



COLLEGE of ARTS & SCIENCES ROBYN RAFFERTY MATHIAS STUDENT RESEARCH CONFERENCE

31st Annual

Saturday, April 10, 2021, 9:15 AM – 5:00 PM

The College of Arts & Sciences (CAS) is pleased to announce a virtual meeting for the 30th Anniversary of the Annual Robyn Rafferty Mathias Student Research Conference, a forum for CAS students to digitally present original scholarly and creative works before colleagues, faculty, and friends.

This event is sponsored in part by a generous grant from AU trustee and alumna Robyn Rafferty Mathias as well as by the NASA District of Columbia Space Grant Consortium.

SCHEDULE OF VIRTUAL EVENTS

9:15 a.m. – 11:00 a.m. EST | Conference Welcome and Session I: Presentation of Original Student Works

Four (4) concurrent panel presentations

11:15 a.m. – 12:30 p.m. EST | Faculty Panel Discussion on Research

Moderator: Kim Blankenship (Sociology)

Featured Panelists:

- Kathleen Holton (Public Health)
- Phil Johnson (Physics)
- Tim Doud (Studio Art)
- Zoë Charlton (Studio Art)

12:45 p.m. – 2:15 p.m. EST | Session II: Presentation of Original Student Works

Three (3) concurrent panel presentations

2:30 p.m. – 4:00 p.m. EST | Session III: Presentation of Original Student Works

Four (4) concurrent panel presentations

4 p.m. – 5 p.m. EST | Research is the Common Thread

Featured presentation by WhiteHat Security

PANEL PRESENTATIONS | SUMMARY

SESSION ONE: 9:30 AM – 11:00 AM

Materials or Commercial & Industrial Products

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Featuring:

- Accuracy of an iPhone app in detecting radiographic breast findings in low-income countries | Evan Steinberg
- Carbon fiber micro electrodes as amino acid sensors using fast scan cyclic voltammetry | Negar Ghasem Ardabili
- Enhanced Detection of Neurotransmitters by Depositing Shape-Specific Gold Nanoparticles onto Carbon Fiber Microelectrodes | Xiangyue Meng, Xiaoyu He
- Oxidation of Cysteine with Fast-Scan Cyclic Voltammetry | Brent Hutcheson
- Characterizing Novel Carbon Fiber Multi Array Electrode using Fast Scan Cyclic Voltammetry | Harmain Rafi

Genomics and Medicine

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Featuring:

- Sex Differences in the Aversive Effects of Methyline | Sara Bowman
- Antibiofilm enzymes as a novel treatment for acne | Emmalene Kyritsis
- A transcriptomic pipeline adapted for genomic sequence discovery of germline restricted sequence in zebra finch, *Taeniopygia guttata* | Kathryn Asalone
- Sars-CoV-2 Detection with RPA/LAMP Molecular Assay | Mark Joseph Ware
- The Impact of Glucose on Eight Week Hyperglycemic Zebrafish | Elizabeth McCarthy, Jillian Dunn
- The Mitochondrial Genome of the Devil Worm Reveals Adaptations to Hypoxia | Megan Guerin
- Fragment-Based Identification of anti-Influenza agents | Shelbi Wuss

Racial Representations in Pop Culture

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Featuring:

- The Production of Whiteness in Duck Dynasty | Reese Phillips
- The Implications of Representation: A Semiotic Interrogation of Vermont's Identity | Kiran Waqar
- Our Black Ophelias and Poseidons: Identifying an Aquatic Sovereign State for the Black Community in Film | Isaiah Washington
- The Discrimination of the Future: Anti-Robot Racism and its Insight into Current Forms of Oppression | Isaiah Washington, Cassidy Stoneback, Trey Sanabria, Daniel Costello
- Unintended Consequences of Integrating Negro League Statistics into MLB Records | Kimber Rockey
- Navigating Whiteness in Contemporary American Cinema | Santos Moreno

Politics, Economic Recovery and Social Inclusion

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Featuring:

- Faculty Experiences with Accessibility & Accommodations for Students with Disabilities at a Small Liberal Arts College | Jessica Chaikof
- The "Shadow Pandemic" on College Campuses | Catalina Cole, Alyssa Cabacunagn, Nia Holden, and Bridget Nehrebecky
- The Role of Occupation and Individuation on Dehumanization | Callie Vitro
- Stock Prices, Lockdowns, and Economic Activity in the Time of Coronavirus | Dingqian Liu
- Nutritional Inequity in Low-Socioeconomic Areas: The Contributing Factors, Consequences, and Potential Interventions | Kelly Barley Arnold
- Interrelationship of the Global South: Sino-Arab Relationship development and future prospect | “April” Yihong Hou

SESSION TWO: 12:45 PM – 2:15 PM

Human and Nature Interaction

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Featuring:

- Spatial habitat parameters and effects of habitat fragmentation on fauna in seepage springs in southeast Washington, DC | Elizabeth Burch
- The Influence of Human Mobility and Meteorology on PM2.5 Using Crowdsourced PurpleAir Sensors | Joseph Minnich
- Examining the Long-Term Effects of Developmental EDC Exposure on Estrogen Signaling in Zebrafish Retina | Annastelle Cohen
- The influence of water quality and soil quality on plant growth in DC area | Xin Lu

Monuments, Icons, and Cultural Changes

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Featuring:

- Botticelli's Madonna of the Pomegranate: A Pictorial Interpretation of Dante's Paradiso | Zola Hoehn
- “Punky Brewster” and Older Parents | Laura Gibson
- “Preserving Chocolate City” | Kathryn Morgan
- Reclaiming of the Jewish Narrative and Memory Through Counter-Monuments | Madeline Scheub
- The Dance: Disconnect and Miscommunication Between Saigon and Washington DC During the Tet Offensive | Connor Mitchell

Women as Creators and Consumers

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Featuring:

- “They want not only to hand over the bricks but also to lay them in place themselves”: Expectations and Experience of Women in the Labor Zionist Movement | Jonah Kaufman-Cohen

- Deceptively Traditional: The Illusory Radicalism of the Cyborg in Contemporary East Asian Media | Keira McCarthy
- In the Public Eye | Rae Puterbaugh
- Marie-Guillemine Benoist’s “Innocence Between Virtue and Vice”: Revolutionary Feminism in 1791 | Emily Starr Roberson
- Confronting the Woman Question: Käthe Kollwitz’s Nieder mit den Abtreibungs-Paragrafen!, The KPD, and the Abortion Debate of Weimar Germany | Taylor Morris
- Memories of Trauma and a Search for Home: Reconstructing and Recentering Mizrahi Women in Israeli Cinema, 1960-2014 | Yael Isaacs

SESSION THREE: 2:30 PM – 4:00 PM

Human Brain, Mind and Behavior

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Featuring:

- Cortical localization of age specific interaction between race and gender in infant face processing | Kira Ashton
- Neural Correlates of Reading and Attention | Sarisha Jagasia
- Neonatal imitation of caregivers at home: A feasibility pilot | Katherine Casey
- The cerebellum’s involvement in prediction across motor and cognitive domains in autism | Nicole Loy
- Facial processing in pediatric social anxiety disorder: exploring neural responses across differing negative emotions | Alena Quinn
- Individual differences in classification of translucent materials using photos of real-world objects | Chenxi Liao

Discrimination and Body Politics

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Featuring:

- Capital Monarchy: Drag Kings and Community Building in Washington, DC, 1960-2020 | Kai Walther
- Images of Integration: The Clash of Black Bodies with White Spaces | Coura Fall
- Dancing Through Colorism: Finding Empowerment Through Movement | Dominique Dempsey
- Trauma Exposure and Mental Health Outcomes of Unaccompanied Central American Youth in the Washington, D.C., Metropolitan Area | Daniel Jenks, Jessica Chaikof, SteVon Felton, Isabella Goris
- Sexual and Gender Minority Youth’s Comprehension of a Daily Minority Stress Scale | Farshad Bazargani
- Purposes of Race-Based Affinity Spaces in Burlington, Vermont Middle Schools | Kiran Waqar

The Arts and Humanities in Times of Crisis

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Featuring:

- How Do Migraines Move | Jess Carrel

- Queer Fiber Art During the Covid-19 Pandemic | Conor Hartman
- Tattoo Taboo: The Evolving Role of Tattoos in Russian Society | Michael McShane
- “Militant Figures and Violent Technical Procedures”: Visualizing Colonial Violence and Surrealist Ethnography in Raoul Ubac’s Penthésilée Photomontages | Megan MacKenzie
- The Hair of Christ: Albrecht Dürer’s Masculinity Examined | Eleanor Dennehy
- “47 Meters Down: Uncaged” & Uncolonized - Destabilizing Colonial Rhetoric & Spaces in the shark horror film “47 Meters Down: Uncaged” | Brady Tuttle

Language and Learning

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Featuring:

- Latent Variable vs Deep Learning Embedding Methods in Misinformation Detection: An Application to COVID-19 | Caitlin Moroney
- COMPAS: A Case Study in Machine Learning Fairness | Caitlin Moroney
- What Studying Cannot Teach You During Language Acquisition: Intuitive vs Learned Usage of Articles Among L1 and L2 Russian, French, and English Speakers | Tatiana Bienvenu
- Evaluating Data Poisoning Attack on Machine Learning Models | Huong Doan
- Using Machine Learning to Uncover the Hidden Information in Images | Lexie Rista, Archibald Latham
- Superlearner for CoxPH | Hannah M Brown

PLENARY DISCUSSIONS | SUMMARY

CAS FACULTY DISCUSSION ON RESEARCH
11:15 AM – 12:30 PM

Moderator: Kim Blankenship (Sociology)

Featured Panelists include Kathleen Holton (Public Health), Phil Johnson (Physics), Tim Doud (Studio Art) and Zoë Charlton (Studio Art)

Kim M. Blankenship, PhD, is Professor in the Department of Sociology, Founding and Acting Director of the Center on Health, Risk and Society (housed in the department of sociology), Associate Dean of Research in the College of Arts and Sciences, and Co-Director of the Developmental Core of the District of Columbia Center for AIDS Research (DC CFAR). She previously served on the faculty of Sociology at Duke University and at the Duke Global Health Institute (2008-2010) and on the faculty at Yale University, where she was also Associate Director of the Center for Interdisciplinary Research on AIDS (1998-2008). Research and publications focus on the social determination of health inequities and structural interventions to address them. She has received funding from NIDA, NIMH, CDC, Russell Sage Foundation (RSF) and the Bill & Melinda Gates Foundation (BMGF). Currently she is PI on an NIMH funded project that focuses on the intersecting impacts of mass incarceration, housing vulnerability, and housing policies in the US -- all contemporary systems promoting race, class and gender inequality -- as they shape HIV related sexual practices. She is also a Co-investigator on an NIDDK study of the impacts of rental assistance on biological and behavioral indicators of diabetes self-management and control, and Co-PI on an RSF study examining the health consequences associated with

the provision of housing in low-income race segregated neighborhoods. She leads the Inequality, Social Justice and Health Lab (<https://www.american.edu/cas/social-justice-lab/>)

Kathleen Holton is an Associate Professor in the Department of Health Studies and a member of the Center for Neuroscience and Behavior at American University in Washington DC. She is a nutritional neuroscientist whose research examines the negative effects of food additives on neurological symptoms, as well as the positive protective effects of certain micronutrients on the brain. The main focus of her research is on glutamate, an excitatory neurotransmitter in the brain which is dysregulated in many neurological conditions including chronic pain, migraine, epilepsy, MS, ALS, and psychiatric conditions such as depression, anxiety, PTSD, OCD, and ADHD.

