UGRADRESEARCH.UCONN.EDU/FRONTIERS2021

UCONN
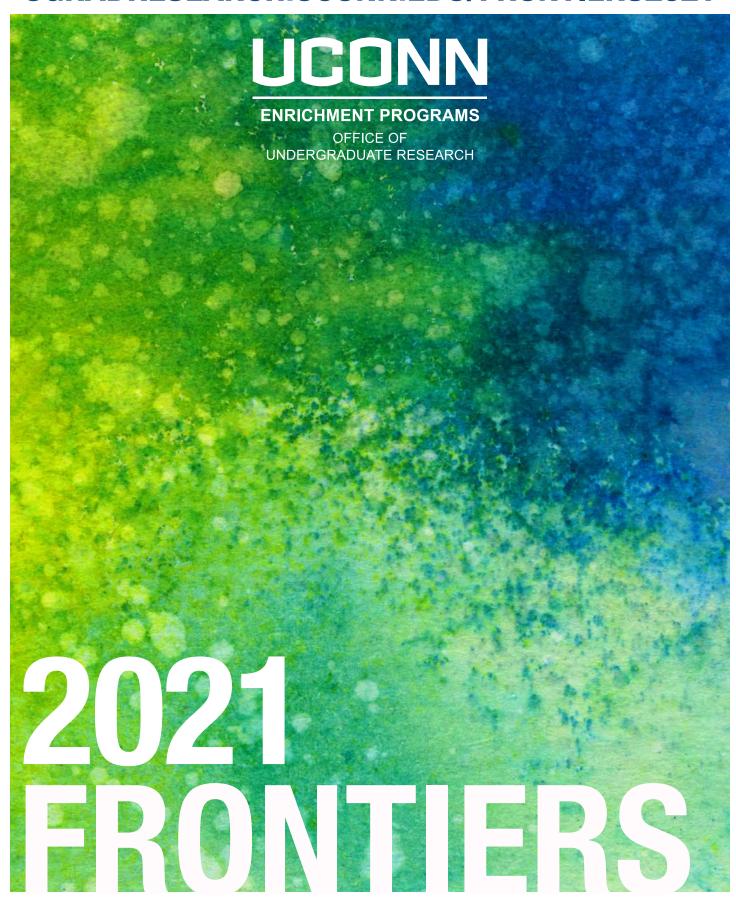
ENRICHMENT PROGRAMS

OFFICE OF
UNDERGRADUATE RESEARCH

2021
FRONTIERS

UNDERGRADUATE RESEARCH ONLINE EXHIBITION

Welcome

to the 2021 Frontiers Online Exhibition! Like most aspects of the spring semester, Frontiers looks different this year. As we cannot gather safely in person to see students present their research and creative projects, we invited students to submit posters and short video presentations for compilation in this exhibition program. Links to those materials, hosted on the Portfolium e-portfolio platform, are included in the program alongside the individual project listings.

In addition to viewing and commenting on the projects in Portfolium, we invite you to participate in seven live, online presentation sessions to hear from student researchers and ask questions about their projects and experiences. Details about the live sessions are available on pages 4-6 of this program.

We thank students, faculty mentors, and staff colleagues for their patience, support, and positivity as Frontiers moved online. We are pleased to have this opportunity to celebrate students' ideas, questions, explorations, discoveries, and creations in a form that keeps UConn Nation safe, healthy, and connected.

- UConn Office of Undergraduate Research

About Frontiers in Undergraduate Research

The Frontiers Exhibition is a multidisciplinary forum showcasing undergraduate research, scholarship, and creative projects at the University of Connecticut. Frontiers 2021 is the twenty-fourth annual Frontiers event sponsored by the Office of Undergraduate Research (OUR) and the second held online. This year's exhibition includes 154 undergraduate students sharing 137 research and creative projects; a student index begins on p. 44.

Students' projects span the disciplines, with some pursued by individuals and others by groups of student collaborators. The projects presented reflect the invaluable contributions of research mentors, including graduate students, postdoctoral scholars, staff, and faculty members. We hope you enjoy learning about our students' innovative projects at this year's online exhibition!

About the Office of Undergraduate Research

The Office of Undergraduate Research (OUR) is a resource for students interested in enriching their undergraduate experience through participation in research, scholarship, and creative activity. OUR provides information and advising to assist students in identifying relevant opportunities, as well as several funding programs to support students and their faculty mentors.

Many of the Frontiers presenters have received financial support for their projects; OUR awarded over $620,000 in 2019-20 in support of students' research and creative endeavors. These awards are funded by OUR with generous support from the Office of the Provost, the Office of the Vice President for Research, the deans of the schools and colleges, and donations from alumni, parents, and other friends of UConn and undergraduate research.

Acknowledgments

The Office of Undergraduate Research wishes to thank the deans of the represented schools and colleges, the Office of the Provost, the Office of the Vice President for Research, and generous donors to OUR and the Honors Program for their support of undergraduate research through contributions to OUR funding programs. In addition, we thank the following individuals for their support:

Thomas C. Katsouleas
President, University of Connecticut

Carl Lejuez
Provost and Executive Vice President for Academic Affairs

Michael Bradford
Vice Provost for Faculty, Staff, and Student Development

Jennifer Lease Butts
Associate Vice Provost for Enrichment Programs & Director of the Honors Program

OFFICE OF UNDERGRADUATE RESEARCH STAFF

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PEER RESEARCH AMBASSADORS

Alexandra Bettencourt '21 (CAHNR)

Kerry Morgan '21 (CLAS, CAHNR)

Mukund Desibhatla '21 (CLAS)

Shreya Murthy '21 (CLAS, BUS)

Claire Fresher '22 (ENG)

Oreoluwa Olowe '21 (ENG)

Brendan Hogan '21 (CLAS)

Ariana Rojas '21 (CLAS)

Anisha Jain '21 (CAHNR)

Sarah Tsuruo '21 (CLAS)

Pavitra Makarla '21 (CLAS)

Lily Zhong '21 (CLAS)

Mentorship Awards

In recognition of the pivotal role that mentors play in supporting undergraduate research and creative activity, the Office of Undergraduate Research offers annual awards for outstanding mentorship. Each year, a committee of Peer Research Ambassadors reviews students' nominations and selects two faculty members and one graduate student who exemplify the ways in which outstanding mentors challenge and support their students, enabling them to take intellectual risks and achieve milestones they might not have initially envisioned being able to reach.

Please join us in congratulating the 2021 Mentorship Excellence Award recipients.

Bradley Wright
Professor, Sociology

Professor Wright was nominated by Nidhi Nair '23 (CLAS) and Irene Soteriou '23 (CLAS). Irene's nomination is excerpted here.

I first began working with Dr. Wright during my freshman year. This was my first experience with undergraduate research, and I am grateful to Dr. Wright because his purpose-driven and student-focused approach enabled me to grow extensively from this experience, both in learning to redefine my understanding of research, and also in considering my own identity within this context. He inspired me to question my preconceptions, motivated me to dig deeper in pursuit of knowledge, and believed in me before I believed in myself. Dr. Wright was always excited to engage in deep, thought-provoking conversations, and from them I was able to reflect more often and more carefully on my identity, reassess my impact, and reevaluate my priorities.

Beth Lawrence
Assistant Professor, Natural Resources and the Environment

Professor Lawrence was nominated by Drew Tienken '22 (CLAS). Drew's nomination is excerpted here.

Dr. Lawrence has exposed me to a breadth of opportunities that have fostered my personal and professional growth, helped satisfy my academic curiosities, and prepared me for a successful future. Watching her passion for wetlands as she explains important concepts has been infectious. When we talk about science, she makes sure that I understand not just the 'what' and the 'why,' but also the ethical and societal dilemmas of scientific investigation, such as describing why it's important to have a colorblind palette on your figures, or how to be actively anti-racist while conducting environmental research. Dr. Lawrence has enabled me to grow throughout my undergraduate career as a student, scientist, and person.

Jessica Gutiérrez
M.S. Student, Ecology and Evolutionary Biology

Jessica was nominated by Mahima Mehta '22 (CLAS). Mahima's nomination is excerpted here.

One of the most exciting aspects of research is the ability to ask new questions. Oftentimes, students have questions but are unsure of how to go about asking them. I was one of those students and, fortunately, Jessica took me under her wing so I could find ways to answering my research questions. Jessica has continuously provided constructive feedback on my scientific writing, helped critique my interview-taking strategies, and assisted me in networking with other individuals with similar interests as me. This can particularly be seen in her involvement in the UConn SEEDS Chapter, where she has been inclusive in easing our tensions about life after our undergraduate career and how to navigate the process that follows, regardless of our backgrounds or prior knowledge.

Read more about the 2021 awardees at **s.uconn.edu/OURawards2021**

Event Program

VICE PROVOST'S REMARKS

We invite all student presenters and audience members to view remarks made on the occasion of the 2021 Frontiers Exhibition by UConn's Vice Provost for Faculty, Staff, and Student Development, Michael Bradford. View the Vice Provost's message at
s.uconn.edu/frontiers21remarks

LIVE PRESENTATION SESSIONS
Monday, March 22, 2021 • 6:30-7:30pm
s.uconn.edu/frontiers21live1

William Brydon '22 (Chemistry, CLAS)
Metal-Free Dehydrogenation Reaction of an Organic Compound Using a Recyclable Oxoammonium Salt

Anisha Jain '21 (Pathobiology, CAHNR)
Pathology and Prevention of Lean Non-Alcoholic Steatohepatitis: A Distinct Disease Regulated by FXR

Shankara Narayanan '21 (Political Science & History, CLAS)
Discourse and Power in U.S.-China Relations

Lucie Turkel '21 (IMJR: Comparative Literary and Cultural Studies, CLAS)
Comparing African Cultural Retention and its Effect on Racial Attitudes in the Music and National Identities of Cuba and the United States

Elise Vanase '21 (Puppet Arts, SFA)
"Remnants" - A Post-Apocalyptic Puppetry Photography Project

Tuesday, March 23, 2021 • 5:00-6:00pm
s.uconn.edu/frontiers21live2

Michelle Antony '23 (Molecular and Cell Biology, CLAS)
EGFR Signaling in Chondroprogenitor Responses to Articular Cartilage Injury

Grace Curley-Holmes '22 (Biomedical Engineering, ENG)
SH2 Profiling Constructs

Michael Martland '22 (Molecular and Cell Biology, CLAS)
Characterizing the Ventricular-Subventricular Zone in a Mouse Model of Post-Infectious Hydrocephalus

Nivedha Natchiappan '21 (Healthcare Management, BUS)
Controlling UPEC Using Lactic Acid Bacteria

Tuesday, March 23, 2021 • 6:30-7:30pm
s.uconn.edu/frontiers21live3

Grace Herrick '21 (IMJR: Global Health, CLAS)
The Critical Need for Early Childhood Development Programs in Uganda

Joel Lopez '21 (Psychological Sciences, CLAS)
Psychedelics for the Treatment of Substance Abuse Disorder: A State of the Art Review

Matthew Pickett '21 (Chemistry, CLAS)
Design and Characterization of a Novel Enzymatic Immobilization Structure

Shaina Selvaraju '21 (Biological Sciences, CLAS)
Do Autism-Spectrum Characteristics Predict the Embodiment of Manipulable Object Concepts?

Wednesday, March 24, 2021 • 6:30-7:30pm
s.uconn.edu/frontiers21live4

Thomas Alvarez '23 (English & History, CLAS)
Ricky's Bar: An Original Screenplay

Julia Desiato '21 (Pathobiology, CAHNR)
Evolutionary History of Rabies Virus in Connecticut

Amit Eshed '21 (Biomedical Engineering, ENG)
Bryan Ziobron '21 (Electrical Engineering, ENG)
Joseph Chenard '21 (Electrical Engineering, ENG)
Functional Electrode Stimulation for Precision Limb Coordination

Aaron Johnson '21 (IMJR: Sustainable Urban Design, CAHNR)
Sauk Trail East

Katherine Lee '22 (Structural Biology and Biophysics, CLAS)
Computational Investigations into Binding Dynamics of Tau Protein Antibodies: Affinity, Specificity, and the Potential for Intentional Design

Thursday, March 25, 2021 • 5:00-6:00pm
s.uconn.edu/frontiers21live5

Shreedula Balakrishnan '23 (Biomedical Engineering & Computer Science and Engineering, ENG)
Study of AML Differentiation Therapy Model

Erin Dennehy '21 (Political Science & IMJR: Law and Society, CLAS)
Public Perception of the Legitimacy of the Supreme Court: The Impact of Improper Behavior

Amelia Hurst '21 (Marine Sciences & Anthropology, CLAS)
Linking Human Activities to Coastal Water Quality in Southern New England: Past and Present

Jasmine Ramirez '22 (Physics, CLAS)
Illuminating the Emission Line Light Echoes of Supermassive Black Holes

Anand Vaish '21 (Biomedical Engineering, ENG)
Image-Based Biomechanical Analysis of Cardiac Morphogenesis using a Zebrafish Model

Thursday, March 25, 2021 • 6:30-7:30pm
s.uconn.edu/frontiers21live6

Kyra Foster '23 (Nutritional Sciences, CAHNR)
Understanding Obesity: Barriers and Assets to Healthy Eating in Black Adults Living in Food Deserts

Simone Fournier '21 (Individualized: Healthcare and Aging, CLAS)
Factors in End-of-Life Planning Among Connecticut Older Adults

Olivia Lemieux '22 (Environmental Sciences, CLAS)
Genotyping Reveals Multiple Cases of Interspecific Hybridization in a Moss Complex

