



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

Western
Carolina
UNIVERSITY

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**

6PM – 7:30PM **UNDERGRADUATE AND GRADUATE POSTERS AND**
UNDERGRADUATE FINE ARTS EXHIBITS

THURSDAY 4.4.19

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

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

11 – 11:45AM **UC THEATER**
GRADUATE STUDENT PANEL

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

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

5PM **UNIVERSITY CENTER GRAND ROOM**
GRADUATE RESEARCH SYMPOSIUM RECEPTION
AND AWARDS

WELCOME

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

TABLE OF CONTENTS

3

WELCOME

5

KEYNOTE BIOGRAPHY

7

DEFINING AMERICA
FEATURED PRESENTATIONS

9

EXEMPLARY UNDERGRADUATE
PRESENTATIONS

10

UNDERGRADUATE EXPO
ORAL AND PERFORMANCE
PRESENTATIONS

15

UNDERGRADUATE EXPO
POSTER AND FINE ARTS
EXHIBIT PRESENTATIONS

20

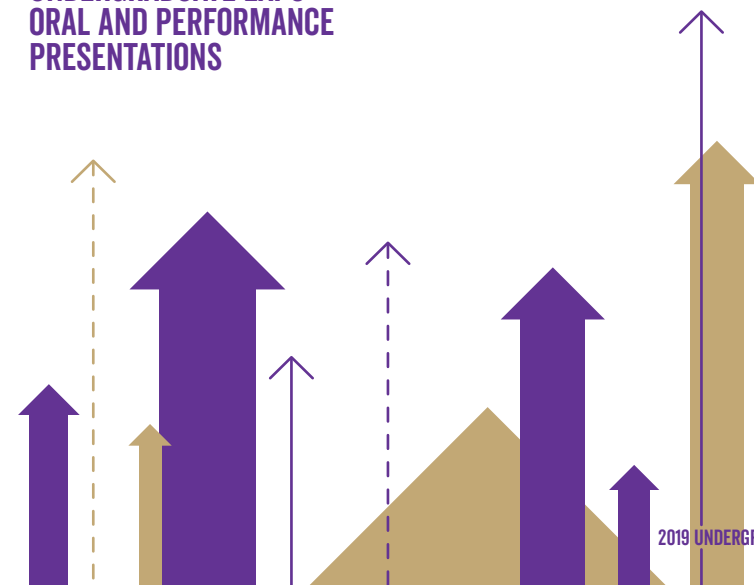
NATIONAL CONFERENCE ON
UNDERGRADUATE RESEARCH
PRESENTATIONS

25

UNDERGRADUATE ACADEMIC
PROJECT GRANT AWARDS

29

ACKNOWLEDGEMENTS



KEYNOTE ADDRESS

WEDNESDAY, APRIL 3, 2019 | 5 PM
RAMSEY CENTER ARENA

DR. MARY C. WATERS

THE JOHN L. LOEB DISTINGUISHED
PROFESSOR OF SOCIOLOGY AT HARVARD
UNIVERSITY

“

Immigration to
the US: Integration
Success and Policy
Failures



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.

ABOUT DR. MARY C. WATERS

Mary C. Waters is the PVK Professor of Arts and Sciences and the John L. Loeb Professor of Sociology at Harvard University. Her work has focused on the integration of immigrants and their children; the transition to adulthood for the children of immigrants; intergroup relations; the measurement and meaning of racial and ethnic identity; and the social, demographic, and psychological impact of natural disasters. The author or co-author of 11 books and over 75 articles, she is an elected member of the National Academy of Sciences, a fellow of the American Academy of Arts and Sciences, and the American Philosophical Society. Her study of the children of immigrants, *Inheriting the City: The Second Generation Comes of Age* (with Philip Kasinitz, John Mollenkopf and Jennifer Holdaway) (Russell Sage Foundation, 2008) won the 2010 American Sociological Association Distinguished Contribution to Scholarship Award, the Mira Komarovsky Award of the Eastern Sociological Society, and the Thomas and Znaniecki Award of the International Migration Section of the ASA. Waters is currently the chair of the National Academy of Sciences Panel on The Integration of Immigrants into American Society, and she is collaborating on a study of the role of government assistance in the integration of Latino immigrants in three American cities. She also leads the RISK Study, a longitudinal study of survivors of Hurricane Katrina.

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 Lavalley, 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 β -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

1 - 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 Duoethnography 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, sponsor

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

POSTER AND FINE ARTS EXHIBIT PRESENTATIONS

Poster & Fine Arts Exhibit presentations will be held at Western Carolina University, April 3 at Ramsey Arena, 6:00-7:30 PM. Below are project titles, presenters, and sponsors by College and Department.

+ Denotes fine arts exhibit.

