



**Office of
Undergraduate Research**
University of South Carolina

2022 Summer Research Symposium

Thursday, July 28, 1:30 – 3:00 pm

Hollings Program Room at the Thomas Cooper Library

*Sponsored by the Office of the Vice President for Research
and the Office of Undergraduate Research*

SMART Program

1 - qPCR vs. dPCR: Analyzing the Efficacies of Diagnostic Testing in the Identification of Chagas Positive Blood Samples

Kaaliyah Harris, USC Columbia, Public Health; Neuroscience - Junior

Mentor: Dr. Melissa Nolan, USC Columbia, Epidemiology and Biostatistics

2 - Using Machine Learning to Predict HPC Job Performance

Marco Martinez Cruz, University of South Carolina Beaufort, Computational Science – Senior

Mentor: Dr. Kishwar Ahmed, USC Beaufort, Computer Science and Mathematics

3 - The Effect of Chromatin Modifiers on mPing Transposition

Zara Lacera, USC Aiken, Biology - Junior

Mentors: Dr. C. Nathan Hancock, USC Aiken, Biology and Geology

Dr. Priscilla Redd, USC Aiken Aiken, Biology and Geology

4 - Asian Longhorn Ticks: Surveillance and study in South Carolina

Titilayomi Abiodun, USC Columbia, Public Health - Junior

Mentors: Dr. Melissa Nolan, USC Columbia, Epidemiology and Biostatistics

Ms. Kia Zellars, USC Columbia, Public Health

5 - Explore Power Allocation Techniques in Heterogeneous Systems

Luis Guillen, USC Beaufort, Computational Science - Senior

Mentor: Dr. Ahmed Kishwar, USC Beaufort, Computer Science and Mathematics

6 - Analysis of the Soybean Yellow Leaf Mutant

Tetandianocee Germany, USC Aiken, Clinical Laboratory Science - Junior

Mentor: Dr. C. Nathan Hancock, USC Aiken Aiken, Biology & Geology

7 - Multiple linear regression for predicting rainfall in Columbia, SC

Ngom Ngaru, USC Sumter, Biological Sciences - Junior

Mentor: Dr. Sher Chhetri, USC Sumter, Science, Mathematics, and Engineering

Biological and Health Sciences

8 - Investigating the Role of RNA Polymerase V in mPing Excision Site Repair

Kaili Renken, USC Aiken, Biology - Junior

Mentor: Dr. C. Nathan Hancock, USC Aiken, Biology and Geology

9 - Disseminated Leishmaniasis and HOTAIR Gene Association: In Situ Analysis

Liz Iglesias, USC Columbia, Biological Sciences - Junior

Mentors: Dr. Lea Castellucci, Federal University of Bahia, Salvador, Bahia, Brazil, Infectious Disease

Dr. Taina Lago, Federal University of Bahia, Salvador, Bahia, Brazil, Infectious Disease

10 - Determining if the Bases Adjacent to the mPing Element Impacts Transposition

Monica Colon-LaBorde, USC Aiken, Biology - Junior

Mentor: Dr. Nathan Hancock, USC Aiken, Biology and Geology

11 - Flower color in natural wildflower hybrids is influenced by two anthocyanin pathway gene

Noah Williams, USC Columbia, Biological Sciences - Senior

Mentor: Dr. Carrie Wessinger, USC Columbia, Biological Sciences

12 - CAMP KEMO

Erika Felder, USC Columbia, Nursing - Senior

Mentor: Ms. Gina Spence, USC Columbia, Center for Integrative and Experiential Learning

Engineering and Computing

13 - Modeling the Breaching of Soil Dams with Respect to Elevation

Oru-Ntui Nkiri, USC Columbia, Civil Engineering - Junior

Lylie Wilkie, USC Columbia, Civil Engineering - Junior

Mentor: Dr. Enrica Viparelli, USC Columbia, Civil and Environmental Engineering

14 - Modeling of soil dam breaches

Eduardo Alvarado, USC Columbia, Civil Engineering - Senior

Luke Groth, USC Columbia, Civil Engineering - Junior

Jens Victorio, USC Columbia, Civil Engineering - Senior

Mentor: Dr. Enrica Viparelli, USC Columbia, Civil and Environmental Engineering

15 - Static clay flocculation experiments: preliminary results

Lloyd Connor, USC Columbia, Civil Engineering - Senior

Mentors: Dr. Enrica Viparelli, USC Columbia, Civil and Environmental Engineering

Dr. Shamia Hoque, USC Columbia, Civil and Environmental Engineering

16 - Impact of sediment on braided channel formation (E. Viparelli CAREER Award REU)