Alyson Schneider '21 (Agriculture and Natural Resources, CAHNR)
Zachary Duda '21 (Agriculture and Natural Resources, CAHNR)
Jonathan Russo '21 (Agriculture and Natural Resources & Sustainable Plant and Soil Systems, CAHNR)
Completely Connecticut Agriculture

Meghan Shaw '22 (American Sign Language & Economics, CLAS)
Relationship Between Cardinal Principle Mastery and Approximation Development in Deaf and Hard of Hearing Children

Friday, March 26, 2021 • 6:30-7:30pm
s.uconn.edu/frontiers21live7

Nour Al Zouabi '23 (Physiology and Neurobiology, CLAS)
The Impact of Cultural, Biological, and Biocultural Adaptations on Humans

Daniel Brocke '21 (Physiology and Neurobiology, CLAS)
Qinwei Chen '21 (Biological Sciences, CLAS)
Optogenetics in Excitation/Inhibition of Drosophila Aggression Neurons

Rei Bufi '21 (Molecular and Cell Biology & IMJR: Globalization, Art, and Activism, CLAS)
The Effect of Exercise on Patients with Non-Alcoholic Fatty Liver Disease: A Meta-Analysis

Alexander Ercolani '21 (Physics, CLAS; Computer Science and Engineering, ENG)
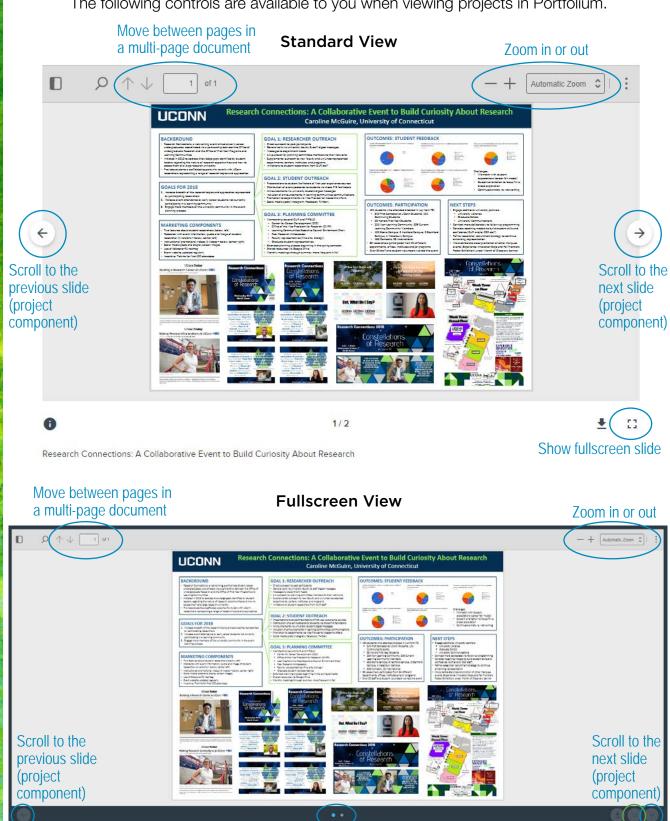*Applying Machine Learning to Particle Detectors*

Victoria Livingston '21 (Chemistry, CLAS)
Self-Healing Aerogel-Like Structures Produced via Click Chemistry

VIEWING PROJECTS IN PORTFOLIUM

The following controls are available to you when viewing projects in Portfolium.

Move between pages in
a multi-page document

Standard View

Zoom in or out

Scroll to the
previous slide
(project
component)

Scroll to the
next slide
(project
component)

1 / 2

Research Connections: A Collaborative Event to Build Curiosity About Research

Show fullscreen slide

Move between pages in
a multi-page document

Fullscreen View

Zoom in or out

Scroll to the
previous slide
(project
component)

Scroll to the
next slide
(project
component)

Scroll between slides (project components)

Exit fullscreen view

Student Projects

IN / BETWEEN
Michaela Abate '21 (Graphic Design, SFA)
Advisor: Mark Zurolo, Associate Professor, Art and Art History
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/in-between-1

"There are two sides to every story, your side, my side and the truth."
IN/BETWEEN tells two sides of the same story and asks the viewer to decide upon the truth. Through visual juxtaposition, the viewer is able to craft a new story, one unique only to them. In this sense, the viewer becomes artist, and the piece becomes a collaborative performance.

Intergenerational Community Conservation Projects, STEM Identity Authoring, and Positioning: The Cases of Two Intergenerational Teams
Bethlehem Abebe '22 (Structural Biology and Biophysics, CLAS), McNair Scholar
Advisor: David Todd Campbell, Professor, Curriculum and Instruction
Supported by: Work-Study Research Assistant Program
Online Materials: https://portfolium.com/entry/dynamics-observed-in-intergenerational-learning

The goal of our research is to better understand the interaction between positioning and STEM identity authoring as intergenerational teams collaborated to complete community conservation projects over the course of a two-day conservation and geospatial technology workshop. Scientists and science educators supported these learners as they developed the focus, resources, timeline, and methods used to accomplish their negotiated pursuits at the two-day workshop and throughout their subsequent community project as a form of public engagement. To better understand the ways in which intergenerational teams located or positioned themselves and their partners, the ways in which teens and adults engaged in STEM identity authoring, and the interplay between positioning and STEM identity authoring, a two-case study was completed.

The Impact of Cultural, Biological, and Biocultural Adaptations on Humans
Nour Al Zouabi '23 (Physiology and Neurobiology, CLAS)
Advisor: Veronica Waweru, Adjunct Faculty, Anthropology
Online Materials: https://portfolium.com/entry/human-adaptations-from-a-holistic-perspective

Humans are perhaps the only species with the ability to adapt biologically and culturally to build resilience and survive. Adaptation helps us to live in different climates and habitats and facilitates mutually beneficial interactions with members of our societies. Moreover, resilience is identified as a trait that reflects our ability to conquer challenges. Over time, humans developed many strategies in response to various biological, environmental and manmade obstacles and events. The field of Anthropology provides an understanding of various strategies used by humans to adapt to different stimuli, and the ability to survive traumas and master struggles. These studies are equally essential when we study specific groups or individuals and how they invent diverse ways to survive and thrive. Understanding the impact of various strategies employed by humans to show how they adapt culturally, bioculturally, and biologically helps scientists to develop research approaches that are more likely to be successful. I will focus on the effect of adaptations on humans and understanding the difference between adaptation and resilience. Moreover, I will discuss the importance of studying human adaptations from a holistic perspective.

Ninaivu: Memory Archive
S. Aanjali Allegakoen '21 (American Studies & Human Rights, CLAS)
Advisor: Cathy Schlund-Vials, Professor, English & Asian and Asian American Studies
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/ninaivu-memory-archive

Ninaivu: Memory Archive is an archive that will be housed on the UConn's Asian American Studies Institute's website. Ninaivu strives to uplift varying representations of the Ilankai/Eelam/Sri Lankan Tamil community, and highlight women and LGBTQ+ members of the community, in an endeavor to create a more nuanced representation of the community.

Combinatorial and Statistical Prediction of Gene Expression from Haplotype Sequence
Berk Alpay '21 (Computer Science, ENG; Mathematics, CLAS), University Scholar, Holster Scholar
Advisor: Derek Aguiar, Assistant Professor, Computer Science and Engineering
Online Materials: https://portfolium.com/entry/predicting-gene-expression-from-haplotype-sequence

Computational gene expression prediction can combine the statistical power and biological insights of transcriptome-wide association studies with the genetic signals discovered by genome-wide association studies. However, current methods are not accurate for many genes. Our models relax the independence of genetic markers to more accurately predict a large subset of genes.

Ricky's Bar: An Original Screenplay
Thomas Alvarez '23 (English & History, CLAS)
Advisor: Bob Hasenfratz, Professor, English
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/rickys-bar-an-original-screenplay

This original screenplay follows characters Jim Gallagher and Sheryl Lawson as they work through their traumatic experiences and support each other while working through their alcoholism. Currently 118 pages in length, the script focuses on establishing the interpersonal nature of healing and the value that one can find in support from those around them.

Analyzing the Neuroprotective Properties of the Ketogenic Diet on Trauma Brain Injury
Sarah Anderson '21 (Biological Sciences, CLAS)
Advisor: Geoffrey Tanner, Assistant Professor in Residence, Physiology and Neurobiology
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/neuroprotective-properties-of-the-ketogenic-diet

Studies have shown that the implementation of the ketogenic diet is an effective way to improve the symptoms of people with different neurological disorders. While the exact mechanism by which ketone bodies exert their protective properties on the brain has not yet been determined, it is predicted that increased levels of NAD+, a molecule found in the body, may play an important role in these effects. I will be measuring the NAD+/NADH ratio in flies with a traumatic brain injury that were placed either on the ketogenic diet or the control diet to see how they compare.

Examining the Effects of Amino-Nogo on ItgaV Expression and Axon Regeneration in Mouse Retinal Ganglion Cells
Anthony Antony '23 (Physiology and Neurobiology & Sociology, CLAS)
Advisor: Ephraim Trakhtenberg, Assistant Professor, Neuroscience
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/amino-nogo-effects-on-itgav-expression-in-rgcs

Central nervous system (CNS) pathologies plague a considerable amount of the population and research to manipulate regeneration of CNS axons is necessary for patient recoveries. In my lab I have determined that ItgaV, a pro-regenerative integrin protein, expression increases in the presence of ECM-2, leading to greater axon regeneration. By examining Amino-Nogo, an inhibitory domain that contributes to the anti-regeneration environment of the CNS, my future project aims to determine whether Amino-Nogo is capable of downregulating ItgaV expression and whether ItgaV expression is related to axon regeneration.

EGFR Signaling in Chondroprogenitor Responses to Articular Cartilage Injury
Michelle Antony '23 (Molecular and Cell Biology, CLAS)
Advisor: Caroline Dealy, Associate Professor, Reconstructive Sciences, Orthopedic Surgery & Cell Biology
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/egfr-signaling-in-articular-cartilage-injury

Articular cartilage lacks intrinsic regenerative abilities and as a result, direct injury to the tissue cannot heal, eventually progressing to osteoarthritis, a debilitating and painful degenerative disease of the cartilage. This is the motivation for exploring cellular pathways involved in cartilage injury and repair and optimizing treatments for cartilage injury that are currently available. The goal of this project is to identify a molecular signal involved in the articular cartilage repair response, and to better understand how this signal interacts to promote articular cartilage healing.

Does Food Supplementation of Eastern Bluebirds Influence their Parasitic Nest Fly Abundance?
Rachel Bahouth '21 (Biological Sciences, CLAS)
Mahima Mehta '22 (Molecular and Cell Biology, CLAS)
Caroline Webb '23 (Environmental Sciences, CLAS)
Advisor: Sarah Knutie, Assistant Professor, Ecology and Evolutionary Biology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/does-food-supplementation-of-eastern-bluebirds-inf

This project determines the abundance of parasitic nest blowflies (*Protocalliphora sialia*) across the range of Eastern bluebirds (*Sialia sialis*) and the effect of food supplementation of bluebirds on blowfly abundance.

Exploring the Upper Crust of Mesopotamian Society: An Archaeological Study of Bread Production at Tell Leilan
Stephen Baker '21 (Physiology and Neurobiology & Anthropology, CLAS)
Advisor: Alexia Smith, Associate Professor, Anthropology
Supported by: OUR Conference Presentation Award
Online Materials: https://portfolium.com/entry/frontiers-2021-presentation-stephen-baker

I seek to establish an accurate list of identification tools to properly identify archaeological remnants of bread and their contents. In my research project, I create an extensive reference collection using different types of grain, replicating the ancient cooking process. I compare this reference collection with archaeological material from Tell Leilan, Syria to identify the archaeological material as ancient bread.

Study of AML Differentiation Therapy Model
Shreedula Balakrishnan '23 (Biomedical Engineering & Computer Science and Engineering, ENG)
Advisors: Paola Vera-Licona, Assistant Professor, Center for Quantitative Medicine
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/study-of-aml-differentiation-therapy-model

Acute Myeloid Leukemia is the cancer of the blood and bone marrow. In a healthy human, the immature stem cells differentiate into mature blood cells; however, in AML, the stem cells are arrested at an immature state. A common treatment of AML is differentiation therapy, where these immature cells are targeted to differentiate, but after treatment, relapse is common. The main goal of our study is to identify the mechanisms that allow for the existence of relapse and to identify complementary targets that prevent relapse in the long term.

Effects of Ketogenic Diet on Spatial Memory
Adam Baran '21 (Biological Sciences, CLAS)
Ian Davies-Welsh '22 (Molecular and Cell Biology, CLAS)
Advisor: Geoffrey Tanner, Assistant Professor in Residence, Physiology and Neurobiology
Supported by: Our Supply Award
Online Materials: https://portfolium.com/entry/effects-of-ketogenic-diet-on-spatial-memory

Our project will consist of three stages, the first of which is spatial conditioning of the flies to recognize the stimulus that will guide them to the safe zone. For this purpose, we are going to build a heat maze apparatus in which Drosophila flies will be taught to recognize a safe zone. The second stage will be focused on traumatic brain injuries and diet modification. The third part of our experiment involves the tau assay that will allow us to evaluate the effects of a ketogenic diet on aberrant tau proteins in flies with spatial recognition impairments.

Genetic Signatures of Range Expansion and Local Adaptation in Arctic Grayling
Gabriel Barrett '21 (Environmental Sciences, CAHNR)
Advisors: Jill Wegrzyn, Assistant Professor, Ecology and Evolutionary Biology; Mark Urban, Professor, Ecology and Evolutionary Biology
Online Materials: https://portfolium.com/entry/frontiers-2021-arctic-grayling

Through applying genotyping-by-sequencing we were able to measure the degree of genetic diversity in Arctic Grayling populations found in North Slope, Alaska. Results from this study will help identify the underlying mechanisms behind gene flow and local adaptation within a rapidly changing landscape.

