

Lafayette College

Friday, September 18, 2020

Welcome to the 2020 Fall Virtual Student Poster Session

Thank you for joining us to virtually celebrate the research and scholarship that Lafayette students conducted last summer and during the spring semester. We invite you to virtually visit the posters presented by our students and explore new topics and themes. You will find an impressive array of work on display.

Lafayette offers students research opportunities through its EXCEL Scholars program, independent studies, and honors theses. Students also can engage in research funded by federal and private foundation grants received by Lafayette faculty. Other student research opportunities are available through programs funded by institutional grants and generous gifts that provide opportunities to students to be LEARN scholars in neuroscience, NaIVEN scholars in biology and the life sciences, Clare Booth Luce scholars in engineering, Bolton scholars in the natural sciences, Sherma scholars in chemistry, and Andrew W. Mellon Foundation digital humanities scholars in the creative arts and digital humanities, as well as many others. It should not come as a surprise that more than half of all Lafayette students are involved in student-faculty research projects before they graduate.

The poster presentation is often more than the concluding event of a student research experience—it is also a first step in professional development. We are proud of the accomplishments of each student presenting a poster today. We also celebrate the accomplishments of the large number of Lafayette students who present their research at discipline-specific professional meetings every year and those who present at the National Conference for Undergraduate Research.

This is a virtual space full of discoveries, representing successes, risks taken, and lessons learned from failures, amidst a year full of uncertainty and change during a pandemic. This event underscores Lafayette's commitment to close faculty-student interaction. And more than anything, it demonstrates the tremendous ability and promise that comes from mixing talented students with the educational experiences that we provide.

--- **Tracie M. Addy**
Associate Dean of Teaching & Learning

Student Research Titles and Authors

4:10 to 5:00pm

No. 1 Freeze-out, Freeze-in, and Everything in Between: A Rich and Complicated Origin Story for Multi-Component Dark Matter - Bobby Luo, Keith R. Dienes, Thomas Flacke, Jeff Kost, Brooks Thomas - *Faculty Mentor: Brooks Thomas*

No. 2 A Reconstruction Conjecture: Inferring Primordial Dark Matter Velocities from Galactic Masses - Kevin Manogue, Keith R. Dienes, Fei Huang, Jeff Kost, Brooks Thomas - *Faculty Mentor: Brooks Thomas*

No. 3 Double Displaced Vertices at the LHC - Tara Leininger, Keith R. Dienes, Doojin Kim, Brooks Thomas - *Faculty Mentor: Brooks Thomas*

No. 4 The Impact of China's Belt and Road Initiative (BRI) on the East Asian Regional Order - Clare Mengel, Il Hyun Cho - *Faculty Mentor: Il Hyun Cho*

No. 5 Effects of Amylose on Starch Film Strength - Colton Schrettner, Polly Piergiovanni - *Faculty Mentor: Polly Piergiovanni*

No. 6 Over the Internet and Through the Screen to Grandmother's House We Go: An Analysis of Family Bonding and how Parents Enhance their Children's Video Chat Experience - Isabella Stoto, Lauren J. Myers - *Faculty Mentor: Lauren J. Myers*

No. 7 Digital Controller for Wireless Neuromodulation - Jordan Leiber, Hayden Fisher, Naga Muppaneni - *Faculty Mentor: Naga Muppaneni*

No. 8 NeueLogo: a situated agent modeling language - Lekso Borashvili - *Faculty Mentor: Jeffrey Pfaffmann*

No. 9 Virtual Reality in Education - Takudzwa Mujuru, Christian Lopez-Bencosme - *Faculty Mentor: Christian Lopez-Bencosme*

No. 10 Using Virtual Reality to Improve Spatial Visualization Skills to Understand the Role of VR in Education - Dan Caroll, Christian Lopez-Bencosme - *Faculty Mentor: Christian Lopez-Bencosme*

No. 11 Utilizing Virtual Reality and Gamification to Promote Physical Activity - Thomas Stranick - *Faculty Mentor: Christian Lopez-Bencosme*

No. 12 Vehicle Tracking Using Machine Learning for Smart Cities - Malolan Vasu, Christian Lopez-Bencosme - *Faculty Mentor: Christian Lopez-Bencosme*

No. 13 Robotic Arm Control Using Reinforcement Learning - Ivan Pogorelov, Christian Lopez-Bencosme - *Faculty Mentor: Christian Lopez-Bencosme*

No. 14 Mapping Military Brothels in Postwar France - Mirana Randriamanantsoa - *Faculty Mentor: Caroline Séquin*

