TWENTY-FIRST ANNUAL
UNDERGRADUATE EXPO
APRIL 3-4, 2019

PART OF WESTERN CAROLINA UNIVERSITY’S RESEARCH AND SCHOLARSHIP CELEBRATION

RESEARCH.WCU.EDU
#RASC19

IN CONJUNCTION WITH:
Office of the Provost, The Honors College and Graduate School and Research

SPONSORED BY:
The 2018 – 2019 Defining America Campus Theme and Sigma Xi, The Scientific Research Honor Society
TWENTY-FIRST ANNUAL UNDERGRADUATE EXPOSITION

SCHEDULE

WEDNESDAY 4.3.19

ALL DAY
VARIOUS LOCATIONS ACROSS CAMPUS
ORAL UNDERGRADUATE EXPO PRESENTATIONS
AND PERFORMANCES

11AM – 2PM
BLUE RIDGE CONFERENCE ROOM
DEFINING AMERICA FEATURED PRESENTATIONS:
Blue Ridge Conference Room; the Departments
of Parks and Recreation Management and Anthropology
and Sociology

3PM
RAMSEY CENTER ARENA
POSTER AND FINE ARTS EXHIBIT PREVIEW

4 – 4:05PM
WELCOME ADDRESS:
Dr. Brandon Schwab, Associate Provost

4:05 – 4:55PM
FACULTY PANEL: INFORMING AMERICA: DEFINING ISSUES
AND PURSUING SOLUTIONS THROUGH RESEARCH

4:55 – 5PM
INTRODUCTION OF KEYNOTE SPEAKER:
Dr. Brandon Schwab, Associate Provost

5 – 6PM
KEYNOTE ADDRESS:
Dr. Mary C. Waters of Harvard University

6PM – 7:30PM
UNDERGRADUATE EXPO RECEPTION AND CELEBRATION

THURSDAY 4.4.19

ALL DAY
VARIOUS LOCATIONS ACROSS CAMPUS
ORAL UNDERGRADUATE EXPO PRESENTATIONS
AND PERFORMANCES

A.K. HINDS UNIVERSITY CENTER
9AM – 6:30PM
GRADUATE RESEARCH SYMPOSIUM

UC THEATER
11 – 11:45AM
GRADUATE STUDENT PANEL

12 – 1PM
GRADUATE RESEARCH SYMPOSIUM‘S
KEYNOTE ADDRESS:
Dr. Laura Wright, Department of English at Western
Carolina University

A.K. HINDS UNIVERSITY CENTER
10 AM – 4:45PM
EXEMPLARY UNDERGRADUATE ORAL PRESENTATIONS

UNIVERSITY CENTER GRAND ROOM
5PM
GRADUATE RESEARCH SYMPOSIUM RECEPTION
AND AWARDS
Welcome to the 2019 WCU Research and Scholarship Celebration (RASC)! This collaboration between The Honors College, Graduate School and Research, and Office of the Provost highlights research, scholarship, and creative activities while advancing knowledge across the disciplines through remarkable academic partnerships.

On Wednesday, April 3, the 21st Annual Undergraduate Exposition will showcase 33 undergraduate oral presentations at various campus locations. Undergraduates from the Department of Anthropology and Sociology and the Parks and Recreation Management program, accompanied by their faculty mentors will give presentations on their current research as part of this year’s campus theme, Defining America. These Featured Oral Presentations will be held in the Blue Ridge Conference Room from 11:00 am - 2:00 pm.

The RASC poster session preview opens in the Ramsey Center arena at 3:00 pm. The session includes 83 undergraduate poster presentations along with 34 research posters presented by graduate students. Five undergraduate fine arts exhibits will also be on display. At 4:00 pm there will be a panel discussion on Informing America: Defining Issues and Pursuing Solutions Through Research by WCU faculty. The panel will cover a range of topics including: migration and immigration, climate and environment, healthcare, social justice, and business innovation. Immediately following at 5:00 pm, Dr. Mary C. Waters will give a keynote address entitled Immigration to the US: Integration Success and Policy Failures. We are excited to host Dr. Waters as part of the Defining America campus theme. She is the John L. Loeb Distinguished Professor of Sociology at Harvard University and will bring fresh perspectives on how immigration research can lead to better solutions and outcomes for immigrants in the United States.

On Thursday April 4 from 9:30 am - 4:45 pm the Graduate Research Symposium will host 43 oral presentations by graduate students in the A.K. Hinds University Center. The Graduate School and Research will also honor eight undergraduate students selected by the 2019 RASC Faculty Committee as the 2019 Exemplary Undergraduate Presenters.

RASC represents countless hours of student effort combined with the tireless dedication of faculty sponsors who span more than 20 departments and programs. Thanks to the faculty, staff, students, and sponsors who worked to make this event possible.

Sincerely,

Dr. Brandon E. Schwab
Associate Provost for Academic Affairs
Immigrants generally do very well in the United States, integrating faster than European immigrants did a century ago, but immigration policy debates and deadlocks are still creating large problems not only for immigrants but for our economy and society. Immigration research can lead to better solutions and outcomes for immigrants in the United States.
Defining America Featured Presentations

This year, RASC joined with the campus theme Defining America in an effort to show how our research, scholarship, and creative activities contribute to a better understanding of who we are, past, present, and future. In collaboration with the departments of Anthropology & Sociology and Parks & Recreation Management, RASC is pleased to feature 6 undergraduate oral presentations on Wednesday, April 3, from 11:00 am to 2:00 pm in the Blue Ridge Conference Room. Their faculty mentors, Dr. Katie Zejdlik-Passalacqua (Anthropology) and Dr. Callie Schultz (Parks & Recreation) will accompany their student presenters with a welcome address and moderate each session. The presenters are listed below along with the time of presentation. Thank you to these undergraduate students, and Drs. Zejdlik and Schultz for their support of these student presentations.

11:00 AM - 12:30 PM IN BLUE RIDGE CONFERENCE ROOM
Department of Parks & Recreation Management
Faculty Sponsor: Dr. Callie Schultz, Assistant Professor and the 2018-2019 Awardee of the UNC Undergraduate Research Award.

UNDERGRADUATE PRESENTERS:
Taylor Carrigan and Krista Patton, presenters
Undergraduate Research through the eyes of a “Newbie”; A Duoethnography Exploration into the Research Process

Ashley Johnson and Krista Patton, presenters
Researching an Immersive Poverty Experience: The Efficacy of MCAN Poverty Simulation

Matthew Long, presenter
Why “just make it free” isn’t the only answer: Health, PE, & Recreation majors gain an understanding about the complexity of poverty

12:45 PM – 2:00 PM IN BLUE RIDGE CONFERENCE ROOM
Department of Anthropology & Sociology
Faculty Sponsor: Dr. Katie Zejdlik-Passalacqua, Assistant Professor and Collections & Facility Curator for the Forensic Osteology Research Station

UNDERGRADUATE PRESENTERS:
Joshua Norris, Zachary Kessinger, presenters
Cullowhee United Methodist Church Cemetery

Alexandra Cruz, presenter
Through the Years: Mt. Zion A.M.E.

