

BURS 2018

18th Annual Berea College Undergraduate Research Symposium October 19th & 20th, 2018

Sponsored by Division I



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Friday, October 19th

Opening Talk – 12:00 PM in Yahng Center (MAC 455)
Dr. Jacquelyn Noronha-Hostler, Rutgers University – "The Quest for Nature's First and Most Perfect Liquid"



Abstract - Milliseconds after the Big Bang the entire universe was filled with the most perfect liquid known to humanity- the Quark Gluon Plasma. The Quark Gluon Plasma has a number of peculiar properties, for instance, it flows like a liquid where friction effects are surprisingly small and it still maintains liquid-like properties on scales as small as the size of the nucleus of an atom. Because of the expansion and cooling of the Early Universe, the primordial Quark Gluon Plasma was extremely short lived and most of its signatures were washed away as the entire universe bloomed into existence. Over the past 15 years, collider experiments have been smashing heavy-ions together at 99.9999% the speed of light in order to produce a tiny droplet of the Quark Gluon Plasma with a radius of \sim trillionth cm. The collisions reach temperatures as high as a few trillion Kelvin which are able to "melt" ions into a dense "soup" of quarks and gluons that are constantly interacting with each other. In this seminar, the motion of this "quark gluon soup" is recreated using state-of-the-art numerical simulations that describe an almost perfect liquid moving at nearly the speed of light on high performance computers.

Oral Session I – MAC 356

Moderator – Dawn Anderson

Speakers indicated by bold typeface

- 1:40 PM** **Lyric Jones & Michelle Zarto**, "Historical Archaeology of Slavery in Peru", Haciendas of Nasca Archaeological Project; Mentor – Brendan Weaver
- 2:00 PM** **Amber Follin**, "Multidisciplinary Views of Medicine - Completing an Internship with Medicine for the Greater Good", Johns Hopkins Bayview Medical Center; Mentor – Panagis Galiatsatos
- 2:20 PM** **Temvelo Matsebula**, "Effect of sleep quality and quantity on deviant behaviors in teenagers", Berea College; Mentor – Megan Hoffman
- 2:40 PM** **Yacine Choutri**, "Identifying Fecal and Urinary Biomarkers of Obesity in Mouse Model Using Proton Nuclear Magnetic Resonance Metabolomics and High-Performance Liquid Chromatography", Vanderbilt University Medical Center; Mentor – Paul Voziyan & Donald F. Stec
- 3:00 PM** **Emma Reasoner**, "Impact of season, game fencing, moon phase, and vegetation on activity overlap of ungulate species in the Greater Waterberg Landscape, Namibia", Cheetah Conservation Fund; Mentor – Laurie Marker
- 3:20 PM** **Zellarose Walden**, "Developing a prototype platform for efficient mass digitization for pinned *Lepidoptera* specimens", Illinois Natural History Survey; Mentor – Thomas McElrath
- 3:40 PM** **Brittany Ortiz-Perez**, "Save Them All- Best Friends, Kitten Nursery", Best Friends Animal Society; Mentor – Ron Rosen

Oral Session II – MAC 306

Moderator – Jay Baltisberger

Speakers indicated by bold typeface

- 2:00 PM** **Michael James**, "Synthesizing Cleavable Antibody Drug Conjugates via Solid Phase Organic Synthesis", Berea College; Mentor–Elizabeth Thomas
- 2:20 PM** **Issac Domenech**, "Characterizing the Molecular Diversity of Pulmonary Sensory Neurons", Stanford University School of Medicine; Mentor – Mark Krasnow
- 2:40 PM** **Clara Reasoner**, "Mapping the Binding Sites of Fatty Acid Synthase on Chikungunya Viral RNA", Vanderbilt University; Mentor – Manuel Ascano

- 3:00 PM** **Yeongha Oh**, “Epidemiology of HPV-Associated Cancers: Changing Trends and Future Burden”, Vanderbilt University Medical Center; Mentor – Krystle Kuhs
- 3:20 PM** **Chann Makara Han**, “Targeted integration of fluorescent reporters into iPSCs using CRISPR/Cas9”, University of Colorado Anschutz Medical Campus; Mentor – Dennis Roop
- 3:40 PM** **Delaney Anderson & Tori Lowrance**, “Faculty Experiences with Student Mental Health”, Berea College; Mentor – Amanda Wyrick

