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SPECIAL AREA COMPETITIONS

SPRING 2023

The Spring 2023 Undergraduate Research Symposium featured twelve Special Area Competitions, designed to provide discipline and category-specific recognition of excellence in student scholarship, sponsored by a variety of undergraduate research partners across Mississippi State University.

3MINUTE RESEARCH PITCH

Sponsored by The Graduate School

The 3Minute Research Pitch is a competition that challenges undergraduate students to present a compelling verbal presentation of their research topic and its significance in just three minutes. Modeled after the Three Minute Thesis (3MT) graduate competition, the goal of this program is to practice academic, presentation, and research communication skills and support the development of undergraduate students' capacity to describe their research in language appropriate to a public audience. Students compete by presenting their research topic in three minutes or less with only one slide. Competitions are judged by a panel comprised of a diverse group of professionals with a wide range of expertise.

1ST

Josie Nasekos (121); Advisor: Alba J. Collart, Agricultural Economics

Food Insecurity: Paying the Price During the COVID-19 Pandemic

2ND

Juliet Buckholdt (45); Advisor: Jenna Altomonte, Art

Picket Fences: How Alphabets Influence Design and Identity

PEOPLE'S
CHOICE

Madeline McKnight (215); Advisor: W. Isaac Jumper, Pathobiology & Population Medicine

Describing the Consumption of Chlortetracycline-Containing Mineral Offered Free-Choice to Commercial Beef Cows on Pasture

BIOMEDICAL RESEARCH

Sponsored by the Departments of Agricultural & Biological Engineering and Comparative Biomedical Sciences

This competition is for students in the life sciences and/or engineering who have conducted research related to preventing, diagnosing, or treating a human medical condition (i.e., illness, injury, or disease). The project should have clear biomedical relevance, and winners are able to discuss the project's proper medical context, the project's purpose or goal, applicable laboratory and engineering techniques used to approach the problem, the project's results and their significance, conclusions that are supported by experimental data, the scope of the project, and time involved.

Emma Palmer (221); Advisor: Natraj Krishnan, Biochemistry, Molecular Biology, Entomology, & Plant Pathology

Friend or Foe? Investigating the Expression of Matrix Metalloproteinases in a Drosophila Model of Spinocerebellar Ataxia Type 1 (SCA1)

1ST

Sophie Jones (197); Advisor: Lauren Priddy, Agricultural & Biological Engineering

Comprehensive Evaluation of Hydroxyapatite Coatings to Improve Degradation Characteristics of Additively Manufactured Porous Magnesium Implants

2ND

Kendall McKinnon (214); Advisor: Russell Carr, Comparative Biomedical Sciences

Inhibition and Recovery of Cholinesterase Activity in Juvenile Rat Brain and Serum following Acute Exposure to a Nerve Agent Surrogate

3RD

CALS & MAFES UNDERGRADUATE RESEARCH SCHOLARS PROGRAM

Sponsored by the College of Agriculture & Life Sciences and the MS Agriculture & Forestry Experiment Station

The Mississippi Agricultural and Forestry Experiment Station, along with the College of Agriculture and Life Sciences, hosts an awards program for all students in the 2022-2023 CALS/MAFES Undergraduate Research Scholars Program. Honor and Merit awards are given to students who show excellence in research through the program.

1ST

Emma Palmer (221); Advisor: Natraj Krishnan, Biochemistry, Molecular Biology, Entomology, & Plant Pathology

Friend or Foe? Investigating the Expression of Matrix Metalloproteinases in a Drosophila Model of Spinocerebellar Ataxia Type 1 (SCA1)

2ND

Emily Little (209); Advisor: Xue Zhang, Food Science, Nutrition, & Health Promotion

Effect of Xanthan Gum on Rheological and Sensory Properties of Gluten-Free Chicken Nugget Batters

3RD

Andrea Gonzalez Lopez (183); Advisor: Rhonda Vann, Animal & Dairy Sciences

Evaluation of Live Animal and Carcass Body Composition Traits in Sheep for Enhancing Genetic Predictors

