

STRONG STUDENTS CREATE, EXPLORE, AND LEAD.



UNDERGRADUATE RESEARCH CONFERENCE
ANNUAL ACADEMIC AND LEADERSHIP AWARDS CEREMONY
SPECIAL EVENTS HIGHLIGHTING STUDENTS' ACCOMPLISHMENTS

21ST ANNUAL CELEBRATING STUDENT ACHIEVEMENT

Program of Events
Thursday, April 13, 2023

Volume 18, Number 1

MEREDITH
COLLEGE

GOING
STRONG

WELCOME

Dear Friends,

I am delighted to welcome you to CSA Day 2023!

We celebrate students' achievements every day, of course, but CSA Day is our opportunity to see the culmination of projects students have been working on all semester and sometimes all year. Many of these projects reflect an individual student's focus; others reflect collaborative productions. All require the guidance and mutual curiosity of our faculty and staff who painstakingly mentor and advise students throughout their learning process.

We sometimes need to remind ourselves that learning is always a process—that we all come to college and our coursework with varying degrees of knowledge, assumptions, and conclusions. More often than not, that knowledge, those assumptions, and drawn conclusions need a great deal of refinement and may even need to be abandoned altogether. Whether that development happens over the course of a lesson, a semester, or a lifetime, it nonetheless is evidence of growth, maturation, and insight. Best is when it also brings greater curiosity and better solutions, leading, we hope, to greater prospects for humanity—our own and that of others.

Celebrating Student Achievement is the cumulative joy of learning, of making, of doing, of being. Whether in the arts, sciences, design, pedagogy, technology, or any other field, that joy drives us beyond the frustrations of failed attempts and confusing complexities and moves us toward enlightenment—oftentimes seeing something we never knew existed.

That kind of victory—that elation—is on full display at CSA Day. Enjoy!



President Jo Allen, '80

ACKNOWLEDGEMENTS

The commitment and dedication of Meredith students, faculty, and staff make this day of celebrating student achievement possible. Special thanks go to —

Jo Allen, '80, President

Matthew Poslusny, Senior Vice President
and Provost

Jean Jackson, '75, Vice President for
College Programs

Carolina Perez-Heydrich, Director of
Undergraduate Research

Cheryl Jenkins, Director, Office of Student Leadership
and Service

Kathryn Pleasant, Administrative Assistant for
Undergraduate Research Program

The Undergraduate Research Advisory Committee

Marissa McCauley and Vanessa Harris, Department
of Marketing

Laura Davidson, Jeffrey Waller, and the Reference
Staff of Carlyle Campbell Library

Courtney Hopper, Michael Altman, and their HOS 320
students

Mindy Sopher and her COM 316 students

Brian Thornburg and Rick McBane, Media Services

Bonnie Aldridge, Administrative Assistant to the Vice
President for College Programs

Coordinator Lauren Hickey and Student Technology
& Training (STAT) Interns

William Brown, Ginny Watkins, and Meredith Events
staff

The faculty mentors who have given concentration, care, and many extra hours to encourage and support today's student presenters and performers.

Day at a Glance

8:30 – 8:45 a.m.	Opening Ceremony <i>A welcoming address will be given by Dr. Jo Allen, along with refreshments and breakfast treats</i>	Carlyle Campbell Library
8:30 – 9:30 a.m.	Morning Poster Presentation Session	Carlyle Campbell Library
9 – 9:25 a.m.	Psychology Awards Presentation	Ledford Lobby
9:30 – 10:30 a.m.	Architecture and Design Presentations	SMB 118
9:30 – 10:45 a.m.	Business and Economics Presentations	SMB 162
9:30 – 10:15 a.m.	Social and Behavioral Science Presentations	Ledford 101
9:30 – 11:10 a.m.	Music History Presentations	Carswell Hall
10:15 – 11:15 a.m.	Math and Science Presentations	Ledford 101
10:30 – 11:30 a.m.	Showcase: Intersections of Math and Art in Italy	SMB 118
11:30 a.m. – 12:15 p.m.	Student Achievement in Leadership Awards Ceremony	Jones Auditorium
12 – 2 p.m.	Arts Showcase and Food Truck Rodeo <i>Community event featuring exhibits, performances, food trucks, complimentary shaved ice, and door prizes</i>	Johnson Hall Fountain
12 – 3 p.m.	Senior Spotlights: Celebrating the Next Steps for the Class of 2023	Park Lobby, 1st Floor Cate Center
12:30 – 1:30 p.m.	The Colton Review Reveal	Kresge Auditorium
1 – 1:45 p.m.	Alpha Sigma Lambda Induction Ceremony	Chapel Common Room
1:30 – 2:30 p.m.	Lambda Pi Eta Induction Ceremony	CHESS Lobby
1:45 – 3:55 p.m.	Music History and World Music Presentations	Carswell Hall

1:45 – 3:15 p.m.	Education Presentations	<i>Ledford 101</i>
2 – 3 p.m.	Female Identity in Art and Literature Presentations	<i>SMB 118</i>
2 – 3 p.m.	Interior Design Senior Portfolio Review	<i>Martin 240 and 242</i>
2:15 – 2:45 p.m.	Politics and Gender Presentations	<i>SMB 162</i>
3 – 3:45 p.m.	Afternoon Poster Presentation Session	<i>Carlyle Campbell Library</i>
3 – 4:30 p.m.	School of Business Awards Ceremony	<i>Kresge Auditorium</i>
4 – 5 p.m.	Student Academic and Leadership Awards Ceremony	<i>Jones Auditorium</i>
5 – 6 p.m.	NMS Student Awards and Recognition Ceremony	<i>Online</i>
5 – 9 p.m.	Department of Music Awards Banquet	<i>Carswell Hall, Jones 121</i>
5:30 – 6:30 p.m.	Kappa Pi Art Honorary Society Induction Ceremony	<i>137 Gaddy Hamrick</i>
5:30 – 7 p.m.	OIP Scholarship Award and Essay Contest Reception	<i>Kresge Auditorium</i>
5:30 – 7 p.m.	Human Environmental Sciences Awards Ceremony	<i>Jones Chapel</i>
5:30 – 7 p.m.	NHHP Awards Ceremony	<i>CHESS Lobby</i>

Schedule of Events

MORNING CONFERENCE SESSIONS

MORNING POSTER PRESENTATIONS

Carlyle Campbell Library

8:30 – 9:30 a.m.

Protein of Unknown Function: An Analysis of the Techniques & Procedures Necessary for Identification
Ryeann Airall

Impact of Exercise Duration and Frequency on Body Composition In Clinical Health Populations
Abby Black

Synthesis of Carbazole-Based Dye to Power a Solar Cell
Katherine Erb and Aiman Jamadar

Identification of Unknown Protein 1YZ1 Using Analytical Methods
Aiman Jamadar

A Mini-Review of N, N-dimethyltryptamine
Jordan Lamont

How does iNaturalist/citizen science data measure up against biodiversity checklists? Using Meredith College campus data as a case study.
Sarah Page

Investigating the impacts of stress and antifungal properties on Raleigh amphibian populations
Kara Solomon and Sophia Bogan

Using Radiofrequency identification to detect wild house mice (Where's Waldo)
Samantha Travis

What does the Dirt Say? An Analysis of Soil Carbon on Meredith College's Campus
Mikayla Watts and Sarah Page

MORNING ORAL PRESENTATION SESSIONS

Architecture and Design Science and Math Building (SMB) 118

- 9:30 – 9:40 a.m. *Push & Pull: Society's Obsession with Minimal and Maximal Design*
Bridget Gable
- 9:45 – 9:55 a.m. *Beyond the Skyline: The Evolution, Design, and Legacy of Singapore's Urban Architecture*
Alexandria Rosenzweig
- 10 – 10:10 a.m. *Historic Preservation: A Dive into Sears Modern Homes*
Cienna Thompson
- 10:15 – 10:25 a.m. *An Analysis of Eames Design Philosophy for NICU Application*
Madison Potter
- 10:30 – 11:30 a.m. *Showcase: Intersections of Math and Art in Italy*
Safa Ahmed, Lauren Bisette, Emma Brooks, Denise Buhane-Bustos, Kaelyn Coleman, Mei Goodrich, Mei Li Moo King, Wanjiru Mambu, Alexis Moseley, Sarah Page, Jessica Tan

Business and Economics Science and Math Building (SMB) 162

- 9:30 – 9:40 a.m. *Impact Investing: A Performance Evaluation*
Riley Davison
- 9:45 – 9:55 a.m. *The U.S. Housing Market from 2000 through 2024: modeling and forecasting Southwestern home values using time series analysis techniques*
Mei Li Moo King
- 10 – 10:10 a.m. *Does Birth Order Affect Educational Attainment and Familial Relationships?*
Victoria Witmer
- 10:15 – 10:25 a.m. *Bilingual Skills of College Graduates: Does it matter for labor market outcomes?*
Sara Chung
- 10:30 – 10:40 a.m. *The Impact of the COVID-19 Pandemic on College Major and Career Decisions*
Mwende Mumo

**Social and Behavioral Science
Ledford (LED) 101**

- 9:30 – 9:40 a.m. *Barriers to On-Campus Counseling for Meredith College Students Experiencing Symptoms of Depression and Anxiety*
Alexandria Crank
- 9:45 – 9:55 a.m. *College Students' Access to and Effectiveness of Mentoring Relationships Across Different Fields of Study and Demographics*
Rayna Maleki
- 10 – 10:10 a.m. *Assessing Reproductive Mental Health Needs in the Raleigh-Durham Community*
Denley Sweeney

**Math and Science
Ledford (LED) 101**

- 10:15 – 10:25 a.m. *Applications of Elliptic Curves and Post Quantum Cryptography*
Emma Mazzola
- 10:30 – 10:40 a.m. *Using eDNA to detect invasive house mice in the field*
Callie Klein
- 10:45 – 10:55 a.m. *Using nonparametric statistical methods to analyze cotton data*
Stephanie Wairagu
- 11 – 11:10 a.m. *The Impact of Physical Activity on the Menstrual Cycle*
Megan George

**Music History
Carswell Hall**

- 9:30 – 9:40 a.m. *Fanny and Felix Mendelssohn: A Dynamically Musical Duo*
Azrielle Marino
- 9:45 – 9:55 a.m. *The Printing Press: A Lasting Impression on Music*
SaraElla Trustman
- 10 – 10:10 a.m. *Pansori*
Eunae Ji
- 10:15 – 10:25 a.m. *Tablature of The Renaissance*
Madison "Abby" Jones
- 10:30 – 10:40 a.m. *The Legacy of Antonio Stradivari's Instruments*
Anna Cochran

- 10:45 – 10:55 a.m. *The Evolution of Opera: The Role of the Castrato Tenor*
Audrey Hubbard
- 11 – 11:10 a.m. *Antonio Vivaldi*
Antonella Rosales