Oral Session III – MAC 307

Moderator – Troy Messina

Speakers indicated by bold typeface

- 1:40 PM** **Daisy Sullivan**, “Using the Liquid Sampling-Atmospheric Pressure Glow Discharge with Capillary Channeled Polymer Fibers for Analysis of Protein Mixtures”, Clemson University; Mentor – R. Kenneth Marcus
- 2:00 PM** **Sergio Axel Perez Cruz**, “Avidin functionalized coverslips for model membrane imaging”, University of Tennessee, Knoxville; Mentor–Tessa Calhoun
- 2:20 PM** **Priscila Garcia**, “Comparison of differentiation capacity between cell lines using the trilineage differentiation assay.” Anschutz Medical Campus; Mentor – Dennis Roop
- 2:40 PM** **Ricardo Santos**, “Creating Analysis of Jet Measurements in Relativistic Heavy Ion Collisions”, University of Tennessee; Mentor – Christine Natrass
- 3:00 PM** **Kemo Jammeh**, “Dependence of Helium Atmospheric Pressure Plasma Jet (APPJ)-Induced DNA Damage on Voltage Pulse Frequency and Irradiation Time”, University of Notre Dame; Mentor – Sylwia Ptasinska
- 3:20 PM** **Daniela Olivera Velarde**, “Improving Accuracy of Parity Violation Measurements for NOPTREX Experiment at LANL”, Los Alamos National Lab; Mentor – Christopher Crawford
- 3:40 PM** **Talha Rehman**, “Self-Assembly of Spheres on a Cone Surface”, Harvard University School of Engineering and Applied Sciences; Mentor–Nabila Tanjeem, Vinothan Manoharan

Plenary Talk – Planetarium (MAC 402) at 4:00 PM

Dr. Elizabeth Cottrell - “Breathing the Earth”

**Curator-in-Charge of the National Rock and Ore Collections,
Department of Mineral Sciences,
National Museum of Natural History, Smithsonian Institution,
Washington DC**

Abstract - When you hear the word “volcano,” what comes to your mind? Volcanoes are windows to Earth’s deep interior, revealing to us what lies beyond depths accessible to human exploration. Volcanoes shape the landscape, the hydrosphere, and human civilization. From natural disasters to climate change and from diamonds to Dr. Evil, we will explore volcano mysteries together.



Dr. Elizabeth Cottrell is the Curator-in-Charge of the National Rock and Ore Collections and a Research Geologist at the National Museum of Natural History of the Smithsonian Institution. Elizabeth received her PhD from Columbia University (2004) and her BS from Brown University (1997). She has previously directed the Global Volcanism Program at the Smithsonian Institution. Prior to joining the Smithsonian Institution, she was a post-doctoral fellow at the Carnegie Institution of Washington (2005-06) as well as a Fulbright Scholar at the L’Institute de Physique du Globe, Paris (1997-98).

Saturday, October 20th

Poster Session – MAC 4th Floor Hallway and MAC 428

9:00 to 11:00 AM

- Poster 1** Favour Akabogu, “Recombinant Expression of Collagen IV from *Ministeria Vibrans*: The Ancestral Collagen of the Animal Kingdom”, Vanderbilt University Medical Center; Mentor – Aaron Fidler
- Poster 2** Jennifer Bentz, “Epidermal growth factor receptor (EGFR) controls kidney fibrosis by regulating nuclear localization of Fused in Sarcoma (FUS)”, Vanderbilt University Medical Center; Mentor – Manuel Chiusa, Ambra Pozzi
- Poster 3** Aubrey Melton, “Altered Immune Cell Profile Contributes to Increase Risk of Heart Disease in Aging Mice”, University of Kentucky; Mentor – Ahmed Abdul-Latif
- Poster 4** Yohannes Amsalu, Matalynn Shealy, Esther Abiara, “Wild bacterial strains and *Pseudomonas syringae* pv. tomato DC3000 differ in resistance to allyl-isothiocyanate defense of *Arabidopsis thaliana*”, Berea College; Mentor – Brian Traw
- Poster 5** Sara Holly, “The Ethical Practices of Kindred Spirit Elephant Sanctuary in Thailand's Growing Tourism Industry”, Kindred Spirit Elephant Sanctuary; Mentor – Megan Hoffman
- Poster 6** Imelda Saintilma, “Disruption of cell adhesion and loss of Arp2/3 complex function in macrophages are not sufficient to induce NF- κ B activity”, Uniformed Services University; Mentor – Jeremy Rotty
- Poster 7** Alli Harper, “Placental Transfer and Metabolism of FDA-approved Drugs Repurposed for Novel Tocolytic Use”, Vanderbilt University Medical Center; Mentor – Shajila Siricilla, Raymond Johnson, Jennifer L. Herington
- Poster 8** Depika Subedi, “Regulation of miR-146a expression in Glioblastoma”, The Ohio State University; Mentor – Tiantian Cui
- Poster 9** Sharman N Sugumaran, “Cysteine Thiol Directed Chemical Modification of a KCNE1 Protein N-Terminus”, Vanderbilt University; Mentor - Keenan Taylor
- Poster 10** Nishimwe P Montessorie, “The impact of nuclear factor erythroid related factor 2 genotype on the hepatic gene expression of juvenile mice exposed to polychlorinated biphenyl 126”, University of Kentucky; Mentor – Kevin Pearson
- Poster 11** Caitlyn Roberts, “Endosperm-based Hybrid Inviability in Mimulus plants”, North Carolina State University; Mentors–Robert Franks, Miguel Flores-Vergara
- Poster 12** Ben Turner, “Defining how Lafora disease patient mutations impact glycogen dephosphorylation”, University of Kentucky; Mentors–Matthew Gentry, Craig W. Vander Kool
- Poster 13** Kateryna Nabukhotna, “Integrin B1 Promotes KRAS-Mutated Lung Cancer Proliferation Via Mapk-Independent Mechanism”, Vanderbilt University Medical Center; Mentor – Scott Haake & Roy Zent
- Poster 14** Abigail Whitaker, “Disruption of choline acetyltransferase (ChAT) by congenital mutations: Screening potential therapeutic leads”, University of Kentucky; Mentor – David Rodgers
- Poster 15** Areli Medina Hernandez, “Role of Shear Stress on Endothelial Insulin Sensitivity”, Dalton Cardiovascular Research Center, University of Missouri; Mentor – Luis A. Martinez-Lemus
- Poster 16** Kamila Nurmakova, “Clostridium isolate growth in a zinc-limited environment”, Vanderbilt University Medical Center; Mentor – Christopher Lopez
- Poster 17** Adam M. Kinyua, “Synthesis of Leuco Dyes”, University of Kentucky; Mentor – John Anthony
- Poster 18** Levi Blevins & Ominica Crockett, “Solid Phase Organic Synthesis of an Antibody Conjugate Linker”, Berea College; Mentor – Elizabeth Thomas
- Poster 19** Nyasha E. Gombami, “Mechanism of quinolone resistance in *Escherichia coli* type II topoisomerases”, Vanderbilt University Medical Center; Mentor–Neil Osheroff

