



A campus-wide  
experiential learning expo

— FEATURING —  
A FALL SHOWCASE OF  
**UNDERGRADUATE  
RESEARCH**

**PRESENTED BY**



THE UNIVERSITY OF  
**TENNESSEE**  
KNOXVILLE

OFFICE OF UNDERGRADUATE  
RESEARCH & FELLOWSHIPS

# WELCOME TO DISCOVERY DAY...

... a day to meet undergraduate students and faculty mentors engaged in research at UT, get a feel for the breadth of undergraduate research happening at UT and the range of opportunities available, and begin to find your own path into research.

The posters dotting Hodges Commons for the 7th annual Discovery Day represent research projects conducted by UT undergraduates in Spring and Summer 2021 across a range of academic fields. Many projects were conducted with faculty here at UT, while some were pursued off campus, such as at the UT Graduate School of Medicine and at universities and labs across the country. In several instances, the posters on display are the product of a UT student's first experience with undergraduate research. Enjoy!

## Symposium

### **Access the online exhibition at our Discovery Day Symposium site!**

This online exhibition hosts abstracts and posters for the undergraduates presenting at Discovery Day 2021 and will remain live throughout the semester. Please check it out, and leave comments and questions for presenters!



SCAN ME



# POSTERS

---

1

## The Effects of Climate Change on Infectious Diseases in Immature Sea Turtles

Megan Cox - Animal Science (Pre-Veterinary Medicine)

*Faculty Mentor: Dr. Deb Miller - Forestry, Wildlife and Fisheries*

2

## Microscopic Identification and PCR Detection of *Cytauxzoon felis* in Wild Bobcat and Ocelot Populations in South Texas

Jessica Kern - Animal Science (Pre-Veterinary Medicine)

*Faculty Mentor: Dr. Deb Miller - Forestry, Wildlife and Fisheries*

3

## Secrets Beneath the Surface: A GPR Analysis of Coan Hall

Keri Burge - Anthropology

Meghan Dadmun - Anthropology

Zaria Bowden - Biological Sciences

*Faculty Mentor: Dr. Barbara Heath - Anthropology*

4

## Studying the Palisade at Coan Hall: Archaeological, Geophysical and Geomorphological Training and Analysis

Gracie Shepard - Anthropology

Marley Ziegler - Anthropology

*Faculty Mentor: Dr. Barbara Heath - Anthropology*

5

## Housing in Late Antique Rome

Anderson Hirt - Architecture

*Faculty Mentor: Dr. Gregor Kalas - Architecture*

6

## Reducing PNNs in a Female Mouse Model of Rett Syndrome Reduces Pup Retrieval Behavior

Miranda Blevins – Audiology & Speech Pathology

*Faculty Mentors: Dr. Keerthi Krishnan & Dr. Billy Lau – Biochemistry & Cellular and Molecular Biology*

7 

## Using deep learning to determine motor deficiencies in female mouse model of Rett Syndrome

Benjamin Bridges – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Keerthi Krishnan – Biochemistry & Cellular and Molecular Biology*

8

## Nuclear Movement in Growing Arabidopsis Root Hairs: A Complex Process that Depends on Both Microtubules and Microfilaments

Justin Brueggeman – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Andreas Nebenfuhr – Biochemistry & Cellular and Molecular Biology*

9

## Vaccine Hesitancy Among Pregnant Women

Sara Burnette – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Samantha Ehrlich – Public Health*

10 

## Forward Genetic Screen on *Arabidopsis Thaliana* erl2

Erik Cazares – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Elena Shpak – Biochemistry & Cellular and Molecular Biology*

11

## Investigating the role of pyruvate kinase M2 in adipogenesis

Jenna Demeter – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Ahmed Bettaieb – Nutrition*

12

## Effect of Ethylene on Root Colonization of *Azospirillum brasilense*

Lauren Donnelly – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Brad Binder – Biochemistry & Cellular and Molecular Biology*

13

## Developing a recombinant murine cytomegalovirus

Ashley Fulmer – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Tim Sparer – Microbiology*

14 

## ApoE & peptide competitive inhibition

Jalen Humphreys – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Jonathan Wall – UT Graduate School of Medicine*

15

## Isolation and characterization of the suppressors of *seipex30* double mutant

Claire Kaple – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Amit Joshi – Biochemistry & Cellular and Molecular Biology*

## 16

### Tuning in to the Radio to Understand Ultrasonic Vocalizations in Mice

Hannah Lee – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

Breanna Ceesay – Neuroscience

Francesca Size – Biological Sciences

Benjamin Bridges – Biological Sciences

Sami Isaac – Chemical Engineering

*Faculty Mentor: Dr. Keerthi Krishnan – Biochemistry & Cellular and Molecular Biology*

