schedule? Although we chose specific values in our example, we plan to determine all scenarios where new attendees can be incorporated into an existing schedule without altering it. This problem is an application of a more general problem in an area of mathematics called graph theory. The schedule can be represented with an appropriately colored graph. Therefore, this project investigates whether a graph with specified properties can be embedded in another graph with the same properties.

Maya Pai

Qualitative Assessment of Lifestyle Attributes after Kidney Transplantation

In the US, there is a one in five chance of developing chronic kidney disease over one's lifetime. Many experience health issues and may lose total kidney function. Around 500,000 are on routine dialysis treatment to replace their kidney function. Kidney transplantation is the best treatment for this disease and over 200,000 individuals in the US are current kidney recipients. Although treatment is effective, long-term viability of kidneys are a concern with kidney transplants, with a transplanted kidney lasting about 14 years. As a result, many patients have several transplants throughout their life. Failure of a transplanted kidney to survive is multifaceted, but generally poor health, immune system issues, and immunosuppressant nonadherence are areas of inquiry. It is common for kidney recipients to gain weight and relive poor lifestyle habits that contribute to poor health outcomes, which necessitates further study into what patients can do to change their behaviors in collaboration with their medical team to improve the longevity of their transplant. This study investigates poor lifestyle choices through post transplantation key informant interviews in those who have gained a substantial amount of weight compared to those who maintained their weight. Transcripts will be analyzed for differences in themes between the two groups to highlight lifestyle variables and education topics that may need to be reinforced after kidney transplant. Implications may affect treatment strategies at medical centers to better identify and target those at risk for excessive weight gain after a transplant.

Sarah Peterson

Assessing the Kinetics of Heavy Metal Adsorption to Magnetic Nanoparticles as a Novel Water Treatment Strategy

The United Nations identifies clean water and sanitation as one of its 17 Sustainable Development Goals. In addition to the world's growing population, water resources are also increasingly threatened by climate and agricultural-related issues. This is why researching efficient, recyclable and cost-effective solutions to clean water are of the utmost importance. This research project aims to study a novel way of decontaminating water: the use of small, magnetic particles (magnetic nanoparticles) to remove heavy metal pollutants from drinking water. The nanoparticles we utilize in our research have an optimized surface area and coating for adhering to the surface of heavy-metal micropollutants such as cadmium and lead. After they have been added to a water sample and allowed time to adsorb to the pollutants, a magnet is used to attract the magnetite particles and they are removed from the water sample. The particles can then be reused on new samples of polluted water. This summer, we will study how the size and coating affects the effectiveness of removing pollutants from water samples, as well as how the saltiness of the water sample impacts nanoparticle effectiveness. Since these nanoparticles are inexpensive, easy to use, and can remove a relatively substantial amount of pollutant from water, this research has the potential to make a monumental impact on underprivileged communities who cannot access expensive and complex water-cleaning systems.

Jordyn Pieper

Measurement of the thermodynamics of minimal hydrophobic collapse during small peptide folding

Proteins are the workhorses of human biology, performing functions from the chemical reactions of enzymes, to being responsible for the strength of our muscles, to carrying chemical messages in our brains. Proteins are composed of linked building blocks, amino acids, and smaller chains of these are called peptides. The properties of these building blocks impart a shape to the peptide or protein, and these three-dimensional shapes across all living organisms give proteins their many functions; this process is known as folding. Peptides initiate folding by clustering of water-insoluble (hydrophobic) amino acid groups which makes the overall molecule more compact similarly to how oil and water separate. While protein folding has been studied for nearly sixty years, there is an apparent lack of knowledge about these earliest stages of folding, which are driven only by simple forces related to the water solubility properties of amino acid building blocks. Previous studies done in our lab show that part of a neuropeptide – a signaling peptide in the human nervous system - called galanin adopts a shape trapped permanently in this earliest stage with hydrophobic clusters of amino acids but none of the more commonly found shapes associated with folded proteins: a so-called "irregular secondary structure." Our hope is to develop a chemical system based on this galanin fragment to measure the energy of a peptide folded an irregularly shaped secondary structure, so that we can then determine how much even just a single amino acid can cause a protein to adopt its shape.

Garrison Rickmon

An Analysis of the Behavior of Accreting Black Holes via Low-Resolution Simulations Featuring a Tilted, Truncated Accretion Disk Model

As black holes gather matter from nearby stars, they form disks around their center known as accretion disks. Due to the strong influx of mass, these accreting black holes also become strong emitters of X-rays, both from the disk itself and from a hot cloud of electrons known as the "corona." Our research will study those disks and coronae that are tilted in relation to the black hole's rotational axis. We will do this through computer simulations with the goal of exploring accretion disks in new limits and conditions. This will hopefully allow us to better understand recent astrophysical observations, as well as expand our knowledge of black holes.