HONORABLE MENTIONS

Jackson Horton (103); Advisor: OP McCubbins, School of Human Sciences

Career and Technical Education Teachers' Opinions on Virtual Reality

Leah Hammons (017); Advisor: Jing Hu, Geosystems Research Institute

Effects of Cover Crops on Soil Temperature, Moisture, and Carbon Dioxide Emissions

COMMUNITY-ENGAGED RESEARCH

Sponsored by the Center for Community-Engaged Learning

Community-engaged research has an impact on the ability of individuals, groups, or organizations—either public or private—to achieve their intellectual, economic, and/or social goals. Community-engaged research projects also include activities that contribute to the development of a community, governmental initiative, and/or society at large within or outside of Mississippi.

SOCIAL SCIENCES CATEGORY WINNER

Sarah Rendon (129); Advisor: Holli Seitz, Communication & Social Science Research Center

Examining Student Perceptions of Community Engaged Learning through Reflection

BIOLOGICAL SCIENCES & ENGINEERING CATEGORY WINNER

Hannah Brasher (157); Advisor: Leyla Rios de Alvarez, Animal & Dairy Sciences

Preliminary Effect of Cottonseed as a Source of Gossypol on the Artificial Infection of Haemonchus contortus

DATA SCIENCE RESEARCH

Sponsored by the Data Science Program

The MSU Data Science Program competition recognizes excellence in undergraduate research relevant to data science from any academic discipline that excels in one of three categories: Basic research that deepens human knowledge of the underlying methods or techniques central to the field of data science, use-inspired research that advances the field of data science based upon a clear potential use case and applied research that addresses a well-defined problem by applying data science methods and principles.

OVERALL WINNER

Minjae Cho (8); Advisor: Sungkwang Mun, Center for Advanced Vehicular Systems

Development of Parameter Dependent conditional Generative Adversarial Network (PDcGAN) Model for Multi-Phase Flow Prediction

USE-INSPIRED DATA SCIENCE RESEARCH WINNER

Minjae Cho (8); Advisor: Sungkwang Mun, Center for Advanced Vehicular Systems

Development of Parameter Dependent conditional Generative Adversarial Network (PDcGAN) Model for Multi-Phase Flow Prediction

HONORABLE MENTIONS

Darrock Flynn (178); Advisor: Matthew Priddy, Mechanical Engineering

Computational Fluid Dynamics in a Perfusion Bioreactor

Zijie Chen (165); Advisor: Sungkwang Mun, Center for Advanced Vehicular Systems

Predicting the Antibacterial Effectiveness of Nanotextured Surfaces Using Transfer-Learning

APPLIED DATA SCIENCE RESEARCH PROJECT WINNER

Clark Hensley (18); Advisor: Matthew Priddy, Mechanical Engineering

ODBPlotter: An Open Source Data Processing and Visualization Tool for Wire Arc Directed Energy Deposition

HONORABLE MENTIONS

Curtis Coleman (166); Advisor: Garrett Street, Wildlife, Fisheries, and Aquaculture

Adrift in time: Correcting time drift in animal-borne accelerometer and magnetometer dataloggers using animal behavior

Josie Nasekos (121); Advisor: Alba J. Collart, Agricultural Economics

Food Insecurity: Paying the Price During the COVID-19 Pandemic

Meng Xiang Chen (164); Advisor: Haifeng Wang, Industrial and Systems Engineering

Developing a Prototype of Cost-Effective Artificial Intelligence System for Real-time Cotton Weed Detection

Justin Yee (44); Advisor: Jingdao Chen, Computer Science and Engineering

Digital Twin Creation in Off-Road Environments from LiDAR Scans

SPECIAL RECOGNITION: CONTRIBUTIONS TO DATA ACQUISITION, DATA WRANGLING, & DATA LABELING

Connor Foley (179); Advisor: Priyadarshini Chakrabarti Basu, Biochemistry, Molecular Biology, Entomology & Plant Pathology

Developing a Computer Vision Algorithm for Monitoring Colony Strength in Honeybees

Surabhi Gupta (16); Advisor: Adam Skarke, Geosciences

Identification of Seafloor Gas Seeps in Sonar Data to Develop a Machine Learning Detection Database

EDUCATION RESEARCH

Sponsored by the College of Education

Any undergraduate student submitting a research project under the primary guidance of a College of Education faculty or staff member is considered for this competition. This may include submissions from the Departments of Curriculum, Instruction, and Special Education (CISE), Counseling, Educational Psychology, and Foundations (CEPF), Kinesiology, Music, Instructional Systems, and Workforce Development (ISWD), and Educational Leadership, as well as The T.K. Martin Center for Technology and Disabilities and the National Research and Training Center for Blindness and Low Vision.