## 17

### Structure-Function Relationship of Mouse Ins1 & Ins2

Connor Long – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Thanh Do – Chemistry*

## 18

### Investigating role of dysferlin in lipid droplet biogenesis

Liliane Nguyen – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Amit Joshi – Biochemistry & Cellular and Molecular Biology*

## 19

### A pilot study investigating a novel biomarker to predict metabolic dysfunction during pregnancy

Brittany Okweye – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Jill Maples – UT Graduate School of Medicine*

## 20

### *Campylobacter jejuni* Sirtuin-like Protein Mediates Interactions with Neutrophils

Mary Wakim – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Jeremiah Johnson – Microbiology*

## 21

### How the Changes in Provisioning Behaviors from Heat Stress Affect Offspring Growth

Mary Williams – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Elizabeth Derryberry – Ecology & Evolutionary Biology*

## 22

### Biochemical role of *Arabidopsis thaliana* GCN2-eIF2 $\alpha$ module in mRNA ribonucleoprotein particle homeostasis

Lindsey Young – Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Albrecht von Arnim – Biochemistry & Cellular and Molecular Biology*

## 23

### Characterization of Different Pulses as Sources of Food Ingredients for Agricultural and Food Sustainability

Lorren Politano – Biological Sciences (Ecology & Evolutionary Biology)

Abby Rodriguez – Food Science

*Faculty Mentor: Dr. Vermont Dia – Food Science*

## 24

### Metabolic Plasticity of Three Species of Dung Beetles in Response to Greater Temperature Variation

Andrew Tucker – Biological Sciences (Ecology & Evolutionary Biology)

*Faculty Mentor: Dr. Kimberly Sheldon – Ecology & Evolutionary Biology*

## 25

### Effect of Climate Change on Salamander Body Sizes

Timothy Meidl – Biological Sciences (Ecology & Evolutionary Biology); Philosophy

*Faculty Mentor: Morgan Fleming – Ecology & Evolutionary Biology*

26

Novel Ultraviolet light technologies for the inactivation of murine hepatitis virus, a SARS-CoV-2 surrogate

Alexia Angelos – Biological Sciences (Microbiology)

*Faculty Mentor: Dr. Doris D'Souza – Food Science*

27 

Friend, Enemies, Frenemies? Microbial Interactions at the Ocean's Surface

Sarah Cathey – Biological Sciences (Microbiology)

*Faculty Mentor: Dr. Erik Zinser – Microbiology*

28 

Effects of an ant chemical on common plant rhizobacteria and multiple plant pathogens

Alana Messier – Biological Sciences (Microbiology)

*Faculty Mentor: Dr. Kim Gwinn – Entomology and Plant Pathology*

29

Identifying Medically Vulnerable Areas in TN

Caroline Parker – Biological Sciences (Microbiology)

*Faculty Mentor: Dr. Kristina Kintziger – Public Health*

30

The effects of PNNs on micro-movements in maternal approach of mice

Trinity Shultz – Biological Sciences; Anthropology

*Faculty Mentor: Dr. Keerthi Krishnan – Biochemistry & Cellular and Molecular Biology*

31

Isolation of Environmental Listeria Phages in Eastern Tennessee

Michelle Claxton – Biomedical Engineering

*Faculty Mentor: Dr. Thomas Denes – Food Science*



**32**

**Effect of Processing Parameters on Microhardness of Additively Manufactured 15-5 Stainless Steel**

**Ethan Connor - Biomedical Engineering**

*Faculty Mentor: Dr. Eric Lass - Materials Science and Engineering*

**33**

**Investigating the Effects of Thrombolytic Drugs on Blood Clot Mechanical and Histological Properties**

**James Corbitt - Biomedical Engineering**

*Faculty Mentor: Dr. Bryan Good - Mechanical, Aerospace, and Biomedical Engineering*

**34**

**Determining the Adhesive Forces between Endovascular Devices and Blood Clots**

**Nick Munsie - Biomedical Engineering**

*Faculty Mentor: Dr. Bryan Good - Mechanical, Aerospace, and Biomedical Engineering*

**35** 

**Generating Lower Limb Prostheses Simulations to Investigate Disabling Pain from Altered Walking Patterns**

**Tatum Perry - Biomedical Engineering**

*Faculty Mentor: Dr. Jeffrey Reinbolt - Mechanical, Aerospace, and Biomedical Engineering*

