20th Annual Berea
Undergraduate Research and Internship Symposium
October 18th, 2019

Sponsored by Division I

Special Thanks
Chemistry Program
Undergraduate Research and Creative Projects Program
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Oral Research Session A – Room 356
Moderator – Dawn Anderson
Speakers indicated by bold typeface

2:30 PM   **Aloyce Riziki**, "Collagen IV 7s Provides novel insights of LOXL2 Kinetic Parameters", Vanderbilt University; Mentor – Roberto Vanacore

2:50 PM   **Yacine Choutri**, "Targeting endogenous genes in human induced pluripotent stem cells using CRISPR/Cas9 (DNMT3B, KRT5, and KRT18)", University of Colorado Anschtuz Medical Campus; Mentor – Dennis Roop

3:10 PM   **Marranne Conge**, "Inclusion of Alkyl-amino Side-chains Improves Potency of Poly(β-amino ester) Nanoparticle Delivery of Nucleic Acids", Johns Hopkins University School of Medicine; Mentor – David R. Wilson & Jordan J. Green

3:30 PM   **Jharna Katwal**, "Differentiation of induced pluripotent stem cells into endoderm, mesoderm and ectoderm using a trilineage differentiation kit", Gates Center for Regenerative Medicine, University of Colorado Anschutz Medical Campus; Mentor – Nicole Diette

3:50 PM   **Clara Reasoner**, "Characterizing preferential RNA-binding targets of ELAVL1 during an immune challenge", Vanderbilt University; Mentor – Manuel Ascano

4:10 PM   **Yeongha Oh**, "Early Detection of HPV-driven OPC using E6 seromarker", Vanderbilt University; Mentor– Krystle Kuhs

4:30 PM   **Amber Earlywine**, "Investigating HMPV Phosphoprotein Function", University of Kentucky; Mentor– Trevor Creamer

Oral Research Session B – Room 357
Moderator – Troy Messina
Speakers indicated by bold typeface

2:30 PM   **Micaela Berry**, "Developing an Animal Affinity or Philozoa Scale", Berea College; Mentor – Neil Mecham

2:50 PM   **Cienna-Paige Alexandria Slattery**, "Identifying the function of VSIG4 as seen in the tumor microenvironment of glioblastoma", Ben Towne Center for Childhood Cancer Research, Seattle Children's Research Institute; Mentor – Nicole Lieberman

3:10 PM   **Eli Prater**, "Fitting Neural Networks to Thermal Equations of State for use in FLASH models", Oak Ridge National Laboratory, Mentor – Bronson Messer

3:30 PM   **Valéria Rosa Rocha**, "Searching for Magnetic High Entropy Alloy Treasure", Berea College; Mentor –Troy Messina

3:50 PM   **Ricardo Santos**, "Testing Silicon Photomultipliers for use in the nEDM Experiment", Oak Ridge National Laboratory, Mentor – Vince Cianciolo

4:10 PM   **Nyasha E. Gombami**, "Mechanism of quinolone resistance in type II topoisomerases", Vanderbilt University; Mentor – Neil Osheroff

4:30 PM   **Anahi Favela**, "Metallicity Gradients of Simulated Dwarf Galaxies", University of Oklahoma

Oral Internship Session C – Room 306
Moderator – Mary Robert Garrett
Speakers indicated by bold typeface

2:30 PM **Caitlyn Rickman**, "Wildlife Rehabilitation at PAWS", PAWS Wildlife Center

2:50 PM **Jennifer Bentz**, "Determinants of Health in Underserved Communities", Health Brigade; Mentor – Wendy Klein

3:10 PM **Morgan Cottrill**, "Basic Butterfly Gardening", Butterfly Ridge Conservation Center

3:30 PM **Aliyah Hocker**, "Partners for Youth Internship", Partners for Youth; Mentor – Briana Persley

3:50 PM **Maddy Richmond**, "Integrated Pest Management and Outreach Activities", University of Tennessee

4:10 PM **Jose Diaz**, "Veterinary Internship", Kanuga Animal Clinic

4:30 PM **Luis Salazar Guzman**, "Climate Change in Alaska", Berea College, Mentors –Sarah Hall & Andrea Woodward