Sarah Burke, presenter
Death Positivity and Acceptance

Featured Faculty Panel

Moderator: Lane Perry, Director, Center for Service Learning

Please join us for a lively discussion on Informing America: Defining Issues and Pursuing Solutions Through Research to be held on Wednesday, April 3 at 4:00 pm in the Ramsey Center Arena, just before the Keynote Speaker. This year the faculty panel will discuss five main topics, which include migration & immigration, climate & the environment, healthcare, education & social justice, and technology, economics, & business innovation. Thanks to these faculty scholars for sharing insights into their work and how their scholarship is shaped by their disciplinary perspectives.

2019 Faculty Panelists

Jerry Miller, Distinguished Professor, Whitmire Professor of Environmental Science, Department of Political Science and Public Affairs

Jeanne Dulworth, Assistant Professor, Department of Social Work

Sean Mulholland, Professor of Economics, Department of Economics, Management and Project Management

Dustin Whitehead, Assistant Professor of Acting, and Program Director for BFA Acting for Stage and Screen

Benjamin Francis-Fallon, Assistant Professor, Department of History, and Director of Social Science Education
EXEMPLARY UNDERGRADUATE PRESENTATIONS

2019 Exemplary Undergraduate Presenters will be participating in the Graduate Research Symposium on Thursday, April 4. These students were selected through the abstract review process for RASC by a faculty committee representing each College and the Hunter Library. They are listed here in alphabetical order by the last name of the primary author. Congratulations to these exceptional students and to their faculty mentors for being selected to present at the Graduate Research Symposium. This truly is a high honor!

Transgender Athletes and the Media: A 2017 Discourse Analysis
Aria Ashburn, presenter
Munene Mwanki, sponsor

Edward MacDowell’s Contributions to American Music During the Late Romantic Period
Savannah Bennett, presenter
Christina Reitz, Andrew Adams, sponsors

Design and construction of heel strike detection device for post-stroke gait rehabilitation
Jazz Click, presenter
Martin Tanaka, Ashley Hyatt, sponsors

Empowerment Against Adversity: The Obstruction of Lithuanian Women’s Identities, 1940-1953
Emily Johnson, presenter
Scott Philyaw, sponsor

Understanding the Kardashian Empire and mass consumption of black culture
Drue Stinnett, presenter
Munene Mwanki, sponsor

Race and Gender Within YA Genre Fantasy: It’s Not All White Boys with Swords
Ryan Tompkins, presenter
Munene Mwanki, sponsor

Closing the gap: roles & responsibilities of K-12 English as a Second Language (ESL) teachers for service coordination with Speech-Language Pathologists (SLPs)
Kelsey Williams, Amelia Wall, Annie Bartholomew, presenters
Erin Callahan, sponsor

Our Global Trash Problem
Grace Woodard, presenter
Karen Britt, sponsor

ORAL AND PERFORMANCE PRESENTATIONS

Exemplary Undergraduate Presentations highlighted in gray

WEDNESDAY, APRIL 3

9am | Coulter Bldg., Room 304
English, College of Arts and Sciences
Speaking Between Their Lines: Euphuism in Much Ado About Nothing
Helen Bowen, presenter
Mary Adams, sponsor

12pm | Belk Bldg., Room 104
School of Engineering and Technology, College of Engineering and Technology
Omnidirectional Ball Balancing Robotic Assistant
Ethan Stiles, Brandon Beiler, Richard Lavallee, Jerome Suminski, Sushanta Magar, presenters
Scott Pierce, Paul Yanik, sponsors

12:15pm | Stillwell Bldg., Room 424
Mathematics and Computer Science, College of Arts and Sciences
The Domination of Permutation Graphs
Peter Gardner, presenter
Risto Atanasov, sponsor

12:30pm | Stillwell Bldg., Room 424
Mathematics and Computer Science, College of Arts and Sciences
On covers of dihedral 2-groups by powerful subgroups.
Luke Guatelli, Adam Gregory, presenters
Risto Atanasov, Andrew Penland, sponsors

12:45pm | Stillwell Bldg., Room 424
Mathematics and Computer Science, College of Arts and Sciences
Deleting Edges from Complete Graphs to Destroy the Ramsey Property
Elijah DeJonge, presenter
Mark Budden, sponsor

1pm | Stillwell Bldg., Room 424
Mathematics and Computer Science, College of Arts and Sciences
The Powerful Covering Number of the 2-Groups of Coclass 1
Adam Gregory, Luke Guatelli, presenters
Risto Atanasov, Andrew Penland, sponsors
1pm | Coulter Bldg., Recital Hall  
School of Music, David Orr Belcher College of Fine and Performing Arts  
**Piecing Together the Modern Piano**  
Faith Garner, presenter  
Christina Reitz, Milton Laufer, sponsors

1:15pm | Stillwell Bldg., Room 424  
Mathematics and Computer Science, College of Arts and Sciences  
**Anti-Ramsey Hypergraph Numbers**  
Will Stiles, presenter  
Mark Budden, sponsor

1:30pm | Coulter Bldg., Recital Hall  
School of Music, David Orr Belcher College of Fine and Performing Arts  
**Comparative analysis of two theories surrounding Pyotr Il'yich Tchaikovsky's Symphony No. 6 in B minor, op. 74, and subsequent death**  
Benjamin Grochowsky, presenter  
Christina Reitz, sponsor

2:30pm | Coulter Bldg., Recital Hall  
School of Music, David Orr Belcher College of Fine and Performing Arts  
**Women Composers and Instrumentalists in Classical Music**  
Anna Kelley, presenter  
Christina Reitz, sponsor

3 pm | Coulter Bldg., Recital Hall  
School of Music, David Orr Belcher College of Fine and Performing Arts  
**Transcribing Three Pieces for Cello and Piano to expand the clarinet repertory.**  
Alexander Eplin, presenter  
Shannon Thompson, sponsor

---

**THURSDAY, APRIL 4**

8am | Belk Bldg., Room 323  
Criminology and Criminal Justice, College of Arts and Sciences  
**From traditional to modern and back again: how indigenous and western models of policing have affected each other**  
Rachel Gibby, presenter  
Ophir Sefiha, sponsor

9:30am | Belk Bldg., Room 366  
School of Engineering and Technology, College of Engineering and Technology  
**On the Versatility of Touch Boards**  
James Nelson, presenter  
Yanjun Yan, sponsor