Aidan Riordan

Explainable Machine Learning Based on Artificial Regulatory Networks

Machine learning algorithms uncover meaningful patterns in data, enabling computers to make predictions and support decision-making. However, many state-of-the-art algorithms like neural networks are black boxes; they make accurate predictions, but offer no explanation of how they arrive at them. In contrast, symbolic regression techniques search for mathematical formulas that both fit given data points and are simple enough for humans to understand. This project will develop new symbolic regression algorithms inspired by biology. Just as networks of genes regulate processes in living cells, networks of math operations will form an iterative calculation

to transform input data into output predictions. A selection-mutation process will discover mathematical expressions that balance accuracy against simplicity. These algorithms will be tested on publicly available datasets and compared to existing methods. Success will advance new tools for interpretable machine learning. The resulting open-source software library will enable others to build understandable prediction models.

Morgan Treadwell

Response, Strength, Variation, and Repetition

Reinforcement strengthens voluntary behavior through the delivery of rewards and is arguably the most important concept in psychology. Investigating how reinforcement promotes response strength is, therefore, a critical research focus. One of the most well-accepted approaches to understanding response strength is behavioral momentum theory. Its supposition is that resistance to change and preference measure response strength. One area of this research focuses on the preference and resistance to change between behavioral variability and repetition. Our ongoing research examines the role of two variables that determine preference and resistance in variable and fixed response sequences: the number of switches within a sequence and the location of these switches (i.e., the proximity of the switch to reinforcement delivery). Based on the results of our ongoing research, the two proposed experiments will further clarify the relative contributions of these two variables. Understanding the strength of variable and repetitive behavior is important. Behavioral variability underlies creative problem-solving and is critical to clinical interventions for individuals who engage in atypically low variability levels. Fully understanding the factors that govern response strength better facilitates the success of psychological treatments. In short, the goal of treatment is to reduce the strength of maladaptive behavior while cultivating and building the strength of behavior that is socially appropriate and rewarding for the client and their community.

Jenna Webb

Suspended Sediment as a Vector for Contaminant Transport in Floodwaters in Charleston, SC

Urban flooding is an increasingly frequent occurrence in coastal areas due to a combination of factors, including rapid urbanization and land use change, local subsidence, coastal flooding, and intense rainstorms driven by changing climate. Our group's recent research shows that floodwaters and standing water in many urban areas contain high levels of contaminants associated with suspended sediment. The clay minerals and organic matter comprise a significant reactive portion of the suspended sediment load. Our recent research studies have shown high concentrations of trace metals and fecal bacteria in floodwaters in Charleston. Given the high reactivity surfaces on environmental particles, we hypothesize that contaminants are most likely associated with the suspended sediment load in floodwaters. To test this hypothesis, floodwater samples will be collected at various sites across the Charleston peninsula, processed to separate sediment from bulk water, and analyzed for trace metals, nutrient ions, organic matter content, and fecal bacteria. Geographic information systems (GIS) tools will be used to create a map of contamination trends as well as contaminant transport pathways into Charleston Harbor. The results will elucidate the links between contaminants present in floodwaters and broad ecological health and management strategies that reduce contamination of coastal ecosystems.

Christian Wright

Unholy City: Brothels, Churches, and Race Relations in Antebellum Charleston

In the 1800s, Madame Grace Peixotto, a slaveholder and daughter of a Kahal Kadosh Beth Elohim synagogue official, operated a brothel in the heart of Downtown Charleston. This

brothel, “The Big Brick”, would become one of the first establishments in Charleston to be fully non-segregated describing itself as having women “of all shades and importations” (Appleton and Boswell 2003, 53). The brothel is an ambivalent site, signaling at once the exploitation and agency of women in 19th-century Charleston. It is both the quintessential symbol of social vice and yet also associated with a religious institution. What other ambivalences might the brothel contain? Using a combination of archival research and fieldwork and interviews, this research aims to explore the history of Charleston’s brothels and their potential as “third spaces” – spaces in which social norms could be subverted and controversial and delicate realities confronted -- in 19th century Charleston society. As a site of scandalous intimacy, the brothel also functions as a quasi-religious space, which made possible conversations, exchanges, and social formations that were otherwise impossible. Focusing on both the French Quarter and Charleston’s 4th Ward, this research will examine the religious and social commitments of those associated with brothels to produce publicly accessible maps and histories of the brothels paired with qualitative analysis reflecting on their significance as social “third spaces.”