Oral Research/Internship Session D – Room 307
Moderator – Paul Smithson
Speakers indicated by bold typeface

2:30 PM **Glendy Pineda**, "Physical Therapy Internship", PIVOT Physical Therapy

2:50 PM **Tiana J Moorer**, "Dementia Friendly Communities", Tennessee Department of Health, Mentors – Sally Pitt & Chelsea Ridley

3:10 PM **Hamilton Craig**, "Never to Come Again: Encounters with the Market in the Diary of Mary Brainard ", Saratoga Springs History Museum

3:30 PM **Megan Voorhees**, "Center on Trauma and Children Internship", University of Kentucky's Center on Trauma and Children

3:50 PM **Justin Vankirk**, "Making Space for Assistive Technology", Community Lifestyle Support

4:10 PM ~~**Alana Pass & Bethany Bigler**, "Pine Mountain Settlement Archival Research Project", Berea College; Mentor – Jason Cohen (withdrawn)~~

4:30 PM **Helina Asrat**, "Rescue for Benzo(a)pyrene as a teratogen - Vitamin E", Neurobehavioral Toxicity Research Core Duke University; Mentor – Edward Levin

Poster Session – MAC Atrium
Odd-numbered posters will present from 3:00 to 4:00 PM,
Even-numbered posters from 4:00 PM to 5:00 PM

Poster 1 Allison M Harper, "Examining the Ex Vivo and In Vivo Efficacy of FDA-Approved Drugs Repurposed for Tocolytic Use", Vanderbilt University, Mentor – Jennifer L. Herington

Poster 2 Sharon Lee, "The cytoplasmic tail of integrin $\beta1$ is required for TGFβ-induced cell proliferation in adenocarcinoma", Vanderbilt University, Mentor – Scott M. Haake

Poster 3 Esther Olabisi-Adeniyi, Celine Skrivanek, Sarah Whitaker, "Correlation of Nutritional Management and Fertility of Second Year Cows at the Berea College Farm", Berea College, Mentor – Quinn Baptiste

Poster 4   Izabella Walker, "Foraging Behavior of Indian Elephants", Kindred Spirit Elephant Sanctuary

Poster 5   Rodrigo Alcaraz Bogado, "Plasticity of the Mesencephalic Neural Crest to Differentiate into Cardiac Neural Crest", California Institute of Technology

Poster 6   Maria Alejandra H. Diaz, "One-Carbon Metabolism Biomarkers and Risk of Barrett's Esophagus and Esophageal Adenocarcinoma", Vanderbilt University, Mentor – Martha Shrubsole

Poster 7   Depika Subedi, "Expression of miR-146a downregulated due to its promoter hypermethylation", The Ohio State University, Mentor – Dr. Erica Bell

Poster 8   Austin Harris Applegate, "Immunological research on NK & CD8T cell hypo-responsiveness in lowering glucose and glutamine levels", University of Kentucky Pathology, Mentor – Steve Presnell

Poster 9   Sarah Staat & Melanie Andrews, "Survival and Development of the Cercaria of the Digenetic Trematode, *Proterometra macrostoma*, within its Snail Intermediate Host, *Pleurocera semicarinata*, Under Winter Temperature Conditions", Berea College, Mentor – Ron Rosen

Poster 10   Bernadette Kwisera & Joseph Mecham, "Possible Predators (Non–Hosts) of the Digenetic Trematode Cercaria, *Proterometra macrostoma*, at North Elkhorn Creek, Kentucky", Berea College, Mentor – Ron Rosen

Poster 11   Yogesh Budhathoki & Hannah Jackson, "A Comparison of Cercarial Swimming Longevity and Distome Emergence from the Cercarial Tail Chamber in the Digenetic Trematodes, *Proterometra macrostoma* and *Leuceruthrus micropter*", Berea College, Mentor – Ron Rosen

Poster 12   Sangyal Dorjee, "Disruption of the R789-D708 Salt Bridge in Discoidin Domain Receptor 1 To Test Its Effect on the Kinase Activity of the Full-Length Receptor", Vanderbilt University Medical Center, Mentor – Corina Borza

Poster 13   Pedro Herrera Castro, "Naphthalenemonoimide based fluorescent chemosensors for detection of metal ions and anions", Berea College, Mentor – Erendra Manandhar

