



TWENT -FIRST ANNUAL

# UNDERGRADUATE EXPO

APRIL 3-4, 2 19

**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

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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**  
 Bl... C... m... D... m...  
 i... M... m... A... l...

**3PM** RAMSEY CENTER ARENA  
**POSTER AND FINE ARTS EXHIBIT PREVIEW**

**4 – 4:55PM** WELCOME ADDRESS  
 D... B... A... i... v...

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

**4:55 – 5PM** INTRODUCTION OF KE NOTE SPEAKER  
 D... B... A... i... v...

**5 – 6PM** KE NOTE ADDRESS  
 D... M... C... H... v... i... v... i...

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

**6PM – 7:30 PM** 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 – 6:30 PM** A.K. HINDS UNIVERSITY CENTER  
**GRADUATE RESEARCH SYMPOSIUM**

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

**12 – 1PM** GRADUATE RESEARCH SYMPOSIUM'S  
**KEYNOTE ADDRESS**  
 D... L... i... D... m... E... li...  
 C... li... v... i...

**1:15AM – 4:45PM** A.K. HINDS UNIVERSITY CENTER  
**EXEMPLAR UNDERGRADUATE ORAL PRESENTATIONS**

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

# WELCOME

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i i l m s m m m  
v il l  
i l  
D B E  
A i v A mi A i

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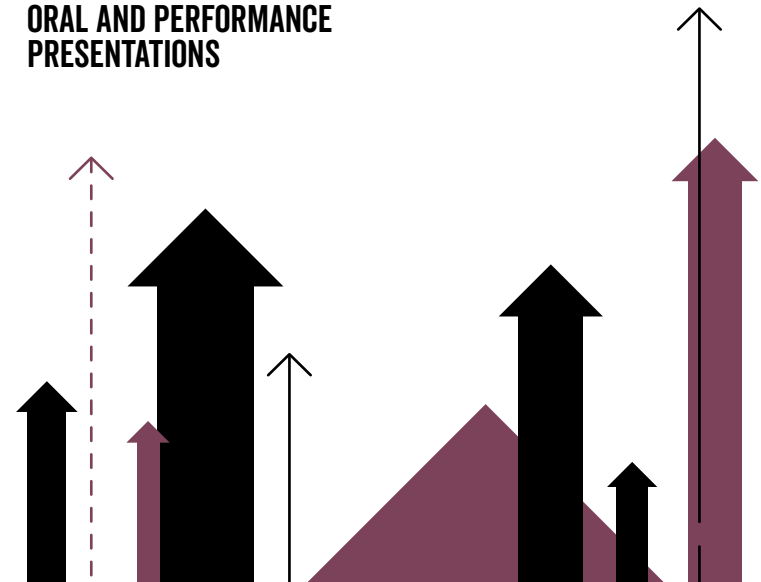
NATIONAL CONFERENCE ON  
UNDERGRADUATE RESEARCH  
PRESENTATIONS

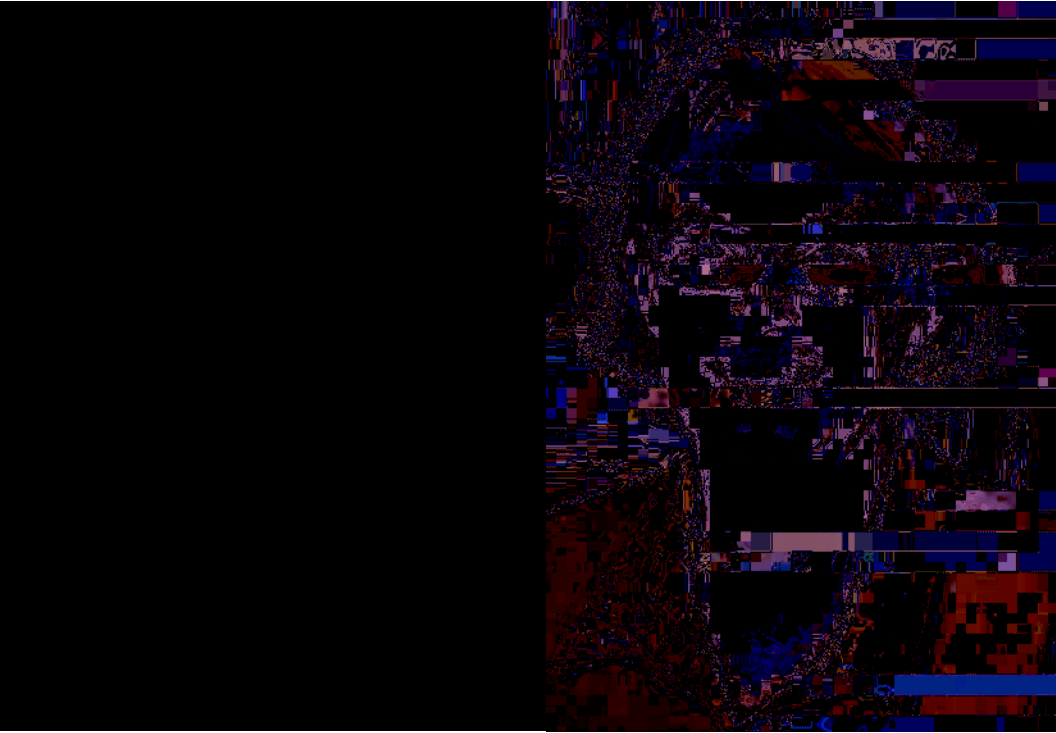
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ACKNOWLEDGEMENTS  
P45 772 | 5DC ACADEMIC