Phil Johnson is an Associate Professor in the Department of Physics and is the Director of the Integrated Space Science and Technology Institute (ISSTI). His research focus includes the quantum physics of ultracold systems, exploring both fundamental physics and possible applications for emerging technologies like quantum computing. In his role as ISSTI director, he also supports and is the Principal Investigator for a number of externally funded space science projects, including research in astrobiology and astrophysics.

| 'sindikit | is developed by artists Zoë Charlton and Tim Doud and is both an extension of their individual practices and is their collaborative art project. They understand the economies of space and the politics of opportunity; both can be used, given, manipulated, shared, bogarted, and democratized to uplift, undermine, engage, estrange, and support communities and ideas.

Zoë Charlton is an Associate Professor and **Tim Doud** is a Full Professor, and both teach in the Department of Art. In addition to having active individual studio practices, Tim and Zoë organize and curate artist projects and exhibitions, conduct studio visits, give joint artist talks, moderate panels, and develop programming as a team. They also work collaboratively teaching, curriculum building, and collecting art. They created the 'sindikit project to engage their research interests in gender, sexuality, race, and the economy of things. It's this shared endeavor and the experiences that arise from them that makes collaboration meaningful.

Zoë and Tim's interest in the intersections of art, community and education makes it crucial for them to work both in and outside of University systems. The pursuit of 'sindikit is to foster community conversations among culture activators, local, national, and international artists, and arts allies that have a stake in discussing socio-political and cultural issues. It is a platform that allows them and invited the 'sindikit artists to respond immediately to what is happening in artists' studios and in the world. These responses are aesthetic, culturally relevant, and often topical. The social capital of the 'sindikit project is collaboration and cooperation, and trust and generosity between artists.

RESEARCH IS THE COMMON THREAD
4 PM – 5 PM

American University welcomes Craig Hinkley from WhiteHat Security, a 2021 Mathias Conference Sponsor, to discuss how research is the common thread in the 21st century workforce, guiding us in our day-to-day lives as students, employees, and leaders. It plays a critical role in decision making for our

career paths, the success of a business, and more. In this session, we will look at how research is applied in these areas.

Craig Hinkley joined WhiteHat Security as CEO in 2015, bringing more than 20 years of executive leadership in the technology sector to this role. He is driving a customer-centric focus throughout the company and has broadened WhiteHat's global brand and visibility.



Materials or Commercial & Industrial Products

moderated by April Shelford, Associate Professor, History

Featured Presentations:

Accuracy of an iPhone app in detecting radiographic breast findings in low-income countries

Evan Steinberg, Senior, Statistics and Political Science

It is common practice to use ultrasound and mammography together to detect masses in the breast. However, ultrasound, mammography might not be available in every circumstance where screening tests are recommended. We examine if an iPhone app (administered by a nurse practitioner) can be used to detect masses on a woman's breast in low-income countries where clinicians, ultrasound, and mammography might not be available. Data was collected from 424 patients in a Nigerian Hospital. Patients received four tests - iPhone Breast Examination (iBE), Clinical Breast Examination (CBE), Ultrasound, and Mammography - in each of the 5 quadrants of both breasts. Ultrasound and Mammography collected information on suspicious masses and non-suspicious masses. Logistic Generalized Estimating Equation (GEE) models were built to calculate the sensitivity and specificity of iBE and CBE at the quadrant, breast, and patient levels of analysis. A McNemar test was performed on both sensitivity and specificity at the patient level to determine if iBE and CBE detect and exclude masses at the same rate. At the quadrant level, iBE was not affected by any external or patient factors while CBE was affected by the size of the mass for any mass (p-value = 0.021) and density of the breast for suspicious masses (p-value = 0.04). Furthermore, at the breast and patient-level for suspicious masses, both iBE and CBE performance was affected by breast density. In addition, findings point toward a higher sensitivity of iBE (p-value < 0.001) and a higher specificity of CBE (p-value < 0.001).

Carbon fiber micro electrodes as amino acid sensors using fast scan cyclic voltammetry

Negar Ghasem Ardabili, MS Candidate, Applied Chemistry

During the past few decades, carbon fiber microelectrodes (CFMEs) have been used for the detection of biomolecules. This method has developed the electrochemical field for improving analytical techniques. Amino acids always have a critical role since they are the monomer backbone of the peptides, therefore, it is necessary to develop a rapid technique for measuring them. Peptides are vital and essential for the human body as they perform physiological and metabolic functions. Most of the Amino acids make up the main components of neurotransmitters, which are one of the important classes of biomolecules, and studying them is valuable for determining several diseases and administering pharmacological treatments. Therefore, studying amino acids as the building blocks of peptides has garnered much research interest. In this method, Tyrosine was detected with Triangle Waveform, when scanned from the holding potential -0.2V to the switching potential of +1.2V. This waveform was insufficient and was not able to solely measure tyrosine due to the shift in the CV plot which was attributed to the Acidic pH of the stock solution hence the triangle waveform causes the analyte to be oxidized and subsequently reduced. Using the measured current, the chemical properties of the substance can be determined. Therefore, the Modified Waveform when the holding potential of -0.2V to the transition potential of +0.7V and switching potential of +1.2V with two different scan rates applied, the huge oxidation shift was eliminated. When co-detecting the Tyrosine(Tyr) with dopamine (DA) and norepinephrine (NE) simultaneously by (1-1-10) ratios of concentration it's observed that, DA and NE share an oxidation peak, therefore a singular peak was seen around +0.6 V and the peak for Tyr Scanned around +1.1 V.

Enhanced Detection of Neurotransmitters by Depositing Shape-Specific Gold Nanoparticles onto Carbon Fiber Microelectrodes

Xiangyue Meng, MS Candidate, Clinical Biochemistry

Xiaoyu He, MS Candidate, Clinical Biochemistry

In vivo detection of neurotransmitters is a difficult process, but such detection methods offer vital data to tracking a patient's progress through certain therapies. Using carbon fiber microelectrodes (CFMEs) has been verified as a cost-effective method to detect neurotransmitters for both in vivo and in vitro experimentation. However, bare CFMEs have some limitations and they are not sensitive enough because

there is only little dopamine in Parkinson patient's brain. Therefore, a more sensitive method is needed. It has been proven that gold nanoparticles (AuNPs) can be deposit onto CFMEs to enhance the detection sensitivity. However, this work is insufficient and can be further explored. There are a number of different shapes and sizes of AuNPs can be synthesized. Shapes such as cubes, octahedrons, rhombic dodecahedrons, rods, spheres, and prisms enhance the sensitivity of detection in different ratios across various neurotransmitter metabolites. The purpose of this research is to use shape-specific AuNPs modified CFMEs (AuNPs-CFMEs) to detect neurotransmitters, such as dopamine. For this study, we have focused on preparing CFMEs coated with cubic, octahedral, and rhombic dodecahedral (RD) AuNPs. Nanoparticles are deposited onto the CFMEs using specific techniques. We plan to find the effect of specific AuNP morphologies, sizes, and uniformity on CFME sensitivity and detection using fast scan cyclic voltammetry (FSCV). Future considerations begin with the synthesis of other morphologies, such as nanorods, nano prisms, and nanospheres. Dopamine analogues, such as tyrosine, can also be considered as an aim for detection in the future.

Oxidation of Cysteine with Fast-Scan Cyclic Voltammetry

Brent Hutcheson, Senior, Biochemistry

Recently, there has been a keen interest in adsorption of certain analytes to the surface of electrodes in fast-scan cyclic voltammetry (FSCV). In this research we will investigate the necessary parameters needed to consistently detect the amino acid L-cysteine: a fundamental amino acid that is responsible for the tertiary structure of all proteins in the human body. Carbon fiber-microelectrodes (CFMEs) will be crafted and used to examine the oxidation peak and reduction peak (if present) of this particular amino acid. A well-defined color plot indicating at what current the reaction occurs will also be evaluated. We will begin by using the dopamine waveform: the electrode potential will be ramped up from -0.4V to 1.3V and back at a scan rate of 400V/s and repeated at a frequency of 10 Hz. Adjustments will likely be needed depending on the sensitivity needed to detect cysteine since it is a relatively non-polar molecule. A stock solution of cysteine will be dissolved in perchloric acid and further diluted with artificial cerebral spinal fluid (aCSF) (buffer salts with a pH of 7.4) for experimentation. After sufficient data is compiled at different scan rates, GraphPad-PRISM will be used to further analyze and organize the collected data. We expect to see a well-defined reduction peak between 0.7V and 1.3V and possibly a reduction peak between -0.4V and 0.0V. If appropriate parameters for cysteine identification can be acquired, then in vivo experimentation can be done via CFMEs to quantify cysteine levels in living organisms.

Characterizing Novel Carbon Fiber Multi Array Electrode using Fast Scan Cyclic Voltammetry

Harmain Rafi

FSCV, or fast scan cyclic voltammetry, is a novel electrochemical technique that can measure the oxidation and reduction of various molecules and proteins. They are oxidized/reduced at very specific voltages which serve as a "molecular fingerprint" for detection. Used in FSCV are carbon fiber microelectrodes, or CFMEs; in-house made electrodes composed of a glass capillary tube and 7-micron thin carbon fiber. Not only are these electrodes biocompatible and able to detect molecules and neurotransmitters with high spatiotemporal resolution but can be coated with polymers to enhance said detection. Previous studies from our lab have shown that coating the electrode with synthetic polymers, can increase sensitivity to a desired transmitter. In the current project, we look at a novel carbon fiber, multiarray electrode manufactured by our colleagues at University of Michigan. This novel electrode can simultaneously detect neurotransmitters through four channels, enabling use in multiple locations. We determine if there is improved detection for dopamine between the multi array and CFMEs and whether multiplexing can be achieved via the multiarray for biomolecules such as dopamine, serotonin, and adenosine. Results from these experiments will not only determine if the multiarray is superior to CFMEs, but if simultaneous detection and identification of biomolecules is possible. It is crucial to have highly sensitive electrodes for accurate measurements which allow for applications in in-vivo, for example, with measuring elicited release of dopamine in an animal model.

Genomics and Medicine

moderated by John Bracht, Associate Professor, Biology

Featured Presentations:

Sex Differences in the Aversive Effects of Methylone

Sara Bowman, Junior, Psychology

Methylone's rewarding effects have been well characterized; however, little is known about its aversive effects and how such effects may be impacted by sex. In this context, the present study investigated the aversive effects of methylone in 35 male and 31 female Sprague-Dawley rats assessed by conditioned taste avoidance and changes in body temperature and activity/stereotypies. Methylone induced significant dose-dependent taste avoidance, with males acquiring avoidance faster than females. Methylone induced an initial decrease in temperature in both males and females and a subsequent dose-dependent increase in temperature (with females displaying both at lower doses than males). Male and female subjects displayed time- and dose-dependent increases in locomotion with males displaying a faster onset and females displaying a longer duration. Males and females displayed time- and dose-dependent stereotypies with no consistent differences. Similar to work with other synthetic cathinones, methylone has aversive effects as indexed by significant taste avoidance and changes in temperature and activity (two characteristics of methylone overdose in humans). These findings parallel prior work with related bath salts, e.g., MDPV and α -PVP, although the specific mechanisms of action for these compounds differ, e.g., reuptake inhibition (MDPV and α -PVP) vs. substrate releaser (methylone) of the brain amines. That the effects of methylone were dependent in part on sex is consistent with a growing literature demonstrating sex differences in the affective properties of many drugs of abuse and the necessity for including sex as a biological variable in the study of the rewarding and aversive effects of drugs.