Poster 14   Jordan Pollard & Jacob Downs, "Synthesis of Thermoelectric Materials", Berea College, Mentor – Mary Robert Garrett

Poster 15   Austin Weber, "Using titanite to determine magmatic thermal histories of granites", Smithsonian Institution, National Museum of Natural History, Mentor – Michael R. Ackerson

Poster 16   Sarah Shaikh, "Cobalt protoporphyrin stimulation induces heme oxygenase-1 expression in mouse peritoneal macrophages", University of Kentucky, Mentor – Lisa Cassis

Poster 17   Edgar Ortiz, Adam Kinyua, & Garett Combs, "The Synthesis of Peptide aldehyde for the study of Penicillin Binding Protein 2", Berea College, Mentor – Matthew Saderholm

Poster 18   Kamila Nurmakova, "Investigation of amyloid precursor protein and small molecules interactions in bicelles", Vanderbilt University, Mentor – Manuel A. Castro

Poster 19   Hayes Clark, Wilkensley Thervil, & Jeremiah M. Radosevich, "How to Build a Solar Car Hub", Berea College, Mentor – Wei Wu

Poster 20   Areli Medina Hernandez, "Synthesis of Thermoelectric Materials with an Electron-Donating Group", Berea College, Mentor – Mary Robert Garrett

Poster 21 Stephanie Itumba & Chipo Kambarami, "Extracting and analysis of soil available phosphorus", Berea College, Mentor – Paul Smithson

Poster 22 Zackary Boothe & Cletus Mbalida, "New Experiments using the JEOL ECZR500 NMR Spectrometer", Berea College, Mentor – Jay Baltisberger

Poster 23 Imaru Agholor & Megan Grey, "Synthesis of Thermoelectric Materials with a Parent Compound", Berea College, Mentor – Mary Robert Garrett

Poster 24 Emely Alfaro Zavala, "The Use of MVC Architecture (Model-View-Controller Pattern) for Android Mobile Applications", Kashmir World Foundation, Mentor – Aliyah Pandolfi

Poster 25 Jamal Aw Yonis, "Creating Plugin-Servers that stream telemetry data via GRPC transport protocol in GPB wire format", Dell Inc., Mentor – Gavin Cato

Poster 26 Hailey Barnett, "Berea College Software Developers", Runestone Interactive, LLC, Mentor – Brad Miller

Poster 27 Alex Bryant, "Creating and Enhancing Web Applications with the Student Software Development Team", Berea College, Mentors – Scott Heggen & Jan Pearce

Poster 28 Aaron Christson, "Predicting Generalization in Neural Networks", University of Illinois, Mentor – Sanmi Koyejo

Poster 29 Nmasichi Chukwuemeka, "Web Development Intern", Suran Systems, Mentor – Alex Clay

Poster 30 Guillermo Cruz, "Data Management", Berea College, Mentors – Scott Heggen & Jan Pearce

Poster 31 Selemawit Gebremedhin, "Elasticsearch", Berea College, Mentor – Daniel Adams

Poster 32 Elaheh Jamali, "Student Software Developer", Berea College, Mentors – Scott Heggen & Jan Pearce

Poster 33 May Jue, "Software Development", Berea College, Mentors – Scott Heggen & Jan Pearce

Poster 34 Samriddha KC, "Application Design and Development", Morgan Stanley, Mentor – Stephanie Mondo

Poster 35 Aleksandr Krasnov, "DevSecOps: InfoSec + DevOps + SOC", Palo Alto Networks, Mentor – Satwant Jakher

Poster 36 Giorgi Lomia, "Advantages of detection architecture combined with classifiacation in camouflage circumstances", Kashmir World Foundation, Mentor – Aliyah Pandolfi

Poster 37 Hila Manalai, "Web Application Design and Software Development", Berea College, Mentor – Jan Pearce

Poster 38 Gerardo Soto, Jesse Walker, John Martin, Rusty Dotson, & Rebekah Whitford, "Interactive Learning from a Near-Peer Perspective", Runestone Interactive, LLC, Mentor – Bradley Miller

Poster 39 Raymond Okyere-Forson, "Design and Implementation of a Single-Page Web Application", Morgan Stanley, Mentor – Stephanie Mondo