**36**

**Measuring the Effects of Thrombus Properties on Flow Pressures and Treatment Methods in an Acute Ischemic Stroke Model**

**Noah Robison - Biomedical Engineering**

*Faculty Mentor: Dr. Bryan Good - Mechanical, Aerospace, and Biomedical Engineering*

37

Effects of Lecithin on Eicosapentaenoic Acid  
Distribution in Rodent Model

Jessie Li – Chemical and Biomolecular Engineering  
*Faculty Mentor: Dr. Michael Karlstad – UT Graduate  
School of Medicine*

38

Harnessing Modular Chassis Cell to Design Regulation  
Proteins to Relieve Carbon Catabolite Repression in  
*Escherichia coli*

Gillian Castro – Chemical Engineering  
*Faculty Mentor: Dr. Cong T. Trinh – Chemical and  
Biomolecular Engineering*

39

Analysis of the UVA/UVB Degradation of Lotions with  
Additives through Raman Spectroscopy

Isabelle Dancer – Chemistry  
*Faculty Mentor: Dr. Bhavya Sharma – Chemistry*

40

Ballistic characteristics of additively manufactured  
panels

Dakota Landrie – Chemistry; Mathematics  
*Faculty Mentor: Dr. Uday Vaidya – Mechanical,  
Aerospace, and Biomedical Engineering*

41

Analysis of Alternate Binder Properties in Optimized  
Concrete

Caleb Napper – Civil Engineering  
*Faculty Mentor: Dr. John Ma – Civil Engineering*

42

USDA Summer Food Service Program: Insights from  
the COVID-19 Distribution Response

Ashlyn Anderson – College Scholars  
*Faculty Mentor: Melissa Weissler – Operation Food  
Search*

43

Precarious Consumption in Knoxville, TN

Emily Morgan – College Scholars

*Faculty Mentor: Dr. Nikki Luke – Geography*

44

A Mixed Method Study of the Socio-Emotional Benefits of Reader's Theatre

Denee Stewart Freeman – College Scholars

*Faculty Mentor: Dr. Deborah Welsh – Psychology*

45

Cultural Autonomy and Identity in Obstetric Care

Juliana Upchurch – College Scholars

*Faculty Mentor: Dr. Susan Lawrence – History*

46

Efficient Numerical Methods for Deep Generative Modeling

Lauren Proctor – Computer Science; Mathematics

*Faculty Mentor: Dr. Yuanzhe Xi – Mathematics, Emory University*

47

LASSO Feature Selection for Sepsis Prediction and Phenotype Classification in *E. coli*

Owen Queen – Computer Science; Mathematics

*Faculty Mentor: Dr. Scott Emrich – Electrical Engineering and Computer Science*

48 

Understanding a \$15 Minimum Wage in Tennessee

Marshall Summar – Economics

*Faculty Mentor: Dr. Marianne Wanamaker – Economics*

49

Big Ideas for the Big Orange Pantry

Giuliana Castillo – Economics; Global Studies

*Faculty Mentors: Dr. Michelle Childs & Dr. Christopher Sneed – Retail, Hospitality, and Tourism Management*

## 50

### Urban Agriculture: Do Soils Tests Tell the Whole Story?

Rebecca Hughes – Environmental & Soil Sciences

Gabriella King – Plant Sciences

Allison Padovani – Biological Sciences (Ecology & Evolutionary Biology)

*Faculty Mentors: Dr. Sharon Jean-Philippe – Forestry, Wildlife and Fisheries; Dr. Natalie Bumgarner – Plant Sciences*

## 51

### Connection between Sleeping Habits and Academic Success in times of a Global Pandemic

Zachary Coover – Finance

*Faculty Mentor: Dr. Lance Dean – English*

## 52

### Characterization of Different Pulses as Sources of Food Ingredients for Agriculture and Food Sustainability

Avery Ollis – Food Science

Laila Martin – Nutrition

*Faculty Mentor: Dr. Vermont Dia – Food Science*

## 53

### Characterization of Different Pulses as Sources of Food Ingredients for Agricultural and Food Sustainability

Joshua Saad – Food Science

Isabella Gregg – Advertising

Saydie Hillis – Plant Sciences

*Faculty Mentor: Dr. Vermont Dia – Food Science*

## 54

### *Quillaja saponaria* bark extract prevents *Salmonella enterica* serovar Typhimurium Sal54 attachment on Vero Cells

Halia Walrond – Food Science

*Faculty Mentor: Dr. Doris D'Souza – Food Science*

55

Polyextremophile brine ecosystems in Antarctica as models for life on Enceladus

Kristen Holbrook – Geology and Environmental Studies

*Faculty Mentor: Dr. Jill Mikucki – Microbiology*

56 

The Beliefs, Knowledge and Attitudes of Latinos in the Knoxville Area about COVID-19 and the Vaccines