Antibiofilm enzymes as a novel treatment for acne

Emmalene Kyritsis, Senior, Biology; Public Health, and Pre-medicine

Acne is a chronic skin infection that results when hair follicles become clogged with oil and dead skin cells. *Cutibacterium acnes* and *Staphylococcus epidermidis* are two bacteria that have been previously associated with acne. Recent research suggests that both species form biofilms (slime layers) and when the *S. epidermidis* biofilm covers the opening of hair follicles, it creates an anaerobic environment in which *C. acnes* can grow. *C. acnes* is arguably more difficult to treat since it is guarded by the *S. epidermidis* biofilm that blocks drug access. In this study, we test the feasibility of a novel treatment for acne that first degrades the *S. epidermidis* biofilm using dispersin B, an antibiofilm enzyme, in order to allow benzoyl peroxide access to treat the *C. acnes* biofilm to prevent growth and spread. Using microtiter plate and disk diffusion assays, preliminary results were consistent with prior research and showed that benzoyl peroxide inhibits both *C. acnes* and *S. epidermidis* growth while dispersin B inhibits *S. epidermidis* proliferation; however, results regarding the use of both drugs concurrently were inconclusive. Further studies are needed to determine whether the pretreatment of dispersin B makes these bacteria more sensitive to killing by benzoyl peroxide. This research is important as these two FDA-approved drugs have not been used together to treat acne, meaning that a novel treatment could be created for those that struggle with the chronic skin infection.

A transcriptomic pipeline adapted for genomic sequence discovery of germline restricted sequence in zebra finch, *Taeniopygia guttata*

Kathryn Asalone, PhD Candidate, Behavior, Cognition, and Neuroscience

Songbirds have an unusual genomic element which is only found in their germline cells, known as the germline-restricted chromosome (GRC). In zebra finch, a well-studied animal model for neuroendocrinology and vocal learning, genome rearrangement involves the GRC, which is eliminated from mature sperm. Transmitted only through the oocyte, it displays uniparental female-driven inheritance, and early in embryonic development it is apparently eliminated from all somatic tissue in both sexes. The GRC

comprises the longest finch chromosome at over 120 million basepairs. Because germ cells contain both GRC and non-GRC (or somatic) sequences, confidently identifying the GRC-derived elements from genome assemblies has proven difficult. We introduce a new computational method of GRC sequence identification, which we term comparative coverage analysis. Our method utilizes genomic read mapping and differential fragments per kilobase per million mapped reads (FPKM) to confidently assign contigs to the GRC. We curated Stringtie-Balgon inputs in order to apply this transcriptomics method to a whole genome assembly. This method was effective in identifying 733 contigs as high confidence GRC sequences and 51 contigs which were validated using quantitative polymerase chain reaction (qPCR). We also identified two new GRC genes and placed 16 previously identified but unplaced genes onto their host contigs. With the current focus on sequencing GRCs from different songbirds, our work adds to the genomic toolkit to identify GRC elements.

Sars-CoV-2 Detection with RPA/LAMP Molecular Assay

Mark Joseph Ware, Junior, Biology

The exquisite sensitivity of molecular assays provides diagnostic capacities unmatched by culture or rapid antigen testing. Multiple studies have highlighted the benefits of rapid nucleic-acid based molecular testing over culture and rapid (antigen-based) testing in terms of speed, sensitivity, and specificity. However, these earlier studies focused mostly on qPCR-based methods that we (and others) have found can be improved still further by the use of Recombinase Polymerase Amplification (RPA), a relative of Polymerase Chain Reaction (PCR). Similar to PCR, RPA uses primer-driven target amplification to detect a genomic region of interest, but it operates isothermally (without temperature cycling) at 37°C. Because 37°C is human body temperature, the reaction can be cultivated within a closed tube within a (gloved) closed fist, eliminating the need for sophisticated thermal cycling equipment. By using a dipstick readout, the result is easily detected as a band, similar to a pregnancy test, and has been implemented in the Bracht laboratory. This equipment-free assay approach--incubation in closed fist, dipstick readout--has been implemented in a study of bovine foot-and-mouth disease virus. Because bovine foot-and-mouth disease is also a positive-stranded RNA virus, it is highly analogous to COVID-19, demonstrating that detection can be achieved within 10-15 minutes of incubation and as few as 100 viral copies (COVID-19 test conducted and verified in Bracht Lab for RPA and LAMP).

The Impact of Glucose on Eight Week Hyperglycemic Zebrafish

Elizabeth McCarthy, MS Candidate, Behavior, Cognition and Neuroscience

Jillian Dunn, Senior, Biology and Public Health

With rising obesity rates in America, Type II Diabetes (T2D) diagnoses are also increasing. T2D has many detrimental effects on the human body, including degradation in the blood retinal barrier (BRB) that can lead to blindness. There is also a reported correlation between T2D and development of Alzheimer's, possibly due to a decrease in the blood brain barrier (BBB), which suggests similar mechanisms in retina and brain. The purpose of this study is to assess if cognitive decline that is apparent in memory loss is correlated with changes in molecular markers associated with the BBB. Zebrafish at four weeks of hyperglycemia (a characteristic of T2D) have shown an increased permeability of the BBB and cognitive decline. Here, we extend the hyperglycemic insult to eight and twelve weeks of exposure to assess long-term effects. Our ongoing research is specifically looking at recovery of hyperglycemic insult and the acclimation to hyperglycemic conditions. This will be studied using behavioral and molecular techniques. With more information about how hyperglycemic conditions affect the BBB in zebrafish, steps can be taken to help people with T2D live more normal lives.

The Mitochondrial Genome of the Devil Worm Reveals Adaptations to Hypoxia

Megan Guerin, Senior, Biology

Halicephalobus mephisto, or the Devil Worm, is a subterranean nematode found 1.3 kilometers below Earth's surface. When underground, the worm was residing in thermal waters and exposed to hypoxic and methane-rich conditions. The ability to thrive in a stressful environment indicates that there must have been an evolutionary event that distinguished this particular species as an extremophile compared to other nematodes. While nuclear genome sequencing revealed stress-related protein family expansions, it is

reasonable to assume that the mitochondrial genome will also exhibit molecular adaptations, as the organelle is vital to the survival and energy production of an organism. The mitochondrial genome of *Halicephalobus mephisto* is composed of 35 genes encoding for the 12s and 16s ribosomal subunits, 21 tRNAs, and 12 protein-coding genes involved in oxidative phosphorylation. Deviating from typical mtDNA structure, this species lacks the ATP synthase subunit 8 (ATP8) gene and the tRNA responsible for the delivery of isoleucine during translation, as well as the duplication of the leucine and serine tRNAs. We identified signatures of positive selection by dN/dS analysis in the COX1 and COX2 gene. Surprisingly, however, positive selection was not detected in the most recent *H. mephisto* branch, but rather, the ancestral clade IV lineage, indicating that that organism and its descendants may all have a stress-adapted version of this gene. Therefore, non-synonymous mutations in the COX1 gene of clade IV nematodes are hypothesized to provide a molecular adaptation that allows *Halicephalobus mephisto* to colonize unconventional environments.

Fragment-Based Identification of anti-Influenza agents

Shelbi Wuss, Senior, Biochemistry and Psychology

This work represents a promising new pathway for the development of antivirals that exhibit activity against representatives of Orthomyxoviridae (Influenza viruses, IV). Despite advances in chemotherapy and the widespread use of annual vaccinations, human influenza A (IAV) and B (IBV) viruses are major human pathogens responsible for seasonal influenza with an estimated 5 million severe cases and 650,000 deaths worldwide. Occasionally, novel antigenically distinct influenza A viruses emerge that may cause pandemic outbreaks as has occurred in 1918, 1957, 1968 and 2009. Although clinically relevant anti-influenza medications exist, they focus on only a few influenza targets: the vaccines for hemagglutinin (HA), antivirals for M2 ion channels, and neuraminidase (NA). Currently, the only effective and globally available drugs are the neuraminidase inhibitors (NAIs) oseltamivir and zanamivir. The worldwide resistance of H1N1 virus to the former underlines the need for entirely new antiviral strategies. One innovative concept is to target an influenza virus associated host factors which are less prone to resistance. Targeting virus entry seems particularly attractive as it blocks all subsequent replication and pathogenic processes. Our approach to design, synthesis and screening of a fragment library for hits active against the IVs will be discussed.

SESSION ONE_PANEL 3 OF 4: 9:30 AM – 11:00 AM

Racial Representations in Pop Culture

moderated by Nancy Jo Snider, Director, Music Program

Featured Presentations:

The Production of Whiteness in Duck Dynasty

Reese Phillips, Senior, SIS and Russian Language

The United States South has a rich and complex history that is often reduced to harmful, homogeneous stereotypes about the population. This paper aims to address the question of: "how does the television show Duck Dynasty reproduce stereotypes about the South"? The answering of this preliminary question is critical for the future study of the reproductions of various stereotypes in American television and in reality shows. In order to understand how Southern stereotypes are reproduced in the media, I conducted a pilot semiotic analysis of three promotional images for Duck Dynasty. Drawing from Stuart Hall, this analysis demonstrates how recurring signifiers in these images reproduce Southern stereotypes. This paper analyzes the most prominent signifiers of clothing and body positions of the cast and identifies key themes of American pride, conservatism, and whiteness in the South, as constructed by the show. Across these signifiers, the reproduction of Southern stereotypes is hyper-focused and enhanced. Again drawing from Hall, I theorize the significance of these systems of signification in terms of racial representations in pop culture and media.

Further research should be conducted to deconstruct and understand various media representations of Southern stereotypes as they pertain to the theme of a homogeneous South. This is critical in continuing the conversation about diversity and representation in Southern-based television shows and in the 'othering' of the South by various regions in the United States.

The Implications of Representation: A Semiotic Interrogation of Vermont's Identity

Kiran Waqar, Junior, Sociology and Transcultural Studies

Vermont is well-known for its progressive politics and yet it is a largely segregated state with 94.2% of the population identifying as white. After setting a brief historical context, this paper offers a preliminary study of three images from the Stay to Stay Program from the Vermont Department of Tourism and Marketing to explore how the presence and meaning of "Vermonters" is constructed. My analysis uses semiotics to decode these images and draws from Stuart Hall, Michael Foucault, and Antoni Gramsci to explore how power circulates through them. My analysis points to the ways that Vermont's definition of itself is tied up in whiteness, heteropatriarchy, and class. Based on my semiotic analysis, I theorize that like other progressive movements, Vermont leverages whiteness in pursuit of progressive politics. My analysis lays ground for future research on how race, gender, and class operate in Vermont. Semiotics help us decode relationships of power in our everyday lives, particularly in the places we're not supposed to look. Because of its semiotic approach, this paper is able to look beyond the stated rhetoric of diversity and inclusion of Vermont's Stay to Stay program, and has larger implications for how to understand whiteness and racism in New England.

Our Black Ophelias and Poseidons: Identifying an Aquatic Sovereign State for the Black Community in Film

Isaiah Washington, Sophomore, Literature and Political Science

64% of African American children cannot swim and they are three times more likely to drown than their white counterparts. The water, like it was when enslaved Africans were deposited in the ocean and swimming Black integrationists were doused with acid, is a racial battleground — a graveyard for Black bodies — a theater of a war on Black people. This project attempts to answer the question of how has Black cinema de-naturalized the rich, deep history of the Black community's complicated relationship with water? This inquiry studies how a generational fear of water can be enervated through Black films acting as representational disruptions. The work seeks to dilate water's racial archive brimming with cautionary tales of what happens when Black bodies wade beyond the shallow end with visual interventions of Black water reclamation. This is achieved through analyses of principal texts (Moonlight, Black Panther, and Pride), using Stuart Hall's reception theory, and semi-structured interviews with Black visual and literary scholars and the families of Black people who have died in water who are termed Black Ophelias. There is a dual desire to exhume the racial history the selected films are encoded with and to propound accessible film role models termed Black Poseidons, positing a future where most to all Black adolescents are captains of their fate because they have learned how to be stewards of the sea. What is the capacity of film to inspire the formation of a Black aquatic heritage?

