Graduate Research Symposium

March 31, 2016 | 11 a.m. - 6:30 p.m. | University Center

graduatesymposium.wcu.edu

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Western Carolina University
Graduate School and Research
Dear Participants,

Welcome to the Twenty-Fourth Annual Graduate Research Symposium! Since 1992, the Graduate Research Symposium, sponsored by Graduate School and Research, has provided graduate students the opportunity to showcase their scholarly research and projects, and I want to express my sincere appreciation to you for sharing your excellent work with your classmates, colleagues, and faculty. I express my warm thanks to all participating faculty and staff mentors: your active and continuing support and encouragement of your students and their research is the hallmark of Western’s graduate education experience.

For many of you, this will be your first opportunity to share empirical findings and creative works with the academic community. Today, you take a step in becoming recognized as a scholar in your chosen discipline. The skills you learn as part of the research process and your ability to convey that research in writing and in person will enable you to share your knowledge, intellectual passion, and commitment to ideas and to your discipline and profession. Congratulations on this significant milestone in your academic development!

It is my hope that your experience inspires you to continue to contribute to our understanding of all areas of knowledge in the arts, humanities, education, health, social sciences, business, and sciences. You are helping to shape the future and the important issues facing our region, state, and world, and what you are doing today as students is just the beginning of all you can do to make a true difference. Thank you. I look forward to meeting each of you personally and to talking with you about your important work and your plans for the future.

Please join your faculty mentors, colleagues, and members of the Graduate School at the research posters that will be viewable starting at 3:00 p.m. on Wednesday, 30 March, at the Ramsey Center. The eleven concurrent oral presentation sessions will be starting at 11:00 a.m. in the University Center on Thursday, 31 March. This year we have featured undergraduate oral presentations leading off some of the oral sessions to better integrate our graduate and undergraduate research. The oral presentations will be followed by the reception and awards ceremony, in your honor, in the University Center Grand Room starting at 5:00 p.m., on Thursday 31 March. We look forward to seeing you and to celebrating your excellence!

Brian D. Kloeppel, Ph.D.
Interim Dean, Graduate School and Research

Activities Overview

**Wednesday, March 30, 2016**
6:00 p.m. – 7:30 p.m.
Graduate Poster Presentations.............Ramsey Center

**Thursday, March 31, 2016**
11:00 a.m. - 6:30 p.m.
Graduate Oral Presentations
and Reception.............................University Center
11:00 a.m.
Biology............................................Multipurpose Room
12:30 p.m.
Health / Anthropology.............Catamount Room
History / Public Affairs..............Cardinal Room
English..............................................Dogwood Room
2:00 p.m.
Physical Therapy..................UC Theater
English..............................................Catamount Room
Psychology / Nursing / Social Work / Higher Education
Student Affairs..................Multipurpose Room
Technology.................................Dogwood Room
3:30 p.m.
English....................................Catamount Room
Technology..........................Dogwood Room
Chemistry..........................Multipurpose Room
Biology................................Cardinal Room
5:00 p.m.
Reception and Awards...............Grand Room

Student News Releases

WCU’s Office of Communications and Public Relations routinely sends news releases about student activities and honors to the hometown/local newspapers of the students involved. Students participating in the Graduate Research Symposium 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.

Questions can be emailed to rholcomb@wcu.edu.

Western Carolina University
Western Carolina is a campus of the University of North Carolina system and enrolls more than 10,000 students. WCU is located in a beautiful valley between the Blue Ridge and Great Smoky Mountains, an hour west of Asheville, N.C., and 2.5 hours northeast of Atlanta, Ga. Here you will find convenient access to a region that offers tremendous opportunities for outdoor research and recreation. Engagement of students and faculty in service learning and other community activities are a critical part of WCU’s tradition of academic excellence.
6:00 p.m. – 7:30 p.m.
Poster Session
Ramsey Center
Poster Judges: Timothy Carstens, David Hudson, Kim Winter

Characterizing the Rheological Properties of Wax Emulsions used as Carriers for Biopesticides in Agricultural Pest Management
Kristen Jordan; Sponsor: Cynthia Atterholt

Determination of Anions and Metals in Kombucha Using Ion Chromatography and Inductively Coupled Plasma Optical Emission Spectroscopy
Monesha Harris; Sponsor: Arthur Salido

Site Directed Mutagenesis and Phage Complementation to Investigate the Electrostatic Interaction of T7 Primase-helicase and T7 DNA Polymerase
Brittni Foster, Jenny Collins, Maggie Carver, Maria Gainey; Sponsor: Jamie Wallen