Effects of Poor Maternal Nutrition During Gestation on Colostrum and Milk Quality in Sheep
Alexandra Bettencourt '21 (Pathobiology & Animal Science, CAHNR)
Advisor: Sarah Reed, Associate Professor, Animal Science
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/effects-of-poor-maternal-nutrition

Forty-six Dorset ewes were bred and randomly assigned to one of three diets: restricted (RES; 60%, n = 17), control (CON; 100%, n = 13), or over-fed (OVER; 140%, n = 16) of National Research Council (NRC) requirements for total digestible nutrients. Colostrum, or first milk, samples were collected from ewes within 24 hours of birth, and milk samples were collected on days 3 and 21 postpartum for analysis. The study aimed to evaluate how variations in maternal nutrition during gestation may impact the quality and concentration of vital nutrients provided to lambs by sheep colostrum and milk.

Identifying and Classifying Disease Resistance Genes in White Pines
Akriti Bhattarai '21 (Molecular and Cell Biology & Statistics, CLAS)
Advisor: Jill Wegrzyn, Assistant Professor, Ecology and Evolutionary Biology
Supported by: SURF Award - Treibick Scholar
Online Materials: https://portfolium.com/entry/disease-resistance-genes-in-white-pines

North American white pine species are susceptible to an invasive disease known as white pine blister rust (WPBR). Candidate genes for major resistance loci are classified in some white pine species as NLRs (distinguished by their characteristic protein domains). Transcriptome analysis was conducted on two North American and six Asian species of white pines to assess the complexity and diversity of resistance genes. Asian white pine species have coevolved with the pathogen causing WPBR, and comparisons of orthologous transcripts between North American and Asian white pine species may help identify potential resistance gene targets.

Using Single-Cell RNA-Seq Analysis to Assess Heterogeneity in a Model of Ependymoma Brain Tumors
Gavin Birdsall '21 (Physiology and Neurobiology, CLAS)
Advisor: Joseph LoTurco, Professor, Physiology and Neurobiology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/scrnaseq-analysis-of-ependymoma-brain-tumor

Single cell RNA sequencing analysis of a model of Ependymoma brain tumors. Heterogeneity of tumors classified by cell type using differential gene expression. Evidence of immune cell invasion and discrete subpopulations involved in immune system response.

Adverse Childhood Experiences and Biological Embedding: A Systematic Review of the Evidence and Methodological Considerations
Julie Brisson '21 (Human Development and Family Sciences & Psychological Sciences, CLAS), University Scholar
Justin Le '22 (Molecular and Cell Biology, CLAS)
Advisors: Blair Johnson, Distinguished Professor, Psychological Sciences; Preston Britner, Professor, Human Development and Family Sciences
Supported by: SURF Award - Treibick Scholar
Online Materials: https://portfolium.com/entry/childhood-adversity-and-biological-embedding

Nearly two-thirds of the U.S. population has suffered from adverse childhood experiences (ACEs). ACEs have been linked to a greater incidence of chronic illness, which has led to significant public health concerns. Thus, this review examines key characteristics in the longitudinal relation between ACEs and biomarkers and makes recommendations to improve the methodological rigor of future studies.

Optogenetics in Excitation/Inhibition of Drosophila Aggression Neurons
Daniel Brocke '21 (Physiology and Neurobiology, CLAS)
Qinwei Chen '21 (Biological Sciences, CLAS)
Advisor: Geoffrey Tanner, Assistant Professor in Residence, Physiology and Neurobiology
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/optogenetics-in-drosophila-aggression

In order to further understand the mechanism behind aggression in Drosophila that have experienced traumatic brain injury, we are building an optogenetic rig. Optogenetics is an emerging field that allows activation and inhibition of specific cell functions using a light stimulus. A functional optogenetics rig includes a circuit for fine control of lights and camera activity regulated by an Arduino.

Metal-Free Dehydrogenation Reaction of an Organic Compound Using a Recyclable Oxoammonium Salt
William Brydon '22 (Chemistry, CLAS), University Scholar
Advisor: Nicholas Leadbeater, Associate Professor, Chemistry
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/metal-free-dehydrogenation-of-an-organic-compound

Creating more sustainable and efficient methods to make molecules is currently a hot topic in chemistry. For my research project, I aimed to build off the work already done in this area by focusing on the chemical transformation of dehydrogenation. Dehydrogenation of an organic compound is usually performed by toxic metal reagents that are harmful to the environment, but I present an alternative metal free method using an organic salt known as Bobbitt's Salt.

The Effect of Exercise on Patients with Non-Alcoholic Fatty Liver Disease: A Meta-Analysis
Rei Bufi '21 (Molecular and Cell Biology & IMJR: Globalization, Art and Activism, CLAS)
Advisor: Linda Pescatello, Distinguished Professor, Kinesiology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/the-effects-of-exercise-on-patients-with-nafld

Non-alcoholic fatty liver disease (NAFLD) is the number one cause of liver disease worldwide. Lifestyle therapies such as diet and exercise are the current cornerstone treatment for the management of NAFLD. This meta-analysis examines the effects of exercise on NAFLD biomarkers such as liver enzymes, blood lipid content, and insulin sensitivity.

Optimization of Behavioral Assays Used to Analyze Anxiety Behavior in a Restraint Stress Paradigm
Emma Burleigh '21 (Physiology and Neurobiology, CLAS)
Advisor: Alexander Jackson, Associate Professor, Physiology and Neurobiology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/optimization-of-behavioral-assays-used-to-analyze

This was a literature analysis for optimizing methods for assessing stress and anxiety in a mouse model of acute stress. Preliminary data was collected and analyzed using this optimized protocol in a cohort of wildtype C57 mice.

Robotic System with Integrated Portable Bioprinter
Stefani Chiarelli '21 (Biomedical Engineering, ENG)
Advisor: Ali Tamayol, Associate Professor, Biomedical Engineering
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/robotic-system-with-integrated-portable-bioprinter

A robot arm has not yet been used for bioprinting, and we wish to optimize its parameters for more complex, translational projects. Specifically, this project consisted of optimizing ranges of input characteristics that enable complex geometrical formations.

A Remote Sensing Approach to Evaluating Secondary Stressors and Forest Health
Mari Cullerton '21 (Environmental Sciences & Natural Resources, CAHNR), University Scholar
Advisors: Robert Fahey, Assistant Professor, Natural Resources and the Environment; Zhe Zhu, Assistant Professor, Natural Resources and the Environment; Thomas Worthley, Associate Extension Professor, Natural Resources and the Environment
Supported by: SURF Award - Wyand Family Honors Scholarship
Online Materials: https://portfolium.com/entry/using-remote-sensing-to-evaluate-forest-health

Primary damage agents in forested ecosystems may lead to stressed vegetation and tree mortality. Secondary stressors have the potential to induce substantial additional tree mortality and may lead to additive or even exponential increases in disturbance severity. This Project investigates (i) the role of secondary mortality agents, specifically the two-lined chestnut borer (*Agrilus bilineatus*) and parasitic fungus, *Armillaria*, in an unprecedented mortality event largely focused on native oak (*Quercus* spp.) species in Eastern Connecticut and (ii) how the use of satellite imagery and remote sensing may be used to better understand spatial and temporal patterns of secondary disturbance agents in forested ecosystems.

SH2 Profiling Constructs
Grace Curley-Holmes '22 (Biomedical Engineering, ENG)
Advisor: Kazuya Machida, Associate Professor, Genetics and Genome Sciences
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/sh2-profiling-constructs

A panel of labeled Src Homology 2 (SH2) domain probes have been constructed and sub cloned. Subsequently functional proteins were purified using bacterial expression system and fluorescent dyes were attached. The final step of the project is to validate the binding activity of the probes in biochemical and imaging analyses.

A Cautionary Tale About the Importance of Taking Individual Differences into Account When Examining Whether tDCS can Enhance Cognitive Control
Sydney Darling '21 (Physiology and Neurobiology, CLAS)
Advisor: Eiling Yee, Assistant Professor, Psychological Sciences
Online Materials: https://portfolium.com/entry/the-effect-of-tdcs-on-cognitive-control

Can inhibitory cognitive control be enhanced via anodal tDCS over left prefrontal cortex? Evidence is mixed, with efficacy likely depending on factors including electrode position and size, stimulation intensity and duration, whether the task is performed during or after stimulation, and domain of cognitive control examined (for meta-analysis, see Imburgio & Orr, 2018). We examined the impact of anodal stimulation over left prefrontal cortex on inhibitory function, as measured via Flanker and Stroop, using an F3-RSO montage. Baseline performances on Flanker and Stroop were measured before stimulation. Afterward, anodal or sham stimulation began (between participants). After 3 minutes of stimulation (1.5mA with 5x7cm saline-soaked sponges), participants repeated the Flanker and Stroop tasks (each lasting 5 minutes) while stimulation continued. If anodal tDCS enhances inhibitory function, then when comparing repeated to baseline performance, there should be a smaller incongruency disadvantage (difference incongruent and congruent trials) for anodal compared to sham—reflecting greater ease inhibiting irrelevant/incongruent information. No differences in RT or accuracy were found in either task. However, if we had compared the incongruency disadvantage after stimulation in anodal vs. sham groups without accounting for baseline performance, we would have observed (contrary to our predictions) a significantly larger incongruency disadvantage in Flanker in the anodal group (because at baseline, the anodal group had a larger incongruency disadvantage). Results suggest that the F3-RSO montage with the simulation parameters we used may not impact inhibitory control, and highlight the importance of using designs that take into account individual differences in baseline inhibitory function.

Optimizing Gestational Nutrition and its Effects on The Developing Embryonic Nervous System
Jake DeFrancesco '21 (IMJR: Neuroscience, CLAS)
Advisor: Roslyn Fitch, Professor, Psychological Sciences
Online Materials: https://portfolium.com/entry/optimizing-gestational-nutrition

In this project, I identify several nutrients that are essential for healthy embryonic neurodevelopment. I also investigate intake trends across socioeconomic status and educational attainment. Lastly, I discuss the social consequences of this potential nutritional disparity.

Data Curation and Integration of Georeferenced Forest Population Studies in the TreeGenes Database
Charles Demurjian '21 (Biological Sciences, CLAS)
Advisor: Jill Wegrzyn, Assistant Professor, Ecology and Evolutionary Biology
Online Materials: https://portfolium.com/entry/data-curation-and-of-georeferenced-forest-trees

Curation and integration of publicly available georeferenced forest population studies. Once uploaded, the associated genetic, phenotypic, and environmental data is viewable on Cartogratree, our visualized map-based web tool.

Public Perception of the Legitimacy of the Supreme Court: The Impact of Improper Behavior
Erin Dennehy '21 (Political Science & IMJR: Law and Society, CLAS)
Advisor: Virginia Hettinger, Associate Professor, Political Science
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/improper-judicial-behavior-and-legitimacy

This project will analyze whether improper judicial behavior of Supreme Court justices is a factor in the public perception of the legitimacy of the Supreme Court. Such analysis will be based off of the results of an experimental survey that records the reaction of participants to a news article discussing a hypothetical Supreme Court nominee that has been involved in improper behavior.

Female Representation in Children's Literature
Francesca DePalma '21 (Elementary Education, ED)
Advisor: Catherine Little, Professor, Educational Psychology
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/female-representation-in-childrens-literature

Female representation in literature has been a topic of interest for many years due to the limited range of representation and female perspective in many types of texts. My project is a content analysis of fifty children's books where each book went through a series of questions to gather data about the representation included.

Evolutionary History of Rabies Virus in Connecticut
Julia Desiato '21 (Pathobiology, CAHNR)
Advisors: Dong-Hun Lee, Assistant Professor, Pathobiology and Veterinary Science; Guillermo Risatti, Professor, Pathobiology and Veterinary Science
Online Materials: https://portfolium.com/entry/evolutionary-history-of-rabies-virus-in-ct

Rabies virus is a zoonotic pathogen that has maintained a stable persistence in Connecticut with 3421 cases seen in the state from 2000-2019. Through molecular epidemiological techniques and next-generation sequencing, we aimed to determine the complete genome sequences of circulating rabies viruses in the State in order to unravel origin, evolutionary history, and spread patterns of the virus. Our comparative phylogenetic analysis revealed multiple subgroups (1a-1c, 2a-2d) of rabies viruses circulating in Connecticut that have evolved independently, highlighting enhanced genomic surveillance to identify potential cross-species transmission of variant rabies viruses.

The Evolution of Novel DA Transporter Inhibitors and their Effects on Effort-Related Motivation: A Review
Mukund Desibhatla '21 (Physiology and Neurobiology & Spanish, CLAS)
Advisor: John Salamone, Distinguished Professor, Psychological Sciences
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/the-evolution-of-novel-da-transport-inhibitors

Depression is a potent disorder that can cause motivational deficits such as psychomotor retardation, anergia, apathy, and fatigue. This project is a comprehensive review of various atypical dopamine transport inhibitors investigated in the Salamone Lab and their potential in ameliorating motivational deficits.

The UConn Podcast Symposium
Mukund Desibhatla '21 (Physiology and Neurobiology & Spanish, CLAS)
Vinayak Mishra '21 (Molecular and Cell Biology, CLAS)
Advisors: Stephen Stifano, Associate Professor in Residence, Communication; Anne Kim, Assistant Director, Honors Program; Jason McMullan, Program Coordinator, Student Union (WHUS Radio)
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/the-uconn-podcast-symposium

The UConn Podcast Symposium is an event purposed to tailor stories of leadership to the UConn community. Through engaging keynotes and interdisciplinary panels, seniors Mukund Desibhatla and Vinayak Mishra use their passion for storytelling to bridge gaps in mentorship.