The Discrimination of the Future: Anti-Robot Racism and its Insight into Current Forms of Oppression

Isaiah Washington, Sophomore, Literature and Political Science

Cassidy Stoneback, Sophomore, Communications, Law, Economics, and Government (CLEG)

Trey Sanabria, Sophomore, SIS and History

Daniel Costello, Sophomore, Political Science and Public Relations

Artificial lifeforms (including robots, androids, gynoids, cyborgs, holograms, and synthetics) have been used throughout works of speculative fiction as analogs for the oppressed and enslaved. When looking toward the future, it is evident that humanity still grapples with the same issues of disenfranchisement that plague it now, specifically the use of "disposable people" as slave labor. Works of speculative fiction serve as a storyboard for what the future may look like, and by analyzing these works, one can determine how the use of the artificial person as a trope and metaphor in speculative works provide insight into humanity and its various oppressions. This research uses the foreparents of Metropolis, The Bicentennial Man, I, Robot, the

Afrofuturist works of Octavia Butler, as well as other classic works of science fiction to trace the bloodline of the universes of Star Trek and Janelle Monáe. The project will be broken down into four sections: the legal process of moving from a de facto to de jure human being and the challenging of such systems through unconventional political participation; the use of memory as both a form of control and resistance; the use of assimilation in order to fit the category of a free, sentient being; and the quest for love, trust, and sexuality across and between species and peoples. Using a critical method of inquiry, this research examines how current problems manifest themselves in the work of speculative fiction, often in the form of anti-robot racism, and how society may move beyond these.

Unintended Consequences of Integrating Negro League Statistics into MLB Records

Kimber Rockey, Senior, American Studies

In 1968, Major League Baseball (MLB) formed a Special Committee on Baseball Records to determine which historical leagues' records to enter into Major League records. The Committee selected nine leagues - but startlingly did not include the Negro Leagues, which included some of the highest caliber players of the early twentieth century. Now, almost a century after the beginning of league integration, in a time of fighting for recognition of overlooked people important to history in many fields within the United States, and on the 100th anniversary of the founding of the Negro Leagues, MLB has decided it will incorporate the Negro League records into the MLB records. This will have many implications for the future of baseball in the areas of operations, statistics, record-keeping, organizational interaction, and recognition of originators of the movement. I plan to explore those implications and a few unintended consequences of the record integration.

Navigating Whiteness in Contemporary American Cinema

Santos Moreno, Senior, American Studies

My capstone project is a film analysis to discuss the ways in which film is used as a means to give commentary on communities' lived experiences under contemporary cultural and social institutions in the Americas. I will also be using said films to make commentary on the navigation of whiteness as BIPOC. I will be specifically focusing on films taking place in the United States. I have decided to prioritize films and stories in my selection that will highlight the stories of marginalized communities. In other words, I'd like to focus broadly on films that convey the message of economic rights and draw insight on racism / other intersecting institutional forces perpetuated on Black and Indigenous People of Color (BIPOC).

SESSION ONE_PANEL 4 OF 4: 9:30 AM – 11:00 AM

Politics, Economic Recovery and Social Inclusion

moderated by Simon Sheng, Associate Professor, Economics

Featured Presentations:

Faculty Experiences with Accessibility & Accommodations for Students with Disabilities at a Small Liberal Arts College

Jessica Chaikof, MA Candidate, Sociology Research and Practice

Previous studies on accessibility and disability in higher education have focused primarily on the barriers that the students face and less on faculty. To better understand the challenges that faculty face, this study seeks to understand, "What challenges do faculty face when students present with academic accommodations?" And "What strategies do they use to meet these challenges?" Faculty at a small liberal arts college from four divisions—STEM, Social Science, Arts/Humanities, and Language—were interviewed about their experiences managing accessibility. Three central challenges emerged: the logistics of providing supports are not always linear, implementing accommodations for exams often involve more work than

necessary, and finding solutions for issues with class discussions, group work, and participation are not always possible. Faculty need more information and strategies to overcome such challenges.

The "Shadow Pandemic" on College Campuses

Catalina Cole, Junior, Public Health; Biochemistry and Pre-medicine

Alyssa Cabacunagan, Junior, Public Health and Pre-medicine

As millions of people continue to feel the devastating impact of the COVID-19 pandemic, it is critical that co-morbidities not be ignored. The urgency of the COVID-19 response has silenced other epidemic issues and has in turn given rise to a secondary "shadow pandemic." Since the start of the stay-at-home order, college students have been forced to endure secondary burdens such as depression, anxiety, and disordered eating while also confronting the direct effects of COVID-19. As the pandemic continues, it is crucial to address the needs of youth populations as COVID-19's impact may span farther than expected. This study's long term goal is to investigate how the COVID-19 "shadow pandemic" has affected students at American University. The central hypothesis is that since the onset of the stay-at-home order, students will display declining levels of physical and mental health as well as implicated financial and social statuses. To investigate this impact, a focus group consisting of 6 American University students was conducted in an attempt to gain insight into the attitudes and experiences of this population. Results indicated that students are intensely struggling in virtual academic spaces and reported negative experiences in their ability to engage in physical activity, social life, eating behaviors, and mental health.

The Role of Occupation and Individuation on Dehumanization

Callie Vitro, Senior, Psychology

Categorization of social information is an essential process for the human mind, but research has shown that this act can lead to prejudice and dehumanization. Evaluating an individual through multiple social categories instead of just one, an act known as multiple categorization, has been cited as a way to mitigate these negative stereotyping effects. Most research evaluates how individuals in positions of power treat targets of prejudice, but the current project seeks to understand this process in reverse to understand where authority figures can improve in community interactions. Police officers are the focus of this research, as there is a well-documented history of police brutality towards marginalized groups. College student participants completed a mixed-methods study where they read stories about police officers, doctors, or civilians who were depicted only as members of their occupation or in multiple social categories. All participants were randomly assigned to one occupational group, and each read one story focused solely on occupation and one story that included multiple categorization. Within these stories, the main character was put into an ambiguous situation with the opportunity to help a bystander. Participants answered long response questions regarding the main characters' likelihood of helping, their motivations for their actions, and what they believed would happen next in the story. They also rated the main character on a variety of prejudice and dehumanization scales. The forthcoming findings will help address a specific mechanism through which police officers erode trust in their interactions with the public.

Stock Prices, Lockdowns, and Economic Activity in the Time of Coronavirus

Dingqian Liu, PhD Candidate, Economics

Stock prices and workplace mobility trace out striking clockwise paths in daily data from mid-February to late May 2020. Global stock prices fell 30 percent from 17 February to 12 March, before mobility declined. Over the next 11 days, stocks fell another 10 percentage points as mobility dropped 40 percent. From 23 March to 9 April, stocks recovered half their losses and mobility fell further. From 9 April to late May, both stocks and mobility rose modestly. This dynamic plays out across the 35 countries in our sample, with a few notable exceptions. We also find that stricter lockdown policies, both in-country and globally, drove larger declines in national stock prices conditional on pandemic severity, workplace mobility, and income support and debt relief policies. Looking more closely at the two largest economies, the pandemic had greater effects on stock market levels and volatilities in the U.S. than in China. Narrative evidence confirms the dominant – and historically unprecedented – role of pandemic-related developments for stock prices in both countries. The size of the global stock market crash in reaction to the pandemic is many times larger than a standard asset-pricing model implies.

Nutritional Inequity in Low-Socioeconomic Areas: The Contributing Factors, Consequences, and Potential Interventions

Kelly Barley Arnold, MS Candidate, Nutrition Education

In America's land of abundance, racial and economic disparities in the equitable distribution of access to healthy foods continues to be perpetuated. Two of the primary factors that impact nutritional access to healthy foods are cost and geographic availability. A third overarching factor that directly impacts, and perpetuates the aforementioned factors, is systemic racism, which correlates with city-wide priorities that value allocating resources to the areas that attract tourism and are primed for gentrification, not to neighborhoods where primarily people of color reside. That systemic racism is still ever-present in America directly affects the cost and availability of healthy food in low-socioeconomic areas. Without addressing this overarching factor, the problem of nutritional inequity in America will persist. Inequitable cost and availability of healthy foods results in stunted growth in children, more proclivity for developing cardiovascular disease in adulthood, and adverse mental and emotional health experience in both children and their parents. One of the greatest takeaways of this research, which necessitates further exploration, is that in order for systemic racism to be addressed and solved, nutrition educators must maintain a sense of cultural consciousness, and this is especially true for Caucasian nutrition educators. Approaching communities, for all intents and purposes, to "save" them from their situation, is not an effective or respectful way to approach the topic of nutritional inequity, even if helpful intentions are present. Additionally, because systemic racism encompasses a myriad of factors beyond access to nutritional food, a cross-disciplinary approach to addressing this issue is necessary.

Interrelationship of the Global South: Sino-Arab Relationship development and future prospect

"April" Yihong Hou, Senior, Arab World Studies and Marketing

This project aims to research on the relationship between China and the Arab countries in the contemporary period. More specifically, through the action in the Belt and Road project toward to the Arab Countries. The Chinese government are using the BRI project for their economic diplomatic strategy; this international diplomacy format is newly developed for the Global South developing countries, and it is different from most of the Western Capitalist powers' actions through the Globalization. However, the Arab World is a sophisticated region with both complex geopolitical and geoeconomic issues. Hence, the purely economic diplomacy could be stagnant due to the absence of political and cultural assimilations. My research project would look into this concern and seek the future prospect for the Belt and Road development.

Human and Nature Interaction

moderated by Meg Bentley, Senior Professorial Lecturer, Biology

Featured Presentations:

Spatial habitat parameters and effects of habitat fragmentation on fauna in seepage springs in southeast Washington, DC

Elizabeth Burch, MS Candidate, Environmental Science

The hypotelminorheic is a shallow subterranean habitat that is groundwater fed and home to aquatic, troglomorphic animals which have a limited range and low occupancy at each site. This study explored the spatial parameters of the seep habitat and nearby fragmentation, at two spatial scales, with the goal of defining what makes the habitat suitable, especially for isopods and amphipods. Using ArcMap, spatial, surface, and fragmentation variables were calculated and added at each georeferenced point where sampling occurred in the small parklands of southeast Washington, DC. At the land patch scale, only forest cover and the number of seeps on an uninterrupted land patch could predict patch occupancy. At the seeps scale, the animals were not very edge avoidant, but geologic and surface features predicted seep occupancy. Removing forest cover is a threat to the habitat, and larger protected parklands would allow for more seeps on each patch of land.