#### **ABOUT DR. MARY C. WATERS**

Mary C. Waters is the PVK Professor of Arts and Sciences and

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

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 A l D C lli l & i ill m i  
 i l m m i li  
 l l i im i  
 D li l i

## 11 AM - 12:30 PM IN BLUE RIDGE CONFERENCE ROOM

Department of Parks & Recreation Management

F l D C lli l A i s s • A  
 NC A

### UNDERGRADUATE PRESENTERS

Taylor Carrigan and Krista Patton, presenters

N i AD E l i  
 i

Ashley Johnson and Krista Patton, presenters

i Imm iv v E i Ef MCAN v im l i

Matthew Long, presenter

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 i m l i v

## 12:45 PM – 2 PM IN BLUE RIDGE CONFERENCE ROOM

Department of Anthropology & Sociology

F l D K i li l A i C lli &  
 F lli C F i O l i

### UNDERGRADUATE PRESENTERS

Joshua Norris, Zachary Kessinger, presenters

C ll i M i C C m

Alexandra Cruz, presenter

M i A M E

Sarah Burke, presenter

D i ivi A

# FEATURED FACULTY PANEL

Moderator: Lane Perry, Director, Center for Service Learning

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 C A K i l ill i  
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## 2019 FACULTY PANELISTS

Jerry Miller Di i i i mi E vi m l i  
 D m l i l i l i A i

Jeanne Dulworth A i D m i l

Sean Mulholland E mi D m E mi M m  
 M m

Dustin Whitehead A i A i m Di BFA A i

Benjamin Francis-Fallon A i D m Hi Di  
 i l i E i



m C | B | i | H ||  
l M i D v i O B | C || Fi mi A

**Piecing Together the Modern Piano**

Fi G  
C i i i Mil L

· m ill || B | m s  
M m i C m i C || A i

**Anti-Ramsey Hypergraph Numbers**

ill il  
M B

· m C | B | i | H ||  
l M i D v i O B | C || Fi mi A

**Comparative analysis of two theories surrounding Pyotr Il'yich Tchaikovsky's Symphony No. 6 in B minor, op. 74, and subsequent death**

B mi G  
C i i i

s · m C | B | i | H ||  
l M i D v i O B | C || Fi mi A

**Women Composers and Instrumentalists in Classical Music**

A K ||  
C i i i

m C | B | i | H ||  
l M i D v i O B | C || Fi mi A

**Transcribing Three Pieces for Cello and Piano to expand the clarinet repertory.**

A l E li  
m

**THURSDA , APRIL 4**

m B | B | m s  
C i m i l C i m i l J i C || A i

**From traditional to modern and back again: how indigenous and western models of policing have affected each other**

l Gi  
O i

· m B | B | m  
l E i i l C || E i i l

**On the Versatility of Touch Boards**

J m N l

m v C D m  
Hi C || A i

**Empowerment Against Adversity: The Obstruction of Lithuanian Women's Identities, 1940-1953**

Emil J  
il

m v C D m  
A l i l C || A i

**Race and Gender Within YA Genre Fantasy: It's Not All White Boys with Swords**

m i  
M M i

m s m v C M l i m  
A l i l C || A i

**Transgender Athletes and the Media: A 2017 Discourse Analysis**

A i A  
M M i

m s m v C C m m  
E li C || A i

**Closing the gap: roles & responsibilities of K-12 English as a Second Language (ESL) teachers for service coordination with Speech-Language Pathologists (SLPs)**