Facing Challenges in Online Learning
Christopher Dwy '22 (Psychological Sciences, CLAS)
Advisor: Edward Neth, Lecturer, Chemistry
Online Materials: https://portfolium.com/entry/facing-challenges-in-online-learning

In this ongoing study, Dr. Neth and I review the current literature regarding the impact of the transition to online learning caused by the COVID-19 pandemic. We will continue to interview students and faculty to get a better perspective of the difficulties faced in providing quality online education, and suggest methods for curbing academic dishonesty.

Ethnic Cleansing within International Criminal Law
Brianna Dyer '21 (IMJR: Global Studies & Human Rights, CLAS)
Advisor: Richard Wilson, Professor, Law
Online Materials: https://portfolium.com/entry/ethnic-cleansing-within-international-criminal-law

Thrown around carelessly, 'ethnic cleansing' is a term often used amongst journalists, lawyers, and political figures to encompass crimes within mass atrocities. When 'ethnic cleansing' is used in place of genocide, war crimes, and crimes against humanity, legal status is given despite it having none. To bring rigor and consistency, I propose my own definition and compare it with crimes against humanity, war crimes, and genocide, discussing the similarities of each category and how 'ethnic cleansing' fits within the scope of international criminal law.

Tackling Antibiotic Treatment Failure: Engineering Probiotic *E. coli* Nissle to Kill Persister Cells

Hanna Englander '21 (Physiology and Neurobiology, CLAS)
Advisor: Wendy Mok, Assistant Professor, Molecular Biology and Biophysics
Supported by: SURF Award - The Antonio and Alison Caxide Award for Undergraduate Research
Online Materials: https://portfolium.com/entry/engineering-probiotic-e-coli-nissle

Through the use of a toxin-antitoxin system, I have engineered model persisters of *E. coli* Nissle bacteria that are able to withstand antibiotic treatment. In doing so, I will be assessing how these engineered cells affect persistence of pathogenic strains when treated with antibiotic and co-cultured together.

Applying Machine Learning to Particle Detectors

Alexander Ercolani '21 (Physics, CLAS; Computer Science and Engineering, ENG)
Advisor: Richard Jones, Professor, Physics
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/neural-networks-for-particle-detectors

My project explores the use of machine learning applied to data from the GlueX particle detector. Over the course of my project I implemented a neural network capable of identifying where a particle hit the detector given raw input from the detector.

Functional Electrode Stimulation for Precision Limb Coordination

Amit Eshed '21 (Biomedical Engineering, ENG)
Bryan Ziobron '21 (Electrical Engineering, ENG)
Joseph Chenard '21 (Electrical Engineering, ENG)
Advisors: Patrick Kumavor, Associate Professor in Residence, Biomedical Engineering; Krystyna Gielo-Perczak, Associate Professor in Residence, Biomedical Engineering
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/functional-electrode-stimulation

Our project is to develop a control system that will stimulate muscles to coordinate movement using preset signals. The aim of this project is to return movement back to patients with paralysis.

The Right to Health and the Philippine Drug War

Floraine Evardo '21 (IMJR: Human Health, CLAS)
Advisor: César Abadía, Associate Professor, Anthropology
Online Materials: https://portfolium.com/entry/the-right-to-health-and-the-philippine-drug-war

This project investigated how the right to health plays a role in the criminalization of drugs and how it affects lives of drug addicts and personalities, using the Philippine Drug War as a case study. Analyzing several factors, including an authoritarian administration (the Duterte Regime) that uses fear based tactics, poverty, lack of resources for rehabilitation and violations of human rights are at play and how they affect the allostatic load and overall health of, not only the lives of those directly criminalized, but the rest of the country's population.

Synthesis and Testing of Fluorophore and Quencher Components for Tethered Voltage Sensitive Dyes
Daniel Fairchild '21 (Structural Biology and Biophysics & Molecular and Cell Biology, CLAS)
Advisors: Ping Yan, Assistant Professor, Center for Cell Analysis and Modeling; James Cole, Professor, Molecular and Cell Biology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/testing-of-fluorophores-and-quenchers-for-vsds

Voltage sensitive dyes offer the ability to measure the electrical activity of large groups of cells. The research described in this progress details information about the synthesis as well as testing of potential voltage sensitive dyes.

Risk Factors for WIC Non-Participation by Parents of Eligible Children
Yuliya Faryna '21 (IMJR: Global Health, CLAS)
Advisors: Elizabeth Kline, Assistant Professor in Residence, Molecular and Cell Biology; Sharon Smith, Adjunct Faculty, Molecular and Cell Biology
Supported by: Undergraduate Research Assistant Program (CCMC/MCB)
Online Materials: https://portfolium.com/entry/risk-factors-for-parent-wic-non-participation-1

For the past 3 years, I participated in the Undergraduate Research Assistant Program, under the supervision and guidance of Dr. Sharon Smith MD and Dr. Elizabeth Kline. My capstone project, titled "Risk Factors for WIC Non-participation by Parents of Eligible Children," is a clinical research study at Connecticut Children's Emergency Department. It investigates the reasons why parents are not using the Supplemental Special Nutrition Program for Women, Infants, and Children (WIC) for their eligible children. Ultimately, the goal of this project is to gain more insight on how to decrease childhood food insecurity in Connecticut by increasing child WIC uptake.

Evidence of Cyanobacteria through Geological Time-Carbonate Precipitation
Breanna Felt '21 (Ecology and Evolutionary Biology, CLAS)
Advisor: Pieter Visscher, Professor, Geosciences
Supported by: Work-Study Research Assistant Program
Online Materials: https://portfolium.com/entry/evidence-of-cyanobacteria-through-geological-time

Cyanobacteria have been contributing to the geological record for billions of years by microbially-induced precipitation. Understanding this mineralization process can help interpret microbial interactions throughout history and their role in the rock record.

The Generalized Riemann Hypothesis and its Connection to Primes
Peter Fenteany '21 (Mathematics, CLAS; Computer Science, ENG), University Scholar
Advisors: Keith Conrad, Associate Professor, Mathematics; Benjamin Fuller, Assistant Professor, Computer Science and Engineering; Alvaro Lozano-Robledo, Professor, Mathematics
Online Materials: https://portfolium.com/entry/the-generalized-riemann-hypothesis-and-its-connect

GRH is a long-standing open problem in mathematics and number theory that has many ramifications to the distribution of primes. In this project, I study the background needed to understand GRH and then see the effects it being true would have on primality tests important to cryptography.

Understanding Obesity: Barriers and Assets to Healthy Eating in Black Adults Living in Food Deserts
Kyra Foster '23 (Nutritional Sciences, CAHNR), LSAMP Scholar, McNair Scholar
Advisor: Loneke Blackman Carr, Assistant Professor, Nutritional Sciences
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/understanding-obesity-barriers-and-assets-to-heal

America is struggling with an obesity epidemic and black adults are suffering at much higher rates than any other race. This is largely due to the fact that black adults make up the majority of residents of food deserts, which are areas where it is difficult to find or buy affordable or good quality food. This project aims to understand the barriers to healthy eating experienced by black adults residing in food deserts, and propose ways to navigate around those barriers so that residents can achieve the most healthful diet possible given their circumstances.

Factors in End-of-Life Planning Among Connecticut Older Adults
Simone Fournier '21 (IMJR: Healthcare and Aging, CLAS)
Advisor: Edna Brown, Associate Professor, Human Development and Family Sciences
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/end-of-life-planning-factors-ct-older-adults

My senior thesis research examines the factors that may impact the decision to complete end-of-life planning among older adults in Connecticut, in order to inform state-specific policies and interventions to promote end-of-life planning. Fifty Connecticut residents aged sixty and older participated in a mixed-methods online survey and optional video interview about their social and physical activity levels, general health, experiences with COVID-19, and experiences with end-of-life planning. Our preliminary qualitative findings indicate that the decision to have a discussion about end-of-life wishes is influenced by one's social circle, experiences with planning or loss, and perception of health.

Mothers' Experiences with Food Pantries During the COVID19 Pandemic and Interest in Mobile Food Pantries
Quamyia Foye '22 (Nutritional Sciences, CAHNR)
Alexa Horkachuck '21 (Dietetics, CAHNR)
Advisor: Molly Waring, Associate Professor, Allied Health Sciences
Supported by: Work-Study Research Assistant Program
Online Materials: https://portfolium.com/entry/mothers-and-food-pantries-during-the-pandemic

Due to the increase of food insecurity more families are turning to food banks and food pantries. The aim of this study is to better understand mothers' experiences with food pantries during the pandemic, and to assess their interest in mobile food pantries.

Salir Adelante: First-Generation Latinx College Students in Their Pursuit of Higher Education
Jenifer Gaitan '21 (History, CLAS), University Scholar
Advisors: Laura Bunyan, Assistant Professor in Residence, Sociology; Ingrid Semaan, Associate Professor in Residence, Sociology; Joel Blatt, Associate Professor, History
Supported by: OUR Supply Award, SURF Award
Online Materials: https://portfolium.com/entry/salir-adelante

At the heart of this project are ten individual interviews conducted with Latinx participants who are the first in their families to attend college in the US. This project explores the obstacles they face on their academic journeys and makes policy recommendations to help support students.

CXCL14 as a Therapeutic Target for Microglia in Alzheimer's Disease

James Galske '21 (Physiology and Neurobiology, CLAS)
Advisor: Riqiang Yan, Professor, Neuroscience
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/undergraduate-frontiers-research-symposium

CXCL14 is a novel chemokine that has been shown to recruit a variety of immune cells and combat inflammation in the periphery but has not been studied in Alzheimer's Disease. Our study examined whether CXCL14 could recruit microglia or astrocytes in order to clear AB plaques. Additionally, we examined whether CXCL14 could prevent cytotoxicity in microglia and neurons *in vitro.*

Influences of Habitat Quality on Juvenile Condition in Anadromous Alewives (*Alosa pseudoharengus*)

Peter Goggins '21 (Environmental Sciences, CAHNR)
Advisor: Eric Schultz, Professor, Ecology and Evolutionary Biology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/influences-of-habitat-quality-on-alewives

In order to generate a better understanding of how available resources and infraspecific competition affect the physical condition of juvenile Alewives migrating out to sea, I sampled groups of these migrants from the outflows of their natal ponds on a weekly basis from June through November 2020. Using the data and samples that I collected, I calculated the condition factor and lipid content of each individual in order to assess how robust they were, relative to their peers from other ponds. In the coming months, I will be incorporating a growth rate analysis in order to attain a better understanding of how these fish fared during their natal periods.

Identifying *Mycoplasma pneumoniae* Protective Antigens Using Proteomic Approaches

Meagan Goodridge '21 (Animal Science & Pathobiology, CAHNR)
Advisors: Steven Szczepanek, Associate Professor, Pathobiology and Veterinary Science; Steven Geary, Professor, Pathobiology and Veterinary Science
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/mycoplasma-pneumoniae-vaccine-protective-antigens

Contributing to the scientific search for a *Mycoplasma pneumoniae* vaccine, this project explores the importance of keeping proteins in their native conformation, in order to illicit a protective immune response by the host. This study involved proteomic work and *in vivo* mouse studies, and provides promising results for future *Mycoplasma* vaccine studies.

The Prevalence of Tooth Loss and Chewing Problems and their Association with Dietary Quality and Health Status in Mobile Food Pantry Users

Samhita Gurrala '21 (Nutritional Sciences, CAHNR; Women's, Gender, and Sexuality Studies, CLAS)
Advisor: Ock Chun, Professor, Nutritional Sciences
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/effect-of-dental-issues-on-food-pantry-users-diet

Food insecurity affects 1 in 10 people in the US, and the diet quality and overall health of this population is at risk. Using data collected from food pantry users in Windham County, CT, this study was aimed to document the prevalence of tooth loss and chewing problems in this vulnerable population and to examine the association between tooth loss and chewing problems and dietary quality and health status.

Meaning-Making and Positive Psychology In Cancer
David Hanna '22 (Psychological Sciences & Physiology and Neurobiology, CLAS)
Advisor: Crystal Park, Professor, Psychological Sciences
Supported by: Work-Study Research Assistant Program
Online Materials: https://portfolium.com/entry/meaning-making-and-positive-psychology-in-cancer

Our project reviewed the meaning-making model in the context of cancer, specifically looking at meaning, spirituality, and perceived growth among cancer survivors. Our findings indicate the importance of meaning-making interventions for cancer survivors.

Identifying the Cell Composition and Clonal Diversity of Supratentorial Ependymoma Using Single-Cell RNA-Sequencing
James He '21 (Molecular and Cell Biology, CLAS), University Scholar, Holster Scholar
Advisor: Joseph LoTurco, Professor, Physiology and Neurobiology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/single-cell-transcriptomics-of-ependymoma-tumors

Supratentorial ependymoma (ST-EPN) is an aggressive subtype of a pediatric brain tumor, and has been found to be driven by an oncogenic fusion mutation. Molecular characterization of this mutation has allowed the LoTurco Lab to develop a new mouse model of ST-EPN, which can be used to study the different mechanisms of tumorigenesis. My project involves a combined computational and experimental approach to define the molecular signatures of supratentorial ependymoma cells and to unravel the heterogeneous cell populations present in supratentorial ependymoma tumors.