Elijah Glover, USC Columbia, Civil engineering - Senior

Yunus Khan, USC Columbia, Civil engineering - Junior

Mentor: Dr. Enrica Viparelli, USC Columbia, Civil engineering

17 - Water Level Recession rates in the Congaree National Park Floodplains (E. Viparelli CAREER Award REU)

Gordon Harrison, USC Columbia, Civil Engineering - Junior

William Caspino, USC Columbia, Civil Engineering - Senior

Mentors: Dr. Raymond Torres, USC Columbia, Earth, Ocean and Environment

Dr. Enrica Viparelli, USC Columbia, Civil and Environmental Engineering

18 - Steam Enhanced Low Concentration Carbon Dioxide Capture via Ceramic-Carbonate Dual Phase Membrane

Aidan Billings, USC Columbia, Mechanical Engineering - Junior

Mentors: Prof. Kevin Huang, USC Columbia, Mechanical Engineering

Dr. Shichen Sun, USC Columbia, Mechanical Engineering

19 - Drying and Storage of Aluminum-Clad Nuclear Fuel from Research and Test Reactors

Robert Demuth, USC Columbia, Aerospace Engineering - Senior

Mentor: Dr. Travis Knight, USC Columbia, Mechanical Engineering

20 - Dip-Coating Carbon Fibers in LiFePO₄ Slurry as Basis for Structural Batteries

Jacob Whisenant, USC Columbia, Aerospace Engineering - Senior

Nick Spencer, USC Columbia, SC Aerospace Engineering – Freshman

Mentors: Prof. Paul Coman, USC Columbia, Chemical Engineering

Dr. Ralph White, USC Columbia, Chemical Engineering

21 - 3D Printing of Tungsten via Laser Powder Bed Fusion Additive Manufacturing

J. Garey Weaver, USC Columbia, Mechanical Engineering- Senior

Mentor: Dr. Lang Yuan, USC Columbia, Mechanical Engineering

22 - Ultrawide Bandgap Semiconductors

Kiyona Trevino, USC Columbia, Electrical Engineering - Junior

Tyrese Smalley, USC Columbia, Electrical Engineering - Senior

Mentors: Dr. Ahmad Iftikhar, USC Columbia, Electrical Engineering

Mr. Samiul Hasan, USC, Columbia, Electrical Engineering

Mr. Mohi Jewel, USC Columbia, Electrical Engineering

23 - Catalytic Co-pyrolysis of Polyurethane with 2-D Zeolites

Nathaniel Wilgers, USC Columbia, Chemical Engineering - Junior

Mentors: Dr. Jochen Lauterbach, USC Columbia, Chemical Engineering

Dr. Thossaporn Onsree, USC Columbia, Chemical Engineering

24 - Strain influence on the oxygen electrocatalysis of epitaxial La_{1-x}Sr_xCoO₃ thin films

Dario Handrick, USC Columbia, Aerospace Engineering - Junior

Mentor: Dr. Dongkyu Lee, USC Columbia, Mechanical Engineering

25 - How to optimize thermoelectric properties of oxide materials in thin film form

Colin Stevenson, USC Columbia, Mechanical Engineering - Junior

Mentor: Dr. Dongkyu Lee, USC Columbia, Mechanical Engineering

26 - Computer Vision for Maritime Object Detection and Classification based on YOLO (You Only Look Once) Model

Rafael Sanchez, USC Columbia, Aerospace Engineering - Senior

Mentor: Dr. Yi Wang, USC Columbia, Mechanical Engineering

27 - Effect of membrane thickness on electrochemical conversion of alkenes to ketones in a PEM electrolyzer