The Influence of Human Mobility and Meteorology on PM2.5 Using Crowdsourced PurpleAir Sensors

Joseph Minnich, Senior, Computational Physics

To hinder transmission of COVID-19, state and local governments have enacted stay-at-home policies and supported other social distancing efforts. These policies and efforts have altered human transportation and behavioral patterns significantly, providing a unique opportunity to study the impacts of reduced human mobility. Satellite observations have shown record low aerosol optical thickness over India and reductions in NO_x column concentrations over China and northern Italy in connection to COVID-19 lockdown measures. In this presentation, we use Generative Additive Models (GAMs) to attribute changes in PM concentrations from 2019 to 2020 to meteorological variables, COVID-19 related changes in mobility, and forest fires. PM concentrations are derived from a network of crowdsourced low-cost PurpleAir air quality monitors. Their plug-and-play design lowers the barrier for entry for interested citizen scientists while maintaining a good correlation to EPA standards, thus improving the spatial and temporal resolution of air quality data in urban areas. We developed GAMs to correlate changes in fine particulate matter (PM_{2.5}) concentrations to NOAA ground weather observations and cell phone mobility data from SafeGraph.

Examining the Long-Term Effects of Developmental EDC Exposure on Estrogen Signaling in Zebrafish Retina

Annastelle Cohen, MS Candidate, Biology

The steroid hormone estrogen is known to play a crucial role in visual system development and maintenance. Any interference with the precise and highly regulated estrogen signaling processes can have deleterious cellular, developmental, and physiological consequences. Exposure to endocrine disrupting compounds (EDCs), ubiquitous environmental chemicals, is one way these precise signaling mechanisms can be disrupted as most EDCs have estrogenic or anti-estrogenic properties. This work using *Danio rerio* (zebrafish) directly manipulates estrogenic pathways during critical periods of visual system development and examines the long-term impacts. Developmental estrogen signaling was manipulated using two environmentally relevant EDCs with opposing estrogenic effects: bisphenol A (BPA), an estrogen mimic, and tributyltin (TBT), an estrogen synthesis inhibitor. Following exposure to each compound, changes in expression of target genes in the estrogen signaling pathway will be monitored, allowing for both a timeline of estrogen disruption and the long-term impacts of developmental estrogen manipulation to be characterized. Our hypothesis is that molecular mechanisms will correlate functional deficits to reveal

aberrant estrogen signaling in the retina of adult zebrafish developmentally exposed to each EDC. The results from this project will not only allow for the long-term molecular impacts of developmental estrogen signaling manipulation in adult retina to be elucidated but can also be used to better understand the underlying mechanisms of ocular diseases, visual complications arising from clinical estrogen treatments, and the effects of environmental exposure to EDCs.

The influence of water quality and soil quality on plant growth in DC area

Xin Lu, Junior, Chemistry

Nowadays, the influence of plants on human life seems to be less and less obvious. In our daily life it seems that fewer and fewer people have direct contact with planting crops or planting and cultivating trees. But none of this is a sign that plants are becoming less important to us. On the contrary, plants are becoming more and more important to the overall ecological environment. Substances provide man with the nutrients necessary for his survival. Plants use sunlight as their energy source to synthesize inorganic matter into organic matter. Organic matter is the source of food for humans and other animals. The photosynthetic crops of plants are the basis of all animal life, including humans. Garden plants in urban green space absorb carbon dioxide from the ambient air through photosynthesis, and release oxygen to the environment while synthesizing the organic nutrients they need, to maintain the carbon and oxygen balance in the urban air. It plays an important and irreplaceable role in maintaining fresh air. The dust in the air is not only an important pollutant, but also toxic substances, bacteria and so on, which have serious harm to people's health. Garden plants in the green space, with rough leaves and twigs, these leaves and twigs have a huge surface area, generally than the plant covers an area of 23 times, many plants also have the surface of the nap or mucus, can absorb and retain a large number of dust particles, reduce the dust content of the air. At the same time, the most abundant substance in plant cells is water, which is an essential component of plant weight. With sufficient water, the stem, branches and leaves of plants can stand upright and stretch in the air, which is conducive to better photosynthesis of plants. With enough water, the flowers bloom better, helping the plants to complete their pollination. Water is one of the raw materials for green plants to carry out photosynthesis. If there is no water, the photosynthesis of plants will be weakened. All the chemical reactions in cells must be dissolved in water for them to occur. Plants also need a lot of water for transpiration, to cool the plant, to prevent leaves from being burned, to facilitate the absorption of water by the roots and the transport of water and inorganic salts in the body. Of course, inorganic salts must be dissolved in water to complete the transport. Water plays a very important role in plant life. Therefore, in this paper, I will observe and determine the influence of soil environment and water quality on plant growth in DC to see if there is an environmental pollution problem in DC.

SESSION TWO_PANEL 2 OF 3: 12:45 PM – 2:15 PM

Monuments, Icons, and Cultural Changes

moderated by Celine-Marie Pascale, Professor, Sociology

Featured Presentations:

Botticelli's Madonna of the Pomegranate: A Pictorial Interpretation of Dante's Paradiso

Zola Hoehn, MA Candidate, Art History

In my research, I questioned the unusual representation of Botticelli's Madonna and Child with a pomegranate (Madonna of the Pomegranate, 1487). I will show the influences that prompted Botticelli's composition, namely the influence of Dante's Paradiso and the traditional symbolic connections to the pomegranate. Building upon research by Herbert Horne and Roberta Olson, I will argue that the circular format or tondo that this painting utilizes, derives from conceptions of heaven within Dante's writing and served as a format for representing heaven. I seek to identify the setting of this painting by utilizing Dante's notions of concentric circles to represent the differing levels of salvation, primarily utilizing the golden disk to

analyze the background's location. Additionally, through an examination of traditional understandings of the pomegranate, I argue that the presence of a pomegranate serves a dual purpose, by referring to the eucharist tradition, it foreshadows the events of Christ's Passion and Resurrection, all the while, connecting the setting to the Garden of Paradise. My research seeks to further the connections between Botticelli's paintings and Dante's writings beyond traditional connections established from Botticelli's drawings of the Inferno. My paper establishes visual links between Botticelli's Madonna of the Pomegranate and Dante's Paradiso to show that Botticelli used Dante's writings to create the setting for this painting.

“Punky Brewster” and Older Parents

Laura Gibson, PhD Candidate, U.S. History

Television series, especially sitcoms, often exaggerate existing social trends to create the premise of a series. The 1980s sitcom "Punky Brewster" highlights two developments of the era: the increase in older parents, especially fathers, and changing attitudes towards the elderly. The basis of the series is that Henry Warnimont, an elderly, childless, widower in his sixties, serves as a foster father and eventually adopts Punky Brewster, a seven-year-old girl whose parents abandoned her. There were multiple reasons for an increase in older parents during the 1980s. Parents were actively planning to have children later in life as opposed to women having unplanned children towards the end of their reproductive years. In addition, divorced men were marrying younger women who often wanted biological children of their own. This series also aired at a time when doctors and scientists challenged the conventional wisdom regarding aging and older individuals. Advancements in medical knowledge demonstrated that many common attitudes and beliefs toward the elderly were myths with no scientific basis. Due to medical and economic advancements, people were living longer and maintaining their previous standard of living into old age. Previous conceptions of the elderly were no longer relevant and people needed to readjust their existing beliefs based on new evidence. By studying this series, it is possible to see a reflection of the change in attitude towards the elderly and older parents in the 1980s.

“Preserving Chocolate City”

Kathryn Morgan, MA Candidate, Public History

Formed in 1970 by Vincent and Robert DeFor(r)est, the Afro-American Bicentennial Corporation (ABC) countered white, hegemonic historical narratives perpetuated by the American Revolution Bicentennial Commission (ARBC) and associated bicentennial activities. A non-profit organization, the ABC advocated for increased representation in the American historical narrative, specifically through designation of historic places related to the Black experience in the National Register of Historic Sites. Prior to 1973, there were only three Black historic sites designated across the entire United States: the Frederick Douglass House in Washington, D.C., the Booker T. Washington House in Virginia, and the George Washington Carver House in Missouri. Yet by 1977, only a year after concluding Bicentennial celebrations, the ABC had designated eighty-one Black historic sites to the National Register, exponentially increasing Black representation across the historic landscape. Using newspapers, organizational paperwork, case studies of nominated Black D.C. historic sites, and secondary literature, I argue the ABC's foundational work in social justice challenged the local Washington, D.C. historic preservation movement in the 1970s to reflect diverse historical narratives in the built environment. While there is still much work to be done in diversifying the inventory of historic places, the ABC acted as an impetus for modernizing historic preservation efforts in the nation's capital, as well as across the country. To complement this research, I am partnering with the D.C. Preservation League to produce a forthcoming, interpretive public history project on their geolocating app, D.C. Historic Sites.

Reclaiming of the Jewish Narrative and Memory Through Counter-Monuments

Madeline Scheub, Junior, International Relations and Arabic

How does one take on the monstrous task of representing the story of Holocaust survivors in spaces once dominated by Nazism? This preliminary study three counter-monuments that commemorate the Holocaust. Counter-monuments invite viewers to defy the power of the Nazis by valuing the experiences of Jews. In this sense, counter-monuments are structures that take up histories from the perspectives of those who were victimized. For this pilot study, I conducted a semiotic analysis of three different counter-monuments: two in

the Czech Republic and one in Germany. Each of the counter-monuments I examined use some kind of stone and are placed in places where Nazis committed acts of violence. My analysis of these monuments draws from Stuart Hall and identifies the counter-monuments as composed of signifiers of resilience, the Jewish burden, the development of empathetic connection, collectivity, and reclaiming of a space once dominated by Nazis. This preliminary study points to the significance of the powerful relationship between symbolic and material forms in life and remembrance. Finally, the paper considers the politics of memory in the case of those prosecuted by the Nazis and how memory can be reclaimed.

The Dance: Disconnect and Miscommunication Between Saigon and Washington DC During the Tet Offensive

Connor Mitchell, Senior, Political Science and History

Historians of the Vietnam War typically attempt to find the missing “How?” in analyzing the United States’ defeat in Vietnam. Current historiographical debates have found their scapegoats in either General William Westmoreland, commander of American armed forces in South Vietnam, or President Lyndon B. Johnson. The historiography surrounding blame negates the reality in which both the leadership in Saigon and in Washington DC both share the burden of ultimate defeat in the Vietnam War. Rather than simply becoming bogged down in the attritional stalemate which currently plagues historiography, this paper takes a more nuanced approach. This paper evaluates the US strategy for warfighting in Vietnam through the complex relationship that exists between the Presidential Commander-In-Chief and the military command within South Vietnam. Typically, when the United States goes to war, the President and his cabinet take the lead into larger strategic goals while their subordinate military generals achieve tactical objectives to work towards their ultimate strategic ideals laid forth by the Commander-In-Chief. However, during the Vietnam War, this metaphorical symbiotic relationship between political leadership and military leadership ceased to exist. By analyzing intelligence leading up to, and during, the Tet Offensive of 1968, the disconnect between the two warfighting entities becomes evident. Thus, the real enemy to American efforts in Vietnam was the disconnect between the American political leadership and the American military leadership.

SESSION TWO_PANEL 3 OF 3: 12:45 PM – 2:15 PM

Women as Creators and Consumers

moderated by Joanne Allen, Senior Professorial Lecturer, Department of Art

Featured Presentations:

“They want not only to hand over the bricks but also to lay them in place themselves”: Expectations and Experience of Women in the Labor Zionist Movement

Jonah Kaufman-Cohen, Senior, History and SIS

This paper argues that despite the movement’s radical egalitarian rhetoric, women in the Labor Zionist Movement were often held to higher work standards than their male comrades and had to fight for their right to be included in all types of labor. Primary research was drawn used firsthand accounts preserved in movement publications like *Arise and Build*, *Builders and Dreamers*, and especially *The Ploughwomen*. I collaborated with AU professors Micheal Brenner and Kate Haulman. I also worked with and interviewed Professor Mark Raider of the University of Cincinnati whose works on the Labor Zionist Movement formed the backbone of my secondary research. I conducted my research of the movement’s archives in cooperation with Librarian Carol Spector of the University of San Francisco. My capstone has already been entered into the archives of the Labor Zionist Movement, and I am beginning the process of having it published in a historical journal.