The Critical Need for Early Childhood Development Programs in Uganda
Grace Herrick '21 (IMJR: Global Health, CLAS)
Advisors: Rhiannon Smith, Associate Professor, Psychological Sciences; César Abadía, Associate Professor, Anthropology
Online Materials: https://portfolium.com/entry/the-need-for-early-childhood-development-in-uganda

This research explores the economic and developmental benefits of preschool education programs, which would serve the Ugandan nation as they have low school completion rates, high grade repetition, and little access to quality preschool programs. Because of this, the disparities between children of economic means and those in poverty in Uganda are even greater, so access to primary education only serves to highlight the disparity, rather than narrow it. The solution is to invest in high quality preschool education, as the best way to minimizing the disparity.

Localizing Lateral Amygdala Projecting Neurons in the Motor Cortex
Daniel Hettrick '21 (Physiology and Neurobiology, CLAS)
Advisor: Linnaea Ostroff, Assistant Professor, Physiology and Neurobiology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/localizing-lateral-amygdala-projecting-neurons-dh

This SURF Summer 2020 project focuses on my ongoing project to determine how our brains are able to differentiate between external and self-generated sounds. This research is crucial for a better understanding of neurological diseases with symptoms of auditory hallucinations such as schizophrenia.

Growing Hate: The Vice, Backlash, and Political Events Influencing the White Nationalist Movement Since 2007

Brendan Hogan '21 (Political Science & Philosophy, CLAS)
Advisors: Michael Morrell, Associate Professor, Political Science; Heather Battaly, Professor, Philosophy
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/examining-the-white-nationalist-movement-since-07

National socio-political changes and individual philosophical and psychological factors have contributed to the growth of the white nationalist movement in the United States since 2007. While many scholars have researched this growth at either the national or individual level, most have not grouped these levels of analysis together. This project considers how white nationalists' political dog whistling and arrogant attitudes, alongside political backlash, has led to the growth of white nationalism since 2007.

Linking Human Activities to Coastal Water Quality in Southern New England: Past and Present

Amelia Hurst '21 (Marine Sciences & Anthropology, CLAS), University Scholar
Advisors: Craig Tobias, Professor, Marine Sciences; Jamie Vaudrey, Assistant Research Professor, Marine Sciences; Eleanor Ouimet, Assistant Professor in Residence, Anthropology; William Ouimet, Associate Professor, Geosciences & Geography
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/linking-human-activities-to-coastal-water-quality

The theme of this project is to look at the timing and effect of direct and indirect anthropogenic influences on the marine environment in embayments in southern New England over the past decades to century timescale. This project focuses on (i) investigating the effects of human land-use practices from colonial through post-industrial times, (ii) determining baseline conditions and natural climatic variability for the sampled region, and (iii) analyzing the response of marine ecosystems to specific local management actions aimed to improve water quality. A coastal sediment core from Mumford Cove, CT was collected and analyzed to answer these questions.

Pathology and Prevention of Lean Non-Alcoholic Steatohepatitis: A Distinct Disease Regulated by FXR

Anisha Jain '21 (Pathobiology, CAHNR)
Advisor: Christopher Blesso, Associate Professor, Nutritional Sciences
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/pathology-and-prevention-of-lean-nash

Non-alcoholic fatty liver disease (NAFLD) and its more severe form of non-alcoholic steatohepatitis (NASH), typically arise in individuals who are obese. In these cases, typically weight loss is the treatment option. In recent years physicians have discovered a large proportion of non-obese individuals who develop NASH. This project was aimed at better understanding the disease process for non-obese NASH, as well as identifying pharmaceutical and nutritional methods to mitigate steatosis and inflammation in mouse models of NASH.

Impulse Noise Induced Tinnitus in Mice

Avni Jain '21 (Physiology and Neurobiology & Human Rights, CLAS)
Advisor: Douglas Oliver, Professor, Neuroscience
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/impulse-noise-induced-tinnitus-in-mice

In this study we focused on creating parameters to successfully induce tinnitus in mice. This is an ongoing study meant to create reliable models for diagnostic and therapeutic development in the future.

Sustainable Honey Bee (*Apis mellifera*) Queen Rearing
Austin Jatkowski '21 (Sustainable Plant and Soil Systems, CAHNR)
Advisor: Julia Cartabiano, Manager, Spring Valley Student Farm
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/frontiers-2021

This IDEA Grant's goal is to multiply and propagate honey bees to increase populations for the environmental and social benefits that they provide to society through queen rearing. Select a specific subspecies of *Apis mellifera* well suited for New England climate with an innate overwintering ability to propagate for future preservation and survivability of local honey bees.

Strength Development in Chemically Stabilized Clay
Caitlin Jenkins '22 (Civil Engineering, ENG)
Advisor: Maria Chrysochoou, Professor, Civil and Environmental Engineering
Online Materials: https://portfolium.com/entry/strength-development-in-chemically-stabilized-clay

This project studies how stabilized clays (clay based concretes) gain strength over time after being set and what chemical reactions create that strength. The ultimate aim is to make a model that predicts the connection between strength development and the internal chemical reactions occurring within stabilized clays.

The Cancer Kid
Chad Jennings '21 (English, CLAS)
Advisor: Cathy Schlund-Vials, Professor, English & Asian and Asian American Studies
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/the-cancer-kid

The Cancer Kid is a comic about my experiences with cancer as a kid and how they impacted me. This project is intended to provide healthy representation for children previously diagnosed with cancer and help them to better cope with their experience.

Sauk Trail East
Aaron Johnson '21 (IMJR: Sustainable Urban Design, CAHNR)
Advisors: Mariana Fragomeni, Assistant Professor, Plant Science and Landscape Architecture; Carol Atkinson-Palombo, Associate Professor, Geography; Norman Garrick, Professor, Civil and Environmental Engineering
Online Materials: https://portfolium.com/entry/sauk-trail-east

Sauk Trail East is an urban mobility research and design study following a proposal for the world's first public connected autonomous vehicle corridor (CAV-C). The intended route links Ann Arbor to the City of Detroit, whose residents have faced severe historic and ongoing issues surrounding transportation equity and access. This study examines CAV-C's potential to relink Detroit communities via changes to land use, modal choice, and intermodal prioritization.

UConn Athletic Deficit
Donovan Johnson '21 (Economics, CLAS), McNair Scholar
Advisor: Oskar Harmon, Associate Professor, Economics
Supported by: Work-Study Research Assistant Program
Online Materials: https://portfolium.com/entry/uconn-athletic-deficit

I assisted on research on the topic of UConn Deficit 2020, developed a readings list for the different viewpoints, and developed data tablets from IPEDS and EADA data bases.

Electric Vehicle Safety Monitoring System
Mitchell Johnson '22 (Electrical Engineering, ENG)
Gregory Haydon '21 (Mechanical Engineering, ENG)
Advisor: Sung Yeul Park, Associate Professor, Electrical and Computer Engineering
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/electric-vehicle-safety-monitoring-system

The goal of this project is to develop a system that monitors safety parameters in an electric vehicle. This system will control the electronics in the car and shut the car down if any safety faults are detected.

Untold Stories of the African Diaspora: The Lived Experiences of Black Caribbean Immigrants in the Greater Hartford Area
Shanelle Jones '21 (Political Science & Human Rights, CLAS), University Scholar
Advisors: Charles Venator, Associate Professor, Political Science; Virginia Hettinger, Associate Professor, Political Science; Sara Silverstein, Assistant Professor, History & Human Rights
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/frontiers-untold-stories-of-the-african-diaspora

In this project, I study the prospect of economic incorporation into American society for West Indian immigrants in the Greater Hartford Area. I conducted and am analyzing data from an online survey of West Indian economic migrants residing in the Greater Hartford Area as well as 10 oral histories to gain a broader perspective on the economic attainment of these immigrants. This project focuses on the following two questions: (1) What are the prospects for economic incorporation into American society for English-speaking West Indians in CT?; (2) Are Afro-Caribbean immigrants affected by downward assimilation?

STEM Can't Save Us: Climate Change is a Social Problem
Emily Kaufman '21 (Environmental Studies & Sociology, CLAS)
Advisor: Phoebe Godfrey, Associate Professor in Residence, Sociology
Supported by: SHARE Award
Online Materials: https://portfolium.com/entry/stem-cant-save-us-climate-change-is-social

Often, environmental crises are portrayed to be STEM (Science, Technology, Engineering, Mathematics) and economic issues. However, using interview data from students in the Environmental Studies Program, I will explore how environmental education must provide a strong background in social theory and social justice in order to adequately prepare students to address environmental issues.

The Relationship Between Endurance Exercise and Music on Stress and Enjoyment
Sejal Khant '21 (Allied Health Sciences, CAHNR)
Allyson Cosman '21 (Exercise Science, CAHNR)
Advisor: Jaci VanHeest, Associate Professor, Educational Psychology
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/exercise-and-music-with-stress-and-enjoyment

Our study aimed to determine if listening to music counteracts negative emotions towards endurance exercising through measuring blood cortisol levels and through surveys of perceived enjoyment. The overall goal of our experiment was to determine if listening to liked musical artists during a workout session will increase a person's level of enjoyment through decreasing stress, in comparison to a no music control session.

Case Study of Two Teachers Who Implemented Thinking Like Mathematicians: Challenging All Grade 3 Students
Julianna Kingsbury '23 (Human Development and Family Sciences, CLAS)
Advisor: E. Jean Gubbins, Professor in Residence, Educational Psychology
Supported by: Work-Study Research Assistant Program
Online Materials: https://portfolium.com/entry/frontiers-exhibition-case-study-of-two-teachers

I completed a case study of two experimental teachers who implemented the math unit. The data sources included their responses to teacher logs and the teacher interview protocol. Teachers implemented the unit with their third-grade math classes at one school over several months. The teachers selected for this case study opted to participate in the study twice, once in the 2018-19 school year and once in the 2019-20 school year.

Fabrication of Microneedles for Chronic Wound Healing
Manogna Komma '23 (Biomedical Engineering, ENG)
Advisor: Ali Tamayol, Associate Professor, Biomedical Engineering
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/microneedles-for-chronic-wound-healing

This project optimized the fabrication process of PEGDA microneedles and optimized the shape and structure of microneedles for better wound care.

SMLM Particle Fusion for Higher Rendering
Nicholas Kuang '22 (Allied Health Sciences, CAHNR)
Advisor: Ji Yu, Associate Professor, Genetics and Genome Sciences & Center for Cell Analysis and Modeling
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/hrp-smlm-particle-fusion-for-higher-rendering

A computational project utilizing ImageJ, plugin Octane developed by Yu Lab and Matlab to process super-resolution microscopy data (ex: STORM/PALM). The aim of the project is to create a post-processing and/or data analysis pipeline for STORM/PALM data utilizing algorithms such as the Monte Carlo method and Fourier Ring Correlation for Single-Molecule localization.

Computational Investigations into Binding Dynamics of Tau Protein Antibodies: Affinity, Specificity, and the Potential for Intentional Design
Katherine Lee '22 (Structural Biology and Biophysics, CLAS), University Scholar
Advisor: Eric May, Associate Professor, Molecular and Cell Biology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/computational-studies-of-tau-protein-antibodies

Abnormal tau protein is linked to the early onset of Alzheimer's disease. This study investigates the binding of antibodies to pathological tau protein for potential diagnostic and therapeutic purposes. Computational methods were used to run molecular dynamics simulations and analyze them to determine communication of amino acids inside the antibodies and binding energetics to abnormal tau.

Genotyping Reveals Multiple Cases of Interspecific Hybridization in a Moss Complex
Olivia Lemieux '22 (Environmental Sciences & Ecology and Evolutionary Biology, CLAS)
Advisor: Bernard Goffinet, Professor, Ecology and Evolutionary Biology
Supported by: SURF Award - The Antonio and Alison Caxide Award for Undergraduate Research
Online Materials: https://portfolium.com/entry/genotyping-reveals-hybridization-in-a-moss-complex

In this study funded by a UConn SURF Award, I performed genetic analyses on 152 populations of moss from the Physcomtrium pyriforme moss complex to identify cryptic diversity through identification of unique haplotypes (many of which represent hybrid forms). I used DNA extraction, amplification, and sequence analysis methods to conduct this research. The results of this study suggest that biodiversity is likely underestimated for many organisms with simple morphologies and that hybridization plays a significant role in speciation within mosses.

Pre-Service Teachers' Perceptions in the Pandemic
Madison Levine '21 (Biology Education, ED)
Advisor: Catherine Little, Professor, Educational Psychology
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/pre-service-teachers-perceptions-in-the-pandemic

Teacher shortages are not a new problem, but now have the possibility of worsening due to the new challenges that have surfaced during the COVID-19 pandemic. Preservice teachers are in the position of observing all of these events and challenges while engaging in professional preparation programs, and they also are experiencing unexpected challenges related to their access to schools and classrooms and the expectation to learn their future work under great uncertainty. A survey of preservice teachers and their attitudes towards their career choice shows preliminary findings of new factors that may play a role in their want to continue on this career path.

Self-Healing Aerogel-Like Structures Produced via Click Chemistry
Victoria Livingston '21 (Chemistry, CLAS)
Advisor: Eugene Pinkhassik, Associate Professor, Chemistry
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/self-healing-aerogel-like-structure-via-click-chem

This project aims at linking hollow porous polymer nanocapsules to produce higher-order materials with high accessible surface area for applications ranging from energy storage to environmental remediation. The resulting porous solid structure is expected to showcase high surface area, low density, low thermal conductivity, and the novel characteristic of self-healing.