AFTERNOON CONFERENCE SESSIONS

AFTERNOON ORAL PRESENTATION SESSIONS

Music History Carswell Hall

- 1:45 – 1:55 p.m. *History of Solfege*
Joy McCreary
- 2 – 2:10 p.m. *The Inner Workings of an Organ*
Eliandras Sims
- 2:15 – 2:25 p.m. *Sonata: The Foundation of Classical Music*
Aliyana Campbell
- 2:30 – 2:40 p.m. *The Life and Work of Francesca Caccini*
Angel Kelley
- 2:45 – 2:55 p.m. *Political Commentary in Mozart's The Marriage of Figaro*
Alaire Donofrio
- 3 – 3:10 p.m. *Élisabeth-Claude Jacquet de la Guerre: The French Prodigy*
Jasmin Brown
- 3:15 – 3:25 p.m. *Joseph Haydn and His Relationship with the Esterhazy Family*
Cynthia Styron Sanchez
- 3:30 – 3:40 p.m. *The Spectrum of Jamaican Music*
Hannah Bomar
- 3:45 – 3:55 p.m. *Music in Ancient Israel*
Megan Spence

Education Ledford (LED) 101

- 1:45 – 1:55 p.m. *The Effects of Using the TWA Strategy to Improve Reading Comprehension*
Abby Dittmann
- 2 – 2:10 p.m. *Using Student Writing Samples to Understand the Impact of Curriculum*
Sara Perry

- 2:15 – 2:25 p.m. *Effects of Stress on Teachers' Wellbeing*
Emily Osborne
- 2:30 – 2:40 p.m. *Learning is not a Spectator Sport*
Carly Davis
- 2:45 – 2:55 p.m. *Nonconventional Communication Patterns in Children: Current Understandings and Training for Future Educators*
Grace Devlin
- 3 – 3:10 p.m. *Examining Teaching Practices in General Education Classrooms that have a High Percentage of AIG students*
Savannah Smoak

**Female Identity in Art and Literature
Science and Math Building (SMB) 118**

- 2 – 2:10 p.m. *When a Woman Takes Power*
Trinity Casey
- 2:15 – 2:25 p.m. *Northanger Abbey: Traditional and Subversive Gender Roles in Jane Austen's Life and Fiction*
Tamara Bomparte
- 2:30 – 2:40 p.m. *In Her Castle: The Integration of Bifurcated Identities in We Have Always Lived in the Castle*
Chanelle A. Bergeron
- 2:45 – 2:55 p.m. *Looking in the Links: Peering into the Unknown with Prose*
Chanelle Bergeron

**Politics and Gender
Science and Math Building (SMB) 162**

- 2:15 – 2:25 p.m. *Evangelicalism in Abortion Policy*
Charlie Hatch
- 2:30 – 2:40 p.m. *Transgender Hate Crimes and Hate Crime Policies: The Effect of Policy on Rates of Transgender Hate Crimes at the State Level*
Mae Lloyd

**AFTERNOON POSTER PRESENTATIONS
Carlyle Campbell Library**

- 3:00 – 3:45 p.m. *Association between pre-delivery low hemoglobin and postpartum acute care utilization – North Carolina, 2018-2021*
Katharine "Kayla" Bruce

An Evaluation of the Inclusiveness of School Playgrounds
Kristin Burroughs

Takarazuka Revue: A Brief Overview
Jalyn Crafton

The Relationship Between Self-Reported Levels of Anxiety and the Quality of Interpersonal Relationships Among Young Adults Age 18-25
Freya Dahlgren

Impact of Meredith Autism Program (MAP) on Career Trajectory of Practicum Students
Peyton Farmer

Relational Red Flags and Green Flags and the Behaviors Behind Them
Caroline Garland, Morgan Maddocks, Meredith Ezzelle, Hannah Brittain-DuBois, Ashleigh Millinder, Sarah Moore, Chapel Bartee, and Kristina Cardenas

The CO-OP Approach for Youth in Inpatient Mental Healthcare Settings
Katherine Grayson

Analyzing Factors That Contribute to Food Insecurity Among the Elderly Population in the United States
Ryan Payne

Raised in the System: The Influence of Exit Pathway on the Route to Justice Involvement
Rachel Walker

The Impact of Gaming Communities on Adults' Mental Health
Jay Williams

Does Foster Care Influence the Risk of Teenage Pregnancy?
Kayla Williams, Thomas Clifton, and Destiny Ferreira

A Comparison of Stress levels Between Parents of Neurotypical Children, and Children with Autism Spectrum Disorder
Carley Williams

Status of Girls in North Carolina, 2023
Hayden Howlett, Malak Haraish, and Hannah Tarkelly

ABSTRACTS OF PRESENTATIONS

THE TWENTY-FIRST ANNUAL MEREDITH COLLEGE UNDERGRADUATE RESEARCH CONFERENCE, 2023

Protein of Unknown Function: An Analysis of the Techniques & Procedures Necessary for Identification

Ryeon Airall

*Research Adviser: Dr. Andrea Carter;
Chemistry, Physics, and Geoscience*

In recent decades, computational biology has played an integral role in advancing pharmaceutical engineering and biotechnology. This field of biology has generated a mosaic of complex algorithms capable of predicting a query sequence's folding or biochemical function by detecting its homology. All of these have their unique methods of comparison, precision, and limitations, resulting in scientists using multiple computational methods to increase the accuracy of their results. The aim of this experiment is to use in silico analysis, a multi-algorithmic approach proposed by Dr. Paul Craig Ph.D. and his team at RIT, to determine the biochemical role of a protein with an unknown function. To assist in this effort, four computational programs will be used: BLAST, InterPro, Dali, and SPRITE. The former two are sequence-based algorithms, which take an evolutionary approach by comparing variations in amino acid sequences and detecting the presence of conserved residues between proteins with similar functions. The latter two are structural-based algorithms that compare the alignment of the protein's backbone and structure of its catalytic site to proteins with similar homology. The hope is that this combination of algorithms will increase the precision and reliability of future results when determining the biochemical role of a protein of unknown function. Preliminary results for using this analysis with a particular protein will be presented.

Using History to Drive Family and Consumer Sciences Education Forward: Assessing Teacher Recruitment and Retention

Gianna Alicea-Rochelle

*Research Adviser: Dr. Chastity Johnson;
Human Environmental Sciences*

A review of literature was conducted on teacher recruitment and retention within Family and Consumer Sciences (FCS) Education. The Family and Consumer Sciences Body of Knowledge was used to support the findings of the literature review. Common themes in the literature were identified and analyzed. The review explores the following themes: a numerical decline in FCS teachers, a decrease in FCS teacher preparation programs, and a lack of knowledge surrounding the FCS Body of Knowledge. An exploration of the history of FCS was used to provide suggestions for new approaches to teacher retention and the future of FCS Education.

Looking in the Links: Peering into the Unknown with Prose

Chanelle Bergeron

Research Adviser: Dr. Jayme Ringleb; English

"Every separation is a link."

— Yanara Friedland, "Groundswell"

Throughout my life, the story of my grandmother's life has been told over and over again in my family. The mythos surrounding my grandmother is a strange and obscured origin story, one that even during the days leading up to her death in the summer of 2021 was being told without a sense of resolution. What haunted my grandmother also haunts me: who is my grandmother, where do the roots of our family tree lead, and how has this ambiguity left its mark not only upon my grandmother,

but upon her own children and grandchildren? Moreover, can any of these fragmented pieces be brought together again to offer a sense of resolution, to create a link where there have only been gaps and separations? These questions, amongst others, led to the birth of this creative project. Through my work researching and writing, I have attempted to collect and offer answers to my looming questions through writing an experimental creative manuscript. This project has been taking shape for the past two years and has resulted in the formation of an auto-fictional manuscript rich with hybridity: poetry, prose, biography, memoir, and fiction all melded into one. Though incomplete, the vision is to create a novel or novella length work—a place where my grandmother's mythology can reside and be shared, and the questions which have surrounded her life may find their answers, or at the very least, find their place to rest.

In Her Castle: The Integration of Bifurcated Identities in *We Have Always Lived in the Castle*

Chanelle A. Bergeron

Research Adviser: Dr. Laura Fine; English

More than the poisonings and the deaths and the fire in Shirley Jackson's 1962 novel, *We Have Always Lived in the Castle*, we might instead view this story as one that is about a unification process. Not only is it a unification for the two main characters in this novel, Merricat and Constance, but it may also be read as a unification for Jackson herself, who was long known to have felt a definitive chasm in how she identified in life. There are many ways to read *Castle*, and it is easiest to read it on the surface: a mystery story bordering on fairy tale about a seemingly deranged young woman who kills her family, burns down the house, and sequesters her beautiful older sister in the charred remains like a dragon would his treasure. But that is only the surface and the aim of this thesis is to present the deeper threads within the novel. In truth, *Castle* is much more than the action

that happens within it. Rather, this is a novel about Jackson herself, one that ends with a resolution. That resolution is in claiming her bifurcated identities, thereby creating a unification of them, of herself, at the novel's end.

Impact of Exercise Duration and Frequency on Body Composition In Clinical Health Populations

Abby Black

Research Adviser: Dr. Heather Sanderson; Nutrition, Health and Human Performance

The American College of Sports Medicine, ACSM, sets the standard recommendation guidelines for physical activity frequency and duration for all populations, including clinical health populations. However, ACSM recommendations may be unachievable for a clinical population due to health conditions or pharmacological side effects, limited access to physical activity, time or other factors. Thus, the purpose of the study is to analyze the impact of a reduced duration and frequency of exercise on body composition in clinical health populations. Fifteen participants completed an 8-week clinical exercise program training twice a week of 50 minute sessions, totaling 100 minutes of physical activity per week. Body composition test using a Bod Pod was performed pre and post program to measure fat mass and fat-free mass percentages. While no statistically significant changes were concluded from the data, there was a slight decrease in fat mass percentage and slight increase in fat-free mass percentage which may be due to the length of the exercise program. This study contributes to further understanding of exercise duration and frequency impacts on body composition in clinical health populations, a topic that is in need of further research.

The Spectrum of Jamaican Music

Hannah Bomar

Research Adviser: Dr. Jean Wozencraft-Ornellas; Music

Jamaican music has its origins in a combination of the culture of African slaves and European colonizers. I am doing research on the instruments, styles, and musical forms used in Jamaican music, as well as the music's history. This presentation will discuss how Jamaicans use music in their daily lives and culture. I'll talk about how European colonialism affected Jamaican music and how the local people created their own music independent of European influence. We have already studied the effect that colonizers and African slaves have had on other regions' music. This presentation will introduce the listener to the origins of modern Jamaican music through the influence of indigenous cultures and explore the many different types of indigenous Jamaican music.