Deceptively Traditional: The Illusory Radicalism of the Cyborg in Contemporary East Asian Media

Keira McCarthy, MA Candidate, Art History

The cyborg—a portmanteau of “cybernetic” and “organism”—was originally formulated in European literature of the mid 1800s, and has inspired both awe and horror. However, in the 1980s, post-modernist thinkers, especially feminists, began to see the radical potential of this hybrid human-machine figure. In her *Cyborg Manifesto* of 1985, Donna Haraway argues that in societies defined by rigidly constructed binaries—man/woman, human/machine, white/non-white—the cyborg emerges as an in-between figure, capable of destabilizing and dissolving societal boundaries. This paper aims to critically evaluate this conception of the cyborg as a radical, destabilizing figure in the contemporary art and media of East Asia. Specifically, I evaluate the effectiveness of the cyborg figure in breaking down the idea of gender difference through an analysis of the 1995 film *Ghost in the Shell* and the sculpture series *Physical Attachment* (2008) by Chinese artist Fan Xiaoyan. Building off of Carl Silvio’s film analysis of *Ghost in the Shell*, I argue that while these two works seem to articulate a radical rethinking of gender through the use of the cyborg motif, they actually reinscribe traditional ideas through an oversexualized portrayal of the female body. Both works appropriate the cyber-feminist rhetoric articulated by Haraway in 1985 to mask the fact that what they present is not radical at all. This suggests a larger problem with discourse that presents the cyborg, and technological progress in general, as liberating forces, when in reality they are often used to reinforce conventional structures of power and domination.

In the Public Eye

Rae Puterbaugh, Junior, Public Relations and Studio Art

This piece deals with the relationship between self-image and the public eye.

Marie-Guillemine Benoist’s “Innocence Between Virtue and Vice”: Revolutionary Feminism in 1791

Emily Starr Roberson, MA Candidate, Art History

In August 1789, the new French National Assembly adopted the “Declaration of the Rights of Man and of the Citizen,” enshrining the revolutionary values of liberty, fraternity, and equality. Two years later, feminist Olympe de Gouges proclaimed the revolution unfinished, publishing the “Declaration of the Rights of Women and of the Female Citizen” to protest the exclusion of women from the political sphere. The same year, the painter Marie-Guillemine Benoist submitted “Innocence Between Virtue and Vice,” an ambitious, large-scale composition, to the annual Paris Salon exhibition. Though this painting took up a common theme in the history of art, her rendering was revolutionary in several important ways. Benoist changed the gender of the painting’s allegorical figures: she cast Innocence and Virtue as female, and depicted Vice as a man. Her alteration radically departed from trends in history painting that prioritized the male figure, making a statement about the role of women in French society. With Virtue clothed in blue, Innocence in white, and Vice in a red cape, Benoist also related this allegory to the tricolour, the flag embodying the ideals of revolution. Together, these symbols make a claim for female equality in the spheres of politics and art. My paper analyzes the iconography of the work and the critics’ responses to Benoist’s painting to support my reading of her success as a feminist history painter, situating her oeuvre within the larger cultural and political trajectory of France in the 1790s.

Confronting the Woman Question: Käthe Kollwitz’s Nieder mit den Abtreibungs-Paragrafen!, The KPD, and the Abortion Debate of Weimar Germany

Taylor Morris, MA Candidate, Art History

Käthe Kollwitz was at the height of her fame and career as a graphic artist when she was approached in 1923 by the Women’s Secretariat of the Kommunistische Partei Deutschlands (German Communist Party, hereafter designated KPD) to create a political poster. Kollwitz created *Nieder mit den Abtreibungs-Paragrafen* (Down with the Abortion Paragraphs!) for the KPD’s first large-scale campaign against Paragraph 218, the restrictive anti-abortion law of the Weimar Republic. Down with the Abortion Paragraphs!

depicts an abused working-class mother and her children, crestfallen as she faces yet another pregnancy. Kollwitz's poster put forth an unusual image of the modern woman. The working-class mother is being rendered in an unidealized way that contested popular depictions of the "New Woman," who was young, athletic, fashionable, and served as a symbol of modern life in Germany. Kollwitz rejected the shift towards representing modern women in that way by presenting the proletarian mother as the face of the abortion debate. Despite the poster's simplicity, Kollwitz's carefully orchestrated image also served as a site of contestation between the abortion debate, the KPD, and the changing perceptions of women during the Weimar Republic. Kollwitz's stark rendering of the pregnant proletarian mother simultaneously evoked sympathy for the cause while presenting a powerful alternative to the KPD's heroic male laborer glorified through communist visual media. Her use of the maternal motif was not just influential on the abortion debate and the KPD but was also successful in creating a space for the proletarian woman's voice within the abortion reform debate and German communism.

Memories of Trauma and a Search for Home: Reconstructing and Recentring Mizrahi Women in Israeli Cinema, 1960-2014

Yael Isaacs, Senior, History and Israel Studies

This paper explores how the images of the Mizrahiot (Mizrahi women) in Israeli cinema. This study analyzes twelve Israeli films depicting Mizrahiot through a social-cinematic lens to illustrate how Israeli cinema was a site of popular contestation where Mizrahiot could reject their marginalized socio-economic position. I examine film through its aesthetic properties, including the development of religious and war allegories, the use of cinematic techniques that either marginalize or center women on screen, and the evolution of Mizrahi narratives of home and immigration. Mizrahiot aesthetic choices in the films they create from the 1990s onwards either reflect, reject, or reconstruct Israeli nationalist ideology. The androcentric Boureka film genre of the 1960s and 1970s centered ethnic stereotypes and portrayed Mizrahiot as plot devices. The New Women's Movement in the 1980s brought Ashkenazi women into the film industry, but second-wave feminism still excluded the Mizrahiot, and cinema continued to relegate Mizrahiot to one-dimensional roles. By the 1990s, feminist and multicultural activism enabled a few Mizrahiot to enter the film industry as actors and screenwriters. When Mizrahiot became active in film production, they challenged and redefined the hegemonic narratives about what it meant to be Jewish, Mizrahi, and Israeli. Further, Mizrahi directors created a new image of Mizrahiot that rendered them active agents of Israeli society attempting to create a home and an identity in a country that has historically excluded them.

Human Brain, Mind and Behavior

moderated by Terry Davidson, Director of the Center for Behavioral Neuroscience and Distinguished Professor

Featured Presentations:

Cortical localization of age specific interaction between race and gender in infant face processing

Kira Ashton, PhD Candidate, Behavior, Cognition and Neuroscience

We examined the effects of race and gender on Event Related Potential (ERP) responses, specifically the N290 and P400 face processing components. We hypothesized that an interactive effect of race and gender would modulate these responses in 3, 6, and 9 month old infants, and would intensify with age due to the perceptual narrowing that comes with visual experience. Infants saw static pictures of male and female faces, of either the infant's own race, or another race while electroencephalography data (EEG) was recorded. The sample consisted of 24 3-month-olds, 26 6-month-olds, and 18 9-month-olds. We used linear mixed effect (LME) models to assess the effects of ROI, age, face race, and face gender, and a quadratic age term on the amplitudes of both components. The mean P400 amplitude was significantly affected by ROI, age, race, the interaction between gender and race (all $p \leq .05$), and a three-way interaction between gender, race, and age ($F[1,1275] = 3.97, p = .046$). In 3 month olds, P400 amplitude was increased for other race faces ($p = .024$). In 9 month olds, a significant interaction between race and gender ($F[1,323] = 18.39, p \leq .001$) was driven by increased P400 amplitudes to female own-race, and male other-race faces. Our next step will be applying cortical source analysis to investigate what areas of the brain are active during face processing, and whether our results reflect age-based changes in cortical activation during face processing as a function of race and gender.

Neural Correlates of Reading and Attention

Sarisha Jagasia, Sophomore, Neuroscience

Neurodevelopmental disorders of reading (e.g., developmental dyslexia) and attention (e.g., ADHD) are comorbid at rates higher than predicted by chance (25-40%). Despite the high rate of comorbidity, little is known about the overlap between neural correlates of reading and attention. Our previous work identified the caudate nucleus as a potential region of interest for comorbid reading and attention issues. To test this in a non-clinical sample, we investigated the unique and shared neural correlates of reading and attention in 47 neurotypically developing youth (females = 21; age = 8 - 18 years, mean \pm SD = 14.1+3.0) from the NIH Pediatric MRI data set. Reading was scored using the Woodcock-Johnson III Letter Word Identification Test and attention was scored using the Child Behavior Checklist (CBCL). Regions where grey matter volume correlated with reading or attention scores were determined using multiple regression analyses. A conjunction analysis was used to identify regions where grey matter was associated with both reading and attention scores. Analyses revealed better reading scores were associated with increased grey matter in the left middle frontal gyrus whereas better attention scores were associated with increased grey matter in the right superior medial frontal gyrus ($p \leq .005$, cluster size > 50). Both reading and attention scores correlated with grey matter volume in bilateral inferior occipital gyri. Future studies will investigate the role of the inferior occipital gyrus in comorbid dyslexia and ADHD.

Neonatal imitation of caregivers at home: A feasibility pilot

Katherine Casey, PhD Candidate, Behavior, Cognition and Neuroscience

Tools that can translate laboratory-based behavioral paradigms to measure behavior longitudinally in large samples of newborns remain lacking. This limits options for large-scale behavioral studies in this age range, which are needed to develop large-scale assessments and interventions that build upon laboratory findings. We address this gap by examining the feasibility of eliciting and measuring neonatal mimicry in a caregiver-led online paradigm. Our between-subjects design focuses on two of the most commonly studied neonatal

gestures in the context of mimicry, tongue protrusion (TP) and mouth opening (MO). Caregivers and their newborns were videotaped, via the online experiment platform Lookit, as caregivers modelled either gesture to their newborns. To assess data quality in this online paradigm, coders separately coded the pilot data (N = 12, all sessions) for total usable time, that is, the total task time with valid video usable to code TP and MO. Usable time is defined by the infant's face being in view, eyes open, and not fussing or bouncing for an extended period of time (i.e., > 3 sec.). In this pilot webcam data, our coders demonstrated a high degree of inter-rater reliability for coding total usable time, $r(5) = 0.95$, $p < 0.001$. Participants took a median time of 12.20-min. to complete the task for included sessions (12.86-min., all sessions), in line with our projected task duration of 15-min. This initial analysis demonstrates the feasibility of measuring neonatal mimicry of caregivers in the home using this paradigm.

The cerebellum's involvement in prediction across motor and cognitive domains in autism

Nicole Loy, Junior, Neuroscience and History

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition characterized by social and communication deficits and the presence of stereotyped behaviors and restrictive interests. Differences in cerebellar structure and function are well-characterized in ASD, but less is known about the cerebellum's contribution. Predictive processing deficits are proposed to support these features, but neural substrates are not yet established. Given right cerebellar lobule VII's (RVII) role in neural prediction and its atypical structure and function in ASD, we hypothesized that this region may play an important role in predictive processing in autism. The present study investigates the cerebellum's role in predictive processing in adults with and without ASD. We tested the effect of cerebellar neuromodulation on task performance in typically-developing (TD; $n=12$, 22.5 ± 2.5 yrs) and ASD (AG; $n=10$, 24.5 ± 9.0 yrs) adults. Participants completed a predictive language, motor, and social task after receiving 20 min of tDCS targeting RVII. Autism Quotient (AQ) scores were also collected as a measure of autism feature severity in both groups. Cerebellar tDCS altered prediction and learning across all task domains. On tasks with a specific learning component (social, motor), AQ scores negatively correlated with performance, indicating poorer learning in individuals with a greater degree of autism features. Following cerebellar tDCS, social learning and language prediction improved selectively in AG. These results provide evidence for the cerebellum's involvement in prediction and autism, and demonstrate that cerebellar tDCS targeting RVII selectively improves performance on cognitive predictive tasks in AG.