10-11am | UC Dogwood Room  
History, College of Arts and Sciences  
**Empowerment Against Adversity: The Obstruction of Lithuanian Women’s Identities, 1940-1953**  
Emily Johnson, presenter  
Scott Philyaw, sponsor

10 - 11am | UC Dogwood Room  
Anthropology and Sociology, College of Arts and Sciences  
**Race and Gender Within YA Genre Fantasy: It’s Not All White Boys with Swords**  
Ryan Tompkins, presenter  
Munene Mwanki, sponsor

11am - 12pm | UC Multipurpose Room  
Anthropology and Sociology, College of Arts and Sciences  
**Transgender Athletes and the Media: A 2017 Discourse Analysis**  
Aria Ashburn, presenter  
Munene Mwanki, sponsor

11am - 12pm | UC Catamount Room  
English, College of Arts and Sciences  
**Closing the gap: roles & responsibilities of K-12 English as a Second Language (ESL) teachers for service coordination with Speech-Language Pathologists (SLPs)**  
Kelsey Williams, Amelia Wall, Annie Bartholomew, presenters  
Erin Callahan, sponsor

11am - 12pm | UC Cardinal Room  
School of Music, David Orr Belcher College of Fine and Performing Arts  
**Edward MacDowell’s Contributions to American Music During the Late Romantic Period**  
Savannah Bennett, presenter  
Christina Reitz, Andrew Adams, sponsors

12pm | Stillwell Bldg., Room 123  
Biology, College of Arts and Sciences  
**Exploring the Unique ß-amylase2 and Its Novel Potential Binding Partner**  
Natasha Kreiling, Ashley Brown, presenters  
Amanda Storm, sponsor

12:30pm | McKee Bldg., Room 208  
Political Science and Public Affairs, College of Arts and Sciences  
**Where You Stand is Where You Sit: The Influence of Party Agendas on Children’s Health Issues in the United States**  
McKenley Webb, presenter  
JoBeth Shafran, sponsor
2pm | UC Cardinal Room
School of Art & Design, David Orr Belcher College of Fine and Performing Arts
Our Global Trash Problem
Grace Woodard, presenter
Karen Britt, sponsor

1 - 2pm | UC Multipurpose Room
Anthropology and Sociology, College of Arts and Sciences
Understanding the Kardashian Empire and mass consumption of black culture
Drue Stinnett, presenter
Munene Mwanki, sponsor

2pm | Coulter Bldg.
English, College of Arts and Sciences
Daisy’s Decisions or Lack Thereof: Bipolar II disorder, Daisy, and The Great Gatsby
Emalee Money, presenter
Brian Railsbak, sponsor

2pm | Natural Sciences Bldg. Room 123
Biology, College of Arts and Sciences
Investigation of Lethal Toxin Neutralizing Factor (LTNF) predicted inhibitory function on Insulin Degrading Enzyme (IDE)
Sierra Rice, presenter
Bob Youker, sponsor

2:30pm | Reid Health and Human Performance Bldg. Room 122H
Human Services, College of Education and Allied Professions
Undergraduate Research through the eyes of a “Newbie”; A Duetnography Exploration into the Research Process
Taylor Carrigan, Ashley Johnson, Krista Patton, Seth Blanton, Matt Long, Madison Armstrong, presenters
Callie Schultz, Gayle Wells, sponsors

2:30pm | Reid Health and Human Performance Bldg. Room 122H
Human Services, College of Education and Allied Professions
Researching an Immersive Poverty Experience: The Efficacy of MCAN Poverty Simulation
Krista Patton, Ashley Johnson, Taylor Carrigan, Matt Long, Seth Blanton, Madison Armstrong, presenters
Callie Schultz, Gayle Wells, sponsors

2:30pm | Reid Health and Human Performance Bldg. Room 122H
Human Services, College of Education and Allied Professions
Why “just make it free” isn’t the only answer: Health, PE, & Recreation majors gain an understanding about the complexity of poverty
Matt Long, Seth Blanton, Madison Armstrong, Krista Patton, Taylor Carrigan, presenters
Callie Schultz, Gayle Wells, sponsors

3:05pm | McKee Bldg. Room 223
History, College of Arts and Sciences
The Untold Stories of a Western North Carolinian Couple during World War II: How They Survived Japanese Internment
Katelynn Patterson, presenter
Scott Philyaw, sponsor

3:20pm | McKee Bldg., Room 223
History, College of Arts and Sciences
When Women Build a War: Women in the Workplace During World War I and World War II
Amelia Konda, presenter
Scott Philyaw, sponsor

3:35pm | McKee Bldg., Room 223
History, College of Arts and Sciences
Germany’s strange partner: Finland
William Thornton, presenter
Scott Philyaw, sponsor

3:45 - 4:45pm | UC Cardinal Room
School of Engineering and Technology, College of Engineering and Technology
Design and construction of heel strike detection device for post-stroke gait rehabilitation
Jazz Click, presenter
Martin Tanaka, Ashley Hyatt, sponsors

4pm | Stillwell Bldg. Room 225
Philosophy and Religion, College of Arts and Sciences
A World Without Super-Problems: The Biomedical Ethics of Superheroes and Transhumanism
Hannah Grace Lemacks, presenter
Christopher Hoyt, sponsor
Amanda Storm, sponsor
Natasha Kreiling, presenter
Novel Potential Binding Partner
Exploring the Unique β-amylase2 and Its Biology
Katie Zejdlik-Passalacqua, sponsor

Cemetery Bioarchaeology Investigation: Locust Field
Katie Zejdlik-Passalacqua, sponsor

Cultural Context
Cemetery Analysis Using Temporal and Spatial Context
Bria Lindsay, presenter
Katie Zejdlik-Passalacqua, sponsor

Bioarchaeology Investigation: Locust Field Cemetery
Mackenzie Avery, presenter
Katie Zejdlik-Passalacqua, sponsor

Visualizing Hypoxia and the Effects of Keratin in HEK293 Cells
Gianna Gerard, Samantha Holmes, presenters
Heather Coan, sponsor

Keratin Affects Autophagic Flux in Human Embryonic Kidney Cells in Vitro
Zane Billings, presenter
Heather Coan, Robert Youker, sponsors

Structural and biochemical analysis of a novel mycobacteriophage transcription regulating protein.
Reliza McGinnis, presenter
Jamie Wallen, sponsors

Exploring a potential interaction between A-amylose3 and the catalytically inactive β-amylose9 in Arabidopsis thalian
Frances Lowder, presenter
Amanda Storm, sponsor

Keratin's effect on autophagy and cell proliferation in mesenchymal stem cells exposed to oxidative stress
Jade Hollars, Emily Zipay, presenters
Heather Coan, Robert Youker, sponsors

The investigation of the effects of keratin on the clearance of endogenous protein aggregates in human kidney cells.
Samantha Varner, Amy Lin, presenters
Robert Youker, Heather Coan, sponsors