Northanger Abbey: Traditional and Subversive Gender Roles in Jane Austen's Life and Fiction

Tamara Bomparte

Research Adviser: Dr. Robin Colby; English

Jane Austen's posthumous novel *Northanger Abbey* (1817) is a Gothic parody following Catherine Morland as she grows from naïveté to maturity and navigates gender relations in her society. As a 23-year-old woman writing this novel at the turn of the century, Austen herself was subjected to the gendered social limitations that her own characters experience. Although the social role of women in the early 1800s was limited to domestic duties and submission to the authority of male figures in their lives, Austen challenges these traditional expectations with her characterization of Catherine as a bold young woman who is unafraid to speak her mind. As Catherine departs from traditional expectations for women, so does Henry Tilney, the male protagonist, depart from traditional expectations for men. Rather than

writing the male and female characters in this novel to strictly adhere to the behaviors associated with their genders, Austen makes her characters more complex by mixing male and female qualities in individual identities. By studying the cast of characters, I aim to analyze the presentation of gender in various characters in *Northanger Abbey*, and argue that Austen's dynamic depictions of characters with a mix of gendered qualities supports a feminist reading of the novel.

Élisabeth-Claude Jacquet de la Guerre: The French Prodigy

Jasmin Brown

Research Adviser: Dr. Kent Lyman; Music

Élisabeth-Claude Jacquet de la Guerre (1665-1729) was a Parisian composer, harpsichordist, organist, and vocalist from the Baroque Era. She composed mostly chamber works with the exception of two stage works: a lost ballet and an opera, the latter believed to be the first opera written by a woman in France. Her father and both brothers were organists, and her elder sister played harpsichord or viol for the household of the Duchess of Guise. Coming from a family of musicians and instrument makers, Élisabeth was quickly labeled a child prodigy. At the age of five she was singing and performing on the harpsichord in the court of Louis XIV. In 1677 she was described as a wunderkind who could sight read difficult music, compose and play pieces in all keys that were requested, and accompany herself or others on the harpsichord. She retired from performing publicly in 1711. Her last known work, a piece celebrating the recovery of Louis XV from smallpox, was performed in 1721. Her life was filled with tremendous loss, immense joy, and overflowed with music. Despite her many musical accomplishments she is under-researched. This presentation will review the life and work of Elisabeth-Claude Jacquet de la Guerre, and highlight some of her more notable works.

Association between pre-delivery low hemoglobin and postpartum acute care utilization – North Carolina, 2018-2021

Katherine "Kayla" Bruce

Research Adviser: Dr. Megan Serr; Biological Sciences

The objective of this study was to evaluate whether pre-delivery hemoglobin (HGB) during childbirth hospitalization was associated with postpartum acute care use (ACU). For our study design, we conducted a retrospective cohort study of patients giving birth at a quaternary care hospital from January 2018 through June 2021. Data were extracted from electronic health records. Pre-delivery HGB was categorized on a scale ranging from 9 to 12+ g/dL. ACU was defined as a visit to obstetric triage, emergency department or inpatient admission within 90 days postpartum. We used generalized estimating equations to quantify the association between pre-delivery HGB and ACU. We created an unadjusted model of the crude association between HGB and ACU, and an adjusted model using directed acyclic graphs. Among 8,677 pregnancies, 1,467 (16.9%) utilized acute care within 90 days postpartum. In crude models, those with predelivery HGB <9 had twice the risk of postpartum ACU compared to those with HGB 12+, with a decrease in risk for each increase in HGB category. The adjusted model showed the same overall trend but with lower effect estimates. In conclusion, low pre-delivery HGB is associated with increased postpartum acute care use. Low pre-delivery HGB could signal to providers that additional follow up and care planning during inpatient stay are warranted. Because HGB is assessed during Labor & Delivery admission, this indicator may be especially valuable for patients with limited prior engagement in healthcare and/or documentation of existing health conditions.

An Evaluation of the Inclusiveness of School Playgrounds

Kristin Burroughs

Research Adviser: Dr. Pamela Norcross; Human Environmental Sciences

Children with profound disabilities typically have a hard time interacting on a playground with their peers because of social or physical boundaries (Fernelius & Christensen, 2017). Children who are not able to independently move have an even more difficult time in outdoor play environments. While playgrounds may be defined as accessible for children with disabilities, that does not always mean they are inclusive for children who need assistance with mobility (i.e. wheelchair use), thus, preventing child directed and child centered play opportunities. This study, An Evaluation of the Inclusiveness of School Playgrounds, looks at the inclusiveness of elementary school playgrounds in Wake County, North Carolina, and if administrators are able to accurately assess their playground's inclusiveness. Twenty principals from around the county were invited to participate, along with a supplemental outdoor playspace checklist retrieved from the Americans with Disabilities Act (ADA). Results from this checklist found that inclusive playgrounds for elementary school-aged wheelchair users to have full access to all playground equipment in Wake County public elementary schools are nonexistent. Results from the principal questionnaire found that principals inaccurately assess the inclusiveness of the school's main playground. These findings accurately support the hypothesis that public school playgrounds will not be inclusive for children with disabilities, and that principals will inaccurately assess their inclusiveness.

Sonata: The Foundation of Classical Music

Aliyana Campbell

Research Adviser: Dr. Kent Lyman; Music

The sonata is the main form of composition in the classic era of music. A sonata is an instrumental piece of music made up of three or four smaller pieces called movements.

A sonata written for a solo instrument is named for said instrument, such as a "piano sonata" or "violin sonata." Meanwhile, a sonata written for a group of instruments is named for the number of instruments being played, such as a "duet," "trio," or "quartet." From the tempo of each movement to the themes presented in each movement, the structure of a sonata is very intricate. The three great composers of the Classical Era of music were Mozart, Haydn, and Beethoven, and they each have several sonatas credited to their name. This presentation will observe and dissect a few of their many works in order to explain the basic structure of a sonata and its importance to classical music.

When A Woman Takes Power

Trinity Casey

Research Adviser: Dr. Beth Mulvaney; Art

Open any survey textbook of western art and female nudes painted by male artists proliferate. Who were these women? Did they have any agency or ownership over their own bodies or narrative? Fast forward to women artists of the modern period and many of these artists challenge the narrative of the past to reclaim their bodies and tell their own stories rather than following the tired conventions of the past.

In my paper I explore the male gaze and its harm of perpetuating gender stereotypes and the idea of male power over female autonomy. I will focus on a collection of modern female artists who, because of their diverse histories, have told different stories than those of the past using novel approaches to the use of the female nude that breaks the cycle of female bodies without female voices. One such voice is Renee Cox whose photograph, *The Hot-En-Tot Venus*, ironically quotes the body of Saartjie Baartman, the original Hottentot Venus. Cox "appropriates" Baartman's body by using prosthetics that emulate the distinctive curves that Europeans used to label Baartman as an exotic curiosity for viewing pleasure and amusement. Cox defiantly calls out this history and seizes the agency stripped from Baartman

by making direct eye contact with the viewer. She, and other artists that I will discuss, take control of their own female nudity traditionally co-opted by the male artist's gaze and present powerful images that declare ownership of their own bodies and stories.

Bilingual Skills of College Graduates: Does it matter for labor market outcomes?

Sara Chung

Research Adviser: Dr. Anne York; Business

I am pursuing licensure to teach English as a Second Language courses and so I am interested in the career plans of multilingual students. Previous research has drawn inconclusive results on whether workers receive any labor market benefits from multilingual skills. To find out about the career plans of Meredith College's multilingual students, I deployed a survey from December 2022 to February 2023 and received the results from 37 participants. The most common languages that the students had fluency in were English and Spanish. Very few students were fluent in a third language. In asking about their career plans, I found that 62% of students are planning to use their language skills in the labor market. As expected, a majority, 75%, of those students plan to be in careers in which they would very likely communicate with clients or the general public, versus being in careers that are mostly working alone or with smaller groups of people. Nearly all students who plan to use their multilingual skills believe they will earn the same or more than coworkers who are not multilingual. Open-ended responses about how they plan to use their language skills in their careers shows that the students want to be able to help others. Society will benefit from more of us being able to communicate better with each other.

The Legacy of Antonio Stradivari's Instruments

Anna Cochran

Research Adviser: Dr. Kent Lyman; Music

Antonio Stradivari (1644-1737) was an Italian luthier, or a maker of stringed instruments such as violins or cellos. Stradivari was often known by the name "Stradivarius", though his real Italian name is "Stradivari". He made approximately 1,100 instruments during his career, including violins, cellos, harps, and guitars. About 650 of these instruments have survived to the present time. During the three centuries since Stradavari died in 1737, his instruments have become highly prized by the public and are some of the most expensive in the world.

This presentation will examine some of the drama surrounding Stradivarius and his instruments, including people that have falsely claimed to own a real Strad, people who have tried to pass off forgeries as authentic instruments, or those who have attempted high profile thefts of his instruments. In addition, there are many examples of talented musicians throughout history who have played Stradivarius instruments. This presentation will identify a few of those people, mention the instruments themselves, the musicians who have played them, and the impact they have had on music today.

Takarazuka Revue: A Brief Overview

Jalyn Crafton

Research Adviser: Dr. Steven Roten; Dance and Theatre

Theatre is an ever-changing art that takes many forms with different origins. This applies to Takarazuka Revue, a type of musical theatre from Hyogo Prefecture, Japan. Takarazuka (named after the city it originated in) is a glamorous and dream-like form of drama primarily known for its all-women cast. An all-women theater being researched by a student at an all-women's college is not a coincidence. "How does an all-female production work and how did it come to be?" These were just some

of the many questions I had when I pitched this research thesis and now, I would like to share my findings with those who are familiar with theatre and those who aren't. Lights up!

Barriers to On-Campus Counseling for Meredith College Students Experiencing Symptoms of Depression and Anxiety

Alexandria Crank

Research Adviser: Dr. Betty-Shannon Prevatt; Psychology and Social Work

Between a third and half of college students have been diagnosed with and/or are treated for a psychiatric disorder, but less than a third of college students utilize available mental health resources (Holtz et al., 2020; Shea et al., 2019; Tran & Silvestri-Elmore, 2021). Studies indicate that college students do not seek mental health treatment for a variety of reasons, including internal barriers, attitudes, and fear (Shea et al., 2019; Ebert et al., 2018). The purpose of the present study is to understand the unique barriers inhibiting Meredith Students from accessing counseling services available from the Meredith College Counseling Center. I hypothesize that symptoms of Generalized Anxiety Disorder, Major Depressive Disorder, demographic barriers, and internal attitudinal barriers will be risk factors to reduce the likelihood of using the Meredith College Counseling Center. Participants, all Meredith College students, will be recruited via convenience sampling to complete a 20 minute long online survey. The survey includes questions about demographics, personal perceptions, and mental health symptomatology. Regression analyses will determine the strongest predictors of use (or lack thereof) of the Counseling Center. While free mental health resources are available to Meredith students, these resources are often underused. By examining the factors that affect students' use of the Counseling Center, we can better understand how to make mental health services more accessible and thus more used by Meredith Students.