Investigation of Human Skeletal Tissue Using Raman Spectroscopy and SERS for Forensic Applications
Kristin Cooke; Sponsor: David Evanoff

The Beauty of Collaboration
Landon Holland; Sponsor: Ann Allen

Development of Analytical Methods to Measure Residues of Commercial Fungicides and a Tannic Acid Biopesticide
Brooke Bien; Sponsor: Cynthia Atterholt

Low Total Harmonic Distortion (THD) Resonant Converter for Cooker Magnetron Power Supply
Yang Zhou; Sponsor: Robert Adams

Investigation of the Catalytic Mechanism of Mycoplasma Pneumoniae L-alpha-Glycerophosphate Oxidase: Mutation of the Proposed Catalytic Base
Craig Crowley, Aric Butler, Alma Plaza-Rodriguez; Sponsor: Jamie Wallen

The Comparison of Three DNA Extraction Kits for the Recovery of Mitochondrial DNA in Human Bones
Jessica McLamb; Sponsor: Kelly Grisedale

Application of Communication Partner Training Principles to Stakeholders of Adults with Intellectual Disabilities: A Qualitative Research Effort
Christine Regiec; Sponsor: Billy Ogletree

Synthesis and Characterization of Time-Resolved Fluorescence Probes for the Potential Detection and Improved Study of Melanoma Cancer
Seth Sedberry; Sponsors: Brian Dinkelmeyer, Channa De Silva, Krista Wilson

Assessment of Sibling Supports Across America
Samantha Stark; Sponsor: Tonya Westbrook

Development of Polymer Coated Silver Nanoparticles for 3D Plasmonic Crystals
Austin Allen; Sponsor: David Evanoff

SERS-active Nylon Evidentiary Swabs for Forensic Applications
Matt Burleson, Katarina Ruehl; Sponsor: David Evanoff

Academic Social Adjustment in the Transition from Elementary to Middle School
Ryan Cooper; Sponsor: Ann Allen

Testing and Analysis of Composite Materials in a Bolted Connection
Nathaniel Franks; Sponsor: Robert Steffen

Efficiency Optimization of Ionic Air Moving Devices
Aaron Griffin; Sponsor: Sean June

Synthesis and Characterization of Upconverting Lanthanide-Doped Sodium Yttrium Fluoride Nanomaterials
Weaver Haney; Sponsors: Channa De Silva, Bill Yang

Going Viral . . . Social Media in Health Care
Melissa Harmon; Sponsor: Ann McDonald

Unheard Voices: Adopted Children's Perception about their Same-Sex Parents and Family
T'Shana McClain, Evan Maas; Sponsor: Amy Murphy-Nugen

Taxonomy and Phylogeny of the Genus Diervilla (Diervillaceae)
Hannah Meeler; Sponsor: Katherine Mathews

Effects of Quantization Noise on a Particle Swarm
Matthew Stender; Sponsor: Yanjun Yan

An Improved Synthesis of Fulgenic Acid and its Supramolecular Chemistry
Andrew Stutesman; Sponsor: Brian Dinkelmeyer

“Research is to see what everybody else has seen, and to think what nobody else has thought.”
Albert Szent-Gyorgyi (Hungarian Biochemist, 1937 Nobel Prize for Medicine, 1893-1986)
11:00 a.m. – 5:00 p.m.
Graduate Oral Presentations
University Center
* Featured undergraduate presenters

11:00 a.m. – 12:15 p.m.
Biology
UC 232 - Multipurpose Room
Moderator: Laura DeWald, Biology

Discovery, Isolation, Characterization and Genome Annotation of Unique Bacteriophage Species
Presenters*: Lindsey Farris, Morgan Stanley, Paige Wright, ReLiza McGinnis
Sponsor: Maria Gainey

The Effects of Roads on Community Structure by Changing Seed Dispersal Patterns
Presenter: Michael Hooker
Sponsor: Beverly Collins

Herb Abundance and Diversity among Fire Severity Classes in Pine-Oak Forests of Great Smoky Mountains National Park
Presenter: Sean Binninger
Sponsor: Laura DeWald

Relationships Between Woody Species Functional Traits and Structure with Distance into Harvested Openings
Presenter: Thomas Green
Sponsor: Laura DeWald

Comparing Maxent and DOMAIN Habitat Suitability Modeling for a Rare Plant Species
Presenter: Ashley Hawk
Sponsor: Laura DeWald