Andrea Linares – Kinesiology

*Faculty Mentor: Dr. Cristina Barroso – Nursing*

57

Hemocompatibility of Nitinol

Eli Christoph – Materials Science and Engineering

*Faculty Mentor: Dr. Bryan Good – Mechanical, Aerospace, and Biomedical Engineering*

58

Effects of Processing Parameters on Density of AM 15-5 PH Stainless Steel

Mary Hagemeyer – Materials Science and Engineering

*Faculty Mentor: Dr. Eric Lass – Materials Science and Engineering*

59

Within Host Mathematical Modeling of Influenza A and B Viral Dynamics

John Maddox – Mathematics

*Faculty Mentor: Dr. Vitaly Ganusov – Microbiology*

60 

Exploring Racism in the Context of K-12 Educational Institutions' Social Media Posts

Tayla Thomas – Mathematics

*Faculty Mentor: Dr. Joshua Rosenberg – Theory and Practice in Teacher Education*

61

## A Camera-Based System for Noninvasive Monitoring in the Neonatal Intensive Care Unit

Samantha Bell – Mechanical Engineering

Jordan Grant – Biomedical Engineering

Michael Palmaccio – Aerospace Engineering

Gabrielle McClarin – Nursing

*Faculty Mentors: Dr. Xiaopeng Zhao – Mechanical, Aerospace, and Biomedical Engineering; Dr. Tami Wyatt – Nursing*

62 

## Transition and turbulence modeling of a NASA 93-10 flared cone

Spencer Dixon – Mechanical Engineering

*Faculty Mentor: Dr. James Coder – Mechanical, Aerospace, and Biomedical Engineering*

63

## Rainbow Garden: Cultivating Community

Alenna Fletcher – Modern Foreign Languages & Literatures (LWB Hispanic Studies)

Bear Moran – Computer Science; Mathematics

Spencer Wood – Economics

*Faculty Mentors: Dr. Sharon Jean-Philippe – Forestry, Wildlife and Fisheries; Dr. Natalie Bumgarner – Plant Sciences*

64 

## Creating a Backyard Buzz: Using Video to Communicate Information and Increase Awareness About Mosquito Populations and Diseases in TN

Caroline Barnes – Neuroscience

*Faculty Mentor: Dr. Rebecca Trout Fryxell – Entomology and Plant Pathology*

65

**Investigating Microglial Cell Function in the  
Suprachiasmatic Nucleus**

**Kara Holt – Neuroscience**

*Faculty Mentor: Dr. Rebecca Prosser – Biochemistry &  
Cellular and Molecular Biology*

66

**Effects of Social Dominance Status on Responses to  
Social Defeat Stress and Activity of Medial Amygdala  
Androgen Receptor-Expressing Neurons**

**Josh King – Neuroscience**

*Faculty Mentor: Dr. Matthew Cooper – Psychology*

67

**Novel Microfluidic Device Used to Maintain Brain  
Tissue and Quantify Excitotoxicity**

**Jimin Lee – Neuroscience**

*Faculty Mentor: Dr. Rebecca Prosser – Biochemistry &  
Cellular and Molecular Biology*

68

**A Chinese Olive Branch to the United States**

**Peibo Li – Neuroscience**

*Faculty Mentor: Dr. Wonjae Hwang – Political Science*

69

**Development of Boronic Acid-Functionalized  
Liposome Formulations**

**Aidan Melton – Neuroscience**

*Faculty Mentor: Dr. Deidra Mountain – UT Graduate  
School of Medicine*

70

**Identifying functional biomarkers of senescence via  
machine learning**

**Deanna Riley – Neuroscience**

*Faculty Mentor: Dr. Jude Phillip – The Institute of  
NanoBioTechnology, Johns Hopkins University*

71

Effect of Alzheimer's A $\beta$  and tau initial toxicity on tissue viability and peptide release in the SCN

Christiane Alvarez - Neuroscience

*Faculty Mentor: Dr. Rebecca Prosser - Biochemistry & Cellular and Molecular Biology*

72 

Investigating whisker-based tactile deficits in a female mouse model of Rett Syndrome

Olivia Fleenor - Neuroscience; Psychology

Alexandra McBryar - University Exploratory

Sarah Perez - Biological Sciences (Biochemistry & Cellular and Molecular Biology)

*Faculty Mentor: Dr. Keerthi Krishnan - Biochemistry & Cellular and Molecular Biology*