The Relationship Between Self-Reported Levels of Anxiety and the Quality of Interpersonal Relationships Among Young Adults Age 18-25

Freya Dahlgren

*Research Adviser: Dr. Mark O'Dekirk;
Psychology and Social Work*

Social networks have been shown to play a large role in support of interpersonal relationships (Shi, 2021). High anxiety levels can be detrimental to students' health and individuals' close interpersonal relationships can help buffer the impacts of mental illness. The goal of the study was to observe if there is a relationship between anxiety and the quality of interpersonal relationships among young adults aged 18-25. It was hypothesized that the greater quality of interpersonal relationships lowers anxiety levels in young adults. There were 231 participants for the Inventory of Depression and Anxiety Symptoms (Adapted; Table A), Quality of Relationships Inventory (Friends; Table A), and a Parent Adult-Child Relationship Questionnaire (Table A) and 198 participants for the Lifespan Sibling Relationship Scale (Table A). The correlation between anxiety and the quality of friendship was positive and statistically significant ($r = .233, p < .01$; Table B). The correlation between anxiety and the quality of the relationship with parents was positive and statistically significant ($r = .155, p < .05$; Table B). The correlation between anxiety and the quality of relationships with siblings was positive and not statistically significant ($r = .029, p > .05$; Table B). Higher levels of anxiety were associated with greater parental relationship quality and friendship quality, which contradicted the hypothesis. One potential explanation could be that individuals with higher anxiety may seek out parental and friend relationships as a means of support leading to higher perceived quality of the relationship.

Learning is Not A Spectator Sport

Carly Davis

Research Adviser: Dr. Cecilia Toole; Education

This project will examine the differences observed in student engagement when using flexible seating, technology, working in groups, or independent work. I have first defined engagement in the classroom as students being enthusiastic, curious, optimistic, motivated, and interested in what they are learning. I will use my instrument to observe if students can complete an assignment in the different student engagement ways. I will observe this by watching students in the different areas such as flexible seating, technology, working in groups, or independent work and seeing if they can complete an assignment in these areas. I will watch students several different times in these different areas and collect data for how students are best engaged in classrooms. I will be sharing my findings through an oral presentation.

Impact Investing: A Performance Evaluation

Riley Davidson

Research Adviser: Dr. Bing Yu; Business

Impact investing is a new strategy that has caught the attention of many investors within the past decade. This investment strategy takes the environmental and social impact of the investment into consideration, along with the risk and return. Since impact investing also focuses on impact, many investors have concerns about the performance of this strategy. This study sought to compare the performance of a portfolio created using the impact investing strategy with the performance of the stock market index. Using portfolio analysis and optimization techniques, I found that the portfolio using impact investing outperformed the stock market index. The results of this study may encourage investors to look further into the impact investing strategy, knowing that their investment can also make a positive impact on the environmental and social areas, in addition to achieving the financial return.

Nonconventional Communication Patterns in Children: Current Understandings and Training for Future Educators

Grace Devlin

*Research Adviser: Dr. Gwynn Morris;
Psychology and Social Work*

Educators are members of children's lives that play a pivotal role in their socioemotional and neurological development. Children spend a significant portion of their day under the supervision of educators. Thus, all educators must understand the communication patterns used by children. Childhood communication can be challenging to interpret, especially when unconventional patterns are present. Delayed echolalia, manding, and tacting are three nonconventional communication patterns among neurodivergent children. An experiment utilizing pre and post-test measures was implemented to investigate both the current understanding of nonconventional communication patterns amongst future educators (N=31) and whether this understanding could be increased with a brief virtual self-paced training. A paired-sample T-test showed a statistically significant increase from the pre-test (M= 5.38, SD= 2.56) to the post-test (M=8.73, SD=1.90), $t(30) = -6.47, p = .001$. The study's results demonstrated the training program effectively improved understanding of nonconventional communication patterns, which could result in a better educational experience for educators and children.

The Effects of Using the TWA Strategy to Improve Reading Comprehension

Abby Dittmann

*Research Adviser: Dr. Abby Ampuja;
Education*

The National Assessment of Educational Progress (NAEP) is a measure of student achievement at national, state, and district levels. Often referred to as the Nation's report card, we can learn a lot about how students are performing from this data. When examining North Carolina's reading and

writing results for 2022 compared to 2019, student scores have been on the decline. This is not a trend that we want to continue in our classrooms. When using content-based reading passages, students can practice both reading and writing skills, giving them more time with both of these subjects and leading to more experienced readers and writers. In this study, the TWA (Think before reading, think While reading, think After reading) strategy was examined and used in order to improve the comprehension of students who struggle with content-based reading comprehension. By completing a series of lessons with a set of two students, both fifth graders, following the TWA model, it will be seen if this is an effective strategy to improve reading to learn comprehension. The lessons include introducing the strategy, modeling the strategy, peer and group practice, and independent usage of the strategy in order for the student to feel comfortable using this model. After the series of lessons are completed, the students are expected to be able to better learn from, and understand content-based texts in order for the teacher to be able to utilize textbooks, readings, and articles in their classroom without hesitation. These lessons also aim to improve the students' confidence in reading, their ability to understand what they are reading, and in turn, write about what they are reading.

Political Commentary in Mozart's *The Marriage of Figaro*

Alaire Donofrio

Research Adviser: Dr. Kent Lyman; Music

Preceding the French Revolution, Mozart's *The Marriage of Figaro* (1786) commented on social inequities of the time and stirred controversy surrounding growing class tensions between the aristocracy of France and the lower class. The opera was banned in numerous cities for a short time, however, the comedic opera continues to inspire the hearts of audiences the same way it did at its opening with its lighthearted and humorous

writing, paving the way for the usage of political satire in opera for future composers centuries to come.

Synthesis of Carbazole-Based Dye to Power a Solar Cell

Katherine Erb and Aiman Jamadar
*Research Adviser: Dr. Alexandra Ormond;
Chemistry, Physics, and Geoscience*

In recent decades, concerns over the use of fossil fuels as a source of energy, both because of limited availability and the political and environmental ramifications, have increased interest in finding alternative sources. Solar panels, which use energy from the sun to generate electricity, are increasing in popularity, but they are still inefficient and expensive to install, and there are also some concerns about the environmental impact of their construction. Solar cells using dyes synthesized from metal-free organic compounds such as carbazole are a promising solution because they do not require ruthenium, which is expensive and a limited resource, and they may increase efficiency due to their strong light-collecting properties.

Our research focuses on the synthesis of a high-yield and pure sample of carbazole dye in order to test its efficiency and functionality in a solar cell. We will use common chemical laboratory techniques such as column chromatography, refluxing, rotovapping, and thin-layer chromatography to synthesize and purify the dye, and then use the dye to assemble a solar cell. We will first perfect our construction of a solar cell made using the dye from a blackberry. The completed solar cells should be able to convert light energy into electricity, as measured by a multimeter, similar to what is found in literature. Our results will determine whether solar cells made using carbazole dye are feasible fuel alternatives and direct future research in the synthesis and modification of solar cells made with metal-free organic dyes.

Impact of Meredith Autism Program (MAP) on Career Trajectory of Practicum Students

Peyton Farmer
*Research Adviser Dr. Mark O'Dekirk;
Psychology and Social Work*

Practicum experiences allow students the opportunities to gain increased self-efficacy and perceived career readiness (Johnson et al., 2017). Many students gain valuable skills necessary for their career and are influenced by the experiences allotted to them through practicum opportunities (Selmon et al., 2020). Students working with individuals with developmental disabilities in a practicum setting are given firsthand insight in motivating factors that lead to accepting a job in the corresponding field (Marozas & May, 1980). Meredith Autism Program (MAP) allows undergraduate students to take a maximum of three practicum-tailored courses working with a child diagnosed with autism. This program involves significant firsthand training and weekly hours of onsite commitment along with an asynchronous course learning about the fundamentals of Applied Behavior Analysis (ABA). The goal for this study was to collect data to see the impact that MAP has on undergraduate students and their perceived career trajectory. Preliminary data has been collected, but the analysis is ongoing and comparison data will be collected following the students' practicum experience.

Push & Pull: Society's Obsession with Minimal and Maximal Design

Bridget Gable
Research Adviser: Dr. Dana Lovelace; Art

Graphic design has always been a battlefield, a game of tug-and-war between extreme styles. From the 1920's opulent and ornate Art Nouveau to the geometric International Typographic of the 1950's, design can be broken down into a battle of minimalism versus maximalism. Minimalists argue that 'less is more', that the clean aesthetics of Brutalism and Industrialism morally outweigh the concept of clutter. Maximalists rebuke that

collections of colors, shapes, and tiny details provide personality, meaning, and the rejection of conformity. This push and pull can be found in trends across multiple parts of American culture— food, fashion, interior design, and art.

Over the decades, the trends in graphic design adapt to societal change, reacting to real-world events with minimal or maximal design in order to create change and escapism. The effects can range from minor to ground-breaking, changing how people consume and create. However, this pendulum can swing too far. My research proves that extreme minimalism or maximalism is a result of traumatic world events, each style used as a weapon or an escape.

Relational Red Flags and Green Flags and the Behaviors Behind Them

Caroline Garland, Morgan Maddocks, Meredith Ezzelle, Hannah Brittain-DuBois, Ashleigh Millinder, Sarah Moore, Chapel Bartee, and Kristina Cardenas

Research Adviser: Dr. Carla Ross; Communication

As relationships are vital to the wellbeing of an individual, it is crucial that we recognize the behaviors responsible for maintaining healthy relationships. Being able to identify the positive behaviors and potentially unhealthy behaviors is challenging for many individuals. We pose a question, inquiring about the most commonly identified communicative behavioral indicators of both healthy and unhealthy relationships. Gathering, organizing, and interpreting scholarly information, our team has compiled a list of both healthy and unhealthy behavioral aspects, referred to as "red" and "green" flags. Regarding elements such as emotional intelligence, equality, control, and insensitivity. We have established educational materials to provide individuals the opportunity to become more aware of unhealthy and healthy indicators in relationships.

The Impact of Physical Activity on the Menstrual Cycle

Megan George

Research Adviser: Dr. Sharon Malley; Nutrition, Health and Human Performance

Research has found a correlation between physical activity and menstrual irregularities, especially for high-level athletes. This study examined the impact frequency, intensity, and duration of physical activity had on the menstrual cycle in active individuals. Study participants included active individuals ranging from those in beginner-level PED classes to collegiate athletes. The participants were asked about their physical activity habits and their menstrual cycle via a questionnaire. Results from the study have shown that there may be a correlation between physical activity levels and menstrual cycle irregularities. Confounding variables included participants' diets, body fat percentages, BMIs, and current medications. All of these variables can also affect the menstrual cycle, and further inquiry about these subjects would be needed to fully determine if there was a direct relationship between physical activity levels and menstrual cycle irregularities.

The CO-OP Approach for Youth in Inpatient Mental Healthcare Settings

Katherine Grayson

Research Adviser: Dr. Mark O'Dekirk; Psychology and Social Work

The Cognitive Orientation to daily Occupational Performance (CO-OP) Approach is a method primarily used in occupational and physical therapy and was designed to treat Developmental Coordination Disorder in children. The approach has since been applied to people with a number of conditions including traumatic brain injury, cerebral palsy, and Asperger's syndrome (e.g., Dawson et al., 2009; Öhrvall, Bergqvist, Hofgren & Peny-Dahlstrand, 2020; Rodger & Brandenburg, 2009). The CO-OP Approach is highly structured and follows the pattern of Michenbaum's "Goal, Plan, Do, Check."