12:30 p.m. – 1:45 p.m.
Health / Anthropology
UC 215 - Catamount Room
Moderator: Brenda Marques, Health Sciences

The Effects of Caffeine on Hydration Status: A Review
Presenters*: Erin Mullens, Fabiola Jimenez
Sponsor: Brenda Marques

Windigo Psychosis and Culture-Bound Syndromes
Presenter*: Gianna White
Sponsor: Ted Coyle

Septic Arthritis in a Collegiate Male Wrestler Following TFCC Repair
Presenter*: Christine Poole
Sponsor: Jill Manners

Insidious Foot Pain in a Collegiate Female Basketball Player
Presenter*: Brooke Donaker
Sponsor: Melissa Snyder

12:30 p.m. – 1:45 p.m.
History / Public Affairs
UC 214 - Cardinal Room
Moderator: Jessie Swigger, History

Harriet Powers’ Applique Quilts
Presenter*: Kimberly Holt
Sponsor: Betty Torrell

The Great and Tragic Jumbo: Memory and History
Presenter: Chelsea Beresford
Sponsor: Jessie Swigger

Emancipation and Memory: A Historiography
Presenter: G. Raquel Kelly
Sponsor: Jessie Swigger

Does Race Matter? Evaluating Racial Differences in Successful Completion of Substance Abuse Treatment
Presenter: Tiffany King
Sponsor: Christopher Cooper

“Somewhere, something incredible is waiting to be known.”
### 12:30 p.m. – 1:45 p.m.

**English**

UC 212 – Dogwood Room  
Moderator: Marsha Lee Baker, English

#### H.D.'s Trilogy and the Language Within: Palimpsest of Identity

- **Presenter**: Anna Oates  
- **Sponsor**: Annette Debo

#### Liberian Civil War Protesters: How Women Used Their Bodies as Rhetorical Instruments for Peace

- ** Presenter**: Alexandra Foote  
- **Sponsor**: Marsha Lee Baker

#### Children as the Lumpenproletariat in Working Class Literature of the American South

- **Presenter**: Abbie Moody  
- **Sponsor**: Mae Claxton

#### Holy Chaos as a Nonviolent End: The Rhetoric Surrounding Homelessness and Haywood Street Congregation

- **Presenter**: Corrine Roberts  
- **Sponsor**: Marsha Lee Baker

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### 2:00 p.m. – 4:45 p.m.

**Physical Therapy**

UC 315 - Theater  
Moderator: David Hudson, Physical Therapy

#### Clinical Anatomy Workshops: Bridging the Gap between Textbooks and Experience

- **Presenters**: Jenna Floyd, Mary Aucoin, Ansel Clayton, Tyler Krings  
- **Sponsor**: Kathy Starr

#### The Impact of an Internal vs. External Focus of Attention on Seated Trunk Control Training in Adults Post Stroke: A Motor Learning Study

- **Presenters**: Rachel Mollica, Kenneth Flinchum, Chanchai Hongdoxmai, Kyle Kitchen, Brenda Lackey, Jarred Lehr  
- **Sponsors**: Sue McPherson, Ashley Hyatt

#### Prevalence of Musculoskeletal Symptoms and Worker Characteristics in Migrant Farmworkers in Western North Carolina

- **Presenters**: Amanda Possidente, James Meuth, Rachel Shumate, Andrew Lingerfelt, Katherine Mulzer, Ben summary placeholder
- **Sponsors**: John Carzoli, Karen Lunnen

#### Effectiveness and Applicability of Health Promotion Education to Alleviate Musculoskeletal Symptoms in a Population of Migrant Farmworkers

- **Presenters**: Ben Stephenson, Andrew Lingerfelt, Kat Mulzer, James Meuth, Amanda Possidente, Rachel Shumate  
- **Sponsors**: Karen Lunnen, John Carzoli

#### The Effects of a Nine-week Core Stabilization Program on Dance Performance

- **Presenters**: Jill Delisio, Sydney Gray, Kaylan Lance, Jennifer Black, Emily Rhodes  
- **Sponsors**: Todd Watson, Jessica Graning

#### Establishing a Core Stability Index to Determine Differences of Lower Extremity Structure and Gait Stability

- **Presenters**: Sarah McNamara, Tyler Matherne, Collin Clark  
- **Sponsor**: David Hudson

#### Effectiveness of a Modified Community-Based Otago Exercise Program

- **Presenters**: Allison Cochran, Patrick Furr, Kristen Howe, Kaya Lindquist, Ariel Meyers, Eleanor Pleasant

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“The contrary to what Asimov says, the most exciting phrase in science, the one that heralds new discoveries, is not ‘Eureka!’ or ‘That’s funny...’ it’s ‘Your research grant has been approved.’”