Raegan Adams (070); Advisor: Chih-Chia Chen, Kinesiology

Training with Badminton Shuttle Time Starter Lessons: What is working for Young Adults with Intellectual Disabilities?

1ST

Laura Grace King (110); Advisor: Arazais D. Oliveros, Psychology

Examining Curriculum Requirements of Undergraduate Teacher Preparation Programs to Gauge Educator Knowledge of Trauma-Informed Education Frameworks

Samuel Stewart (139); Advisor: Mehdi Ghahremani, Counseling, Educational Psychology, & Foundations

Students' Thinking Styles and Academic Performance

2ND

Lucy Brake (080); Advisor: Jianling Xie, Counseling, Educational Psychology, & Foundations

TikTok Addiction and Student Learning Outcomes: The Mediating Role of Self-Regulation

Sally Hatten (190); Advisor: Adam Knight, Kinesiology

Characterizing Neuromuscular Effort in Primary Ankle Stabilizers in Soccer Players When Performing a Dynamic Balance Test

3RD

ENGINEERING RESEARCH

Sponsored by the Bagley College of Engineering

Projects completed under the supervision of a faculty member in the Bagley College of Engineering are eligible to receive a Bagley College of Engineering Undergraduate Research Award. Projects are judged on the importance of work to society, originality of work, and presentation clarity.

1ST

Mallory Mott (30); Advisor: Shreyas Narsipur, Aerospace Engineering

Aerodynamic Analysis of Tubercled v. Traditional Airfoil Geometries With and Without Propeller Implementation

2ND

Wilson Martinez Diaz (211); Advisor: Matthew Priddy, Mechanical Engineering

Modular Framework for Finite Element Analysis of Lattice Structures and Application to Post-Lumbar Interbody Fusion Cage Design

3RD

Nate Venarske (248); Advisor: Vitor Martins, Agricultural and Biological Engineering

Mapping Plant-Insect Interactions with iNaturalist Data from Mississippi

FORESTRY & WILDLIFE RESEARCH

Sponsored by the College of Forest Resources and the Forest & Wildlife Research Center

Undergraduate research projects completed under the supervision of or in association with a faculty member in the College of Forest Resources are eligible to be recognized with a College of Forest Resources/Forest and Wildlife Research Center Undergraduate Research Award. Eligible projects include but are not limited to, those supported by the CFR/FWRC Undergraduate Research Scholars Program. Selection criteria include novelty and originality, relevance, scientific merit, impact, and presentation.

Mary Tingle (244); Advisor: Li Zhang, Poultry Science

Investigating the Effectiveness of 405 nm Light in Controlling the Proliferation of Avian Pathogenic
Escherichia coli

1ST

Emily White (252); Advisor: Courtney Siegert, Forestry

Carbon Sequestration Potential of Non-Commercial Tree Species in the Southeast

2ND

Baylor Doughty (172); Advisor: Adam Polinko, Forestry

Effects of Fertilization and Endophyte Application on Growth of Planted Longleaf Pine

3RD

HUMANITIES RESEARCH

Sponsored by The Institute for the Humanities

The humanities competition recognizes outstanding student work that highlights the insights and values of humanities scholarship. Projects may summarize work with a community partner on a humanities project (e.g., a public history exhibit for a local organization) or translate humanities scholarship conducted in class for a layperson audience. Any student may use humanities research conducted in class or under the supervision of a faculty mentor, provided their poster or paper aims to present the research in an accessible way and explain its relevance to the symposium audience.