K l illi m Am li || A i B l m  
E i C ||

m s m v C C i l m  
l M i D v i O B | C || Fi mi A

**Edward MacDowell's Contributions to American Music During the Late Romantic Period**

v B  
C i i i A A m

s m ill || B | m s  
B i l C || A i

**Exploring the Unique B-amylase2 and Its Novel Potential Binding Partner**

N K ili A l B  
Am m

s · m M K B | m s  
l i i l i l i A i C || A i

**Where You Stand is Where You Sit: The Influence of Party Agendas on Children's Health Issues in the United States**

M K l  
J B

5 m WCC i l m  
l A & D i D vi O B l C ll Fi mi A

# Our Global Trash Problem







Inhibition Studies of ZnO Nanoparticles and their Chemical Attachment to Cotton Textile for Potential Antimicrobial Applications

M i  
C D ilv M i G i

Determining the genetic similarities of viruses discovered at Western Carolina University in 2018.

D v i C B  
D v C  
M i G i J m i ll

Comparative Analysis of DNA Extraction from Bone using a Manual vs. Automated Extraction Method

B il C v C i D  
F i K i l i l

Binding of zinc oxide nanoparticles to unmodified and modified cotton cloth

D i C  
C m H m

Determining the structure and function of unique regions found in the DNA Polymerase Gamma of Cryptococcus neoformans

L i F i D l m l l

J m i ll

Micobacteriophage Minor Tail Proteins and Their Influence on Bacteriophage Host Range

H B i B il  
C m G m m E i i  
M li H m  
M i G i

Locating promoters and terminator sequences in bacteriophage genomes

i G i M v  
l l M  
M i G i

Predicting the structure and function of proteins encoded by bacteriophages Slentz and Ciel

B l H l J l J  
im Emil A C i A i

M i G i J m i ll

Identification of Mycobacteriophage Larva Toxic Gene Products and Their Cellular Binding Partners

K l D C l i G B  
M i G i J m i ll

Genetic Engineering and Transcriptional Interference of Actinobacteriophages

G i M i N m  
M i C G l  
A i D v i  
M i G i

## COMMUNICATIONS

Goals, Attitudes, and Socialization Within Group Projects

C l l i v D  
il B l O N M D i l  
J l i B  
C N l m

## CRIMINOLOG AND CRIMINAL JUSTICE

Hiding in plain sight: Non-text communications and violent crime on social media

A l i  
J A H

Does legal counsel at a first appearance court session really matter?

C D v i  
J m i

Do we need pretrial reform to improve the functioning of the judicial prosecution process?

C i i D v i  
J m i

Perceived Stigmatization of Mental Health Issues Following Victimization

D i J  
i

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

B l C l  
J A H

Comparing Police Arrest and Response Methods to Drug Offender's in Different Countries

B i m i  
J A H

Forensic Science and the Criminal Justice System

C i m  
C C v l i

Sexual Assault Prevalence in Deaf and Hard of Hearing Communities

A H i  
L i B i

Student Suggestions for Decreasing Sexual Assault on Campus: Communication,

A i  
m G i f  
i

## EMERGENC DISASTER MANAGEMENT PROGRAM

Analysis of Pre and Post 9/11 Counter-terrorism methods in the U.S

J G i  
J l i C l

Governors Report

G i f  
L i B i

The Link Between Terrorism and Immigration

A i  
m J

Previous Terrorism Methods: Room for Improvement

J G i G i f  
m J

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A H i  
J l i C l

## GEOSCIENCES AND NATURAL RESOURCES

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K i A l l i  
L D l

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D L i l i F  
J G

Evaluating the potential role of a facultative symbiont of the hemlock woolly adelgid

i C  
A l M

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"

A illi  
C l m

## PHILOSOPHY AND RELIGION

A Guide to Medical Ethics for Harris Regional Hospital

J  
C i H

## POLITICAL SCIENCE & PUBLIC AFFAIRS

The Empowerment of Women in Developing Countries

illi m  
l i B

## COLLEGE OF BUSINESS SCHOOL OF ACCOUNTING, FINANCE, INFORMATION S AND BUSINESS LAW

Past performance may be a guarantee of future results

A l i B v  
G A l l

## COLLEGE OF EDUCATION AND ALLIED PROFESSIONS PSYCHOLOG

Perceived Addiction to Pornography: The Role of Religiosity

C C  
D v i D J

Gender and self-disclosure on the campaign trail

l  
E i M

## SCHOOL OF TEACHING & LEARNING

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L  
K ll

How Does Project Based Learning Increase Engagement in Middle School Students?