Isolation and exposure of Human Embryonic Kidney (HEK) cell exosomes to HEK cells in oxidative and non-oxidative environments.
Brinley Harrington, Dakota Perez, Fletcher Metcalfe, Jacob Kulp, presenters
Heather Coan, sponsor

Synthesis of Europium Metal-Doped Calcium Fluoride Nanoparticles with Enhanced Luminescent Properties
Wan Ching Chan, Aaron Lipchak, presenters
Channa De Silva, sponsor

Identification of Mosquito Species Utilizing Infrared Spectroscopy
Connor Larmore, Harrison Edmonds, Morgan Cheek, presenters
Scott Huffman, sponsor

The Synthesis and Complexation of Boronic Acid Derivatives with N-Oxides
Hannah Kline, Keely Thomas, presenters
Bill Kwochka, sponsor

Body Fluid Identification Utilizing Next Generation Sequencing
Madison Klein, presenter
Brittania Bintz, sponsor

A Pilot Study on Ancient Burial Practices in Medieval Transylvania using Ancient DNA
Chelsea Jones, presenter
Frankie West, Katie Zejdlik-Passalacqua, sponsors

Evaluation of cell toxicity studies of europium metal-doped zinc oxide nanoparticles
Morgan Borszich, presenter
Channa De Silva, Heather Coan, sponsors

Protein Expression and Purification of 2 Bacteriophage Repressor Proteins
Hannah Miller, Brandon Stamey, Reliza McGinnis, presenters
Maria Gainey, Jamie Wallen, sponsors

Antimicrobial Properties Of Altered Zinc-Metal Based Nanoparticles And The Possible Applications To The Clinical Setting
Kaitlyn Brasecker, presenter
Channa De Silva, Indrani Bose, sponsors

Optimization of synthesis parameters and characterization of surface functionalized iron oxide nanoparticles
Christian Wyatt, presenter
Rangika Hikkaduwa Koralege, sponsor

Extraction of DNA from Forensically Relevant Chewing Gum Samples
Ashton Jones, presenter
Brittania Bintz, Frankie West, Maureen Hickman, sponsors

Microwave-Assisted Synthesis of Zinc Oxide Nanoparticles
Kody Burrows, presenter
Channa De Silva, sponsor

The synthesis of water soluble phenanthroline-europium Complexes for confocal microscopy.
Paul Venturo, presenter
Brian Dinkelmeier, sponsor

Complexation of Trifluoro Boronate
Julie Cadigan, presenter
Bill Kwochka, sponsor

Using Sequencing Technologies to Understand how a Virus Mutates to Combat Defects in DNA Replication
Henry Salvo, presenter
Jamie Wallen, Maria Gainey, sponsors

Investigating the effects of sample age on the Raman signal of analytes collected on SERS-active evidence swabs
Savannah Mosteller, presenter
Geraldine Monjardez, David Evanoff, sponsors

Investigation of weathering of automotive clear-coat formulations using Fourier-transform infrared spectroscopy (FTIR) for forensic purposes
Hossam Elaskalani, presenter
Nuwan Perera, sponsor

Examining Chromatography using Trace Metal Analysis
Samantha Sullivan, presenter
Carmen Huffman, Jerry Miller, sponsors
Inhibition Studies of ZnO Nanoparticles and their Chemical Attachment to Cotton Textile for Potential Antimicrobial Applications
Monica Reece, presenter
Channa De Silva, Maria Gainey, sponsors

Determining the genetic similarities of viruses discovered at Western Carolina University in 2018.
David White, Coy Yarboro, Brandon Rockette, Devynn Crouch, presenters
Maria Gainey, Jamie Wallen, sponsors

Comparative Analysis of DNA Extraction from Bone using a Manual vs. Automated Extraction Method
Bailey Cave, Catherine Dutour, presenters
Frankie West, Katie Zejdlik-Passalacqua, sponsors

Binding of zinc oxide nanoparticles to unmodified and modified cotton cloth
Dennis Cruz, presenter
Carmen Huffman, sponsor

Determining the structure and function of unique regions found in the DNA Polymerase Gamma of Cryptococcus neoformans
Lindsey Farris, Dylan Rood, Samuel Walter, presenters
Jamie Wallen, sponsor

Microbacteriophage Minor Tail Proteins and Their Influence on Bacteriophage Host Range
Hannah Baysinger, Bailey Spencer, Cameron Gammon, Erin Rigsbee, Melissa Huamancondor, presenters
Maria Gainey, sponsor

Locating promoters and terminator sequences in bacteriophage genomes
Veronica Garcia, Macey Savage, Itzel Mondragon, presenters
Maria Gainey, sponsor

Predicting the structure and function of proteins encoded by bacteriophages Slentz and Ciel
Brooklynn Herold, Jonah Slentz, Jacob Simpson, Emily Anderson, Catherine Austin, presenters
Maria Gainey, Jamie Wallen sponsors

Identification of Mycobacteriophage Larva Toxic Gene Products and Their Cellular Binding Partners
Kayla Deacon, Caleigh Gress-Byrd, presenters
Maria Gainey, Jamie Wallen, sponsors

Genetic Engineering and Transcriptional Interference of Actinobacteriophages
Georgia Matheson, Szonia Nemes, Morgan Santiago, Courtney Gobble, Aria David, présenters
Maria Gainey, sponsor

COMMUNICATIONS
Goals, Attitudes, and Socialization Within Group Projects
Caleb Sullivan, Dane Wagner, Sydney Philbeck, Bradley Owen, Nathan McDaniel, Julia Brown, presenters
Candy Noltensmeyer, sponsor

CRIMINOLOGY AND CRIMINAL JUSTICE
Hiding in plain sight: Non-text communications and violent crime on social media
Anna Vasshah, presenter
John A. Hansen, sponsor

Does legal counsel at a first appearance court session really matter?
Chasey Davis, presenter
Jamie Vaske, sponsor

Do we need pretrial reform to improve the functioning of the judicial prosecution process?
Christine Davis, presenter
Jamie Vaske, sponsor

Perceived Stigmatization of Mental Health Issues Following Victimization
Dajiah Johnson, presenter
Tasha Youstin, sponsor

Police Officer Fatalities in the United States: Presentation vs. Reality
Brooklynn Clear, presenter
John A. Hansen, sponsor

Comparing Police Arrest and Response Methods to Drug Offender’s in Different Countries
Brittany Smith, presenter
John A. Hansen, sponsor

Forensic Science and the Criminal Justice System
Christen Thomas, presenter
Cindy Caravelis, sponsor

Sexual Assault Prevalence in Deaf and Hard of Hearing Communities
Aspen Hastings, presenter
Lisa Briggs, sponsor

Student Suggestions for Decreasing Sexual Assault on Campus: Communication, Awareness and Reporting
Samantha Griffin, presenter
Tasha Youstin, sponsor