Psychedelics for the Treatment of Substance Abuse Disorder: A State of the Art Review

Joel Lopez '21 (Psychological Sciences, CLAS), McNair Scholar
Advisors: Gregory Sartor, Assistant Professor, Pharmaceutical Sciences; Aaron Wolfgang, Psychiatry Resident, Yale School of Medicine; Monnica Williams, Associate Professor, Social Sciences, University of Ottawa
Supported by: SURF Award, Institute for Brain and Cognitive Sciences (IBACS) Undergraduate Research Grant
Online Materials: https://portfolium.com/entry/psychedelics-and-sud-shift-in-addiction-treatment

Among the many clinical and therapeutic applications of psychedelic substances, treating substance use disorders in individuals is a very exciting subsection of research. In this state of the art review, we explore the current paradigm for treating substance use disorders and posit that psychedelic-assisted treatments for these disorders has the potential to shift the current standard of care to a more holistic and long-lasting standard of care. Through consideration of the most recent literature and early psychedelic studies, and through consultation with indigenous practitioners of sacred plant medicines, this project not only demonstrates the potential change to psychiatric care as we presently know it, but elucidates the way forward.

Identifying Cortical Electrode Placements in the Rat Using Histological Techniques

Jessica MacIntyre '21 (IMJR: Cognitive Neuroscience, CLAS)
Advisor: John Salamone, Distinguished Professor, Psychological Sciences
Online Materials: https://portfolium.com/entry/identifying-cortical-electrode-placements-in-rats

This is an NIH-funded project to identify electrophysiological markers in the frontal cortex of rats engaging in effort-based choice behaviors. My part of the project involves sectioning brain tissue following surgical electroencephalography (EEG) electrode implantation and recording experiments, and then using histological staining methods to identify anatomical placement of the cortical electrodes under microscopic examination. This project will contribute to an understanding of the brain circuits regulating effort-based aspects of motivation and could shed light on the neural basis of the motivational symptoms seen in psychiatric and neurological disorders.

Animal Models in Achilles Tendon Repair: A Literature Review

Malavika Madan '22 (Physiology and Neurobiology, CLAS),
Advisor: Sangamesh Kumbar, Associate Professor, Orthopedic Surgery
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/animal-models-in-achilles-tendon-repair

The Achilles Tendon is one of the most common tendon injuries in the body. This literature paper aims to examine how animal models are used in Achilles Tendon research. The paper also expands on the Achilles Tendon structure, its properties and pathophysiology. It investigates current treatments available for defects and injuries associated with the tendon. Furthermore, the paper also explores which animal models have been used in research and their advantages and limitations.

Investigating The Neural Mechanisms For Classification of Vocalization Sequences

Carly Malesky '21 (Physiology and Neurobiology & Psychological Sciences, CLAS)
Advisors: James Chrobak, Professor, Psychological Sciences; Heather Read, Professor, Psychological Sciences;
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/mechanisms-for-classification-of-vocalizations

Prior studies have demonstrated high-resolution mapping with µECoG (micro-electrocorticographic) arrays in awake animals, but none have used this approach to examine the clinically relevant question of how cortical neurons process and support moment-to-moment sound discrimination and decision making. Given this information, it is hypothesized that neural responses will vary specifically with sound onset cues (e.g., slow (5 Hz) slope onset versus fast (32 Hz) slope onset) and predict the behavioral choice for classifying a given sound duration (100-200 millisecond) in a two alternative-forced choice (2AFC) psychophysics task. This study has potential to reveal basic neural mechanisms for classifying vocalization sequences and to inspire novel medical approaches to the treatment of communication disorders.

Characterizing the Ventricular-Subventricular Zone in a Mouse Model of Post-Infectious Hydrocephalus

Michael Martland '22 (Molecular and Cell Biology, CLAS)
Advisor: Joanne Conover, Professor, Physiology and Neurobiology
Supported by: OUR Supply Grant
Online Materials: https://portfolium.com/entry/modeling-post-infectious-hydrocephalus-in-mice

This project focuses on holistically assessing Post Infectious Hydrocephalus in mice. Post-Infectious Hydrocephalus (PIH) is a condition that effects newborns following maternal exposure to viral particles and leads to degradation of the ependymal wall and expansion of the lateral ventricles. Ventriculomegaly associated with PIH is analyzed based on the ratios of the whole brain to lateral ventricles, comparing surface area and enclosed volumes of each to determine severity of ventricular expansion.

Examining Isolationism Through Drama

Alexander Mika '21 (English, CLAS), University Scholar
Advisors: Ellen Litman, Associate Professor, English; Evelyn Tribble, Professor, English; Frank Costigliola, Distinguished Professor, History
Online Materials: https://portfolium.com/entry/examining-isolationism-through-drama

"Examining Isolationism Through Drama" is a project that consists of two parts: the drafting of a neo-Shakespearean play that explores the detrimental effects of isolationism on foreign and domestic policy and an essay that uses the play, as well as a literary and historical lens, to argue that many isolationist policies are not sustainable in an interconnected world.

Impact of Angiogenic and Osteogenic Factors in the Presence of Biodegradable Piezoelectric Films *In Vitro*

Jayla Millender '21 (Molecular and Cell Biology & Africana Studies, CLAS), University Scholar, LSAMP Scholar, McNair Scholar
Advisors: Thanh Nguyen, Assistant Professor, Material Sciences; Kenneth Campellone, Associate Professor, Molecular and Cell Biology; Shawn Salvant, Associate Professor, English & Africana Studies
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/impact-of-growth-factors-in-vitro

This project focuses on advancing current synthetic bone graft techniques to increase vascularization of the grafted region, shorten patient healing time, and decrease likelihood of rejection. Using a variety of cell culturing techniques and a newly developed biodegradable material, this project dives into the integration of material sciences and biomedical engineering tactics to increase long bone graft success rates.

Improving Self-Management of Chronic Low Back Pain in the Hispanic Population: A Feasibility Study
Jasmeen Mohammed '21 (Nursing, NUR)
Advisor: Deborah McDonald, Associate Professor, Nursing
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/improving-self-management-of-chronic-low-back-pain

The purpose of this study is to examine the feasibility and acceptability of the Spanish version learning modules for SPINE (Sensitivity to Pain IN Me), a P20 funded chronic low back pain (cLBP) self-management pilot intervention. Our findings support that providing the Spanish version of the SPINE cLBP self-management modules is acceptable and feasible for Spanish-speaking Hispanics with cLBP. The Spanish version SPINE modules need to be pilot tested, and may help reduce health disparities in cLBP self-management for Hispanics.

Physiological Effects of a Stepwise Reconditioning Program in Polo Ponies
Nicole Moody '21 (Animal Science, CAHNR)
Advisor: Sarah Reed, Associate Professor, Animal Science
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/stepwise-reconditioning-program-in-polo-ponies

Reconditioning protocols are not well-described in polo ponies, and none have been validated scientifically to determine if they do indeed improve fitness. Therefore, with this project, our objective is to determine if a stepwise fitness program will improve fitness in polo ponies.

Analyzing the Behavior of Rats in an Aversive Situation to Better Understand Emotional Memory Processing
Riley Nadolny '21 (Physiology and Neurobiology & Psychological Sciences, CLAS)
Julia Levin '21 (Physiology and Neurobiology, CLAS)
Advisor: Etan Markus, Professor, Psychological Sciences
Supported by: UConn IDEA Grant, PCLB Psychological Sciences Undergraduate Research Grant, Innovation Award - Science of Learning and Art of Communication (SLAC)
Online Materials: https://portfolium.com/entry/analyzing-behavior-of-rats-in-an-aversive-context

Rats will be trained until they are proficient at discriminating "safe" and "unsafe" trials in a changing environment. Behavioral changes will then be examined under these changing conditions, and in the future we will examine inactivation of their dorsal hippocampus under these contexts. This research will provide a better understanding of the function of the ventral hippocampus and its connectivity to the dorsal hippocampus during memory formation.

Discourse and Power in U.S.-China Relations
Shankara Narayanan '21 (Political Science & History, CLAS), University Scholar
Advisors: Alexis Dudden, Professor, History; Frank Costigliola, Distinguished Professor, History; Alexander Anievas, Associate Professor, Political Science
Online Materials: https://portfolium.com/entry/discourse-and-power-in-us-china-relations

The U.S. government's 2017 National Security Strategy claimed, "China and Russia challenge American power, influence, and interests, attempting to erode American security and prosperity." As U.S. academics and policymakers prepare for escalating military competition with China, the discourse underpinning the U.S.-China relationship remains understudied. During the Marshall Mission (1945-1947), U.S. policymakers failed to unify Chiang Kai-Shek's Nationalist Party (Kuomintang), and Mao Zedong's Chinese Communist Party (CCP). This poster reflects the findings of my discourse analysis of the Marshall Mission, drawing out broader lessons for U.S. foreign policy in Asia.

Controlling UPEC Using Lactic Acid Bacteria
Nivedha Natchiappan '21 (Healthcare Management, BUS)
Advisor: Kumar Venkitanarayanan, Professor, Animal Science
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/controlling-upec-using-lactic-acid-bacteria

Uropathogenic *E. coli* (UPEC) is the primary cause of urinary tract infections (UTI) in adult women, which account for about $1.6 billion in medical expenses and 1 million hospitalizations in the US alone. However, treating UTIs has become more difficult and complex as UPEC has become more resistant to antibiotic treatments. This project looks specifically at different lactic acid bacteria (LAB) isolates as possible inhibitors of UPEC growth and virulence

Optimizing Voltage-Sensitive Dye Imaging Using Cell Culture
Morgan Neydorff '21 (Biomedical Engineering, ENG)
Advisor: Corey Acker, Assistant Professor, Center for Cell Analysis and Modeling
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/optimizing-voltage-dye-imaging-using-cell-culture

Characterization of a voltage-sensitive dye was performed by studying the electrical signaling of human induced pluripotent stem-cell (hiPSC) cardiac cells using an epifluorescence microscope and time series data. This data could be used to determine the safety of new developmental drugs by analyzing the action potentials of hiPSC cardiac cells *in vitro* before human trials. MATLAB was utilized to visualize data, creating the action potential images provided in the presentation.

Self-Reporting of Internalizing Symptoms in Children Whose Mothers Have Experienced Partner Conflict
Sydney Osborne '22 (Allied Health Sciences, CAHNR)
Advisor: Margaret Briggs-Gowan, Associate Professor, Psychiatry
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/self-reporting-of-internalizing-symptoms-in-childr

The goal of the Adaptation and Resilience in Childhood Study (ARCS) study is to measure and observe how children who have experienced or witnessed domestic violence or intimate partner violence (IPV) respond or adapt to stressful situations. Using measures from the ARCS, we wanted to investigate if children whose mothers reported higher partner conflict/IPV had children who self-reported more internalizing symptoms during the Berkeley Puppet Interview (BPI) measure.

Microscopic Analysis of Cellular Invasion
Aditya Pant '23 (Biomedical Engineering, ENG)
Carlos Hurtado Munoz '23 (Biomedical Engineering, ENG)
Advisor: Kshitiz, Assistant Professor, Biomedical Engineering
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/health-research-program-poster-and-video

This is the poster and video presentation of my Health Research Program project on Microscopic Analysis of Cellular Invasion between Cancer Cells and Stromal Cells. This is on the research we conducted and methods we used along with what we learned and future goals.

When Problems Become Solutions: Harnessing the Osteogenic Capacity of Disease-Causing Stem Cells to Repair Bone Fractures
Mehreen Pasha '22 (Molecular and Cell Biology, CLAS), University Scholar
Advisor: David Goldhamer, Professor, Molecular and Cell Biology
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/when-problems-become-solutions

My project seeks to use Acvr1 mutant fibroadipogenic progenitors (FAPs)—the major cell type implicated in fibrodysplasia ossificans progressiva (FOP), a genetic disorder involving unregulated bone growth—to efficiently repair bone fractures in mice for future clinical applications. Additionally, I am currently developing a novel assay to simulate a bone fracture in order to test my research questions in a less invasive manner.

Translesion Synthesis Inhibitors: A New Class of Cancer Chemotherapeutics
Seema Patel '22 (Molecular and Cell Biology, CLAS), University Scholar, Rowe Scholar
Advisor: Kyle Hadden, Associate Professor, Pharmaceutical Sciences
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/translesion-synthesis-inhibitors-2

Acquired drug resistance is a well-known challenge when developing novel chemotherapeutics. Discovering new sites of inhibition is critical as this will enhance patients' quality of life. My research focuses on developing and testing chemotherapeutics against a multi-protein complex termed translesion synthesis in a cancer cell model.

The Parent and Child Emotions Study (PACES)
Mercedez Patrick '21 (Allied Health Sciences, CAHNR)
Advisor: Carolyn Greene, Assistant Professor, Psychiatry
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/the-parent-and-child-emotions-study-paces

The Parent and Child Emotions Study (PACES) is investigating the nature and interactions of parent and child emotion regulation, emotion socialization, and childhood trauma. This includes evaluation of emotion socialization parenting behaviors and a physiological component, the autonomic nervous system.

Design and Characterization of a Novel Enzymatic Immobilization Structure
Matthew Pickett '21 (Chemistry, CLAS), University Scholar
Advisors: Steven Suib, Distinguished Professor, Chemistry; Alfredo Angeles-Boza, Associate Professor, Chemistry; Jessica Rouge, Associate Professor, Chemistry
Online Materials: https://portfolium.com/entry/design-of-an-enzymatic-immobilization-structure

Here the design and characterization of a novel process for the immobilization of a phosphotriesterase enzyme is presented. Enzyme immobilization is an important route towards the decontamination of toxic organophosphate chemicals that harm human, animal, and environmental health. This technique points towards its use as a viable, environmentally friendly, and cost effective method for organophosphate decontamination.

Pyrrhotite Oxidation in Connecticut Crumbling Foundations Homes
Samuel Pontes '23 (Environmental Engineering, ENG)
Advisor: Maria Chrysochoou, Professor, Civil and Environmental Engineering
Online Materials: https://portfolium.com/entry/pyrrhotite-oxidation-in-crumbling-foundations

This presentation provides an overview of the issue of crumbling concrete in Connecticut stemming from Pyrrhotite Oxidation. It presents the mechanics of Pyrrhotite Oxidation, what we know and what we don't know, and how our team plans to further investigate. Additionally our project gives specifics of the experimental design/setup which will be used to produce anticipate data.