Hamil  
Am Cl Divi

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**SCHOOL OF ENGINEERING AND TECHNOLOGY**

Facial Expression Recognition Applications to American Sign Language Translation

Mil  
Am

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

Kil  
BK

Swarm Robotics using Crazyflie 2.0 Drones

Jiv

A Model to Accurately Predict Hydrogen Explosion Severity in Nuclear Power Stations

Cl Cll ill im

BK

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

Unmasking Identity +

Ch  
K Bi

That Color Looks Good on You: A New Approach to Portrait Photography +

Kil  
Mik Bi

Examining how the lack of Serotonin affects Emotions +

M  
i i i

Silhouette +

Ei O  
i i i

**SCHOOL OF STAGE AND SCREEN**

Constructing furniture: from design to stage

i M  
i i D

**COLLEGE OF HEALTH AND HUMAN SCIENCES**  
**SCHOOL OF HEALTH SCIENCES**

The Effects of Cellular Coverage on Patient Survival in the Rural Setting

Emm H  
J Di l

Ingredient Comparison of Commercially Available Enteral Nutrition Formularies

B l H M ll B ll m m

Eli ll B

Premenstrual Syndrome (PMS) and the Potential of B Vitamins to Bring Relief

A l  
Eli ll B

Probiotics and its effects on Irritable Bowel Syndrome (IBS)

Mil G Bi Li  
C l s Eli s ll B J s

J s Eli s ll J i m l l B M l s Mi l G B F i J J i

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C L m H i E m  
H m B i B

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E i C  
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M i G i

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N i l J  
C D i l v

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v M l l  
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C i C  
C D i l v

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J m i

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E l i l l  
B i l l

Daisy's Decisions or Lack Thereof: Bipolar II disorder, Daisy, and The Great Gatsby

E m l M  
B i l l

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H l B  
M A m

With Each Day There Is Hope, Until the Sun Sets: John Steinbeck's Of Mice and Men

v B  
B i l l

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L D l

FORENSIC SCIENCE

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B i l i B i

GEOSCIENCES & NATURAL RESOURCES

Relating Variations in Soil Composition to Concentration-Discharge Relationships in a Disturbed Headwater Catchment

D l i l  
J G

HISTOR

When Women Build a War: Women in the Workplace During World War I and World War II

A m l i K  
i l

Empowerment Against Adversity: The Obstruction of the Identity of Lithuanian Women, 1940-1953

E m i l J  
i l

Operation Jedburgh: Playing with Heads

J B i v  
i l

The Untold Stories of a Western North Carolinian Couple during World War II: How They Survived

K l  
i l

Germany's strange partner: Finland

i l l i m  
i l





## 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  
 Eli D J                    ill il    ii  
 M    B

Presenting Ramsey Theory Research  
 at the Joint Mathematics Meetings in  
 Baltimore, Maryland  
 Eli D J                    ii  
 M    B

## COLLEGE OF EDUCATION AND ALLIED PROFESSIONS PSYCHOLOG

Gender and Self-disclosure on the  
 Campaign Trail  
 I                    ii  
 E i M

## SCHOOL OF TEACHING AND LEARNING

That Can Be Me: Using Bibliotherapy  
 as a Means of Becoming Culturally  
 Responsive and Encouraging Personal  
 Identity  
 K i D                    ii  
 K i D

## COLLEGE OF ENGINEERING AND TECHNOLOGY SCHOOL OF ENGINEERING AND TECHNOLOGY

In-Depth Analysis and Creation of Bare  
 Conductive Touchboard Projects  
 J m    N l                    ii

Analysis of Inherent Residual Stress  
 Developed Through Direct Metal Laser  
 Sintering of 316L Stainless Steel  
 I A m J                    L    ll    E                    il  
 B il    illm    J    m    mi    i    ii  
 J    F    m

## COLLEGE OF FINE AND PERFORMING ARTS SCHOOL OF ART AND DESIGN

Creating a sculptural project to explore  
 locality through craft, labor, and material  
 J    L                    ii  
 M                    K

Modern Interpretations of a Victorian  
 Work Dress  
 A                    l C                    ll    ii  
 M    i

Research-Based Studio Art Project on  
 Sex Trafficking  
 G                                    ii  
 M    Li    l

## SCHOOL OF MUSIC

2018 Percussive Arts Society International  
 Convention Performance  
 J                    M    D                    G v    M  
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 M K    i                    i    H                    B ll    M  
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 A    m G

WCU Fusion Ensemble Performance at  
 the Jazz Education Network Conference  
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 B                                    Elli    L                    J                    Bl    J  
 A    L

# ACKNOWLEDGEMENTS

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