- No. 15** Effect of Habitat Fragmentation by Roads on Soil Salinity & Abundance of Terrestrial Salamanders - Nikki Morley - *Faculty Mentor: Megan Rothenberger*
- No. 16** Social Entrepreneurship Education: Literature Review and an Analytical Look at Lafayette's Stand - Rabia Demirelli, Christopher Ruebeck, Benjamin Cohen - *Faculty Mentor: Christopher Ruebeck; Benjamin Cohen*
- No. 17** Pressure Pulse Detection for Non-invasive Cardiac Function Monitoring - Yulin Zhou, Yih-Choung Yu - *Faculty Mentor: Yih-Choung Yu*
- No. 18** Transitioning to the OpenBCI Ultracortex IV for Robot Navigation - Joshua Virtell - *Faculty Mentor: Yih-Choung Yu*
- No. 19** Heterocyclic Product Identification of Atmospheric Aerosol Mimics - Elizabeth Obarow, Rochoel Holappa, Taylor Estock, Melissa Galloway - *Faculty Mentor: Melissa Galloway*
- No. 20** Absorption and Chemical Composition Changes in Brown Carbon Systems Due to Photolysis - Jacqueline R. Sharp, Joseph L. Woo, Melissa Galloway - *Faculty Mentor: Melissa Galloway*
- No. 21** Simulating Signalling Cascades - Richard Donati, Casey Ford, Xinran Zhang - *Faculty Mentor: Chun Wai Liew*
- No. 22** "Poster withdrawn"
- No. 23** Politicization of the Supreme Court - Edward Martin - *Faculty Mentor: Bruce Allen Murphy*
- No. 24** Life Cycle Analysis of Bio-Modified Asphalt - Danielle Mullan, Haritha Malladi - *Faculty Mentor: Haritha Malladi*
- No. 25** Demographic Model of *Lycorma Delicatula* Population in the US - Swati Pandey, Billy Daniel Stroembom - *Faculty Mentor: Billy Daniel Stroembom*
- No. 26** Effects of Wind Angle on the Distribution of Highway Pollutants - Quintin Sefton, Jonathan Steffens - *Faculty Mentor: Jonathan Steffens*
- No. 27** Development of an Improved Thermodynamic Model for Binary Alcohol + Hydrocarbon Systems - Justin Sayers, Maximilian Bragg, Aseel Bala - *Faculty Mentor: Aseel Bala*
- No. 28** Coprime Labeling of Ladder Graphs - Deniz Ozbay - *Faculty Mentor: Ethan Berkove*
- No. 29** Drone-Based Automatic Indoors Fire Fighting - Khaknazar Shyntassov, Jon Wallace - *Faculty Mentor: Jon Wallace*
- No. 30** Characterization of Heart Rate Variability Using Nonlinear Dynamics - Zhaoyi Ding, Eric Ho - *Faculty Mentor: Eric Ho*

5:10 to 6:00pm

No. 1 Exploring the Impact of Menthol Exposure on UGT and CYP mRNA Isoform Expression in Lung Cancers from African Americans and European Americans - Adina Shrestha, Khadijah Mitchell - Faculty Mentor: Khadijah Mitchell

No. 2 Exploring The Relationship Between Telomere Lengthening Mechanisms And Genetic Ancestry In African-American Males And European-American Males With Lung Adenocarcinoma - Kwabena T. Acheampong, Khadijah Mitchell - Faculty Mentor: Khadijah Mitchell

No. 3 Comparing Clinically Relevant Copy Number Profiles in African Americans with Lung Cancer - Isaiah Osei-Gyening, Khadijah Mitchell - Faculty Mentor: Khadijah Mitchell

No. 4 Comparing PDE4C Copy Number Variations and Gene Expression in Lung Cancer Health Disparities - Joelle Rabin-Court, Khadijah Mitchell - Faculty Mentor: Khadijah Mitchell

No. 5 Comparing Therapeutically-Relevant Copy Number Profiles in African Americans and European Americans with Clear Cell Renal Cell Carcinoma - Erica Beatson, Khadijah Mitchell - Faculty Mentor: Khadijah Mitchell

No. 6 The Biological, Impact of Kinesins (KIFs) by Race in Triple Negative Breast Cancer - Savanna Toure, Adam Engler - Faculty Mentor: Adam Engler

No. 7 Covid-19 Video Visits Reduces Racial Barriers to Care; Sociodemographic Factors that Influence Access to Virtual Care - Naomi S Ganpo-Nkwenkwa - Faculty Mentor: Grant Greenberg