WINNER

Karter Wilbert (66); Advisor: Sol Pelaez, Classical and Modern Languages & Literatures

No tener límites: La monstruosidad de Susy Shock

MOVEMENT SCIENCES & HEALTH RESEARCH

Sponsored by the Department of Kinesiology

Movement Sciences and Health is multidisciplinary studies on human movement that discusses and applies the dimensions of wellness related to personal and public health. Undergraduate students from a variety of backgrounds, including injury prevention and rehabilitation, sport medicine, biomechanics, exercise physiology, health promotion and fitness, psychology and sociology of physical activity, motor control and development, and/or sport administration are welcomed. All poster presentations are judged for creativity, organization of content, technical procedures employed, oral delivery, knowledge of material, clarity of artwork, and overall presentation.

Sally Hatten (190); Advisor: Adam Knight, Kinesiology

Characterizing Neuromuscular Effort in Primary Ankle Stabilizers in Soccer Players When Performing a Dynamic Balance Test

1ST

Raegan Adams (070); Advisor: Chih-Chia Chen, Kinesiology

Training with Badminton Shuttle Time Starter Lessons: What is working for Young Adults with Intellectual Disabilities?

2ND

Hartleigh Schambeau & Rachel Davis (132); Advisor: Chih-Chia Chen, Kinesiology

Does Volleyball Training Enhance Volleyball Skill Acquisition and Transfer of Learning in Badminton for Adults with Intellectual Disabilities?

3RD

Morgan Bailey (151); Advisor: Stamatis Agiovlasis, Kinesiology

Wrist Accelerometer Cut-Points For Measuring Physical Activity And Sedentary Behavior In Adults With Down Syndrome

PUBLIC HEALTH RESEARCH

Sponsored by the Department of Food Science, Nutrition, & Health Promotion

In celebration of National Public Health Week, the Public Health Research Competition component of the Undergraduate Research Symposium is designed to highlight the important work that undergraduate students at MSU are doing in public health. Public health research can be any research related to promoting and protecting the health of people and communities. Projects are evaluated on the overall quality and clarity of the abstract and implications statement, the relevance of the research to public health, and the significance of the contribution to public health.

1ST

Rosalynn Corzine (167); Advisor: Justin Thornton, Biological Sciences

Identifying Mechanisms of Antibiotic Uptake in *S. pneumoniae*: The Role of Metabolic Transporters

2ND

Amelia Driggers (87); Advisor: David Buys, Food Science, Nutrition, & Health Promotion

Changes in Life-Space with Loss of Relatives and Friends among Older Adults: Results from the UAB Study of Aging

3RD

Ainsley Jessup (195); Advisor: Shecoya White, Food Science, Nutrition, & Health Promotion

Efficacy of Thermal Inactivation of *Salmonella* spp. in Air Fried Brownies

TOMORROW BUILDER AWARD

Sponsored by Theta Tau Professional Engineering Fraternity

Theta Tau Professional Engineering Fraternity is a co-ed student organization that promotes service, professional development, and brotherhood. Our members are a diverse group from every major in the Bagley College of Engineering, and we strive to become the engineering leaders of the future. We are excited to support an individual in this year's research symposium to receive the Tomorrow Builder Award, which aims to recognize an engineering undergraduate student who uses their skills and research to help solve complex problems of critical importance to society.

WINNER

Andie Nanney (31); Advisor: Amanda Patrick, Chemistry

Reproducibility of Drift Gas Modifier Effects in Ion Mobility Spectrometry of Select Small Organic Compounds

The Office of Undergraduate Research and Creative Discovery extends gratitude to all Special Area Competition sponsors and judges for supporting student research. Special thanks to the following individuals, who created and hosted these competitions:

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Kristine Evans, Ph.D.

Daniel Gadke, Ph.D.

Cory Gallo, Ph.D.

Antonio Gardner, Ph.D.

Michelle Garraway

Robert Green, Ph.D.

Lilli Harris

Melanie Loehwing, Ph.D.

Julia Osman, Ph.D.

Kari Reeves, Ph.D.

Matthew Ross, Ph.D.

Holli Seitz, Ph.D.