Facial processing in pediatric social anxiety disorder: exploring neural responses across differing negative emotions

Alena Quinn, Senior, Psychology and Health Promotion

Anxiety patients experience heightened behavioral and neural responses to threat, and behavioral interventions such as Cognitive Behavioral Therapy (CBT) have shown promising results in limiting these behavioral responses. However, there is limited research regarding the neural responses to threat, especially within children, when anxiety disorders typically develop. The Faces and Feelings project aims at establishing specific neural markers for pediatric social anxiety through children's electroencephalography (EEG) responses to positive (happy) and negative (anger, fear, disgust) facial emotions. The present study is a data processing and analysis sub-project within the Faces and Feelings project looking specifically at Event-Related Potential (ERP) data derived from the facial emotion processing EEG task. The aim for this sub-project is to further support the overall goal of determining whether neural markers of pediatric social anxiety can detect social anxiety in children prior to the onset of symptoms, therefore potentially providing earlier detection and intervention opportunities in infants before symptoms develop in childhood. Specifically, I hypothesized that there will be a significant relationship such that ERP responses to different negative emotions will have different levels of association with social anxiety. To test this hypothesis, I planned to examine whether there are independent levels of association between ERP responses to each negative emotion by extracting mean ERP amplitudes from each emotion using EEGLab software, then designing an analysis plan through SPSS software to test the strength of the associations. As EEG data collection was

interrupted by COVID-19, the poster will focus on the design and implementation of the ERP preprocessing pipeline, the analysis plan, and the existing pilot and experimental data (N = 3).

Individual differences in classification of translucent materials using photos of real-world objects

Chenxi Liao, PhD Candidate, Behavior, Cognition and Neuroscience

Many real-world materials are translucent (e.g. skin, wax), but our understanding of translucent materials is limited compared with other material properties, such as surface gloss. Previous findings of human perception of translucency are mainly based on rendered images, which are restricted by their diversity of appearance and realism. In this study, we measure observers' translucency perception with photographs of real objects. Here, we examine individual differences and the role of color in perceiving translucent appearance through a classification task. Observers classified 250 images as "Translucent", "Opaque" or "Unsure". Stimuli were photographs of real objects made of natural or artificial materials, such as wax, ceramics. In Experiment 1, the stimuli were RGB images. In Experiment 2, the images were the same but in grayscale. First, we found substantial individual differences in both color and grayscale conditions. Furthermore, more observers reported "Unsure" in the grayscale condition in comparison to the color one. We constructed the representational dissimilarity matrices (RDMs) based on individual votes for each image pair for both conditions. The patterns of the image-by-image RDMs are visually different between the color and grayscale conditions (Kendall's $\tau_A=0.27$, $p<0.01$), revealing a shift in observers' responses to certain stimuli and a significant but weak correlation between the two RDMs. Our results suggest that there are substantial individual differences in translucency classification from photographs of real objects, likely due to interpersonal differences in interpretation of translucency and object categories. Moreover, removing color has an effect on the votes for some stimuli.

SESSION THREE_PANEL 2 OF 4: 2:30 PM – 4:00 PM

Discrimination and Body Politics

moderated by Mary Ellen Curtin, Associate Professor, Critical RGC Studies

Featured Presentations:

Capital Monarchy: Drag Kings and Community Building in Washington, DC, 1960-2020

Kai Walther, MA Candidate, Public History

Despite a history dating back to the mid-late 20th century, both LGBT and mainstream media and audiences continue to overlook drag kings, especially in comparison to drag queens. Even so, DC is home to a flourishing, if understudied, drag king scene. Shaped by racial segregation and political protests while living in the shadow of the federal government, queer DC had to overcome racial and gender boundaries, as well as government-imposed silence, to build their own communities. Drag kings played and continue to play a critical role in this endeavor. The following analysis examines the role of drag kings in making visible different expressions of queerness among DC's diverse queer population, addressing and explaining those changes throughout time. It will demonstrate how drag kinging has and continues to provide those regularly overlooked by society, such as queer women, transgender individuals, and people of color, with a means of building community and self-empowerment through performance and gender exploration. Within the last few years, DC's drag king scene has become more visible and inclusive, illustrating the subversive nature of drag in its capabilities to break down barriers of gender and respectability while celebrating those on the margins of society. The ever-important value of community at drag king shows and in troupes has expanded, providing more opportunities for performing with less limitations on what drag should look like.

Images of Integration: The Clash of Black Bodies with White Spaces

Coura Fall, Junior, Political Science and International Studies

In an era during which Diversity, Equity and Inclusion (DE&I) movements have gained traction, it is worthwhile to look back to earlier efforts to desegregate American institutions. The conventional understanding of integration is that it was a courageous shift in racial politics that declared that all children are entitled to a fair education with equal opportunity to succeed. This paper complicates that dominant understanding. My analysis is based on a preliminary study of three images that capture the first efforts to desegregate schools in the late 1950s. Using semiotic analysis, I decode these images that capture the entrance of Black students into white schools. My analysis is theoretically informed by Stuart Hall and Antonio Gramsci. These tools offer insight into the burdens born by young Black girls entering gatekept spaces, and these images help frame a counter-hegemonic discourse surrounding the construction of Black female identity and the eradication of Black childhood. As such, my analysis offers some ground to theorize a throughline between the costs of school integration to Black school children and the emotional, psychological and physical costs DEI work to Black and Brown people who make white supremacist spaces more accessible for their group.

Dancing Through Colorism: Finding Empowerment Through Movement

Dominique Dempsey, Senior, International Relations and Dance

Dance has immense capabilities to embody varying lived ideologies specifically regarding racial paradigms. This project strives to examine how the act of embodying colorism is a radical means of reaffirming agency, educating, and engaging students. The workshop Dancing Through Colorism: Finding Empowerment Through Movement will allow for research exploration regarding how dance can be utilized as a mechanism to facilitate conversations about colorism. The presentation presents the findings from 7 workshops and the process of dancing through colorism workshops with 130 middle and high school students.

Trauma Exposure and Mental Health Outcomes of Unaccompanied Central American Youth in the Washington, D.C., Metropolitan Area

Daniel Jenks, MA Candidate, Sociology Research and Practice

Jessica Chaikof, MA Candidate, Sociology Research and Practice

SteVon Felton, MA Candidate, Sociology Research and Practice

Isabella Goris MA Candidate, Sociology Research and Practice

This paper investigates the mental health outcomes of a sample of Central American youth asylum seekers living in the Washington, D.C. area, surveyed in 2016 and 2017. Unaccompanied Central American youth face numerous challenges in trauma exposure and mental health, including increased psychopathological risk, low state capacity and high levels of violence in sending countries, and restrictive immigration policies that increase the fear of deportation for themselves, their family members, or both. The context of integration also affects this population's mental health, who are hard to reach, vulnerable, and may have significant levels of trauma exposure from a young age. Using survey data along with PHQ-9 and PCL-5 scales, we find that our respondents have seen improvements in their mental health but remain at risk. We found disproportionate likelihood of PTSD from the PCL-5 scale and discuss the implications of our other findings. In line with the literature, we conclude that structural changes that allow for higher access to social services, schooling, healthcare, and employment for them and their families' mental health is needed to improve this population's mental health and treat their trauma exposure.

Sexual and Gender Minority Youth's Comprehension of a Daily Minority Stress Scale

Farshad Bazargani, Senior, Public Health and Biology

Sexual and gender minority youths (SGMY) experience unique stressors (i.e., minority stressors) related to the daily stigma they experience because of their marginalized sexuality or gender identity (i.e., heterosexism, transphobia). As claimed by the minority stress model, minority stressors poorly affect the mental health outcomes of SGMY and may contribute to disparities in health. However, limited work has been conducted to appropriately measure minority stress and to properly examine SGMY's comprehension of minority stress measures. Therefore, the purpose of this study was to investigate SGMY's comprehension

of the nine items of a newly developed measure for daily diary studies, the Everyday Minority Stress Scale (EMSS). Participants (N=80) with the age range of 12-18 years were recruited from the DC area's LGBT+ community. After completing a daily diary study, participants completed an exit survey that measured their understanding and comprehension of the items of the EMSS. Using cognitive interview techniques, the qualitative data from exit surveys were gathered and analyzed, then each question's data were categorized into different themes based on the participants' understanding of each question. The results showed that most questions of the EMSS were clearly understood by the participants "very well," with the exception of some outliers that did not have the same comprehension as the majority.

Purposes of Race-Based Affinity Spaces in Burlington, Vermont Middle Schools

Kiran Waqar, MA Candidate, Public History

Vermont is well-known for its progressive politics and yet it is a largely segregated state with 94.2% of the population identifying as white. After setting a brief historical context, this paper offers a preliminary study of three images from the Stay to Stay Program from the Vermont Department of Tourism and Marketing to explore how the presence and meaning of "Vermonters" is constructed. My analysis uses semiotics to decode these images and draws from Stuart Hall, Michael Foucault, and Antoni Gramsci to explore how power circulates through them. My analysis points to the ways that Vermont's definition of itself is tied up in whiteness, heteropatriarchy, and class. Based on my semiotic analysis, I theorize that like other progressive movements, Vermont leverages whiteness in pursuit of progressive politics. My analysis lays ground for future research on how race, gender, and class operate in Vermont. Semiotics help us decode relationships of power in our everyday lives, particularly in the places we're not supposed to look. Because of its semiotic approach, this paper is able to look beyond the stated rhetoric of diversity and inclusion of Vermont's Stay to Stay program and has larger implications for how to understand whiteness and racism in New England.

SESSION THREE_PANEL 3 OF 4: 2:30 PM – 4:00 PM

The Arts and Humanities in Times of Crisis

moderated by Danielle Mysliwicz, Associate Professor, Department of Art

Featured Presentations:

How Do Migraines Move

Jess Carrel, Senior, Dance and Anthropology

This project is a combination of my anthropology and dance research and thus has an integrated set of research questions that guide each type of inquiry. I begin with my overarching question of "How do Migraines Move Us?" This question presumes the framework of "movement" to understand the physical and cultural consequences of migraines on sufferers. It underscores the necessity of movement research as an ethnographic methodology and helps substantiate the subsequent research inquiries- those being: How can movement research and improvisation be used to physically render pain in order to answer the question "How does your migraine move?", how can movement be mobilized as a theoretical framework for understanding the effect of migraine on the daily life of sufferers in order to answer the question "How does your migraine move you?" and finally to dive deeply into the relationship between pain, the body, and movement in reconciling alienation in pain suffers to answer the question "How do you move your migraine?"

Queer Fiber Art During the Covid-19 Pandemic

Conor Hartman, Senior, Studio Art; Environmental Science and Graphic Design

I am using fiber art to depict Queer relationships to subvert and reject traditional ideas around these fiber arts. I have dedicated this time in my practice to depicting Queer relationships and sexuality since many of the spaces where we can meet and interact with each other freely are public places that are closed due to the coronavirus pandemic. I've chosen to work in embroidery and punch needle as they are outside the traditional art canon because of the identities of these artists traditionally as women. By choosing to work with fiber after its rejection from the traditional western art canon I am choosing to reject this canon and create my own.