John Alejandro King (American Comic)
2:00 p.m. – 3:15 p.m.

**English**

UC 215 - Catamount Room

Moderator: Mary Adams, English

The Memorable Power of the Library: Knowledge and Memory in Shakespeare's The Tempest  
Presenter: Laura Davidson  
Sponsor: Mary Adams

Handkerchiefs, Hoods, and Veils: Cognitive Metaphors Sewn Within Shakespeare's Cloth  
Presenter: Heidi Sherlock  
Sponsor: Mary Adams

Maintaining/Maintaining the Social Order: The Genre-Action of Shakespeare's Clowns in Twelfth Night and King Lear  
Presenter: Jessica Swaringen  
Sponsor: Mary Adams

Play to Win: Investment and Commerce in The Merchant of Venice  
Presenter: Nathan Campbell  
Sponsor: Mary Adams

2:00 p.m. – 3:15 p.m.

**Psychology / Nursing / Social Work / Higher Education Student Affairs**

UC 232 - Multipurpose Room

Moderator: Tonya Westbrook, Social Work

Veteran Intake Variables Predicting Elevated Scores on the Suicidality Scale of the MMPI-2-RF  
Presenter*: James Houston  
Sponsor: David McCord

Facilitating Dementia Care in the Primary Practice Setting through Electronic Medical Record Customization  
Presenter: Cynthia Stephens  
Sponsor: Alex Sargsyan

Assessment of Sibling Supports Across America  
Presenter: Samantha Stark  
Sponsor: Tonya Westbrook

Interventions for Reducing Recidivism among Women Who Are Incarcerated  
Presenter: Michelle Frech  
Sponsor: Amy Murphy-Nugen

A Scholar-Practitioner Perspective to Promoting Minority Success in STEM  
Presenters: Terry Chavis, Megan Cowington  
Sponsor: April Perry

2:00 p.m. – 3:15 p.m.

**Technology**

UC 212 - Dogwood Room

Moderator: Martin Tanaka, Technology

KetchCad: A Web-based 3D Modeling Tool  
Presenters*: Charlie Hreha, Cody Pedro  
Sponsor: Scott Barlowe

GPS Navigation System  
Presenter: Kenyatta Fortune  
Sponsor: Peter Tay

Utilizing Bandwidth to Quantify Human Torso Motor Control Capability  
Presenter: Shahab Karimi  
Sponsor: Martin Tanaka

Static Gesture Recognition Using Leap Motion  
Presenter: Stephen McNeil  
Sponsor: Robert Adams

Low Total Harmonic Distortion (THD) Resonant Converter for Cooker Magnetron Power Supply  
Presenter: Yang Zhou  
Sponsor: Robert Adams

3:30 p.m. – 4:45 p.m.

**English**

UC 215 - Catamount Room

Moderator: Mary Adams, English

Directors' Cuts: A Presentist Examination of Contemporary Productions of Othello  
Presenter: Aaron Cole  
Sponsor: Mary Adams

The Complexity of Masculinity in Shakespeare's Macbeth  
Presenter: T. A. Thomas  
Sponsor: Mary Adams

Morality and Authority in William Shakespeare's Measure for Measure  
Presenter: Carroll Varner  
Sponsor: Mary Adams

Bullingbrook, Richard and Epyllion: Reading Shakespeare's Richard II as a Cautionary Tale  
Presenter: Jason Huber  
Sponsor: Mary Adams
3:30 p.m. – 4:45 p.m.
Technology
UC 212 - Dogwood Room
Moderator: Sudhir Kaul, Engineering and Technology

PEP: Towards a Multipurpose Suite of Encryption Technique
Presenter*: Clinton Bryson
Sponsor: Scott Barlowe

Image Processing to Optimize Wave Energy Converters
Presenter: Kyle Bailey
Sponsors: Peter Tay, Bora Karayaka, Yanjun Yan

Solar Farm Hourly Dispatching using Super-Capacitor and Battery System
Presenter: Jordan Chaires
Sponsors: Bora Karayaka, Yanjun Yan, Patrick Gardner

Statistical Quality Characterization of Selective Laser Melting for Additive Manufacturing
Presenter: Jacob Rogers
Sponsors: Aaron Ball, Sudhir Kaul, Wes Stone

Comparison Between the Dynamic Response of Selective Laser Melting (SLM) Parts and Conventionally Manufactured Parts
Presenter: Lee Sechrest
Sponsor: Sudhir Kaul