Bridgett Young, USC Columbia, Chemical Engineering - Senior

Mentors: Dr. Ben Meekins, USC Columbia, Chemical Engineering

Dr. Sirivatch Shimpalee, USC Columbia, Chemical Engineering

28 - Implementing a packet filter using a P4 programmable data plane switch

Boozer Caroline, USC Columbia, Computer Science and Cyber Intelligence – Junior

Mentors: Dr. Jorge Chrichigno, USC Columbia, Integrated Information Technology

Mr. Ali Mazloum, USC Columbia, Integrated Information Technology

Mr. Jose Gomez, USC Columbia, Integrated Information Technology

29 - Implementing a Denial of Service (DoS) SYN Attack Prevention with Next-generation Firewalls

Sean Batchelder, USC Columbia, Integrated Information Technology - Senior

Mentors: Dr. Jorge Chrichigno, USC Columbia, Integrated Information Technology

Mr. Ali AISabeh, USC Columbia, Integrated Information Technology

30 - Static American Sign Language Recognition Using Neuromorphic Hardware

James Seekings, USC Columbia, Computer Science / Mathematics - Senior

McNair Junior Fellows

Sara Hendrix, USC Columbia, Computer Science - Sophomore

Mentors: Dr. Ramtin Mohammadizand, USC Columbia, Computer Science and Engineering

Mr. Peyton Chandarana, USC Columbia, Computer Science and Engineering

31 - Detection and Discovery of Structural Motifs in Crystal Materials

Cassidy Carter, USC Columbia, Computer Engineering - Senior

Mentor: Dr. Jianjun Hu, USC Columbia, Computer Science and Engineering

32 - Influence of process parameters on defect formation for AA 6061 via Laser Powder Bed Fusion Additive Manufacturing

Faith Buchanan, USC Columbia, Public Health - Senior

Mentors: Dr. Andrew Gross, USC Columbia, Mechanical Engineering

Mr. Sivaji Karna, USC Columbia, Mechanical Engineering

McNair Junior Fellows

33 - Explainable Artificial Intelligence (XAI) User Interface Design for Solving a Rubik's Cube

Katelyn Wyandt, USC Columbia, Computer Science - Sophomore

Mentor: Dr. Dezhi Wu, USC Columbia, Integrated Information Technology

34 - Exploring the relationship between polysubstance use disorder and prenatal care through a Twitter infoveillance

Harvey Villanueva, USC Columbia, Computer Science - Sophomore

Mentor: Dr. Dezhi Wu, USC Columbia, Integrated Information Technology

35 - Machine Learning for Fuel Classification with Nuclear Magnetic Resonance (NMR)

Parker Huggins, USC Columbia, Electrical Engineering - Sophomore

Mentors: Dr. Austin Downey, USC Columbia, Mechanical Engineering

Jake Martin, USC Columbia, Mechanical Engineering

36 - Increasing In SHR Aortic Distensibility During The Onset Of Hypertension: The Role Of Appropriate Normalization For Stress-Strain Measurements

Ian Shiota Timmers Montandon, USC Columbia, SC, Biomedical Engineering and Neuroscience - Sophomore

Mentors: Dr. Camilla Wenceslau, USC School of Medicine Columbia, Cardiovascular Translational Research Center

Dr. Milene Fontes, USC School of Medicine Columbia, SC Cardiovascular Translational Research Center

37 - FARSI++, Reinforcement Learning Upgrade

Samuel Whidden, USC Columbia, Computer Engineering - Junior

Abhinav Sharma, Indian Institute of Information Technology Guwahati, Assam, Computer Science and Engineering - Junior

Mentor: Prof. Pooyan Jamshidi, USC Columbia, Computer Science

38 - LFG to Energy Applications: Siloxane Removal Using Atmospheric Pressure Plasma