Poster 40 Anne Otieno, "Global Technician Specialist", Google, Mentor – Nuriel Garrett

Poster 41 Luis Riera, "Student Software Development Team", Berea College, Mentors – Scott Heggen & Jan Pearce

Poster 42 Sherzodjon Sanginov, "Software Development Experience", Morgan Stanley, Mentor – Stephanie Mondo

Poster 43   Roberto Santos-Hernandez, "Software Programming", Berea College, Mentors – Scott Heggen & Jan Pearce

Poster 44   Natasha Stallsmith, "Quantifying Visual Complexity in Movie Trailers", Vanderbilt University, Mentor –Maithilee Kunda

Poster 45   Tirtha Subedi, "Network Planning Tools (NPT)", UPS Information Technology, Mentor – Dan Chambers

Poster 46   Donstonbek Toirov, "Open Source Software Development in Agile Environment", Red Hat, Mentor – Jennifer Albertson

Poster 47   Elyor Tukhtasinov, "Robotic and Intelligent Process Automation", PricewaterhouseCoopers Advisory Services LCC, Mentor – Katie Kleiboeker

Poster 48   Ahad Zai, "Utilizing Electronic Dental Record Data to Automatically Assign Periodontal Diagnosis", Indiana University School of Dentistry, Mentor – Thankam Thyvalikakath

Poster 49   Oluwatobi Adejumo, "Wedding photography Internship", Jaylim Studio, Mentor – Jay Lim

Poster 50   Rabina Phuyel, "Transformation as a Defense to Adversarial Attacks against Deep Neural Network", University of South Carolina, Mentor – Ying Meng

Poster 51   Tradd Schmidt & Bethanie Williams, "An Approach to Increase Availability of Cultural Archives: Pine Mountain Settlement School", Berea College, Mentor – Mario Nakazawa

Poster 52   Juan Chavez Casiano & Austin Glasgow, "Physical activity and the Peabody Picture Vocabulary Test on preschool-aged children", Berea College Child Development Lab, Mentor – Michelle Thornton

Poster 53   Abby M. Nash & John-Paul E. Cesare, "Magnetic High Entropy Alloys", Berea College, Mentor – Troy Messina

Poster 54   Jose Zapata Meza, "Summer Internship With Civil Engineering Firm", LDA Engineering

Poster 55   Nicholas Straub-Deck, "Modeling of H2 Radiation Emissions from Nebula IC133", Berea College, Mentor – Tracy Hodge

Poster 56   Axel Quintanar, "Light pollution and its effects on Berea College", Berea College, Mentor – Tracy Hodge

Poster 57   James Henderson, "Berea College's New Telescope", Berea College, Mentor – Tracy Hodge

Poster 58   Jasmine Roman & Alex Wilson, "Spontaneous numerical cognition in chickens (*Gallus Gallus Domesticus*)", Berea College, Mentor – Sarah Jones

Plenary Talk Planetarium (MAC 402) at 5:10 PM

**Dr. Jessie Dotson – "NASA's First Exoplanet Finding
mission -- Kepler/K2"
K2 Project Scientist, Ames Research Center, NASA**

Abstract - The first planet orbiting a star other than our sun was confirmed in 1989. For the next 20 years, the majority of the exoplanets we discovered were large planets orbiting very close to their stars. In 2009, NASA launched the Kepler space telescope for the primary purpose of finding planets around other stars. For 4 years it observed one part of the sky nearly continuously. After the failure of a two reaction wheels, the spacecraft was no longer able to observe the same part of the sky, but spacecraft engineers developed a novel operation mode that allowed the spacecraft to a observe an additional 20 regions along the ecliptic plane for 80 days at a time (aka the K2 mission). During its 9.5 years of operation, the Kepler spacecraft produced an unprecedented data set of high-precision, uninterrupted brightness measurements of over 500,000 stars. This transformational dataset has established that planets are ubiquitous in our galaxy and revealed the diversity of planetary systems. In addition, Kepler data has illuminated the interior workings of stars and the earliest moments of supernova. I will provide a review of Kepler's top results, a tour through recent results, and discuss emerging results and future directions.

Dr. Jessie Dotson received her BA at the Massachusetts Institute of Technology and her PhD at the University of Chicago in astronomy and astrophysics.