Mathematical Modeling of Glioblastoma Brain Tumor Volume Change With and Without Chemotherapy
Presenter: Mitra Shabanisamghabady
Sponsors: Martin Tanaka, Jeff Lawson

3:30 p.m. – 4:45 p.m.
Chemistry
UC 232 - Multipurpose Room
Moderator: Channa De Silva, Chemistry

Adsorption of Copper(II) by Peanut Hulls in a Fixed-bed Continuous Flow Column
Presenter: Tyler Cook
Sponsor: Carmen Huffman

Development of Zinc Oxide Nanoparticles with Antimicrobial Activity for Potential Clinical Use
Presenters: Nicole Dragan, Joseph Lee, Jordan Spell
Sponsors: Channa De Silva, Indrani Bose

Computational Chemistry Studies on the Electronic Excited States of Europium β-diketonate Complexes with Dipyridophenazine Ligands: Tuning the Luminescent Properties based on Substituent Effects
Presenters: Christian Jensen, Rachel Downing, Alexander Lillie
Sponsors: Channa De Silva, Brian Dinkelmeyer

Adsorption of Zinc Oxide Nanoparticles to Cotton Fibers
Presenter: Stephen Printz
Sponsor: Carmen Huffman

3:30 p.m. – 4:45 p.m.
Biology
UC 214 – Cardinal Room
Moderator: Joseph Pechmann, Biology

Differences in Surface Activity Behavior in Two Terrestrial Salamanders
Presenter*: Joseph Kennedy
Sponsor: Joseph Pechmann

Is There Functional Significance Among Different Song Types in Song Sparrows (Melospiza melodia)?
Presenter: Cameron Duke
Sponsor: Barbara Ballentine

Gosner Stage may Impact Survival of Southern Leopard Frogs (Rana sphenocephala) Exposed to the Protozoan Parasite “Dermomyoides”
Presenters: Matthew Atkinson, John Tupy, Robin Overstreet
Sponsor: Joseph Pechmann

Life Cycles of a Facultatively Paedomorphic Salamander at High Elevation
Presenter: Elijah White
Sponsor: Joseph Pechmann

Movements and Habitat Use of Bog Turtles in a Unique Wetland
Presenter: Samuel McCoy
Sponsor: Joseph Pechmann

“If we knew what it was we were doing, it would not be called research, would it?”
Albert Einstein (Theoretical Physicist, 1879-1955)
Research Paper Competition Participants
Judges: Beth Jones, Erin McNelis

The Importance of Self-Determination Skills in Postschool Outcomes & Employment for Individuals with Disabilities
Lindsay Ryan, Special Ed: Severe/Profound Disabilities - M.A.Ed. - Distance

America’s Gun Control Disaster: How Our “Event/Reaction” Approach to Gun Violence Has Failed and Needs Revival
Joshua Taylor, English - M.A.

Solar Farm Hourly Dispatching using Supercapacitor and Battery System
Jordan Chaires, Technology - M.S.

FEMA Disaster Relief: The Distribution of Disaster Relief Funds
Shelli Tayman, Public Affairs - M.P.A.

Liberian Civil War Protestors: How Women Used Their Bodies as Rhetorical Instruments for Peace
Alexandra Foote, English - M.A.

Emancipation and Memory: A Historiography
G. Raquel Kelly, History - M.A.

Interventions for Reducing Recidivism among Women Who Are Incarcerated
Michelle Frerich, Social Work - M.S.W.

A Scholar-Practitioner Perspective to Promoting Minority Success in STEM
Terry Chavis, Higher Education Student Affairs, M.Ed.

Holy Chaos as a Nonviolent End: The Rhetoric Surrounding Homelessness and Haywood Street Congregation
Corrine Roberts, English - M.A.

Unheard Voices: Adopted Children’s Perception About Their Same Sex Parents and Family
T’Shana McClain and Evan Maas, Social Work - M.S.W.

Gardening for Individual and Community Wellness
Julia Robinson, Social Work - M.S.W.

Three Minute Thesis Award Winners
Kevan Frazer, Pat Gardner, Julie Spiro

First Place: Kristin Cooke, Chemistry
Making a Method: Detecting DNA Quality in Human Bone Using Raman Spectroscopy

Second Place: Jordan Chaires, Technology
Solar Farm Hourly Dispatching Using Supercapacitor and Battery System

People’s Choice: Cameron Duke, Biology
Understanding the Language of Birdsong