Quantifying Microneedle Gel Effectiveness for PRG4 Delivery to Promote Chronic Wound Healing
Nadya Ponthempilly '22 (Biomedical Engineering, ENG)
Advisor: Tannin Schmidt, Associate Professor, Biomedical Engineering
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/quantifying-microneedle-gel-effectiveness

This project involves the testing of microneedle gels that will be used to deliver PRG4 to chronic wounds to promote the healing process. The effectiveness of these gels will be tested using alphaLISA assays and western blotting. Compiling the results from four alphaLISA assays and two western blots, the data showed that generally, the more time PRG4 was left in the microneedle gels, the more PRG4 passed through the gel.

Observing Anthropogenic Impacts on the Magnitude of Antarctic Ice Melt
Aquia Providence '21 (Geoscience, CLAS)
Advisor: Julie Fosdick, Assistant Professor, Geosciences
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/observing-anthropogenic-impacts-on-antarctica

Studying the rate at which Antarctic ice melt is happening can aid scientists in planning for the future. The ice sheet cover is one of the key components of the polar climate system. This project summarizes data surrounding anthropogenic impacts and the amount of Antarctic ice sheet loss by utilization of previous scientific data, aerial photographs, ice core information, and greenhouse gas emissions data.

Illuminating the Emission Line Light Echoes of Supermassive Black Holes
Jasmine Ramirez '22 (Physics, CLAS), LSAMP Scholar
Advisor: Jonathan Trump, Assistant Professor, Physics
Supported by: Work-Study Research Assistant Program
Online Materials: https://portfolium.com/entry/emission-line-light-echoes

To resolve a discrepancy in broad-line region sizes reported by a recent reverberation mapping survey, the emission lines of three gases are analyzed. The radius-luminosity relationship is the focus of this study as both of these properties of supermassive black holes can be used to estimate their masses with a single observation.

Media Messages Surrounding Migrants and Immigrants
Ramona Ramsarran '21 (Allied Health Sciences, CAHNR)
Advisor: Bandana Purkayastha, Professor, Sociology
Supported by: Work-Study Research Assistant Program
Online Materials: https://portfolium.com/entry/media-messages-surrounding-migrants-and-immigrants

Print Media Messages Surrounding Migrants and Immigrants.

Evolution of Insulin-Like receptor (InR) in Insecta
Ariana Rojas '21 (Molecular and Cell Biology, CLAS)
Advisor: Elizabeth Jockusch, Professor, Ecology and Evolutionary Biology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/frontiers-2021-ariana-rojas

A phylogenetic analysis of the InR receptor genes in the class Insecta was completed. The goal of this analysis was to understand the evolutionary relationships and diversification of InR within Insecta.

Detection of Carbapenem Antibiotic Resistance Among Enterobacteriaceae Family in Mastitic Milk and Animal Tissues
Elisabeth Rothman '21 (Molecular and Cell Biology, CLAS)
Annushka Sewrathan '21 (Animal Science & Pathobiology, CAHNR)
Advisor: Guillermo Risatti, Professor, Pathobiology and Veterinary Science
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/antibiotic-resistance-in-enterobacteriaceae

Investigating Carbapenem antibiotic resistance among members of the Enterobacteriaceae family isolated from mastitic milk and animal tissues.

Where Mothers Get Information about Child Nutrition and How Credible They Find Information Sources by Maternal Health Literacy
Lauren Rudin '22 (Exercise Science, CAHNR)
Advisor: Molly Waring, Associate Professor, Allied Health Sciences
Supported by: OUR Conference Presentation Award
Online Materials: https://portfolium.com/entry/child-nutrition-and-maternal-health-literacy

Mothers play an important role in shaping children's diets. Nutrition misinformation abounds on online and in-person social networks, and health literacy affects one's ability to accurately evaluate health information. We examined the association between maternal health literacy, sources of child nutrition information, and perceived credibility of information sources. Where mothers get child nutrition information and how credible they find information from different sources varies by health literacy.

Saxophone Repertoire and Technique - An Extensive Musical Development
Ian Sauco '21 (Music Composition, SFA; English, CLAS)
Advisor: Greg Case, Adjunct Faculty, Music
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/saxophone-repertoire-and-technique

A quest for personal growth as a soloist, a chamber musician, and an arranger/composer through the study of the saxophone. This will be achieved through intensive practice and study along with attending the American Saxophone Academy for one week during the summer of 2020.

Completely Connecticut Agriculture
Alyson Schneider '21 (Agriculture and Natural Resources, CAHNR)
Zachary Duda '21 (Agriculture and Natural Resources, CAHNR)
Jonathan Russo '21 (Agriculture and Natural Resources & Sustainable Plant and Soil Systems, CAHNR)
Advisors: Michael O'Neill, Associate Director, UConn Extension; Stacey Stearns, Educational Program Administrator, UConn Extension
Supported by: UConn IDEA Grant, UConn Extension
Online Materials: https://portfolium.com/entry/completely-connecticut-agriculture

Completely Connecticut Agriculture is all about sustainably grown products by farmers we know and who want to keep communities at the center of their work. This documentary will highlight the innovative work farmers across the Nutmeg state are doing to bring Connecticut residents nutrient dense, environmentally friendly products so that every consumer can put a face to their food.

An Evaluation of the Accessibility of Durable Medical Equipment in Low-Income Households
Simran Sehgal '21 (Biomedical Engineering, ENG), University Scholar, Holster Scholar
Advisor: César Abadía, Associate Professor, Human Rights and Anthropology
Supported by: BOLD Women's Leadership Network
Online Materials: https://portfolium.com/entry/accessibility-of-durable-medical-equipment

In our biotechnologically forward society, capitalistic principles have inverted our healthcare delivery philosophy: paradoxically, the highest need of care is met with the lowest access to care due to the inaccessibility of medical resources and high costs of medical devices. The disability community carries a disproportionate burden of disease, notably in health care coverage and services for durable medical equipment. My project seeks to broadly study the gaps in our healthcare system that has increased difficulty of accessing durable medical equipment by analyzing the lived experiences of individuals with disabilities.

Do Autism-Spectrum Characteristics Predict the Embodiment of Manipulable Object Concepts?
Shaina Selvaraju '21 (Biological Sciences, CLAS)
Advisor: Eiling Yee, Assistant Professor, Psychological Sciences
Online Materials: https://portfolium.com/entry/autism-spectrum-characteristics-and-embodiment

The purpose of this study was to investigate the relationship between semantic knowledge and autism-spectrum characteristics. As those who have higher autism-spectrum characteristics tend to rely less on their bodily experience to support cognition, we predict that they are less likely to be influenced by the manipulation-relatedness effect.

The Extent of Disability Concealment, Disclosure, and Claim in Type One Diabetics
Elisa Shaholli '23 (Economics, CLAS), Holster Scholar
Advisor: Brenda Brueggemann, Professor, English
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/uconn-idea-grant-project

This research project is focused on analyzing the social experience of type one diabetes: How does diabetes affect an individual when it comes to work, school, friendships, relationships, and daily life? How does diabetes relate to the concept of "passing" where an individual of a stigmatized group uses "disidentifiers" to look "normal"? Where does diabetes fall when it comes to "disability"?

Relationship Between Cardinal Principle Mastery and Approximation Development in Deaf and Hard of Hearing Children
Meghan Shaw '22 (American Sign Language & Economics, CLAS)
Advisor: Marie Coppola, Associate Professor, Psychological Sciences & Linguistics
Supported by: SHARE Award
Online Materials: https://portfolium.com/entry/cp-and-ans-in-deaf-and-hard-of-hearing-children

This research investigates how understanding of cardinal principle and approximate number systems are related, specifically with Deaf and hard of hearing children ages 3 to 7. It is based upon previous research that has shown that the two systems are connected, and are predictors of mathematical skills later in life. The study found that there is a strong bidirectional relationship between the two systems, meaning that understanding of cardinal principle predicted acuity of approximate number systems, and vice versa.

Crack Monitoring of a Reinforced Concrete Wall Using Low-Cost RFID-Based Sensors
Rinchen Sherpa '21 (Civil Engineering, ENG; Molecular and Cell Biology, CLAS)
Advisor: Shinae Jang, Associate Professor in Residence, Civil and Environmental Engineering
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/crack-monitoring-using-rfid-based-sensors

In this presentation, the RFID-based crack sensors have been implemented in a residential building with cracks from crumbling foundation. A hand-held RFID reader, RFID tags with a specific measurement method to control environmental effects are used to monitor the health of a RC structure. Conducting this crack monitoring is vital as it will aid critical decision making especially in the case of crumbling foundation as any decision can be extremely costly. Likewise, the reliability of the experiment is supplemented with the conduction of experiment of an additional parameter.

Uncovering the Men Behind Britain's Slave Trade
Virginia Shugrue '21 (English, CLAS)
Advisor: Dwight Codr, Associate Professor, English
Supported by: SHARE Award
Online Materials: https://portfolium.com/entry/uncovering-the-men-behind-britains-slave-trade

This project was an attempt to un-"whitewash" history. During the late 1600s, as indicated by a primary document from the Royal African Company, a number of notable members of British society backed the transatlantic slave trade; however, their participation in the institution has been largely left unmentioned. With my SHARE Award, I looked for other forms of the proof that these men were, in fact, involved in the transatlantic slave trade, and I edited a number of their Wikipedia pages to reflect this participation.

Comparison of Wrist Worn Wearable Technology for Measuring Steps and Percent Time Active in Occupational Settings and Its Application to Assess Psychosocial Impact of Critical Workplace Events
Manjot Singh '22 (Molecular and Cell Biology, CLAS)
Advisor: Jennifer Garza, Assistant Professor, Occupational and Environmental Medicine
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/investigation-on-wearable-technology

Physical activity out of work is known to be beneficial, but what are the effects of occupational physical activity?

Finding Substrates of TRIM22, a Gyrencephalic Mammal-Specific Ubiquitin Ligase
Aditi Sirsikar '22 (Physiology and Neurobiology, CLAS), Holster Scholar
Advisor: Byoung-Il Bae, Assistant Professor, Neuroscience
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/finding-substrates-of-trim22-a-gyrencephalic-mamm

Loss of the ASPM (abnormal spindle-like microcephaly-associated) gene is the most frequent cause of genetic microcephaly in humans. Severe microcephaly is observed in ferrets without the ASPM gene, a gyrencephalic (folded brain) carnivore, but not in mice, a lissencephalic (smooth brain) rodent. The intracellular mechanism by which the same genetic mutation causes species-specific phenotypes is unknown. We aim to probe the extent to which TRIM22 substrates change upon loss of ASPM.

Who's Who: A Workflow for Identifying Ambiguous Salp Samples at Sea
Hannah Smith '21 (Molecular and Cell Biology, CLAS)
Advisor: Rachel O'Neill, Professor, Molecular and Cell Biology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/whos-who-a-workflow-for-identifying-salp-species

Salps are pelagic tunicates displaying exceptional capacity for population expansion and distribution shifts as oceans warm, resulting in large scale alterations in food web dynamics. However, salps are difficult to differentiate morphologically, making it nearly impossible to understand and predict changes among species. Therefore, this project developed a workflow to differentiate salp species with portable, long-read sequencing technology, enabling efficient sample collections to study the mechanisms underlying salp population dynamics.

Host Plant Suitability and Feeding Preferences of the Asiatic Garden Beetle *Maladera castanea* Arrow (Coleoptera: Scarabaeidae)
Kaelin Smith '21 (Sustainable Plant and Soil Systems, CAHNR)
Advisor: Ana Legrand, Assistant Extension Professor, Plant Science and Landscape Architecture
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/feeding-preferences-of-the-asiatic-garden-beetle

The Asiatic Garden Beetle (*Maladera castanea* Arrow) is an invasive pest that is known to cause detrimental damage to many different plant species. Little is known about the feeding preferences of adult beetles and this study aimed to gain a better understanding of this by testing and comparing the leaf area consumed by AGB on nine basil cultivars and four ornamental plant species.

School-Based Discriminatory Victimization of Transgender and Gender-Non-Binary (T&GN) Youth: Students', Parents', and School-Staff's Evaluations of and Perceived School Climate for T&GN Youth
Abby Stepka '21 (Human Development and Family Sciences, CLAS)
Advisor: Alaina Brenick, Associate Professor, Human Development and Family Sciences
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/school-based-victimization-of-transgender-students-1

High rates of transgender and gender non-binary (T&GN) youth experience discrimination in schools. To effectively address transgender and gender non-binary discrimination, we must understand how students, parents, and schools evaluate these acts of discrimination. This project will create a comprehensive and empirically sound measure of institutional and interpersonal discrimination experienced by T&GN youth in the school context. Currently, we are conducting focus groups in order to inform our measure so that it accurately reflects the lived experiences of T&GN youth.

Immune Checkpoint Markers on Tumor-Infiltrating Lymphocytes (TILs) as a Prognostic Factor for Breast Cancer

Jillian Strandberg '21 (Biomedical Engineering, ENG)
Advisor: Henry Smilowitz, Associate Professor, Cell Biology
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/immune-checkpoint-markers-and-cancer

A literature review was conducted on immunohistochemistry of immune checkpoint markers on tumor samples from breast cancer patients. It was found that the most common markers that are stained for are LAG-3, PD-1, PD-L1, TIM-3, and GITR. Current studies are trying to relate the quantity of these biomarkers to the cancer patient's prognosis.