COLLEGE OF ARTS & SCIENCES ANTHROPOLOGY AND SOCIOLOGY

The John A. Williams Documented Human Skeletal Collection

Cayley Johnson, Coryann Collins, Jessica McLawhorn, presenters
Katie Zejdlik-Passalacqua, sponsor

Researching Green Hill Cemetery and its inhabitants using methods in bioarchaeology

Taylor Metts, presenter
Katie Zejdlik-Passalacqua, sponsor

Finding Lost Souls: Ground Penetrating Radar survey of a slave cemetery, Freedom Cemetery, Hayesville, North Carolina

Holly Duggins, presenter
Blair Tormey, sponsor

A Critical Review of Ossuary Excavation Methods

Evan Puckett, presenter
Frankie West, Katie Zejdlik-Passalacqua, sponsors

Cemetery Analysis Using Temporal and Cultural Context

Bria Lindsay, presenter
Katie Zejdlik-Passalacqua, sponsor

Bioarchaeology Investigation: Locust Field Cemetery

Mackenzie Avery, presenter
Katie Zejdlik-Passalacqua, sponsor

BIOLOGY

Exploring the Unique β -amylase2 and Its Novel Potential Binding Partner

Natasha Kreiling, presenter
Amanda Storm, 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, sponsor

Exploring a potential interaction between A-amylase3 and the catalytically inactive β -amylase9 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

CHEMISTRY AND PHYSICS

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

Computational Chemistry Studies of Europium(III) Metal-based Coordination Complexes for Luminescent Applications

Adam Gregory, Nickolas Joyner, presenters
Channa De Silva, sponsor

Identification of forensically relevant biological fluids using Droplet Digital PCR (ddPCR™)

Noah Smith, presenter
Brittania Bintz, sponsor

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 Chemostratigraphy 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

Micobacteriophage 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, presenters
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

Annalyssia Soonah, 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

Daijah Johnson, presenter
Tasha Youstin, sponsor

Police Officer Fatalities in the United States: Presentation vs. Actuality

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
Cyndy 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

COLLEGE OF ENGINEERING AND TECHNOLOGY SCHOOL OF ENGINEERING AND TECHNOLOGY

Facial Expression Recognition Applications to American Sign Language Translation

Michaela Stratton, presenter
Robert Adams, sponsor

An Examination into the Viscoelastic Properties of Phenolic Resin for Radioisotope Power Systems

Kyle Monaghan, presenter
Bora Karayaka, 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

DAVID ORR BELCHER COLLEGE OF FINE AND PERFORMING ARTS SCHOOL OF ART AND DESIGN

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 Moyle, presenter
Victoria Depew, sponsor

COLLEGE OF HEALTH AND HUMAN SCIENCES 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 Formulas

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

Evan 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 β -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

The Synthesis and Complexation of Boronic Acid Derivatives with N-Oxides

Hannah Kline, Keely Thomas, presenters
Bill Kwochka, sponsor

Determining the structure and function of unique regions found in the DNA polymerase gamma of Cryptococcus neoformans

Lindsey Farris, presenter
Jamie Wallen, sponsor

Antimicrobial Studies of Zinc Oxide Nanoparticles and their Chemical Attachment to Cotton Textile for Potential Clinical Applications

Monica Reece, presenter
Channa De Silva, sponsor

Inhibition Studies of ZnO Nanoparticles against Actinobacteria and Actinobacteriophages

Monica Reece, presenter
Maria Gainey, sponsor

Computational Photoluminescent Studies of Eu(TTA)₃Phen for Potential Biomedical Imaging

Nickolas Joyner, presenter
Channa De Silva, sponsor

The Synthesis of Water Soluble Phenathroline-Europium Complexes for Confocal Microscopy

Paul Venturo, presenter
Brian Dinkelmeyer, 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

CRIMINOLOGY & CRIMINAL JUSTICE

Hiding In Plain Sight: Non-Text Communications and Violent Crime on Social Media

Annalyssia 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

The Great Divide: Parallels Between the Economy of The Great Gatsby and the Present Day

Zachery Shatley, 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 Duoethnography 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

Transatlantic Civil Death: A Comparative Analysis of the United States and the United Kingdom

Sydney Burchfield, presenter
Ingrid Bego, sponsor

PROGRAM FOR THE STUDY OF DEVELOPED SHORELINES

Finding Lost Souls: Ground Penetrating Radar Survey of a Slave Cemetery, Freedom Cemetery Hayesville, NC

Holly Duggins, presenter
Blair Tormey, 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 Surrent, 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	College of Education and Allied Professions
Adam Olsen	Hunter Library
Indrani Bose	College of Arts and Sciences
Qai Ha	College of Engineering and Technology
Kim Hall	College of Health and Human Sciences
Sanjay Rajagopal	College of Business
Eldred Spell	College of Fine and Performing Arts
Kloo Hansen, Chair	The Office of the Provost