It is often administered in 10 sessions. The therapist provides guidance throughout the process. Family involvement is also a key feature. Previous research has shown generalization and transfer of skills as well as increases in markers of wellbeing, such as self-efficacy (e.g., Houldin, McEwen, Howell & Polatajko, 2018; Öhrvall, Bergqvist, Hofgren & Peny-Dahlstrand, 2020). The CO-OP Approach has been applied in limited cases to adolescent inpatient behavioral health treatment, but no research has been published as of this date. The approach is theoretically applicable to this population in part because of the variety of goals that can be met, the time-limited nature of the therapy, and the positive psychological effects that have been reported in studies for other conditions.

The purpose of the present study was to establish the foundation for further study of this approach in mental health treatment by exploring how the CO-OP Approach is currently being applied in youth inpatient mental healthcare settings. The perspectives of practitioners were shared through qualitative informational interviews. The study utilized two themed interviews, completed via email, investigating practitioner experience, billing, and documentation. A previously unpublished case study investigating the effectiveness of the program was also explored.

Evangelicalism in Abortion Policy

Charlie Hatch

Research Adviser: Dr. Whitney Manzo; History, Political Science, and International Studies

Thomas Jefferson's Letter to the Danbury Baptists encouraged the separation of the Church and State. He pictured a government whose representatives put their religious views aside for the betterment of the United States citizens when implementing laws and policies. However, since Ronald Reagan's gubernatorial term, Evangelicals have been strategizing to ban abortion across the United States. The

overturning of Roe v. Wade (1973) and data from the Meredith Poll demonstrate how Evangelical Christianity has influenced public opinion on abortion over time and how it has resulted in abortion bans across the United States.

I used the data from Meredith Poll's Fall 2022 online survey following the overturning of Roe v. Wade (1973). The poll asked respondents a variety of questions concerning their opinions on access to abortion as well as contraception. Additionally, demographic questions asked what faith respondents practiced. For those who practiced a sect of Christianity (Catholic, Protestant, Orthodox, Mormon), respondents were asked if they considered themselves "born again" or "evangelical." I found that Protestant non-Evangelical women were among the majority of those who favored conservative approaches to abortion law. Those who supported strict abortion bans were overwhelmingly Evangelical. The results from the Meredith Poll show that there is a positive correlation between Protestant Evangelicals and their opinions on abortion which then affect who and what they vote for. By understanding these results, it can be understood how much religion has an impact on laws in a country that is supposed to have a separation of church and state.

The Evolution of Opera: The Role of the Castrato Tenor

Audrey Hubbard

Research Adviser: Dr. Kent Lyman; Music

Opera has been one of the most influential and important musical genres, and its origins can be traced back to the early 1600s in Italy. While there were women who sang on stage, certain males were employed to sing the roles of women characters. To find men who could sing these roles, many choir directors would scout out young boys with great musical talent, and they would have the boys castrated before puberty. This left the boys singing as sopranos even into adulthood, and a name

was given to this particular kind of male, the castrato (castrati pl.) tenor.

Many males were able to achieve great fame by singing castrato roles. Castrati have had a prominent role in the musical world, well even into the mid to late 1800s. The practice gradually stopped, but the last known castrato survived into the early twentieth century, and there are recordings of him singing. Now men called countertenors are taught to use falsetto techniques to sing the soprano range. While castrati are not seen in opera, there are similar practices that continue, such as steroids for athletes, or hormone treatments and surgical alterations.

This presentation will examine the history of the castrato tenor, some of the most notable figures within this tradition, and the impact that they have had on the literature and development of opera and vocal technique.

Identification of Unknown Protein 1YZ1 Using Analytical Methods

Aiman Jamadar

Research Adviser: Dr. Andrea Carter; Chemistry, Physics, and Geoscience

Understanding the function of unknown proteins can greatly expand knowledge about various cellular processes. Currently, while much of the genome has been sequenced, there is still much to learn about what it actually encodes. This study investigated the protein 1YZ1, a protein sequence from the Protein Data Bank (PDB), to determine the function by analyzing the structure and sequence using various online software. BASIL modules were used to perform the analysis and each set of results uncovered something new about the identity of 1YZ1. BLAST was used to compare the amino acid sequence to those of other proteins, followed by Pfam to categorize what protein family to which this sequence was most similar. Dali compared the crystal structure of the protein with the structure of known proteins. Z-scores, RMSD values, and sequence ID percentages were

used to make this identification. Subsequently, SPRITE was used to determine the potential catalytic/active sites of this protein that may also overlap with other known proteins. Chimera was used as the primary visualization software throughout this process.

Pfam and BLAST indicated that 1YZ1 belonged to the Transitionally Controlled Tumor Protein (TCTP) Superfamily. All associated structures found through Dali also confirmed that other structures within the TCTP superfamily resemble 1YZ1. SPRITE results were inconsistent in determining an active site, so it was concluded that 1YZ1 is not an enzyme; rather, it is a key structural protein associated with tumor control.

Pansori

Eunae Ji

Research Adviser: Dr. Kent Lyman; Music

Pansori, or Korean folk opera, is a compound word made up of two shorter Korean words. The first part, "pan" means "a place where many people gather" or "situation and scene." The second part, "sori" means sound. This presentation will examine some of the similarities and differences between Pansori and Western opera.

They were both created in the 17th century. Western opera contains recitative, which is a form of singing that is speech-like. Pansori has "aniri" which refers to "saseol," or speaking in everyday tones without depending on rhythm or melody. (Jung, "Aniri").

Western opera contains the aria, which is usually performed after a recitative and is more like a song, with a definite tempo and meter, and a rhymed text. Pansori has chang, which means "sing" and is usually performed after aniri. Pansori takes turns with aniri and chang to make the performance comprehensible to the story and enjoyable to watch.

There are differences between Pansori and Western opera, particularly in the style of vocal production. Western opera values the production of clear vocal sounds and

articulation of the words. Pansori often uses a rough and turbid vocal style that would be considered inappropriate in Western opera.

These and other similarities and differences between Pansori and Western opera will be the focus of this presentation.

Tablature of the Renaissance

Madison "Abby" Jones

Research Adviser: Dr. Kent Lyman; Music

From the Renaissance period until the present day, lute, guitar and other stringed instruments have relied on a musical notational system known as tablature. This presentation will explore three historical methods of tablature: Italian, French, and German. During this presentation images of these methods of tablature will be provided illustrating how each method can be read. Comparisons will be made to identify the many similarities and differences between these historical methods. Tablature is an ever-evolving tool that was used for stringed instruments during the Renaissance period and is an important part of the evolution of modern tablature. This presentation will introduce this unique form of reading music with detailed explanations on how tablature has evolved and how it is used today. Modern tablature is especially important to guitarists because tablature is the main musical notation system that a guitarist reads. Having an understanding of tablature is beneficial to those who wish to learn about guitar, as well as many other stringed instruments.

The Life and Work of Francesca Caccini

Angel Kelley

Research Adviser: Dr. Kent Lyman; Music

Francesca Caccini (1578-1641) was the oldest daughter of the composer Giulio Caccini, one of the early innovators in the field of opera. Like her father, Francesca Caccini became a composer of opera and is the first woman known to compose in that genre. She was surrounded by music throughout her life,

receiving training as a singer and on several different instruments. In 1618, she published a collection of songs entitled *Il primo libro delle musiche* (The First Music Book), which strengthened her reputation as a composer and a musician of some influence in Italy. In 1625, she composed her only opera that has survived: *La liberazione di Ruggiero dall'isola d'Alcina* (The Liberation of Ruggiero from the Island of Alcina).

This presentation will examine her life and a selection of her principal works, which have only recently received greater recognition thanks to research into the history of women in music.

Using eDNA to detect invasive house mice in the field

Callie Klein and Sophia Bogan

Research Adviser: Dr. Megan Serr; Biological Sciences

Invasive house mice (*Mus musculus*) are a concern, especially on islands. The ability to detect mice on islands is important, most notably in the efforts to determine the effectiveness of recent eradication efforts. In collaboration with others, we developed an experimental design to monitor the persistence of environmental DNA (eDNA) in outdoor enclosures to try and detect the presence of mice. A similar experiment was previously completed in a controlled laboratory setting. Our experiment employed the use of wild house mice that were introduced to a field site located in Raleigh, North Carolina. This modified field experiment utilized eleven trapped mice that were distributed among six 16'x20' enclosures for a period of one week. Swabbing for eDNA occurred before, during, and after the mice were removed. To collect eDNA, we swabbed daily for: soil, water containers, feeders, and burrows within the enclosures. After one month of daily swabbing, we moved to a weekly data collection schedule. The swabs are scheduled to be analyzed through quantitative polymerase chain reaction (qPCR). Although

the results of our experiment have yet to be analyzed, the aforementioned laboratory experiments did detect eDNA on all substrates one month after the mice were removed. Based on these results, we hypothesize that eDNA will be detectable in our field enclosures as well in small amounts. Our goal is to apply this research in order to detect the presence of invasive house mice on islands in the future.

A Mini-Review of N, N-dimethyltryptamine

Jordan Lamont

*Research Adviser: Dr. Andrea Carter;
Biological Sciences*

N,N-dimethyltryptamine (DMT) is a substance that is naturally produced in the human body as well as being found in other animals and even plants. DMT is a neurotransmitter derived from the amino acid Tryptophan. Exogenous DMT has been known to cause hallucinations and can be taken in multiple ways including ingestion of plant leaves, teas, and intramuscular injections; this compound had been used in religious ceremonies because of this. This review aims to give a brief history of DMT as well as cover its biosynthesis, commercial synthesis, and review novel studies pertaining to it, including what endogenous DMT's possible functions are as well as its relationship with stress and the positive symptoms of psychosis all while providing critique of the literature alongside the findings.

Transgender Hate Crimes and Hate Crime Policies: The Effect of Policy on Rates of Transgender Hate Crimes at the State Level

Mae Lloyd

Research Adviser: Dr. Kris Macomber; Sociology and Criminology

Transgender hate crimes are crimes committed motivated by the real or perceived gender identity of an individual. Based on analysis of data on state political ideology, hate crime legislation, and gender identity hate

crimes, this article examines the relationship between state political leaning and the structure of hate crime legislation with the rates of transgender hate crimes. It highlights the influence of political ideology on the inclusion of statutes in hate crime legislation, and compares the structure of hate crime legislation by state to the rates of transgender hate crimes in that state.