EMERGENCY DISASTER MANAGEMENT PROGRAM
Analysis of Pre and Post 9/11 Counter-terrorism methods in the U.S
Joshua Geiger, presenter
Julia Crowley, sponsor

Governors Report
Griffin Tracy, presenter
Lisa Briggs, sponsor

The Link Between Terrorism and Immigration
Addie Ward, presenter
Tom Johnson, sponsor

Previous Terrorism Methods: Room for Improvement
Joshua Geiger, Griffin Tracy, presenters
Tom Johnson, sponsor

The Shift in Active Shooter Preparedness After Columbine
Aspen Hastings, presenter
Julia Crowley, sponsor

GEOSCIENCES AND NATURAL RESOURCES
Consumption of single-use plastics in dining at Western Carolina University
Katherine Allison, presenter
Laura DeWald, sponsor

Relating Variations in Soil Composition to Concentration-Discharge Relationships in a Disturbed Headwater Catchment
Dakota Little, Veronica Ferry, presenters
JP Gannon, sponsor

Evaluating the potential role of a facultative symbiont of the hemlock woolly adelgid
Sierra Croney, presenter
Angela Mech, sponsor

Presenting original research at a Geological Society of America conference: “Trail-scale slope failure risk maps: a pilot study in Great Smoky Mountains National Park”
Anna Willis, presenter
Cheryl Waters-Tormey, sponsor

PHILOSOPHY AND RELIGION
A Guide to Medical Ethics for Harris Regional Hospital
Jordan Schechter, presenter
Christopher Hoyt, sponsor

POLITICAL SCIENCE & PUBLIC AFFAIRS
The Empowerment of Women in Developing Countries
William Towery, presenter
Ingrid Bego, sponsor

COLLEGE OF BUSINESS
SCHOOL OF ACCOUNTING, FINANCE, INFORMATION SYSTEMS AND BUSINESS LAW
Past performance may be a guarantee of future results
Alexia Bevers, presenter
Grace Allen, sponsor

COLLEGE OF EDUCATION AND ALLIED PROFESSIONS
Psychology
Perceived Addiction to Pornography: The Role of Religiosity
Casey Cook, presenter
David DeJong, sponsor

Gender and self-disclosure on the campaign trail
Sara Roles, presenter
Erin Myers, sponsor

SCHOOL OF TEACHING & LEARNING
Creating a Modern Fantasy Picture Book for Children+
Luke Webb, presenter
Kelly Tracy, sponsor
How Does Project Based Learning Increase Engagement in Middle School Students?
Hannah Swords, Emily Wild, presenters
Amanda Clapp, David Strahan, sponsors

SCHOOL OF ENGINEERING AND TECHNOLOGY

An Examination into the Viscoelastic Properties of Phenolic Resin for Radioisotope Power Systems
Michaela Stratton, presenter
Robert Adams, sponsor

Swarm Robotics using Crazyflie 2.0 Drones
Jesse Sarver, presenter
Yanjun Yan, sponsor

A Model to Accurately Predict Hydrogen Explosion Severity in Nuclear Power Stations
Paola Cruz, Colin Reilly, Timothy Rayburn, presenters
Bora Karayaka, sponsor

DART ORR BELCHER COLLEGE OF FINE AND PERFORMING ARTS

Unmasking Identity +
Connor Henderson, presenter
Karen Britt, sponsor

That Color Looks Good on You: A New Approach to Portrait Photography +
Kayla Wright, presenter
Susan Martin, Karen Britt, sponsors

Examining how the lack of Serotonin affects Emotions +
Morgan Waterbury, presenter
Richard Tichich, sponsor

Silhouette +
Erin Odette, presenter
Richard Tichich, sponsor

SCHOOL OF STAGE AND SCREEN

Constructing furniture: from design to stage
Stephanie Moyse, presenter
Victoria Depew, sponsor

SCHOOL OF HEALTH SCIENCES

The Effects of Cellular Coverage on Patient Survival in the Rural Setting
Emma Hand, presenter
Jackson Deziel, sponsor

Ingredient Comparison of Commercially Available Enteral Nutrition Formulations
Bayley Hooper, Molly Basile, Thomas Rhom, presenters
Elizabeth Wall-Bassett, sponsor

Premenstrual Syndrome (PMS) and the Potential of B Vitamins to Bring Relief
Ashley Parker, presenter
Elizabeth Wall-Bassett, sponsor

Probiotics and its effects on Irritable Bowel Syndrome (IBS)
Michaela Gossett, Brianna Lippard, Chelsea Barber, presenters
Elizabeth Wall-Bassett, sponsor

Calcium Intake on Bone Mineral Density
Faith Rice, Jennifer Xiong, Haley Lyerly, presenters
Elizabeth Wall-Bassett, sponsor

The effect of intermittent fasting on weight loss in obese adults.
Alyssa Robinson, Loryn Hartbarger, Kristen Miles, presenters
Elizabeth Wall-Bassett, sponsor

Carbohydrate Intake and Endurance Athlete Performance
Reeve Reinsborough, Reilly Carter, Morgan Coker, presenters
Elizabeth Wall-Bassett, sponsor

Vegetarian Diets recommendations for Diabetes Mellitus Type 2: Evidence Analysis
Audrey Lakin, Amber Lakin, Savannah Robbins, presenters
Elizabeth Wall-Bassett, sponsor

The effects of B12 in the treatment of generalized anxiety disorder in adults
Allison Hixson, Ashley Brown, presenters
Elizabeth Wall-Bassett, sponsor

NATIONAL CONFERENCE ON UNDERGRADUATE RESEARCH 2019

Below are the projects attending the 2019 conference. Projects are listed by titles, student presenters, their sponsors, and by discipline. NCUR33 is hosted this year by Kennesaw State University.

More than 75 abstracts from WCU students were accepted to NCUR for the April 11-13, 2019 conference in Kennesaw, Georgia.