73

Differences Between College Males' and Females' Coping Mechanisms in Relation to the COVID-19 Pandemic

Margaret Tasket - Nursing

*Faculty Mentor: Dr. Allyson Neal - Assistant Dean of Graduate Programs for Nursing*

74 

Creating Superconducting Interfaces

Mitchell Compton - Physics

*Faculty Mentor: Dr. Hanno Weitering - Physics & Astronomy*

75

Quantum Transport in Low-dimensional Semiconductors

Cory Cravens - Physics

*Faculty Mentor: Dr. Joon Sue Lee - Physics & Astronomy*



76

### Measuring the efficiency of proton detection

William Greene – Physics

*Faculty Mentor: Dr. Nadia Fomin – Physics & Astronomy*

77

### Creating Analytic tools for CHIMERA

Daniel Lamphere – Physics

*Faculty Mentor: Dr. William Hix – Physics & Astronomy*

78

### Realizing Atomic Flatness for Epitaxial Growth

Alexander Sizemore – Physics

*Faculty Mentor: Dr. Jian Liu – Physics & Astronomy*

79

### Rivet Analyses of High Energy Collisions

Adam Tilley – Physics

*Faculty Mentor: Dr. Christine Natrass – Physics & Astronomy*

80

### Conserving the imperiled Atlantic White-cedar: A population genetics perspective

Zane Smith – Plant Genetics and Biotechnology

*Faculty Mentor: Dr. Denita Hadziabdic Guerry – Entomology and Plant Pathology*

81 

### Discovering Racial and Gender Patterns within Political Ads

Tena Beard – Political Science

*Faculty Mentor: Dr. Leah Christiani – Political Science*

82

### Single-Molecule Studies on DNA Bending by Transcription Factor Protein Sox2

Chandni Naidoo – Political Science

*Faculty Mentor: Dr. Rajan Lamichhane – Biochemistry & Cellular and Molecular Biology*

83

**Puberty and the Development of Perineuronal Nets in the Medial Amygdala**

Raneem Ammar – Psychology

*Faculty Mentor: Dr. Kalyann Schulz – Psychology*

84

**A Moderation of Intimate Partner Violence-Linked Drug Use by Family of Origin Violence and Depression**

Mary Jensen – Psychology

*Faculty Mentor: Dr. Gregory Stuart – Psychology*

85

**Merchandising Strategies for the Big Orange Pantry**  
**Madison Morgan – Retail, Hospitality and Tourism Management**

*Faculty Mentors: Dr. Michelle Childs & Dr. Christopher Sneed – Retail, Hospitality, and Tourism Management*

86

**Ijams Community Weaving Project**

Isabella Killius – Sociology

*Faculty Mentors: Dr. Nikki Luke – Geography; Dr. Mike McKinney – Earth and Planetary Sciences*

87

**Assessment of Physiological Markers in PET/CT Images to Identify Infiltration**

Nikhil Chatra – Statistics

*Faculty Mentor: Dr. Dustin Osborne – UT Graduate School of Medicine*

88 

**Secondary seed dispersal in Pisgah National Forest**  
**Holly Whited – Wildlife & Fisheries Science**

*Faculty Mentor: Dr. Charles Kwit – Forestry, Wildlife and Fisheries*

# Interested in Additional Opportunities to Pursue and Present Undergraduate Research?

---

The Office of Undergraduate Research & Fellowships funds and coordinates several on-campus undergraduate research programs, such as Semester Research Assistantships, Summer Research Internships, and the Summer Research Scholars Program, as well as campus-wide research exhibitions, including EURēCA.

We also support students interested in off-campus research experiences and conferences. Looking to take your undergraduate research to the next level?

Consider working with our staff to:

apply for a nationally-competitive research award, such as the Goldwater, Amgen, Fulbright, DAAD RISE, or an NSF REU or Graduate Research Fellowship

explore research opportunities with the UT Graduate School of Medicine and Oak Ridge National Lab

secure travel funding to present at a research conference in your field or at NCUR, Posters at the Capitol, or Posters on the Hill



SCAN ME

**Visit our "Find Opportunities" page for more information**

# **STAY INVOLVED**

**WITH**

## **UNDERGRADUATE RESEARCH AND FELLOWSHIPS**

**FOLLOW US ON SOCIAL MEDIA  
TO KEEP UP ON EVENTS,  
RESEARCH OPPORTUNITIES,  
AND MUCH MORE!**



**@UgradResearch**



**UTK Undergraduate  
Research**



**ugradresearch**

**#VOLRESEARCH**