Interaction of Coupled Osmotic and Thermal Stressors in the Differential Gene Expression in *Haloferax volcanii*

Gwendolyn Strickland '21 (Physiology and Neurobiology, CLAS)
Advisor: Mark Urban, Professor, Ecology and Evolutionary Biology
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/h-volcanii-coupled-stressor-dge

This project applies a transcriptomic approach to the model archaeal organism, *Haloferax volcanii*, to gain a deeper understanding of the interaction of coupled osmotic and thermal stressor environments. The individual and coupled effects of the stressor pair were compared by isolating and sequencing RNA from cells grown in each challenge condition.

Diving Into the Inner Disk of Supermassive Black Holes with Hubble Space Telescope

Megan Sturm '21 (Physics, CLAS), University Scholar
Advisor: Jonathan Trump, Assistant Professor, Physics
Online Materials: https://portfolium.com/entry/diving-into-the-inner-disk-of-black-holes-with-hst

Supermassive black holes are fascinating objects up to billions of times the mass of our sun that operate under extreme gravity and reside in the center of every massive galaxy. As nearby material interacts with the black holes, it begins to orbit in what is called the accretion disk. This project will use the Hubble Space Telescope in an unusually efficient program along with reverberation mapping techniques to explore the current discrepancies in model predictions and observations of the structures of accretion disks for a variety of supermassive black holes.

Approach Avoidance Tendencies in Problematic Opiate Users

Jocelyn Theriault '21 (Psychological Sciences, CLAS)
Julianne Kelly '22 (Physiology and Neurobiology, CLAS)
Advisor: Robert Astur, Associate Professor, Psychological Sciences
Supported by: SHARE Award
Online Materials: https://portfolium.com/entry/approach-avoidance-tendencies-in-opiates-users

The purpose of this study is to examine whether an approach bias is evident in undergraduates who report problematic opiate use. We expect to see a significant approach bias for opiate stimuli relative to the neutral stimuli and to see stronger approach bias scores in participants with more severe opiate use. Results for this study will have implications for interventions for problematic opiate use, such as cognitive bias modification.

Scaling Biogeochemical Data by Vegetation Extent Can Alter Interpretation of Tidal Restoration
Drew Tienken '22 (Environmental Sciences & Political Science, CLAS), University Scholar
Advisor: Beth Lawrence, Assistant Professor, Natural Resources and the Environment
Supported by: Connecticut Sea Grant Coastal Science Fellowship
Online Materials: https://portfolium.com/entry/the-importance-of-scale-in-tidal-restoration

This mapping project compared the extent of three dominant salt marsh grass zones between tidally restored and reference marshes. It then scaled up denitrification rates and soil organic carbon content per area of each grass zone to see how these data are reflected on the ecosystem scale. When watching the video, make sure to click the highest quality available in order to see the poster as clearly as possible!

EGFR Clustering Model Using Virtual Cell and SpringSaLaD
Gavin Till '23 (Mechanical Engineering, ENG)
Advisor: Bruce Mayer, Professor, Genetics and Genome Sciences & Center for Cell Analysis and Modeling
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/egfr-cluster-modeling-using-vcell-and-springsalad

In vivo experiments have shown that steady-state binding levels in clusters are higher than those in low-density distributions. This project aims to model this phenomenon using various cell modeling programs. VCell project completed Summer 2020. SpringSaLaD project ongoing.

The Biosymmetrix Project
Cara Tran '22 (Biomedical Engineering, ENG)
Advisor: Liisa Kuhn, Associate Professor, Biomedical Engineering
Supported by: Health Research Program
Online Materials: https://portfolium.com/entry/the-biosymmetrix-project

This project focuses on the design, development, and manufacturing of external breast prostheses for mastectomy patients. We intend to create a product that is customized, comfortable, flexible, and breathable. In order to do this, we utilize CAD modeling, mechanical testing, and 3D printing.

Sex-Specific Immunoendocrine Responses of 11-keto Testosterone and 17β-oestradiol in Stickleback Fish
Sarah Tsuruo '21 (Biological Sciences, CLAS)
Advisors: Daniel Bolnick, Professor, Ecology and Evolutionary Biology; Chris Simon, Professor, Ecology and Evolutionary Biology
Supported by: OUR Supply Award, SURF Award
Online Materials: https://portfolium.com/entry/sex-specific-immunoendocrine-responses

11-keto testosterone and 17β-oestradiol are two sex hormones that have been observed to influence sex-specific immune response differences. Looking specifically at the host-parasite relationship of the threespine stickleback fish (*Gasterosteus aculeatus*) and its parasite, the helminth cestode (*Schistocephalus solidus*), this study aims to understand the immune-endocrine responses in male and female stickleback with immune response-mediated fibrosis.

Comparing African Cultural Retention and its Effect on Racial Attitudes in the Music and National Identities of Cuba and the United States
Lucie Turkel '21 (IMJR: Comparative Literary & Cultural Studies, CLAS)
Advisor: Jeffrey Ogbar, Professor, History
Online Materials: https://portfolium.com/entry/african-cultural-retention-in-us-and-cuba

This project investigates to what extent the African roots of popular music in the United States and Cuba are acknowledged and examines if this level of cultural acknowledgement has any influence on the postcolonial social, political, and economic treatment of African Americans and Afro-Cubans. Does a greater and/or more widespread acceptance of African cultural retention in a country's national identity help alleviate racism in that country?

Domestication of Lethal Fungal Pathogens in Cicadas
Jason Vailionis '21 (Ecology and Evolutionary Biology, CLAS), University Scholar
Advisor: Chris Simon, Professor, Ecology and Evolutionary Biology
Supported by: OUR Supply Award, SURF Award
Online Materials: https://portfolium.com/entry/domestication-of-lethal-fungal-pathogens-in-cicada

Some cicadas have domesticated formerly lethal fungal pathogens in the genus *Ophiocordyceps*, and are now nutritionally dependent on them. Sequencing of the domesticated fungi shows complex evolutionary dynamics including evidence for multiple parallel domestications and fungi replacing other domesticated fungi. Additionally, the relationship of the domesticated *Ophiocordyceps* to other *Ophiocordyceps* was determined.

Image-Based Biomechanical Analysis of Cardiac Morphogenesis Using a Zebrafish Model
Anand Vaish '21 (Biomedical Engineering, ENG), University Scholar
Advisors: Kazunori Hoshino, Associate Professor, Biomedical Engineering; David Daggett, Assistant Professor in Residence, Molecular and Cell Biology; David Goldhamer, Professor, Molecular and Cell Biology
Online Materials: https://portfolium.com/entry/biomechanical-analysis-of-cardiac-morphogenesis

This project aims to learn more about human embryonic heart development using a zebrafish cardiac model. As embryonic development is mostly conserved within vertebrates, zebrafish embryos can be used to determine how the biomechanical properties of the embryo heart change throughout its formation and development. By better understanding the process of cardiac morphogenesis, improved diagnostic tools and therapies can be developed, as well as the mechanisms behind cardiac chamber formation and valveless pumping be determined.

Efficacy and Mechanisms of Ketogenic-Like Treatment in a Drosophila Model of Parkinson's Disease
Hanna Van Pelt '21 (Physiology and Neurobiology, CLAS)
Advisor: Geoffrey Tanner, Assistant Professor in Residence, Physiology and Neurobiology
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/ketogenic-like-treatments-for-parkinsons-model

This project plans to explore how the symptoms of Parkinson's Disease are affected by the implementation of a ketogenic-like diet in a *Drosophila melanogaster* model.

"Remnants" - A Post-Apocalyptic Puppetry Photography Project
Elise Vanase '21 (Puppet Arts, SFA)
Advisor: Bartolo Roccoberton, Professor, Puppet Arts
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/remnants-a-puppetry-photography-project

"Remnants" is a photography project that includes a human model and a life-sized puppet to tell a story about a girl in a post-apocalyptic world who manifests her loneliness into a supernatural companion that guides her through the process of coming to terms with her painful memories. The photographs will be arranged to tell the story along with text to create a book similar to the style of a graphic novel.

By Our Love: Exposing Paradox in Political Tribalism
Miles Waterbury '22 (Digital Media and Design, SFA)
Advisors: Earl MacDonald, Professor, Music; Cora Lynn Deibler, Professor, Art and Art History
Supported by: SHARE Award
Online Materials: https://portfolium.com/entry/miles-waterbury-frontiers-2021-by-our-love

By Our Love is a musical and visual experience that encourages open dialogue and contemplation of the current polarized political climate in the US, and its relationship to faith practices. This project brings together art, animation, and music to spread a message and spark discussion in relation to our everyday lives.

breathe.
Justyn Welsh '21 (Chemical Engineering, ENG)
Patrick Paul '21 (Chemical Engineering, ENG)
Advisor: David Noble, Associate Professor in Residence, Management
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/breathe-7

The breathe. project is a lifestyle change that promotes shameless stress relief. This lifestyle shift is influenced by our product: the breathe. blanket. This blanket combines aromatherapy and pressure therapy into a blanket that is meant not only to calm and relax someone, but encourage them to do so.

The Role of Extracurricular Activities in the College Decision-Making Process
Natalie Wong '21 (Music Education, ED)
Advisor: Catherine Little, Professor, Educational Psychology
Supported by: OUR Supply Award
Online Materials: https://portfolium.com/entry/extracurricular-activities-in-college-decisions

This study is about how students prioritized their extracurricular activities for their decision on where to attend college/university. I also wanted to know how their participation in extracurricular activities changes from high school to college.

Phylogenetic Tree Completions with Minimal Robinson-Foulds Distance
Keegan Yao '21 (Mathematics, CLAS; Computer Science, ENG)
Advisor: Mukul Bansal, Associate Professor, Computer Science and Engineering
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/phylogenetic-tree-completions-with-minimal-robinso

Phylogenetic trees are models built to compare biological objects and predict the changes that have occurred over time. Most methods of comparing different phylogenetic trees require the trees to compare the same collection of biological objects. In this project, we extend phylogenetic tree comparison to trees with only partially overlapping leaf sets.

Vasculature-on-Chip: Engineering Bone Tissue
Kaitlyn Yeh '21 (Biomedical Engineering, ENG)
Advisor: Yupeng Chen, Associate Professor, Biomedical Engineering
Supported by: UConn IDEA Grant
Online Materials: https://portfolium.com/entry/vasculature-on-chip-engineering-tissue-chip

The overarching goal of this project is to contribute to the development of a 3D cell culture platform which can mimic the bone tissue environment. A key component of bone tissue are the blood vessels which supply nutrients, expel waste, and deliver oxygen. Using a novel injectable scaffolding combining janus-based nanotubules with fibronectin protein in a collagen gel, this project aims to achieve the formation of capillaries with human umbilical vein endothelial cells within a microfluidic tissue chip.

Expanding the Range of Laser Diode Wavelengths
Amanda Zettler '22 (Physics, CLAS)
Advisor: Daniel McCarron, Assistant Professor, Physics
Supported by: SURF Award
Online Materials: https://portfolium.com/entry/expanding-the-range-of-laser-diode-wavelengths

This project has had two components: one complete and one ongoing. The complete portion focused on programming servo motors to use as rotating shutters for blocking lasers. The ongoing portion focuses on drastically cooling laser diodes in order to tune their wavelengths to specific values.

Defining a Novel Neural Projection to Melanin-Concentrating Hormone (MCH) Neurons in the Lateral Hypothalamic Area (LHA)
Lily Zhong '21 (Physiology and Neurobiology, CLAS), University Scholar
Advisor: Alexander Jackson, Associate Professor, Physiology and Neurobiology
Supported by: OUR Supply Award, SURF Award, Institute for the Brain and Cognitive Sciences (IBACS) Undergraduate Research Grant
Online Materials: https://portfolium.com/entry/novel-neural-circuit-related-to-stress-and-anxiety

The lateral hypothalamic area (LHA) is a region of the mammalian hypothalamus that is a crucial modulator of behavioral homeostasis. Through a heterogeneous distribution of neuronal cell types, the LHA receives and sends projections throughout the brain, allowing it to control diverse physiological and behavioral functions. Our project investigates a novel neural circuit in the mouse brain consisting of a tachykininergic projection to the LHA. Specifically, we identified a population of neurokinin B (NKB)-expressing neurons in several brain regions that appear to project onto melanin-concentrating hormone (MCH)-expressing neurons, which are uniquely found in the LHA. We began analyzing these complex NKB projections to LHA MCH neurons in the mouse brain using both anterograde and retrograde viral tracing techniques. This bidirectional anatomical analysis is a first step towards elucidating neural mechanisms underlying the etiology of stress and anxiety, which could contribute to future treatment possibilities.

Self-Assembly Flat DNA Origami Structure in Super-Resolution Microscopy with CaDNAno
Kexin Zhu '21 (Physiology and Neurobiology, CLAS; Economics, CLAS),
Advisor: Ji Yu, Associate Professor, Genetics and Genome Sciences & Center for Cell Analysis and Modeling
Online Materials: https://portfolium.com/entry/self-assembly-flat-dna-origami-structure

After Paul W. K. Rothemund raised the idea of DNA origami by using the property of DNA base pairing rules to build a rigid nanostructure, DNA origami now become convenient due to the its programmable specificity. We are also engaged in DNA origami techniques. To build a structure we want, we need a long 'scaffold' single strand DNA as a template that can be paired with hundreds of short sequences of oligonucleotide 'staple' strands. The 'scaffold' strand first needs to be fold into the shape we want, and would be planar antiparallel with the 'staple' strands, 'staple' strands would act like crossovers to stabilize the helices structure, i.e., force the 'scaffold' strands to fold into specific angels and position. In other words, we could imagine DNA as a long foldable cylinder which could fold like paper into other 3D objects.

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