Tavien Giles, USC Columbia, Civil Engineering - Senior

John Hill, USC Columbia, Mechanical Engineering - Senior

Mentor: Dr. Shamia Hoque, USC Columbia, Civil and Environmental Engineering

39 - An IoT Remote Water Level Monitoring System for High-Hazard Dams

Corinne Smith, USC Columbia, Mechanical Engineering - Senior

Mentors: Dr. Austin Downey, USC Columbia, Mechanical Engineering

Dr. Jasim Imran, USC Columbia, Civil and Environmental Engineering

40 - Decision Making

Zachary Ziehl, USC Columbia, Computer Information Systems - Sophomore

Mentor: Dr. Austin Downey, USC Columbia, Mechanical Engineering

41 - Investigating Rainfall Induced Fine Particle Migration in Fouled Railroad Ballast

Briana McQueen, USC Columbia, Civil and Environmental Engineering - Senior

Mentor: Dr. YuQian, USC Columbia, , Civil and Environmental Engineering

42 - Autonomous Epoxy Extrusion

Jacob Walker, USC Columbia, Aerospace Engineering - Senior

Mentor: Dr. Wout De Backer, USC Columbia, Aerospace Engineering

43 - Drone Deliverable Vibration Sensor

Ryan Yount, USC Columbia, Mechanical Engineering - Senior

Mentors: Dr. Austin Downey, USC Columbia, Mechanical Engineering

Mr. Joud Satme, USC Columbia, SC Mechanical Engineering

44 - Development of Mucoadhesive Lipid-Polymer Nanoparticles

Sadie Lofton, USC Columbia, Biomedical Engineering - Senior

Mentors: Dr. Michael Gower, USC Columbia, Biomedical Engineering

Mr. Nicholas Colonna, USC Columbia, Biomedical Engineering

45 - Numerical Modeling of Residual Stress and Distortion in the Laser Powder Bed Fusion Additive Manufacturing

Jacob Vaught, USC Columbia, Mechanical Engineering - Sophomore

Mentor: Dr. Lang Yuan, USC Columbia, Mechanical Engineering

46 - Exploring Metallic Porous Materials Through Laser Powder Bed Fusion Additive Manufacturing

Mina Schaafsma, USC Columbia, Biomedical Engineering- Junior

Mentors: Dr. Lang Yuan, USC Columbia, Mechanical Engineering

Dr. Andrew Gross, USC Columbia, Mechanical Engineering

47 - Analysis of Contemporary GNSS Accuracy

Ross Vicario, USC Columbia, Computer Engineering - Senior

Mentors: Dr. Ioannis Rekleitis, USC Columbia, Computer Science and Engineering

Mr. Ibrahim Salman, USC Columbia, Computer Science and Engineering

48 - Experimental Characterization of Impact on Carbon Fiber Laminates

Yug Desao, USC Columbia, Aerospace Engineering - Junior

Mentor: Dr. Wout De Backer, USC Columbia, Mechanical Engineering

49 - Evaluation of Cold Spray on Polymers and CFRPs

Patrick Bailey, USC Columbia, Aerospace Engineering - Senior

Mentor: Dr. Wout De Backer, USC Columbia, Aerospace Engineering

50 - Artificial Intelligence Applications for American Sign Language
MacKenzie Meier, USC Columbia, Biomedical Engineering - Sophomore
Mentor: Dr. Nick Boltin, USC Columbia, Biomedical Engineering

51 - MXene membrane pure water flux
Luke Reynolds, USC Columbia, Biomedical Engineering - Junior
Mentor: Dr. Nader Taheri-Qazvini, USC Columbia, Mechanical Engineering

REU in CO₂ Chemical Engineering Opportunities and Challenges

52 - Controlling Pt Particle Size on Carbon Supports with Surface Tension
Mikayla Romero, University of New Mexico, Albuquerque, NM, Chemical Engineering – Junior
Nathan Thornburg, USC Columbia, Chemical engineering - Junior
Mentor: Prof. John Regalbuto, USC Columbia, Chemical engineering

53 - Efficiency of Zero-gap AEM Water Electrolyzers
Caleb Diamond, Texas A&M University, College Station, TX, Chemical Engineering - Junior
Mentors: Dr. William Mustain, USC Columbia, Chemical Engineering
Ms. Jasmine Bohannon, USC Columbia, Chemical Engineering