BIOCHEMISTRY

Antimicrobial properties of altered zinc-metal based nanoparticles and the possible applications to the clinical setting
Kaitlyn Brasecker, presenter
Channa De Silva, sponsor

BIOLOGY

Isolation and exposure of Human Embryonic Kidney (HEK) cell exosomes to HEK cells in oxidative and non-oxidative environments
Brinley Harrington, presenter
Heather Coan, sponsor

Quantifying Bos taurus Vocalizations as an Indicator of a Welfare Issue
Brooke Burns, presenter
Barbara Ballentine, sponsor

The Effects of Keratin on Human Embryonic Kidney Cell Proliferation Under Oxidized Stress
Emily Zipay, presenter
Heather Coan, sponsor

A Critical Review of Ossuary Excavation Methods
Evie Puckett, presenter
Frankie West, sponsor

Keratin’s effect on autophagy and cell proliferation in mesenchymal stem cells exposed to oxidative stress
Jade Hollars, Emily Zipay, presenters
Heather Coan, sponsor

Exploring the Unique ß-amylase2 and Its Novel Potential Binding Partner
Natasha Kreiling, presenter
Amanda Storm, sponsor

CHEMISTRY & PHYSICS

Optimization of DNA Extraction Method for Forensic Chewing Gum Samples
Ashton Jones, presenter
Brittania Bintz, sponsor

Protein Expression and Purification of 2 Bacteriophage Repressor Proteins
Brandon Stamey, presenter
Maria Gainey, sponsor

Identification of Mycobacteriophage Larva Toxic Gene Products and Their Cellular Binding Partners
Caleigh Gress-Byrd, presenter
Maria Gainey, sponsor

Optimization of DNA Extraction Method for Forensic Chewing Gum Samples
Chelsea Jones, presenter
Brittania Bintz, sponsor
Identification of Mosquito Species Utilizing Infrared Spectroscopy
Connor Larmore, Harrison Edmonds, presenters
Scott Huffman, Brian Byrd, sponsors

The Search for a Novel Repressor Gene in Cluster M Bacteriophages
Erin Cafferty, presenter
Maria Gainey, sponsor

Synthesis of Europium Metal-Doped Calcium Fluoride Nanoparticles with Enhanced Luminescent Properties
Wan Ching Chan, presenter
Channa De Silva, sponsor

Investigating the effects of sample age on the Raman signal of analytes collected on SERS-active evidence swabs
Savannah Mosteller, presenter
David Evanoff, sponsor

Synthesis of Europium Metal-Doped Calcium Fluoride Nanoparticles with Enhanced Luminescent Properties
Wan Ching Chan, presenter
Channa De Silva, sponsor

THE SEARCH FOR A NOVEL REPRESSOR GENE IN CLUSTER M BACTERIOPHAGES
Erin Cafferty, presenters
Maria Gainey, sponsor

The Synthesis and Complexation of Boronic Acid Derivatives with N-Oxides
Hannah Kline, Keely Thomas, presenters
Bill Kwochka, sponsor

The Synthesis and Complexation of Boronic Acid Derivatives with N-Oxides
Hannah Kline, Keely Thomas, presenters
Bill Kwochka, sponsor

CRIMINOLOGY & CRIMINAL JUSTICE
Hiding In Plain Sight: Non-Text Communications and Violent Crime on Social Media
Annalysia Soonah, presenter
John Hansen, sponsor

Does legal counsel at a first appearance court session really matter?
Chasey Davis, presenter
Jamie Vaske, sponsor

Perceived Stigmatization of Mental Health Issues Following Victimization
Daijah Johnson, presenter
Tasha Youstin, sponsor

Police Reactions to Social Unrest and Anti-Police Attitudes
Haley Johnson, presenter
Tasha Youstin, sponsor

Student Suggestions for Decreasing Sexual Assault on Campus: Communication, Awareness and Reporting
Samantha Griffin, presenter
Tasha Youstin, sponsor

Perceptions of Local and Campus Law Enforcement
William Towery, presenter
Tasha Youstin, sponsor

EMERGENCY MEDICAL CARE
The Effects of Cellular Coverage on Patient Survival in the Rural Setting
Emma Hand, presenter
Jackson Deziel, sponsor

ENGLISH
Blue Streams and Grey Skies: A River Runs Through It and Home
Allena Opoku, presenter
Brian Railsback, sponsor

Post-Traumatic Stress Disorder: The Driving Force in The Great Gatsby
Elizabeth Sellers, presenter
Brian Railsback, sponsor

Daisy’s Decisions or Lack Thereof: Bipolar II disorder, Daisy, and The Great Gatsby
Emalee Money, presenter
Brian Railsback, sponsor

Reading Between Their Lines: Euphuism in Much Ado About Nothing
Helen Bowen, presenter
Mary Adams, sponsor

With Each Day There Is Hope, Until the Sun Sets: John Steinbeck’s Of Mice and Men
Savannah Bennett, presenter
Brian Railsback, sponsor

ENVIRONMENTAL SCIENCE
Consumption of Single-Use Plastics in Dining at Western Carolina University
Katherine Allison, presenter
Laura DeWald, sponsor

FORENSIC SCIENCE
Body Fluid Identification Utilizing Next Generation Sequencing
Madison Klein, presenter
Brittania Bintz, sponsor

GEOSCIENCES & NATURAL RESOURCES
Relating Variations in Soil Composition to Concentration-Discharge Relationships in a Disturbed Headwater Catchment
Dakota Little, presenter
JP Gannon, sponsor

HISTORY
When Women Build a War: Women in the Workplace During World War I and World War II
Amelia Konda, presenter
Scott Philyaw, sponsor

Empowerment Against Adversity: The Obstruction of the Identity of Lithuanian Women, 1940-1953
Emily Johnson, presenter
Scott Philyaw, sponsor

Operation Jedburgh: Playing with Heads
Jackson Bivens, presenter
Scott Philyaw, sponsor

The Untold Stories of a Western North Carolinian Couple during World War II: How They Survived
Katelynn Patterson, presenter
Scott Philyaw, sponsor

Germany’s strange partner: Finland
William Thornton, presenter
Scott Philyaw, sponsor
HUMAN SERVICES
Researching an Immersive Poverty Experience: The Efficacy of the MCAN Poverty Simulation
Krista Patton, presenter
Callie Schultz, sponsor

Why “just make it free” isn’t the only answer: Health, PE, & Recreation majors gain an understanding about the complexity of poverty
Matt Long, presenter
Callie Schultz, sponsor

Undergraduate Research through the eyes of a “Newbie”; A Du ethnography Exploration into the Research Process
Taylor Carrigan, presenter
Callie Schultz, sponsor

PHILOSOPHY & RELIGION
A World Without Super-Problems: The Biomedical Ethics of Superheroes and Transhumanism
Hannah Lemacks, presenter
Christopher Hoyt, sponsor

A Sartrean Analysis of Dysthymic Depression as a Byproduct of Societal Relations with the Other and Alienation
Jordan Schechter, presenter
James McLachlan, sponsor

The Nature of Hell, according to Nicolas Berdyaev and Emmanuel Levinas
Mary Brown, presenter
James McLachlan, sponsor

POLITICAL SCIENCE & PUBLIC AFFAIRS
Party Agenda Setting: Does Congressional Attention to Children’s Health Encourage Party Members to be more Productive on the Issue?
McKenley Webb, presenter
JoBeth Shafran, sponsor

PSYCHOLOGY
Fatigue and frustration in working with individuals with developmental disabilities
Kaitlyn Bryant, presenter
Ellen Sigler, sponsor