College Students' Access to and Effectiveness of Mentoring Relationships Across Different Fields of Study and Demographics

Rayna Maleki

*Research Adviser: Dr. Candalyn Rade;
Psychology and Social Work*

College students benefit from mentoring relationships with outcomes of increased academic achievement, better mental well-being, and higher levels of motivation (Herd et al., 2016; Aprechino et al., 2020). It is imperative that first generation college (FGC) students, minority students, and science, technology, engineering, and math students have access to effective mentoring relationships as protective factors throughout their undergraduate studies to mitigate academic challenges and psychological risk factors added due to their identity or rigorous field of study (Campbell & Campbell, 1997; Wang, 2012). The present study seeks to evaluate students' access to and effectiveness of mentoring at a small, liberal arts institution. A sample of undergraduate students at Meredith College were recruited to participate in a survey of demographic information and accounts of mentoring experiences and relationships. Results showed that minority students reported less access to mentoring as compared to non-minority students, while effectiveness of existing mentoring relationships did not differ for those of differing racial backgrounds. Access to and effectiveness of mentoring was not significantly different between FGC and non-FGC students. Perceived effectiveness of mentorship significantly differed across

fields of study. Results from this study serve as validation for mentoring practices at Meredith College and as guidance to help faculty and staff as they identify and work to close gaps in the educational experience. Further research should include replicating research on outcomes of mentoring, studying mentoring at larger institutions, and examining the prevalence and effectiveness of minority students seeking out minority faculty as mentors (Fries-Britt & Snider, 2015).

Fanny and Felix Mendelssohn: A Dynamically Musical Duo

Azrielle Marino

Research Adviser: Dr. Kent Lyman; Music

Felix Mendelssohn is considered one of the greatest Romantic composers. His musical talent was recognized when he was a child, and he was given music education under some of the musical greats. Mendelssohn wrote many sonatas, lieder, and piano music throughout his life, and his expressive style was influenced by Beethoven but infused with his own personal style. However, Mendelssohn was not alone—his older sister Fanny was given the same education, wrote many piano and vocal works, and developed her style that was strongly influenced by Beethoven.

Felix and Fanny were four years apart in age, but died within six months of each other. Critics attempted to turn them against each other in the centuries after their deaths, claiming that the siblings were in competition. In fact, the siblings supported each other in their musical endeavors, and served as inspiration for the other's music. Fanny published many of her works under Felix's name. She also wrote the Easter Sonata that was misattributed to her brother, for she had signed it "F. Mendelssohn." Unfortunately, in Fanny's time, publishing under a man's name was the only way for women to get their work published, as women were considered performers, not composers. However, Felix was supportive, and worked to get her works published under her name. This presentation will examine how the Mendelssohns were

close-knit composers, and how they supported each other throughout their musical careers.

Examining How Instructional Strategies in Music Applications of Elliptic Curves and Post Quantum Cryptography

Emma Mazzola

Research Adviser: Dr. Jennifer Hontz; Mathematics and Computer Science

Cryptography is the methodology for encoding and decoding information. An elliptic curve is a set of ordered pairs that satisfy a specific equation, and elliptic curves have a wide range of use in cryptography. Elliptic-curve cryptography (ECC) is an approach to cryptography that relies on algebraic properties of the sets of ordered pairs, which make up a specific kind of set called a group. Quantum cryptography is a method of cryptography that uses the properties of quantum mechanics, and it is a modern threat in the cryptologic world because classic methods, including those of ECC, are susceptible to attack by quantum computers. This presentation will look at two different forms for the equation of an elliptic curve, and show how one should be able to translate between the two equations. In addition, it will look at a modern, quantum-resistant method, proposed by Luca de Feo, David Jao, and Jérôme Plût, that utilizes elliptic curves in order to compute specific mappings in a way that is resistant to attack by quantum computers.

History of Solfege

Joy McCreary

Research Adviser: Dr. Kent Lyman; Music

Guido d'Arezzo (c. 990 – c. 1050) is credited with the invention of the musical system known as solfege. This presentation will explore the life and achievements of Guido d'Arezzo, and examine the impact solfege has had on music since its invention to the present day. Guido revolutionized new methods of reading, teaching, and notating music, as well as the foundational form of solmization, otherwise

known as solfege. As time progressed, changes and adaptations were made to Guido's works, slowly shifting into the systems and habits musicians follow today. Thanks to Guido and the creation of solfege, modern Western music notation and solfege exist and are available and helpful to all modern musicians. In his time, Guido created a mnemonic device in order to aid singers in learning and remembering the solfege scale with ease. By using his hand, he was able to assign sections of the hand to specific notes or syllables in the solfege scale. "Guido's Hand" became a well-known historical reference when discussing the origins of solfege, and remains intriguing even today. The closest example of a modern-day version of Guido's Hand would be the current hand symbols that are designated to each solfege syllable, which allows for more coordination and understanding of the solfege pitches and syllables. Solfege as a whole provides musicians with the tools necessary to gain pitch recognition, help with sight singing, and understanding music theory. The solfege scale is used across the world, remaining a vital tool for all who utilize it.

The U.S. Housing Market from 2000 through 2024: modeling and forecasting Southwestern home values using time series analysis techniques

Mei Li Moo King

Research Adviser: Dr. Dylan Glotzer; Mathematics and Computer Science

Being a homeowner has always been part of the "American dream" as it provides financial security and contributes to economic growth, but in recent years this dream has become more difficult to achieve. The 2000s housing bubble and the COVID-19 pandemic have significantly impacted both long term interest rates and home values; as economic activity and demand for housing change, mortgage rates respond to fit current market conditions. This research seeks to explore how precisely we can predict future home values in Phoenix, Las Vegas, Los Angeles, and San Diego using time

series analysis, establish whether or not home values in one city could be influencing home values in another city, and identify effects from the COVID-19 pandemic. We investigated Fannie Mae single-family mortgage data from the years 2000-2022 using the Python programming language and JMP statistical software to construct time series models with and without including long-term federal interest rates as an exogenous factor. We demonstrate that increases in housing values since 2020 diverged notably from historical patterns. Additionally, a Granger causality test revealed that changes in Las Vegas', Los Angeles' and San Diego's home values all precede those in Phoenix which builds on previous research based on home prices from earlier decades.

The Impact of the COVID-19 Pandemic on College Major and Career Decisions

Mwende Mumo

Research Adviser: Dr. Anne York; Business

The COVID-19 pandemic and its related societal concerns has had significant effects on the mental and physical health of college students, their sense of economic and financial stability, and their awareness on social justice issues. The myriad of issues caused by and resulting from the pandemic has led some students to reassess their career and major decisions. Previous work by Goulas and Megalokonomou on the major selection of Greek college students during the 2008 financial crisis showed that students tend to avoid majors with poor employment prospects during times of economic uncertainty. To determine whether the pandemic had similar effects on Meredith College students, an online survey on the effects of the pandemic was deployed. The survey results established that most Meredith students became more concerned about their physical and mental health, financial and economic stability, and social justice issues after the pandemic. Furthermore, 45% of respondents confirmed that the pandemic and the situations that

arose around it affected their career plans. When requested to elaborate what the exact effects were, 25% of respondents mentioned matters regarding their career and income. Most of this subset were in majors that lead to careers with lucrative pay. Social justice issues and physical and mental health concerns had the least effects on career changes. Students whose major decision was affected by a desire to improve their communities were more likely to be arts & humanities majors or pursuing similar majors that led to careers with less lucrative pay options.

Effects of Stress on Teachers' Wellbeing

Emily Osborne

*Research Adviser: Dr. Betty-Shannon Prevatt;
Psychology and Social Work*

While teaching is often perceived as glorified babysitting, it is now being reported as one of the most stressful jobs in the world (Wang et al., 2015). Many factors contribute to this stress including heavy workload, long hours, low pay, and poor support (Camacho, 2021). Teachers are often overburdened with large class sizes that translate to a workload that extends beyond the hours of a typical workday. Teachers may deal with occupational stress in ways other professions do not experience such as abusive parents and lack of support from administrators. Given the national shortage in teachers (Oyen & Schweinle, 2020), it is imperative that the educational system identifies factors associated with teacher wellness in addition to stress and burnout. This study will examine the effect of stress on teachers' overall wellbeing. It is hypothesized that teachers with greater stress and less administrative support will report worse wellbeing. Teachers in the state of North Carolina will be recruited via social media using convenience sampling techniques to complete an online survey. The survey includes items to assess teacher demographics (age, grade level, county, experience) and perceived administrative support. Additionally, teacher stress will be assessed using Teacher Stress

Inventory (Fimian, 1984) and wellbeing will be measured with the Teacher Subjective Wellbeing Questionnaire (Renshaw, 2015) and Teacher Well-being Scale (Collie, 2014). A step-wise linear regression will be implemented to test the hypothesis. It is valuable to consider how stress affects teachers to optimize their wellbeing, performance, and job retention.

How does iNaturalist/citizen science data measure up against biodiversity checklists? Using Meredith College campus data as a case study

Sarah Page

*Research Adviser: Dr. Maria Pickering Villa;
Biological Sciences*

Biodiversity is often viewed as an important metric for indicating the health of an ecosystem or area. Monitoring and tracking biodiversity over time is one way to get a sense of changes to the environment and the organisms that rely on it. Since pandemic learning began in 2020 Meredith College Animal Biology students have been documenting organisms on campus using the citizen science application known as iNaturalist. Now, in 2023, there are over 5,000 observations made within the boundaries of Meredith College's campus, including observations from five complete semesters of Animal Biology students. The goal of this research is to compare opportunistic data from iNaturalist against known biodiversity checklists, and thereby determine the accuracy or validity of the iNaturalist data collected by the Meredith College community. The research is ongoing, and includes comparing the 402 insect species recorded through iNaturalist observations from Meredith College with known species checklists and databases from nearby parks in Wake County, North Carolina. Our findings will be useful to determine whether iNaturalist observations can be used to monitor biodiversity changes on our campus.

Analyzing Factors That Contribute to Food Insecurity Among the Elderly Population in the United States

Ryan Payne

*Research Adviser: Dr. Carolina Perez-Heydrich;
Biological Sciences*

Among households with elderly living alone, 9.5% experienced food insecurity. While previous studies have demonstrated an association between depression and food insecurity, this project aimed to look at this association specifically within the elderly population. This cross-sectional study used data from the 2013-2014 National Health and Nutrition Examination Survey (NHANES) to evaluate the associations among food insecurity, depression, chronic illness, and cognitive functioning among adults over 60 years old. Statistical analyses involved the calculation of crude and adjusted odds ratios for all relationships, along with t-tests and multiple linear regression models for cognition-related test scores. After adjusting for confounding variables, results indicated that food insecurity was significantly associated with depression (ORadj: 1.62; 95% CI: 1.07 - 2.42), and depression significantly increased the odds of chronic illnesses and cognitive impairment. An integrated solution that addresses food insecurity and depression, such as senior companion programs, may benefit elderly populations as these help with social isolation and loneliness.