54 - Improving Low Temperature and Pressure Ammonia Synthesis Production Rates utilizing Promoted Ruthenium based Catalysts
Stephanie Orraca, University of Puerto Rico Mayagüez, PR, Chemical Engineering – Senior
Mentors: Dr. Jochen Lauterbach, USC Columbia, Chemical Engineering
Mr. Samuel Drummond, USC Columbia, Chemical Engineering
Mrs. Jennifer Naglic, USC Columbia, Chemical Engineering

55 - Development of Highly Dispersed Bimetallic Ag-Cu and Ag-Ni Catalysts Using Galvanic Displacement
Jaxon Boudreau, University of New Hampshire, Durham, NH, Chemical Engineering - Junior
Mentors: Prof. John Monnier, USC Columbia, Chemical Engineering
Prof. John Tengco, USC Columbia, Chemical Engineering

56 - Hydrodeoxygenation of Coniferyl Alcohol over Ru (0001) Catalyst Explored Via Density Functional Theory (DFT)
Jason Tan, Syracuse University, Syracuse, NY, Chemical Engineering - Senior
Mentors: Dr. Andreas Heyden, USC Columbia, Chemical Engineering
Mr. Panuwat Watthaisong, USC Columbia, Chemical Engineering
Mr. Mubarak Bello, USC Columbia, Chemical Engineering

57 - Spectroscopic Characterization of Adsorbed Carbon Monoxide on Supported Isolated, Single Atom Catalysts
John Piorkowski, Bucknell University, Lewisburg, PA, Chemical Engineering - Junior
Mentor: Prof. Christopher Williams, USC Columbia, Chemical Engineering

58 - Investigation of Low-Temperature Ammonia Decomposition via Ruthenium-Based Catalysts
Katherine O'Connell, Saint Mary's College, Notre Dame, IN, Chemistry and Chemical Engineering (double major) - Senior
Mentor: Dr. Jochen Lauterbach, USC Columbia, Chemical Engineering

59 - The Effect of H₂O on the CO₂ Working Capacity on both MLD Modified and Pristine 13X Zeolite via Thermogravimetric Analysis

Jamielyn Jarvis, Florida Institute of Technology, Melbourne, FL, Chemical Engineering – Senior
Mentor: Dr. Armin Ebner, USC Columbia, Chemical Engineering
Dr. James Ritter, USC Columbia, Chemical Engineering

60 - Electrolysis of Aqueous HCl Using Polybenzimidazole (PBI) Membranes

Brandon Naumann, Florida Institute of Technology, Melbourne FL, Mechanical Engineering – Senior
Mentors: Dr. Ben Meekins, USC Columbia, Chemical Engineering
Dr. Shimpalee Sirivatch, USC Columbia, Mechanical Engineering
Mr. Kris Likit-anurak, USC Columbia, Chemical Engineering

61 - Important variables in AEM water electrolyzer design

Ruysdael Garcia, Texas Tech University, Lubbock, TX, Chemical Engineering - Junior
Mentors: Dr. William Mustain, USC Columbia, Chemical Engineering
Mr. Noor Ul Hassan, USC Columbia, Chemical Engineering

REU in Engineering Medical Advances at the Interface of Experiments and Computation

62 - 3D printing of coaxial nozzle for direct ink writing of core-shell filaments

Luis Vega Lugo, University of Puerto Rico Mayagüez, PR, Mechanical Engineering – Senior
Mentors: Dr. Monirosadat Sadati, USC Columbia, Chemical Engineering
Dr. Nader Taheri Qazvini, USC Columbia, Chemical Engineering and Biomedical Engineering

63 - Impact of Fluorescence Characteristics on TriFusion, an Automated Program to Assess Muscle Cell Growth

Miranda Copenhaver, Washington University in St. Louis, St. Louis, MO, Biomedical Engineering – Senior
Mentors: Dr. Michael Gower, USC Columbia, Chemical Engineering and Biomedical Engineering
Ms. Candice Cheung, USC Columbia, Biomedical Engineering