Inclusion, Self-Determination, and Acceptance: A Qualitative Analysis of Interviews with Adults with Disabilities
Madison Surratt, Rebecca Peterson, presenters
Ellen Sigler, sponsor

SCHOOL OF ART & DESIGN
Unmasking Identity
Connor Henderson, presenter
Karen Britt, sponsor

Our Global Trash Problem
Grace Woodard, presenter
Karen Britt, sponsor

That Color Looks Good on You: A New Approach to Portrait Photography
Kayla Wright, presenter
Karen Britt, sponsor

SCHOOL OF ENGINEERING & TECHNOLOGY
Omnidirectional Ball Balancing Robotic Assistant
Ethan Stiles, presenter
Scott Pierce, sponsor

On the Versatility of Touchboards
James Nelson, presenter
Yanjun Yan, sponsor

Design and Construction of Heel Strike Detection Device for Post-stroke Gait Rehabilitation
Jazz Click, presenter
Martin Tanaka, sponsor

Swarm Robotics using Crazyflie 2.0 Drones
Jesse Sarver, presenter
Yanjun Yan, sponsor

Rheological Examination of Phenolic Resins for use within Radioisotope Power Systems
Kyle Monaghan, presenter
Glenn Romanoski, sponsor

Facial Expression Recognition Applications to American Sign Language Translation
Michaela Stratton, presenter
Robert Adams, sponsor

Investigation of Residual Stresses Present in DMLS Process Using XRD
Tyrele Adams, presenter
Hayri Sezer, sponsor

SCHOOL OF HEALTH SCIENCES
Traumatic Eye Injury in a Soccer Goalie: A Level 4 Rare Event Case Study
Gracyn Haskins, presenter
Melissa Snyder, sponsor

SCHOOL OF MUSIC
Edward MacDowell’s Contributions to American Music During the Late Romantic Period
Savannah Bennett, presenter
Christina Reitz, sponsor

SOCIOLOGY
Transgender Athletes and the Media: A 2017 Discourse Analysis
Aria Ashburn, presenter
Munene Mwanki, sponsor
UNDERGRADUATE ACADEMIC PROJECT GRANTS 2018-19

Initiated by Chancellor John Bardo in 1996, the Undergraduate Academic Projects Grant Program funds a variety of student projects. Thirty-six proposals were awarded with grants by the committee as of March 8, 2019. Many thanks to the Academic Project Grant committee for their work. Members of the committee include:

- Callie Schultz, Chair
- Adam Olsen
- Indrani Bose
- Qai Ha
- Kim Hall
- Sanjay Rajagopal
- Eldred Spell
- Kloo Hansen, Chair

College of Education and Allied Professions
Hunter Library
College of Arts and Sciences
College of Engineering and Technology
College of Health and Human Sciences
College of Business
College of Fine and Performing Arts
The Office of the Provost

Structural Determination of a Novel Mycobacteriophage Repressor Protein
Reliza McGinnis, recipient
Jamie Wallen, sponsor

Chemistry and Physics
Synthesis and characterization of peptide conjugated superparamagnetic iron oxide nanoparticles
Christian Wyatt, recipient
Rangika S. Hikkaduwa Koralege, sponsor

Investigation of Weathering of Automotive clear-coat Formulations using Fourier-Transformation Infrared Spectroscopy (FTIR) for Forensic Purposes
Hossam Elaskalani, recipient
Undugodage Don Nuwan Perera, sponsor

Using Sequencing Technologies to Understand how a Virus Mutates to Combat Defects in DNA Replication
Henry Salvo, recipient
Jamie Wallen, Maria Gainey, sponsors

Designing zinc metal-based nanomaterials using a microwave method for potential biomedical applications
Kody Burrows, recipient
Channa De Silva, sponsor

Developing Lanthanide Metal-Based Calcium Fluoride Nanoparticles with Enhanced Luminescent Properties for Optical Applications
Wan Ching Chan, recipient
Channa De Silva, sponsor

Synthesis of Antimicrobial Fabrics Using Zinc Oxide Nanoparticles
Dennis Cruz, recipient
Carmen Huffman, sponsor

CRIMINOLOGY AND CRIMINAL JUSTICE
WCU Criminology Student Presentations at the 2019 North Carolina Criminal Justice Association Annual Conference
Samantha Griffin, Madison Hale, Daijah Johnson, and MacKenzie Avery, recipients
Tasha Youstin, sponsor

FORENSIC SCIENCE
A Critical Review of the Effectiveness of Buccal Swabs in Mortuary DNA Extraction and STR Profiling
Alexandra Cruz, recipient
Frankie West, sponsor

GEOSCIENCES AND NATURAL RESOURCES
Chemical Composition and X-ray Analysis of the Meteorite NWA 1877 Thin-section
Liam Turner, recipient
Amy Fagan, sponsor

Isolating Background Volcanism in an Early Jurassic Coral Reef
Hannah Cothren, recipient
Shane Schoepfer, sponsor

Conditions around the Guadalupian - Lopingian Boundary in British Columbia, Canada
Samuel Moorer, recipient
Shane Schoepfer, sponsor

Soil Saturated Hydraulic Conductivity as an Indicator of Stream Intermittency
John Morgan, recipient
JP Gannon, sponsor

Concentration-discharge relationships between two tributaries in a catchment.
Veronica Ferry, recipient
JP Gannon, sponsor

Volcanism and its links to the Permian-Triassic Mass Extinction at Penglaitan
Eldridge Machen, recipient
Shane Schoepfer, sponsor

Relating Variations In Soil Composition To Concentration-Discharge Relationships
In A Disturbed Headwater Catchment
JP Gannon, recipient
JP Gannon, sponsor

Travel to present research at Geological Society of America Southeastern Conference
Kevin Cottingham, Samuel Moorer, Eldridge Machen, and Hannah Cothren, recipients
Shane Schoepfer, sponsor

Complex Groundwater – Stream Water Interactions In A Headwaters Catchment, Western North Carolina
Kenya Ingram, Hannah Cothren, John Morgan, Marguerite Suminski, Joshua Turnbull, and Anna Willis, recipients
Mark Lord, sponsor

GEOLOGY
Geochemistry of the Cache Creek terrane during the Permian-Triassic boundary
Kevin Cottingham, recipient
Shane Schoepfer, sponsor

Presenting original research at a Geological Society of America conference: “Trail-scale slope failure risk maps: a pilot study in Great Smoky Mountains National Park”
Anna Willis, recipient
Cheryl Waters-Tormey, sponsor

Creating Lanthane Metal-Based Calcium Fluoride Nanoparticles with Enhanced Luminescent Properties for Optical Applications
Wan Ching Chan, recipient
Channa De Silva, sponsor

Synthesis of Antimicrobial Fabrics Using Zinc Oxide Nanoparticles
Dennis Cruz, recipient
Carmen Huffman, sponsor