- Poster 20** Muntathar Jamal Alshimary, “A functional module for a response to low nutrients in Arabidopsis”, University of Chicago; Mentor – Jean Greenberg
- Poster 21** Valéria Rosa Rocha, “Procedure improvement for FAPbI3 perovskite solar cells”, University of Kentucky; Mentor – Kenneth Graham
- Poster 22** Helina Asrat, “Dose-dependent induction of circulating Serum Amyloid A, and markers of pulmonary inflammation following ozone exposure: implications for Alzheimer’s disease”, US Department of Veterans Affairs, Seattle, Washington; Mentor – Michelle Erickson
- Poster 23** Courtney Brown & Adan Martinez, “Trash to Shine”, Berea College; Mentor – Elizabeth Thomas
- Poster 24** Emily Brown, “The synthesis of Annulene-Oxacalixarene Hybrids”, Northern Kentucky University; Mentor–KC Russell
- Poster 25** Destiny Strange-Banks, Sienna Burgess, Katie Bledsoe-Houston, “Reggio Emilia Inspired Practice at the Child Development Laboratory”, Berea College Child Development Laboratory; Mentor – Cindy McGaha
- Poster 26** E. Dove DeNigris, Miranda E. Goens, Jenna D. Hughes, & Abdirahman O. Mohamed, “Simulations of Belief Propagation through Social Networks”, Berea College; Mentor – Jan Pearce
- Poster 27** Jacob Uzzle, “Combinatorial Game Theory and Graphs”, Berea College; Mentor – Kristen Barnard
- Poster 28** Jessie Whitaker, “Combinatorics game theory”, Berea College; Mentor – Kristen Barnard
- Poster 29** Sahet Dovranov, “Playing ‘Double Take’ on a Graph”, Berea College; Mentor – Kristen Barnard
- Poster 30** Ciara Felty & Clint Chaffins, “Analyzing Appalachian Media for Purposeful Usage”, Berea College; Mentor – Maggie Robillard
- Poster 31** Enrique Escobar & Josh Wilson, “Physical Activity Intensity Levels in Outdoor Rock Climbing”, Muir Valley; Mentor – Michelle Thornton & AJ Mortara
- Poster 32** Glendy Pineda, “The Economic Impact of the Pinnacle Trails in Berea Kentucky”, Berea College; Mentor – Louisa Summers
- Poster 33** Jaden J Johnson, “Physical Activity and Health Patterns of Users in a Kentucky Trail Town”, Berea College; Mentor – Louisa Summers
- Poster 34** Sierra Turner & Sangyal Dorjee, “Application of Multi-theory model in predicting small portion size consumption in rural Appalachia”, Berea College; Mentor – Ram Lakhani
- Poster 35** Eli Prater, Brian Leist, & Mo Thi, “Experiments with single photons: Demonstration of Existence and Interference”, Berea College; Mentor – Martin Veillette
- Poster 36** Heather Thompson, “Investigating the Efficacy of Histotripsy on Drug Delivery”, University of Chicago; Mentor – Kenneth Bader