64 - Cellular Migration of Self-Assembling Toroids

Sean Folan, University of Massachusetts, Amherst MA, Computer Science and Math - Junior
Mentor: Dr. Mark Uline, USC Columbia, Chemical Engineering and Biomedical Engineering

65 - Investigating the Interactions between PFOA, HSA, and γ -CD with Nanopore Sensors

Gabriela Lozada, University of Puerto Rico Mayagüez, PR, Mechanical Engineering – Senior
Mentors: Dr. Chang Liu, USC Columbia, Chemical Engineering
Dr. Xiaojun Wei, USC Columbia, Chemical Engineering

66 - Analyzing the Molecular Regulation of Toroid Development

Savannah Orton, LeTourneau University, Longview, TX, Biomedical Engineering – Senior
Mentor: Dr. Jay Potts, USC School of Medicine Columbia, Cell Biology and Anatomy

67 - TriFusion: A Software Program for the Automated Quantification of Muscle Cell Differentiation

Andres Ocampo, Colorado School of Mines, Golden, CO, Quantitative Biosciences and Engineering, Computer Science Minor - Senior
Mentor: Dr. Homayoun Valafar, USC Columbia, Computer Science and Engineering and Biomedical Engineering

REU in Disparities in the Criminal Justice System

68 - Criminal Court Case Processing of American School Shooters

Tessa Jones, University of Kentucky, Lexington, KY, Psychology - Junior

Hannah Rath, Oklahoma State University, Stillwater, OK Psychology - Senior

Lex Weber, Arizona State University, Tempe, AZ Criminology & Criminal Justice - Senior

Mentors: Dr. Brent Klein, USC Columbia, Criminology & Criminal Justice

Ms. Christina Plakas, USC Columbia, Criminology & Criminal Justice

69 - Understanding the victim-offender relationship through LWOP and death-sentences

Funmi Dada, Stevenson University, Baltimore County, Maryland, Psychology - Senior

Prasanna Jayaganesh, University of Illinois Champaign-Urbana, Illinois, Mathematics & Philosophy – Senior

Steven Manso, University of Florida, Gainesville, FL, Criminology - Senior

Mentors: Dr. John Burrow, USC Columbia, Criminology and Criminal Justice

Ms. Hyeseon Noh, USC Columbia, Criminology and Criminal Justice

70 - Considering Domestic Violence Victims: Exploring Victim-related Factors in Prosecutor Case Summaries

Anna Criswell, USC Columbia, Criminal Justice and Psychology - Junior

Elena Ortiz Dilone, SUNY Farmingdale State College, Farmingdale, NY, Applied Psychology - Junior

Mentor: Dr. Barbara Koons-Witt, USC Columbia, Criminology and Criminal Justice

Ms. Hannah Sedlacek, USC Columbia, Criminology and Criminal Justice

SC Advancing Diversity in Aging Research

71 - Analysis of the Relationship between Age and Autonomic Function in COVID-19 Symptomology and Presentation

Evan Simms, Claflin University, Orangeburg, SC, Biochemistry - Junior

Mentors: Prof. Dirk den Ouden, USC Columbia, Communication Sciences and Disorders

Mrs. Sara Sayers, USC Columbia, Communication Sciences and Disorders

Mrs. Sarah Newman-Norlund, USC Columbia, Communication Sciences and Disorders

Prof. Julius Fridriksson, USC Columbia, Communications Sciences and Disorders

72 - Investigating the generation of MDSCs and Macrophages

Justice Bell, Claflin University, Orangeburg, SC, Biochemistry - Junior

Mentor: Dr. Narendra Singh, USC School of Medicine, Columbia, Pathology, Microbiology, and Immunology

73 - Medication-Related Adverse Outcomes Among South Carolina Alzheimer's Disease Registry Cases

Maya Taylor, Claflin University, Orangeburg, SC, Biology - Junior

Mentor: Dr. Maggi Miller, USC Columbia, Office for the Study of Aging and Epidemiology and Biostatistics

74 - Early Onset Colorectal Cancer

Nichelle Tomlin, Claflin University, Orangeburg, SC, Biology - Junior

Mentor: Dr. Marj Pena, USC Columbia, Biological Sciences