Tattoo Taboo: The Evolving Role of Tattoos in Russian Society

Michael McShane, Senior, SIS and Russian Language & Area Studies

Throughout much of its history, Russia has maintained a complex relationship with tattoos and body art. Though the practice long existed within Arctic, Siberian, and Caucasian communities, it first gained prominence among Russian sailors in the early 1900s and later grew synonymous with Vory (thieves) culture as a means of identifying one's past crimes and criminal associations. These tattoos, known as nakolki in Russian, abide by a rigid code that denotes meaning and hierarchy. Over time, tattoos in Russia have come to represent a wide range of causes, whether it be criminal, cultural, political, or simply no cause at all. Yet, despite this apparent evolution, tattoos remain controversial within Russian society and tend to carry many negative connotations. This paper aims to explore this cultural dynamism and analyze the ways in which tattoos have come to mean many different things depending on the person. Additionally, I will explore how this tradition has re-emerged as a means of political expression, especially among leading oppositionists who have used body art to amplify their respective causes.

“Militant Figures and Violent Technical Procedures”: Visualizing Colonial Violence and Surrealist Ethnography in Raoul Ubac’s Penthésilée Photomontages

Megan MacKenzie, MA Candidate, Art History

Created between 1937 and 1939, Belgian Surrealist Raoul Ubac’s Penthésilée photomontages depict imagined scenes of graphic violence that fragment the female body to the point of rendering it illegible. This violence is not only visual, but also embedded in the surface of the photograph through darkroom techniques such as exposing the photographic plate to light and burning it over a flame. While the violent imagery and techniques of Ubac’s photomontages has been examined through the lens of Surrealist misogyny and the Spanish Civil War, this project will instead argue for a reading of the Penthésilée photomontages in light of the visual record of Belgian colonial violence in the Congo. Reading the iconography of Ubac’s images and his engagement with the legend of the ancient Amazons, I will analyze the ways in which Ubac responds to the historic framing of the Amazon as “Other.” Ubac takes as his inspiration the myth of the Amazonian queen Penthesilea and Heinrich von Kleist’s Romantic play Penthesilea (1808), a reimagining of the original myth, both of which frame Penthesilea as “Other” and inferior to her foe/lover, Achilles. Within the context of the Surrealist movement’s engagement with anti-colonialist politics in juxtaposition with their ethnographic interest in “primitive” cultures, I will argue that Ubac critiques photography’s use as a tool of imperialism while simultaneously presenting his photomontages as a record of a mythologized colonial violence.

The Hair of Christ: Albrecht Dürer’s Masculinity Examined

Eleanor Dennehy, Junior, Art History and Literature

Throughout the Middle Ages, hair has worked as a symbol for perpetuating and challenging ideas of gender and sexuality. Hairstyles, beards, and pubic hair all have the ability to provide a specific lens into the different social norms and representation of gender that existed between men and women during the Northern Renaissance. Hair was often used on the body of Christ to promote his humanity and morality within the viewer, creating a tangible connection between Christ and the onlooker. Albrecht Dürer’s, Self Portrait, will be used as a vehicle for connecting the beliefs that hair has an underlying meaning and socio-historical importance, especially with the idea that Dürer is portrayed as “christ-like” in his portrait. I will be arguing that there is a spiritual and secular reading of Albrecht Dürer’s Self Portrait dated 1500 through the lens of hair. First, the spiritual representation links Christ and Dürer together by their long hair as it is seen

as a motif that brings humanity and humility to Christ, yet elevates Dürer's being to a spiritual realm. The secular interpretation of body hair such as beards constructs a divide between the sexes, reinstating Dürer's masculinity and dominance over the female sex, and even mankind as he is seen in likeness to Christ. Ultimately, Dürer's usage of body hair acts as a vehicle for perpetuating and challenging ideas of religion, masculinity, and femininity, during the Renaissance.

“47 Meters Down: Uncaged” & Uncolonized – Destabilizing Colonial Rhetoric & Spaces in the shark horror film “47 Meters Down: Uncaged”

Brady Tuttle, MA Candidate, Literature, Culture and Technology

"47 Meters Down: Uncaged (2019) is the indirect sequel to 47 Meters Down (2017) and follows four American teenage girls as they cave-dive in a flooded Mayan temple in Mexico and catacomb that, unbeknownst to them, houses (at least) two ancient, blind sharks who attack the girls as they attempt to escape the caves. Within the film, I argue that the sharks function as signifiers of the Mayan culture and people and, as such, form a resistance against those who feel entitled to Mayan history. In contrast to this, the humans of the film very much fall into the role of neo-colonizer, attempting to exert their will over indigenous histories. In this paper, I argue 47 Meters Down: Uncaged is a film that destabilizes traditional conceptions of pre-colonial, indigenous spaces through a colonial viewpoint, by de-centering the colonial experience and instead privileging the perspective of those most impacted by the colonial intrusion. By analyzing the film in relation to the conventions of space found in both horror and archeological adventure films, I highlight how the physical construction of the space, as well as the privileging of the sharks' viewpoint, transforms this movie from one of conquest to one of resistance.

SESSION THREE_PANEL 4 OF 4: 2:30 PM – 4:00 PM

Language and Learning

moderated by Nathan Slusher, Director, Career Education & Outreach, Career Center

Featured Presentations:

Latent Variable vs Deep Learning Embedding Methods in Misinformation Detection: An Application to COVID-19

Caitlin Moroney, MS Candidate, Data Science

The detection of misinformation from social media during high impact events, e.g., COVID-19 pandemic, is a sensitive and pressing application. This suggests that any automated system used for this purpose must display both high prediction accuracy as well as explainability. Although Deep Learning methods have shown remarkable prediction accuracy, accessing the contextual information that Deep Learning-based representations carry is a significant challenge. We propose a data-driven solution that is based on a popular latent variable model called Independent Component Analysis (ICA), where a slight loss in accuracy with respect to a BERT model is compensated by interpretable contextual representations. This methodology is applied to a novel labeled COVID-19 Twitter dataset that is based on socio-linguistic criteria.

COMPAS: A Case Study in Machine Learning Fairness

Caitlin Moroney, MS Candidate, Data Science

In this study, we aim to contribute to the growing literature on the subject of ethics in machine learning. Specifically, we are interested in using machine learning techniques to analyze the “fairness” (or lack thereof) of an algorithm’s predictions when dealing with features which include protected groups (such as

race). We focus on the much-studied COMPAS dataset provided by ProPublica which contains information on criminal defendants in Broward County, Florida.

What Studying Cannot Teach You During Language Acquisition: Intuitive vs Learned Usage of Articles Among L1 and L2 Russian, French, and English Speakers

Tatiana Bienvenu, Junior, Communications, Law, Economics, and Government (CLEG); French and Russian Translation (Certificate)

As a multiethnic and multilingual student, I have been studying English, French, and Russian in the context of translation and linguistics. Subconsciously, accents and grammatical mistakes are usually the first things we notice when we are speaking to someone which triggers questions and/or guesses about where a person is from and what their first language is. Since speaking is such an important part of our interactions and communications, I wanted to study why it is easier for certain L1 speakers to learn a language compared to speakers of another language. This study is an analysis across English, Russian, and French native (L1), L2 and L3 speakers. While this study does touch on the effects of the age at which language acquisition began, the effect of knowing other languages, and similarities among language families, it specifically looks at the part of speech that tends to be the most unique to each language and arguably has the most intuitive usage: articles. Each language has a different way of expressing core groups of meanings such as definitiveness and plurality. In some languages like English, articles are used to convey several of these factors. However, in other languages such as Russian, articles simply do not exist, so other mechanisms such as word order are used to express those discrete meanings of the sentence or word. This research project is still in progress and is built on linguistic literature research as well as case studies and examples of common mistakes along with their explanations and analyses.

Evaluating Data Poisoning Attack on Machine Learning Models

Huong Doan, MS Candidate, Data Science

Machine learning is one of the most significant technological developments recently. For example, one of its applications is a self-driving car which is able to detect road signs by using machine learning and computer vision techniques. However, recent research shows that machine learning models may be vulnerable to various attacks, such as data poisoning attacks. For example, a data poisoning attack can manipulate the machine learning model to misclassify a stop sign as a speed limit sign. Such data poisoning attacks target the data used to train machine learning in order to get wrong prediction or classification. This can be done by modifying or introducing carefully designed data samples in the dataset. It would not be easy to notice that a small portion of poisoned samples are thrown into thousands or millions of data samples (e.g., images). In this project, we study how to craft such poisoning data samples as few as possible and as humanly imperceptible as possible to evaluate the trustworthiness of machine learning models. We consider image data in this project for machine learning image classifiers.

Using Machine Learning to Uncover the Hidden Information in Images

Lexie Rista, Junior, Computer Science and French

Archibald Latham

Steganography is a process used to conceal a secret message within a piece of media such as a photo, video, or audio file with the goal being to transmit this message undetected over the internet. Modern uses include, but are not limited to, protecting data from threats, watermarking to ensure copyright, and maintaining confidentiality. However, steganography can also be used maliciously. In this case, dangerous entities may communicate and spread malware while evading law enforcement. These positive and negative uses present the need for both strong encoding and detection algorithms. For this project, we propose a machine-learning model for detecting the presence of steganographic manipulation in images. To start, we used a deep learning model, generative adversarial network, to produce encoded images that evade traditional steganalysis detectors (e.g., least significant bit). Analyzing these encoded images against their original counterparts revealed key markers of modification such as smoothing of color channels in histogram data and an increased presence of high-frequency noise under a Gaussian mask. Using these markers, we

propose a robust machine learning based methodology that has a higher rate of detection than current approaches. Ideally with the sophisticated steganalysis methodology proposed, law enforcement could easily intercept malicious encoded media. Furthermore, we are experimenting with Steganographic methodologies that can hide multiple layers of encoded data and avoid information loss from image compression. This research will allow further development of techniques in both the realms of steganography and steganalysis.

Superlearner for CoxPH

Hannah M. Brown, Senior, Applied Statistics and Political Science

Due to the complex, nonlinear associations between response and exposure variables in occupational health data, new analytic methods are necessary to estimate these relationships. However, with the breadth of smoothing methods available and without a priori knowledge of the shape of the relationship it is difficult to identify the best method of analysis. Recent data-driven procedures such as the SuperLearner provide a new solution to address this problem by combining various data-specific smoothing and learning methods into one singular package. This research explores and models nonlinear associations between exposure and outcome variables, particularly within the occupational setting, by comparing traditional methods of analysis with newer methods such as the SuperLearner. Initial research developed an updated literature review of the application area, smoothing methods, and the SuperLearner, followed by an investigation of the applications of the SuperLearner R package to the occupational health data. Although the application of the SuperLearner in the Cox Proportional Hazard regression setting has been proposed, very little research exists. Due to the scarcity of literature, this research will assess the SuperLearner's suitability for implementation on Carpal Tunnel Syndrome (CTS) and Lower Back Pain (LBP) with the CoxPH regression algorithm. So far, this research has demonstrated that the SuperLearner ensemble performs better than any of the algorithms outside of the SuperLearner or the discrete SuperLearner algorithms alone. This is confirmed by the risk scores and the ROC performance scores. Current research is focusing on the implementation of the SuperLearner to the CoxPH setting.

The 31st College of Arts & Sciences Robyn Rafferty Mathias Student Research Conference is sponsored in part by a generous grant from AU trustee and alumna Robyn Rafferty Mathias as well as by the NASA District of Columbia Space Grant Consortium and WhiteHat Security.



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