Using Student Writing Samples to Understand the Impact of Curriculum

Sara Perry

*Research Adviser: Dr. Jennifer Olson;
Education*

Writing is an integral part of the classroom curriculum and an important life skill to acquire. The skill of writing allows individuals to persuade, explain, inform, entertain, and evaluate. There is always a purpose behind any piece of writing, which is why it is essential to have a curriculum that supports

the development of effective writing. EL Education Language Arts curriculum is an open educational instructional resource that has been implemented in a local school district. The purpose of this study was to investigate the impact of the EL curriculum on opinion writing by students in third grade. Data collected were field observations of literacy instruction, and unassisted pre- and post-opinion writing samples. The analysis included curriculum-based measurements (CBM) and a grade-level-specific rubric. Quantitative results indicate students grew over time in total words written, the number of words spelled correctly, total letters written, and correct writing sequence. In addition, results indicate student writing improved when evaluated with a rubric assessing qualitative measures of effective opinion writing. These measures include using a topic sentence, adding details supported by text evidence, elaborating, and providing a concluding sentence. Implications for educators include using student writing to assess the effectiveness of a literacy curriculum.

An Analysis of Eames Design Philosophy for NICU Application

Madison Potter

*Research Adviser: Dr. Laura Prestwood;
Human Environmental Sciences*

Charles and Ray Eames and their collection of work are consistently viewed as an inspiration for modern furniture designers and have created standards in the design and manufacturing process. Their influence on both the interior design and furniture design industries is apparent by reviewing first-hand accounts, case studies of their work, and interviews regarding their designs. Knowing the significance and impact of the Eames design philosophy, this analysis will apply their design philosophy to a problem that the Eames did not address during their careers. This research aims to focus on healthcare furnishings, specifically furniture needed for

Neonatal Intensive Care Unit (NICU) Facilities. Given that the Eames began their work in the furniture industry utilizing the same technology used to create medical splints, it is only appropriate that their design philosophy would provide guidelines for a prototype of furniture designed for healthcare. A completed prototype of this piece will be created for a NICU facility inspired by the Eames Design philosophy. This design research will provide a foundation for future explorations in the Eames design philosophy and how it can be specifically applied to NICU facilities.

Antonio Vivaldi

Antonella Rosales

Research Adviser: Dr. Kent Lyman; Music

Antonio Vivaldi (1768-1741) is an Italian composer who was noted for the large number of concertos he wrote for a variety of instrumental combinations. His work entitled "The Four Seasons" (Le quattro stagioni) is his best known set of concertos and is perhaps one of the most recognizable pieces of classical music in the world. The four concertos represent each season of the year. They are scored for solo violin, accompanied by orchestra and basso continuo. Each concerto is divided into 3 movements, and each one takes about 10 minutes to play.

One of the most interesting things about this work is the fact that it is program music. It is filled with musical effects that depict various aspects of the four seasons, such as the chirping of birds, thunder and lightning, shivering in the cold of winter, celebrating the bountiful harvest, and many other effects.

This presentation will explore how Vivaldi succeeded at capturing the sights and sounds of the Four Seasons in music, establishing program music as a type of instrumental music to be taken seriously.

Beyond the Skyline: The Evolution, Design, and Legacy of Singapore's Urban Architecture

Alexandria Rosenzweig

Research Adviser: Dr. Beth Mulvaney; Art

Singapore's architecture has evolved significantly over time, influenced by its rich cultural heritage, colonial past, and rapid urbanization. Today, the city is home to some of the most iconic examples of contemporary and high tech architecture in the world. Two key examples of this innovation can be seen through the Marina Bay Sands Hotel and Gardens by the Bay structure. Not only have these projects brought great economic benefit, but they also serve as a symbol of Singapore's ambition and status as a global city. This inventive architectural design has been a magnet for tourism and a marvel throughout world economies for its futuristic design and pragmatic ingenuity in utilizing space.

Singapore is renowned for its modern and innovative architecture, which has been crafted to create a harmonious and sustainable environment. The city-state has incorporated cutting-edge design into its buildings and infrastructure to ensure that it is both functional and aesthetically pleasing. This includes the use of natural materials, such as wood, stone, and metal, as well as green technology such as solar panels and green roofs. In addition, the government has implemented an Urban Redevelopment Authority that has been tasked with preserving the city's architectural heritage and promoting green initiatives. All of these efforts help to create a unique environment that is both beautiful and sustainable. Singapore's embrace of high tech architecture has earned it a reputation as a leader in innovative design.

The Inner Workings of an Organ

Eliandras Sims

Research Adviser: Dr. Kent Lyman; Music

Organs are massive instruments that create a mystifying wall of sound. A person can go their whole life without looking into the depths of an organ, and they typically only see it in one place: a church. Organs can be used as solo instruments, or to amplify the sound of other instruments in an orchestral piece, or to keep a group of people together as they sing. To the untrained eye an organ is a series of pedals and piano keys, with an astounding array of pipes along the wall. But hidden behind that wall is a whole mechanism, all working together to create a wide array of sounds. This presentation will examine the inner workings of the organ, and discuss the music of some of the composers that helped shape it into what today is regarded as the "King of instruments".

Examining Teaching Practices in General Education Classrooms That Have a High Percentage of AIG Students

Savannah Smoak

Research Adviser: Dr. Julie Schrock; Education

The Academically/Intellectually Gifted (AIG) program at Holly Ridge Elementary School prioritizes meeting the needs of students identified as AIG. The school is unique in that five of the six fifth-grade classes have a very high percentage of AIG students in one general education classroom. Five fifth-grade classroom teachers responded to survey questions that asked them to explain the methods they implemented to meet the needs of the AIG students in their classrooms. The pros and cons of the various methods implemented were described by the teachers. This project synthesizes these data and provides a likely successful approach for teachers to use to support AIG students in the general education classroom.

Investigating the impacts of stress and antifungal properties on Raleigh amphibian population

Kara Solomon and Sophia Bogan

Research Adviser: Dr. Megan Serr and Dr. Carolina Perez-Heydrich; Biological Sciences

Both stress and the skin microbiome are important factors for overall amphibian health as they impact infection risk with the fungal pathogen *Batrachochytrium dendrobatidis* (Bd). Pathogenesis with Bd is negatively impacting amphibian populations around the world and here in North Carolina. For this study, we have nine field sites including Wake County Parks and the Meredith College campus. At each location, we are dermally swabbing individual amphibians for Corticosterone (CORT), Bd infection, and skin microbiome analysis. We also record biometric data – such as weight and snout-to-vent-length – as well as the location where each individual was captured. CORT is used as a correlate of stress and we will analyze it using Enzyme-Linked Immunosorbent Assays (ELISA). Elevated CORT concentrations have been found to suppress amphibian immune systems and thus increase Bd infection susceptibility. At this time, we are refining CORT analysis by performing practice ELISAs to see how we can best quantify CORT from dermal swabs. For microbiome analysis, we will culture skin swabs from these same amphibians to test the Bd inhibition capacity of skin microflora by performing inhibition assays using Bd cultured in the lab. We will also test to see whether or not the individuals we swabbed are infected with Bd. Correlating CORT stress levels and antimicrobial properties against Bd is critical for overall amphibian survival. Measuring CORT and conducting skin microbiome analysis for Wake County amphibian populations is an important first step to understanding the overall health of local amphibians.

Music in Ancient Israel

Megan Spence

Research Adviser: Dr. Jean Wozencraft-Ornellas; Music

For my presentation on CSA day, I will be researching the music of Ancient Israel, including the history, the style of the music, the instruments used, and the religious practices using their music. I will discuss how/if the music has changed over time in Israel, and how the current culture has been affected by music.

I will research Ancient Israeli music as well as current Israeli music. This includes biblical times up until the current year, 2023. I will contemplate and share how music in Israel relates to or differs from music and instruments that we have learned about thus far in our class. So far I have some references to music in Israel during Biblical times...

"Whenever a bad spirit from God comes upon you, he will play it, and you will feel better..." (just a small excerpt from I Samuel 16:14-23) (and some other examples are II Samuel 6:5, Judges 11:34.) Music was used as a form of celebration, worship, and healing. Music has been a part of Jewish life since Biblical times, and remains a constant in their religion and their culture as well.

Joseph Haydn and His Relationship with the Esterhazy Family

Cynthia Styron Sanchez

Research Adviser: Dr. Kent Lyman; Music

Franz Joseph Haydn (1732-1809) was an Austrian composer who spent almost thirty years of his career as the Kapellmeister for the Esterhazy family, one of the wealthiest and most influential families of the Austrian Empire. Haydn's career is an excellent example of how the patronage system could work to the benefit of a composer. In the case of Haydn, his relationship with his patrons allowed him to develop a style which became one of the most influential in all of Europe, especially in the genres of the symphony and the string quartet. It should be noted that Haydn worked as a servant in the Esterhazy household. He

had the luxury of hearing his works performed on a daily basis, but he was also required to compose according to Prince Esterhazy's preferences and not his own. Still, this did not stop him from incorporating his own humor and wit into his compositions. This presentation will examine the relationship that Haydn had with his royal patrons, with illustrative examples of works that demonstrate his mastery of various styles, and his incorporation of humor into his music.

Assessing Reproductive Mental Health Needs in the Raleigh-Durham Community

Denley Sweeney

Research Adviser: Dr. Betty-Shannon Prevatt; Psychology and Social Work

Perinatal mood disorders (PMD) are the most common complication of childbirth (Meltzer-Brody & Jones, 2015). Not only can untreated PMD lead to delayed fetal growth, higher rates of premature delivery, and low birth weights in newborns, but it is also associated with a higher risk of Postpartum Depression and attachment issues in the birthing person (Meltzer-Brody & Jones, 2015). Yet, resources to support the mental health needs of birthing people are scant in many communities (Lin et al., 2020). In the United States, around 52% of reproductive aged-women self-report having a mental illness, many coming from communities with insufficient prenatal and perinatal mental health services (Lin et al., 2020). Understanding the needs and resources available is a key component for developing effective interventions, as such, this mix-methods study will explore perceptions of birthing experiences and access to reproductive mental health resources within the community. Additionally, the study will examine how access or lack of access to these resources impacts the birthing experience as a whole. This study extends recruitment from a prior study and present participants were recruited from Raleigh, Durham, and Chapel Hill, North Carolina using a purposive sampling method. Participants completed an online survey consisting of 25

questions querying access to resources while pregnant, throughout the birthing process, and during the year postpartum. Thematic Analysis will be used to assess participants' open-ended responses. Findings from this study can inform interventions to eliminate barriers to reproductive mental health access leading to better birthing experiences and outcomes in our society.

Historic Preservation: A Dive into Sears Modern Homes

Cienna Thompson

*Research Adviser: Dr. Laura Prestwood;
Human Environmental Sciences*

The purpose of this study is to examine the importance of historic preservation, specifically focusing on the identification and preservation of undocumented Sears Modern Homes. Historic preservation is a discipline that aims to preserve and protect the heritage of buildings and landscapes of historical significance. The first graduate program in historic preservation was founded in 1964, and the National Historic Preservation Act was developed two years later, in 1966. Prefabricated homes were not a new concept, but Sears and Roebuck were the most notable, selling homes and other prefabricated buildings to almost 100,000 clients between 1908 and 1940. Sears and Roebuck offered over 400 styles of homes during this time, however proper records were not kept and many Sears Modern Homes have been destroyed or have not yet been identified. By conducting research on the history of the discipline and practice of historic preservation and Sears Modern Homes from 1908 to 1940, the study aims to inform about current issues within historic preservation, the importance of Sears Modern Homes in relation to architecture and interior design, and why it is important to preserve buildings, specifically Sears homes.