No. 8 VTEAM Model of Voltage-Controlled Memristors Implemented Through SPICE Macromodelling - Eli Crippen, Todd Wey - Faculty Mentor: Todd Wey

No. 9 Importing 3rd Party Simulations Into KiCAD - Henry Grote - Faculty Mentor: Todd Wey

No. 10 MPC for Five Voltage Level Converter - Zhanfan Yu, Harry Zhu, Chikomborero Dhire, Sally Sajadian - Faculty Mentor: Sally Sajadian

No. 11 Pulsar Shape Changes I: An Introduction to Pulsars, Pulse Timing, and NANOGrav - Evan Braasch, Luke Martin, David Nice - Faculty Mentor: David Nice

No. 12 Pulsar Shape Changes II: Searching for Mode Changes Millisecond Pulsar Data - Luke Martin, Evan Braasch, David Nice - Faculty Mentor: David Nice

No. 13 Determining A1 or A2 chromophore in Red-Eared Slider Melanopsin - Michael O'Connor, Heidi Hendrickson, James Dearworth - Faculty Mentor: Heidi Hendrickson

No. 14 Investigating the effects of solvating environments on UV-Vis absorption in aqueous aerosols using density functional theory - Rachel Petzoldt, Heidi Hendrickson, Melissa Galloway - Faculty Mentor: Heidi Hendrickson

No. 15 Advancing Informal STEM Learning - Marwa Saleh - Faculty Mentor: Arthur Kney

- No. 16** Optimizing Struvite Production for Phosphorus Recovery - Bowen Hou, Simba Wu, Evan Savage, Arthur Kney - *Faculty Mentor: Arthur Kney*
- No. 17** Welfare Gains of IRAs - Pooja Kumar, Joe Polifonte - *Faculty Mentor: Erin Cottle Hunt*
- No. 18** Welfare Gains of Automatic IRAs: a Theoretical and Computational Investigation - Joseph Polifonte, Pooja Kumar, Erin Cottle Hunt, Elina Huang - *Faculty Mentor: Erin Cottle Hunt*
- No. 19** MatchingRef: Matching variable names in the reference page to assist novice programmers to fix compiler errors - Shokhzodbek Saidov, Thuc Nhi Le, Justin Smith - *Faculty Mentor: Justin Smith*
- No. 20** Justice for all? A review of rural drinking water quality literature - Sharon Engel, Andrea Armstrong - *Faculty Mentor: Andrea Armstrong*
- No. 21** Racial Literacy - Erik Mathews - *Faculty Mentor: Ian Smith*
- No. 22** Modeling the Local Spread of the Spotted Lanternfly in the U.S. - Autumn Sands, Daniel Stroembom - *Faculty Mentor: Daniel Stroembom*
- No. 23** Seeking answers to Spotted Lanternfly Ecology, Invasion, and Spread on Lafayette's Campus: Mobilizing Citizen Science and Social Media - Sakib Shahriar Arnob, Analisa Coppa, Nancy McCreary Waters - *Faculty Mentor: Nancy McCreary Waters*
- No. 24** Enabling Solar Power Using Residential Electric Resistance Water Heaters - Celeste Fieberg, Amy Van Asselt - *Faculty Mentor: Amy Van Asselt*
- No. 25** Quantifying Color and Shape of Eastern Bluebird Eggs to Explore the Relationship Between Egg Ellipticity and Saturation - Grace Marie Emin - Mike Butler - *Faculty Mentor: Mike Butler*
- No. 26** Re-implementation of the CADAPPLETS Project - Zheping Yin, John Nestor - *Faculty Mentor: John Nestor*
- No. 27** Classifying Cancerous Skin lesions with Various Convolutional Network Architectures and Data-Augmentation Strategies - William Chabala, Ismail Jouny - *Faculty Mentor: Ismail Jouny*
- No. 28** Designing a Duo-Trigger Switchable Hydrophilicity Solvent System for Biomass Extraction - Ryan Thomas Berry, Lindsay Soh - *Faculty Mentor: Lindsay Soh*
- No. 29** Biostimulated MICP — Piloting Approaches to Support a Proposed National Study - Emily Eng, Cayla Mandel - *Faculty Mentor: Mary Roth*
- No. 30** The Kinetic and Thermal Effects of the Isothermal Crystallization of PEO-b-PCL - Alex Ahsley, Ryan Van Horn - *Faculty Mentor: Ryan Van Horn*
- No. 31** Predicting Tumor Response to Radiotherapy Based on Pre-Treatment Model Parameters - Tina Huang, Allison Lewis - *Faculty Mentor: Allison Lewis*