CRIMINOLOGY AND CRIMINAL JUSTICE
WCU Criminology Student Presentations at the 2019 North Carolina Criminal Justice Association Annual Conference
Samantha Griffin, Madison Hale, Daijah Johnson, and MacKenzie Avery, recipients
Tasha Youstin, sponsor

FORENSIC SCIENCE
A Critical Review of the Effectiveness of Buccal Swabs in Mortuary DNA Extraction and STR Profiling
Alexandra Cruz, recipient
Frankie West, sponsor

GEOSCIENCES AND NATURAL RESOURCES
Chemical Composition and X-ray Analysis of the Meteorite NWA 1877 Thin-section
Liam Turner, recipient
Amy Fagan, sponsor

Isolating Background Volcanism in an Early Jurassic Coral Reef
Hannah Cothren, recipient
Shane Schoepfer, sponsor

Conditions around the Guadalupian - Lopingian Boundary in British Columbia, Canada
Samuel Moorer, recipient
Shane Schoepfer, sponsor

Soil Saturated Hydraulic Conductivity as an Indicator of Stream Intermittency
John Morgan, recipient
JP Gannon, sponsor

Concentration-discharge relationships between two tributaries in a catchment.
Veronica Ferry, recipient
JP Gannon, sponsor

Volcanism and its links to the Permian-Triassic Mass Extinction at Penglaitan
Eldridge Machen, recipient
Shane Schoepfer, sponsor

Relating Variations In Soil Composition To Concentration-Discharge Relationships
In A Disturbed Headwater Catchment
JP Gannon, recipient
JP Gannon, sponsor

Travel to present research at Geological Society of America Southeastern Conference
Kevin Cottingham, Samuel Moorer, Eldridge Machen, and Hannah Cothren, recipients
Shane Schoepfer, sponsor

Complex Groundwater – Stream Water Interactions In A Headwaters Catchment, Western North Carolina
Kenya Ingram, Hannah Cothren, John Morgan, Marguerite Suminski, Joshua Turnbull, and Anna Willis, recipients
Mark Lord, sponsor

GEOLOGY
Geochemistry of the Cache Creek terrane during the Permian-Triassic boundary
Kevin Cottingham, recipient
Shane Schoepfer, sponsor

Presenting original research at a Geological Society of America conference: “Trail-scale slope failure risk maps: a pilot study in Great Smoky Mountains National Park”
Anna Willis, recipient
Cheryl Waters-Tormey, sponsor
Travel Support for Student Presentations on Topics in Ramsey Theory at the University of North Carolina Greensboro Regional Mathematics and Statistics Conference Elijah DeJonge and Will Stiles, recipients Mark Budden, sponsor

Presenting Ramsey Theory Research at the Joint Mathematics Meetings in Baltimore, Maryland Elijah DeJonge, recipient Mark Budden, sponsor

Creating a sculptural project to explore locality through craft, labor, and material Jesse Lloyd, recipient Morgan Kennedy, sponsor

Modern Interpretations of a Victorian Work Dress Annabela Cockrell, recipient Susan Martin, sponsor

Research-Based Studio Art Project on Sex Trafficking Grace Woodard, recipient Matt Liddle, sponsor

2018 Percussive Arts Society International Convention Performance Jonathan Myers, Dakota Groves, Mason Malone, Prince Jackson, Caleb Lonon, McKenzie Squires, Heath Ballard, Max Schmidt, recipients Adam Groh, sponsor

WCU Fusion Ensemble Performance at the Jazz Education Network Conference Savannah Bennett, Matt Brooks, Willie Burke, Tucker Ellis, Logan Jayne, Blake Jones, Zach Shatley, Logan Strahley, and Tyler Townsend, recipients Chris Beyt, sponsor

In-Depth Analysis and Creation of Bare Conductive Touchboard Projects James Nelson, recipient Yanjun Yan, sponsor

Analysis of Inherent Residual Stress Developed Through Direct Metal Laser Sintering of 316L Stainless Steel Tyrele Adams, Jacob Lewallen, Ethan Stiles, Bailey Stillman, Jerome Suminski, recipients Joe Fahmy, sponsor

Epididymal Hematoma in a High School Football Player Jeremy Rolow, recipient Melissa Snyder, sponsor

Traumatic bilateral patellar rendon rupture in a collegiate football player Jonathan Bramblett, recipient Ashley Thrasher, sponsor

About the 2019 Undergraduate Expo Sponsors

Sigma Xi, the Scientific Research Society, actively promotes the promise of science and technology. Sigma Xi’s goals are to foster worldwide interactions among science, technology and society; to encourage the appreciation and support of original work in science and technology; and to honor scientific research accomplishments.

Since its founding in 1886, Sigma Xi members and chapters have enriched scientific discussion and nurtured networking between young and established scientists and engineers from diverse research disciplines. With approximately 60,000 members in over 500 chapters around the world, Sigma Xi chapters are found wherever scientific research is undertaken. Sigma Xi’s motto, Spoudon xynones, or “Companions in Zealous Research,” makes the Undergraduate EXPO a particularly natural opportunity for Sigma Xi to partner in facilitating.
ACKNOWLEDGEMENTS

Western Carolina University, the Office of the Provost, Graduate School and Research, and The Honors College would like to thank all student participants, both undergraduate and graduate, who shared their work at the 2019 Research and Scholarship Celebration (RASC). Thanks are also in order to the faculty and staff who sponsored and supported the student participants and those who encouraged participation in the Undergraduate Expo and Graduate Research Symposium.

It is with gratitude that we thank our talented and knowledgeable faculty research panel. Your influence on research at WCU is notable and appreciated.

We are particularly thankful that Dr. Mary C. Waters, our keynote speaker, could join us this year.

Thank you to the Ramsey Arena staff, Aramark catering and staff, and the print shop for all of your support and help in making this event a success.

Thanks to our faithful volunteers: The 2019 RASC Student Volunteer Leadership Committee, The Honors College Student Board of Directors members, Honors College Ambassadors, L.E.A.R.N.™ at WCU student volunteers, Degree Plus, and faculty and staff who volunteered their time to help with all things Expo.

NCDOCKS

WCU is a member of NC Digital Online Collection of Knowledge and Scholarship (NCDOCKS). Contact Assistant Professor Scottie Kapel (skapel@wcu.edu) of Hunter Library to learn how you can post your project in this online repository for easy sharing with potential employers, graduate schools, etc. More information is available at libres.uncg.edu/ir/wcu/submitting.aspx.

STUDENT PRESS RELEASES

WCU’s Office of Communications and Public Relations routinely sends news releases about student activities and honors to the hometown or local newspapers of the students involved. Students participating in the Undergraduate Expo who wish to take advantage of that service should visit the website studentawards.wcu.edu to complete an online form and submit it via email to the Office of Communications and Public Relations.