Using Radiofrequency identification to detect wild house mice (Where's Waldo)

Samantha Travis

Research Adviser: Dr. Megan Serr; Biological Sciences

House mice (*Mus musculus*) are often an invasive species responsible for impacting ecosystems and are linked to native species declines. Tracking their movement is key to being able to monitor their invasion. Radio Frequency Identification (RFID) is a device that is used to identify the location and unique identifier of each mouse. In our research, we used RFID on wild mice. Our goal with using RFID was to track and identify their patterns of movement within six outdoor enclosures. Following RFID insertion, we placed the mice into the enclosures that were 16'x20'. We were able to inject five mice with RFID tags. Additionally, we ear-punched all mice (11) in a unique pattern. The RFID was successful for the first three days. We detected all mice consistently in the same burrow and location, indicating very little initial movement, regardless of sex. However, the mice were able to move between and out of enclosures. This prevented us from being able to track the mice consistently beyond day three as other mice were present that were not RFID chipped. Nonetheless, when the mice were trapped and removed after our set seven days they were all still chipped and the RFID system was working. This is a promising step in the direction of being able to identify mouse patterns and movements in outdoor enclosures. Furthermore, detecting invasive house mouse movements allows us to better understand their ability to spread and how we can prevent detrimental impacts on ecosystems.

The Printing Press: A Lasting Impression on Music

SarahElla Trustman

Research Adviser: Dr. Kent Lyman; Music

With the invention of the Gutenberg movable type printing press in 1450, the way music was created and shared changed dramatically. Before this monumental invention, music

was copied by hand, a painstaking and time-consuming process. While the Gutenberg printing press was revolutionary, printing music was still widely hand-written until further advancements were made by Octaviano Petrucci. These advancements in printing music led to music notation being standardized. Petrucci's work was improved upon by Pierre Attaignant and John Rastel who introduced movable-type single-pass printing for music. The single-press method of printing music was the preferred method until plate engraving was introduced in the seventeenth century. Photographic technology advancements at the end of the 19th century further revolutionized the printing process. Each invention improved the way in which music was shared, increasing composers' sphere of influence and allowing for international trends in music. While there were some negative effects of music mass-publishing, the positive effects far outweigh the detriments. Today, music notation software makes it possible for almost anyone to create, type, and edit musical scores. Music is now universally available to people of all demographics, thanks largely to the work of publishers like Gutenberg, Petrucci, Attaignant, and Rastell.

Using nonparametric statistical methods to analyze cotton data?

Stephanie Wairagu

*Research Adviser: Dr. Emily Lada;
Mathematics and Computer Science*

Plant-derived biostimulants, such as iQFORTE, have gained popularity due to their potential to enhance plant growth, yield, and quality while minimizing the need for fertilizers and preserving the environment. This research aims to investigate the impact of iQFORTE on cotton, an agriculturally important crop in North Carolina, by exploring and analyzing data collected from 20 treated plants and 20 control plants. The data were collected by a researcher from the Department of Crop and Soil Sciences at North Carolina State University, with response variables of interest including

the number of open bolls per plant, open boll weight, seed weight, and lint weight. As the sample size for each group is 20, normality cannot be assumed based on the Central Limit Theorem. Therefore, normality is first assessed through the Shapiro-Wilk test, and based on the result, a t-test or a Wilcoxon Rank Sum test is conducted to evaluate the effect of the biostimulant on cotton. The study intends to enhance the understanding of nonparametric statistical tests like the Wilcoxon Rank Sum test and provide recommendations to the researchers at NCSU for analyzing crop data with small sample sizes and non-normally distributed outcomes.

Raised in the System: The Influence of Exit Pathway on the Route to Justice Involvement

Rachel Walker

*Research Adviser: Dr. Candalyn Rade;
Psychology and Social Work*

Research indicates that children who age-out of the foster care system are at an increased risk for criminal justice involvement (Shook et al., 2011; Font et al., 2021). This trend has been studied across racial and socioeconomic lines (Hines et al., 2007); however, these significant variations have yet to determine whether there are strong connections between reunification and criminal justice involvement. It is hypothesized that youth who exit the foster care system through pathways other than reunification would have increased risk of becoming justice involved. Longer stays in foster care are related to specific implications, like substance use disorders, criminal justice involvement, and teen pregnancy. The three variables being used to analyze the research question are reunification, aging out, and justice involvement. The data was collected via five separate research studies on individuals in foster care who are justice involved – studies are based in five different states. A series of bivariate analysis showed that amongst individuals aging out, 17% had been arrested within two years of their emancipation date.

Among that same group, 17.5% were re-arrested two years later. Findings for this study may be limited by lack of random sampling and the use of pre-existing quantitative data from other research samples. Research implications highlight the need for a diverse population across diverse locations in the United States. This would greatly increase the potential to collect more representative research on the foster care system, as well as provide insight to improve policy and programming for youth in foster.

What Does the Dirt Say? An Analysis of Soil Carbon on Meredith College's Campus

Mikayla Watts and Sarah Page

*Research Adviser: Dr. Matthew Stutz;
Chemistry, Physics, and Geoscience*

The Meredith College campus is rich with multiple soil types and soil carbon levels, otherwise referred to as organic matter, due to available vegetation, soil history, and available nutrients. Learning about the carbon levels in the soil can tell us a lot about the soil profiles. Soil composition can have a large impact on land management. Infiltration and runoff levels are just a couple of examples of that impact. By collecting soil samples from several different plots around campus, discussing the data, and categorizing them, areas of concern could be identified. Sample locations were designated to get a diverse picture of the different soils on campus. All of the samples were categorized by soil type including loamy sand, sandy clay, sandy clay loam, sandy loam, and silt loam. Samples were collected, baked in an oven to determine water content, and burned in a furnace to determine the carbon content and organic matter. Our results found a different array of compositions across campus. We found that older, more well-tended areas on campus had a higher carbon concentration compared to other areas. This culminated in creating a carbon map that can be used by future students and our colleagues in Meredith ground management.

The Impact of Gaming Communities on Adults' Mental Health

Jay Williams

*Research Adviser: Dr. Betty-Shannon Prevatt;
Psychology and Social Work*

More people are forming and strengthening social connections through the use of video games and video gaming communities in the current era of digital communication and in the wake of social changes caused by the Covid-19 pandemic (Bengtsson et al., 2021). Recent literature indicates that moderate amounts of video game playing, especially cooperative, non-violent, family and multi-player-oriented gameplay, can increase levels of mental well-being (Kowal et al., 2021). This study aimed to examine the interactions between different aspects of gaming and mental health with a focus on the levels of social interaction acquired in these gaming settings. I hypothesized that more time spent playing multiplayer and cooperative games, more time interacting with people in the gaming community, and more time spent playing or watching others play video games will be associated with lower depression, anxiety, and stress scores indicating a more positive mental health status. Adult participants were recruited through convenience sampling methods using online outreach and social media websites as well as word of mouth and snowball sampling. Participants completed a survey self-reporting demographic data and gaming-related behaviors. Mental well-being was assessed using the 21-item Depression Anxiety and Stress Scale (DASS-21) (Lovibond & Lovibond, 1995). Findings from this study can be used to increase the general knowledge base of how different aspects of video gaming and video game communities impact an adult's mental health in the wake of broad social changes and current-era technologies.

A Comparison of Stress levels Between Parents of Neurotypical Children, and Children with Autism Spectrum Disorder

Carley Williams

*Research Adviser: Dr. Candalyn Rade;
Psychology and Social Work*

Parenting can make parents feel stressed out no matter what age the child is (Hayes & Watson, 2012). A family that has a child with ASD (autism spectrum disorder) is said to experience more instability than those of a neurotypical family (Hayes & Watson, 2012). The current study examined the stress levels of parents with neurotypical children compared to the levels of stress experienced by parents with children on the Autism Spectrum (ASD). The parent participants were reached via social media platforms. They completed a survey electronically, answering questions about age, relationship status, and the Autism Parents Stress Index (Silva & Schalock, 2012). Participants completed a consent form outlining the entire process before starting the survey and also had a debriefing at the end of the survey, connecting them to available resources. After the data was collected, it was cleaned and put into SPSS. An independent sample T-test was run to compare the stress levels of parents that had children with autism and parents of neurotypical children. The data showed that there were significant results; Parents of ASD children reported more stress ($M=1.461$, $SD=.605$) Compared to parents of neurotypical children ($M=.490$, $SD=.379$, $T=-6.275$, $P<.001$, $D=.154$, 95% CI 1.284-(-.658). These findings will help support parents with children that have ASD on managing stress as well as create more awareness of these stress levels to develop coping skills.

Does Birth Order Affect Educational Attainment and Familial Relationships?

Victoria Witmer

*Research Adviser: Dr. Jeff Langenderfer;
Business*

Birth order effects have been studied since the early 1900s, with notable research contributions

from Alfred Adler, a birth order effects pioneer, and later Frank Sulloway. The overwhelming evidence indicates that birth order has no systematic effect on individual personality. There is however, some evidence that birth order affects intellect, educational attainment, as well as relationship dynamics. The purpose of this study is to add to the body of evidence regarding birth order effects. Two anonymous surveys examine birth order by assessing educational attainment and familial vis-a-vis extra-familial relationships. Both surveys rely on self-reported demographics and personal histories using Likert scales for comparative relationship assessment.

Does Foster Care Influence the Risk of Teenage Pregnancy?

Kayla Williams, Thomas Clifton, and Destiny Ferreira

*Research Adviser: Dr. Carolina Perez-Heydrich;
Biological Sciences*

The national survey of family growth (NSFG) gathers information on family life, marriage and divorce, pregnancy, infertility, use of contraception, and men's and women's health. Using data from the NSFG, we evaluated the association between foster care and sexual health outcomes (i.e. age at first sex, teen pregnancy, number of sexual partners) in adult women. We conducted a series of statistical analyses, including odds ratios, ANOVAs, and two-sample t-tests to address our research objective. We found that those who had lived in foster care settings had higher odds of teen pregnancy (OR: 2.60, 95% CI: 1.95, 3.49), younger age at first sex ($p\text{-value} < 0.001$), and more lifetime sexual partners ($p\text{-value} < 0.001$) compared to women who never lived in foster care settings; however, duration of foster care residence had no added effect on these outcomes. These results align with those of previous studies, and highlight the importance of sexual health programming for youth in foster care settings.

Meredith College challenges students to discover what makes them strong, build on those strengths, and prepare to make a positive impact on the world. With more than 90 undergraduate academic programs, 30 graduate and certificate programs, and StrongPoints®, a powerful strengths-focused personal coaching initiative, it's no wonder *U.S. News*, *Princeton Review*, and *Forbes.com* have all named Meredith a "Best College." **Wherever you're going in life, lead with your strengths – and go strong.**

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