COLLEGE OF ARTS & SCIENCES BIOLOGY

Investigation of Cellular Autophagy through Western Blotting

Jade Hollars, recipient
Heather Coan, sponsor

Investigation of Insulin Degrading Enzyme Inhibition by LT10 Peptide

Sierra Rice, recipient
Bob Youker, sponsor

Human Embryonic Kidney Cell and Bone Marrow Stem Cell Response to Exosome

Brinley Harrington, recipient
Heather Coan, sponsor

Exploring a potential interaction between β -amylase3 and the catalytically inactive β -amylase9 in *Arabidopsis thaliana*

Frances Lowder, recipient
Amanda Storm, sponsor

Exploring the Unique β -amylase2 and Its Novel Potential Binding Partner

Natasha Kreiling, recipient
Amanda Storm, sponsor

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

MATHEMATICS AND COMPUTER SCIENCE

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

COLLEGE OF EDUCATION AND ALLIED PROFESSIONS PSYCHOLOGY

Gender and Self-disclosure on the Campaign Trail
Sara Roles, recipient
Erin Myers, sponsor

SCHOOL OF TEACHING AND LEARNING

That Can Be Me: Using Bibliotherapy as a Means of Becoming Culturally Responsive and Encouraging Personal Identity
Kristy Doss, recipient
Kristy Doss, sponsor

COLLEGE OF ENGINEERING AND TECHNOLOGY SCHOOL OF ENGINEERING AND TECHNOLOGY

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

COLLEGE OF FINE AND PERFORMING ARTS SCHOOL OF ART AND DESIGN

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 Little, sponsor

SCHOOL OF MUSIC

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 Townson, recipients
Chris Beyt, sponsor

SCHOOL OF STAGE AND SCREEN

Academic Project Grant- A1 Auditions
Victoria Russell, recipient
Ashlee Wasmund, sponsor

COLLEGE OF HEALTH AND HUMAN SCIENCES SCHOOL OF HEALTH SCIENCES

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

ATHLETIC TRAINING

Traumatic bilateral pottellar tendon rupture in a collegiate football player
Jonathan Bramblett, recipient
Ashley Thrasher, sponsor

ABOUT THE 2019 UNDERGRADUATE EXPO SPONSORS

/də·fīn·ing/
America
Past. Present. Future.

This year Western Carolina University adopted the Defining America campus theme to promote awareness and understanding of issues surrounding diversity and inclusion. Through curricular and co-curricular connections, our campus has embraced opportunities to enhance diversity and inclusion, and make it a central part of defining who we are, where we've been, and where we're going. We live

in a time of rapid change and development, and through the lenses of the Defining America campus theme, Western Carolina's Research and Scholarship Celebration has aimed to highlight the research and creative endeavors that seek to recognize who we are and where we've been, and provide insight into how we will continue grow in our most diverse avenues of academic advancement.



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.

RESEARCH AND SCHOLARSHIP CELEBRATION COMMITTEE

Jill Granger, Dean, The Honors College

Brian Kloeppe, Dean, Graduate School and Research

Brandon Schwab, Associate Provost

Kloo Hansen, Undergraduate Research Coordinator, Office of the Provost

Jan Stanfield, Student Services Specialist, Graduate School and Research

Don Strickland, Computer Support Technician, Graduate School and Research

April Tallant, Associate Dean, The Honors College

UNDERGRADUATE EXPO COMMITTEE

Grace Allen, Professor, College of Business

Jill Granger, Dean, The Honors College

Bora Karayaka, Assistant Professor, College of Engineering and Technology

Susan Braithwaite, Assistant Professor, College of Health and Human Sciences

Lihua Xu, Assistant Professor, College of Education and Allied Professions

Lane Perry, Director, Center for Service Learning

Ahmed Al-Bayati, Associate Professor, College of Engineering and Technology

Brandon Schwab, Associate Provost

Jan Stanfield, Student Services Specialist, Graduate School and Research

Scottie Kapel, Outreach and Scholarly Communications, Hunter Library

Kloo Hansen (Chair), Undergraduate Research Coordinator, Office of the Provost

Colin Townsend, Advisor and Director of Communications, The Honors College

Mary Kay Waters, Associate Professor, College of Fine and Performing Arts

Munene Mwaniki, Assistant Professor, College of Arts and Sciences

Robert Youker (Co-Chair), Assistant Professor, College of Arts and Sciences

Katie Zejdlik-Passalacqua, Assistant Professor, College of Arts and Sciences

Callie Schultz, Assistant Professor, College of Education and Allied Professions

Suzanne Melton, Administrative Support Specialist, Office of the Provost



1 University Drive / Cullowhee, NC 28723

RESEARCH.WCU.EDU