

THE FOURTH ANNUAL
UNDERGRADUATE RESEARCH
AND CREATIVITY SYMPOSIUM



METHODIST
UNIVERSITY

Engage.
Enrich.
Empower.



“One of the most exciting developments on our campus is the creation of the Undergraduate Research Symposium. Not only does it feature collaborative work between our students and faculty, but it also sets the stage for a lifetime of intellectual pursuit.”

– Dr. Ben E. Hancock, Jr.
President, Methodist University

“I am pleased that Methodist’s Center for Undergraduate Research and Creativity encourages students and faculty to collaborate on research and creative endeavors. Faculty enjoy mentoring their students, helping students prepare for graduate school and successful careers.”

– Dr. Delmas S. Crisp, Jr.
Executive Vice President

THE FOURTH ANNUAL METHODIST UNIVERSITY UNDERGRADUATE RESEARCH AND CREATIVITY SYMPOSIUM

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MISSION STATEMENT OF THE METHODIST UNIVERSITY CENTER FOR UNDERGRADUATE RESEARCH AND CREATIVITY

The mission of the Methodist University Center for Undergraduate Research and Creativity is to establish educational opportunities that are collaborative and inquiry-based with the intention that every Methodist University student has access to exploratory learning across the curriculum.

METHODIST UNIVERSITY



JOURNEY



WEEK AGENDA | APRIL 13 – 17, 2015

Monday April 13		
11 a.m. – noon	Faculty Presentations	Locations vary
6 – 9 p.m.	The Second Annual Graduate Research Symposium	PA Auditorium
Tuesday April 14		
7 – 9 p.m.	Creative Writing: Poetry students	PA Auditorium
Wednesday April 15		
8:45 a.m. – 3:30 p.m.	The Fourth Annual Undergraduate Symposium	Locations vary
3:30 p.m. – 5 p.m.	University Awards Ceremony	Huff Concert Hall, Reeve Fine Arts Building
Thursday April 16		
8 p.m.	The Second Presidential Lecture Series Featuring Doris Kearns Goodwin	Huff Concert Hall, Reeve Fine Arts Building
Friday April 17		
11 a.m. – noon	Faculty Presentations	Locations vary

CURC SYMPOSIUM AGENDA | APRIL 15, 2015

Time	Event	Location
8:45 – 9:25 a.m.	Opening Reception	Reeves Fine Arts Building lobby
9:30 – 10:45 a.m.	Morning Session	See program for locations
11 – 11:45 a.m.	Chapel	Hensdale Chapel
Noon – 12:45 p.m.	Lunch	On your own
1 – 1:30 p.m.	“CURC is EPIC”	Hendricks Science Building 222
1:40 – 2:25 p.m.	Workshops	Hendricks Science Building 222
2:30 – 3:25 p.m.	Afternoon Session	See program for locations
2:30 – 3:25 p.m.	Poster Session	Berns Student Center
3:30 – 5 p.m.	University Awards Ceremony	Huff Concert Hall

MORNING SESSION

Psychology Alumni Dining Room		
9:30 - 9:50 a.m.	Social Conformity	Ryan Bledsoe, Cara Cohen, Josh Franklin
9:55 - 10:15 a.m.	The Lonely State of Mind: The Effect of Loneliness on the Perception and Learning of Negative Words	Volha Sviarkaltsava, Jessica Puckett Aleksandra Przulj
10:20 - 10:40 a.m.	Your Brain on Texting: How Does it Affect Learning?	Rebekah Thompson, Lindsay Stinson
10:40 - 11 a.m.	Additional time for questions with student presenters	
English/Business Hendricks 122		
9:30 - 9:50 a.m.	The Evolution of Transcendentalism: Charles Darwin’s Role in Early American Romantic Thought	Lin Baumeister
9:55 - 10:15 a.m.	One Flew Over the Cuckoo’s Nest: Interdisciplinary Analysis of Ralph Ellison’s <i>Invisible Man</i> Using a Psychological Interpretation of Literature	Ashlyn Diggs
10:20 - 10:40 a.m.	Ice Cream and Instagram: The Effects of Social Media on the Food Industry	Kayleen-Marie Smithling
10:40 - 11 a.m.	Additional time for questions with student presenters	
Environmental Management/Computer Science Hendricks 222		
9:30 - 9:50 a.m.	Monarch Creek Stream Project	Nick Baggett, Nicole Spink Cameron Baggett, Christopher Webster
9:55 - 10:15 a.m.	Will You Pass the Salt and Benzoic Acid, Please?	Sharon Moran
10:20 - 10:40 a.m.	Shielder 3.0 Content Generator for C#/XNA Games	Bryan Bennett
10:40 - 11 a.m.	Additional time for questions with student presenters	
Economics Reeves G5		
9:30 - 9:50 a.m.	Drug War in Guatemala: A Case Study	Rebecca Burnett
9:55 - 10:15 a.m.	Capital Control Institutions and Externalities: Progressive Tax Policy in the Global Economy	Alexander Demitraszek
10:20 - 10:40 a.m.	Trans-Pacific Partnership Agreement: Impacts on Blue-Collar Workers in the American Workforce and Abroad	Patrina Lowrie
10:40 - 11 a.m.	Additional time for questions with student presenters	
Health Care Administration/Accounting Nursing 103		
9:30 - 9:50 a.m.	Veteran’s Health Care System: The Strategic Approach for Those Who Served	Donnie Fann, Emilie Ingram, Aaron O’Neil
9:55 - 10:15 a.m.	The Future of Family Practice in Fayetteville, NC for the Coming Decade	Kaitlin Tart, Shiva Sharma Miguel da Silva Guterres
10:20 - 10:40 a.m.	Benford’s Law: An Insight Into Fraud Investigation	Olorato Condrad Mbi
10:40 - 11 a.m.	Additional time for questions with student presenters	

AFTERNOON SESSION


Chemistry Alumni Dining Room		
2:30 - 2:50 p.m.	Concise Synthesis of Chiral Diflourinated Epihirsutanonol And Related Analogues	Mariama Jabati
2:55 - 3:15 p.m.	Quantitative Analysis of Potassium and Acetic Acid in Various Substances Used by Athletes for Rapid Muscle Cramp Relief	Taylor Tipton
3:15 - 3:30 p.m.	Additional time for questions with student presenters	
Biology/Psychology Hendricks 122		
2:30 - 2:50 p.m.	Comparative Analysis of <i>Vibrio</i> Abundance and Virulence Gene Frequencies Between <i>Mercenaria Mercenaria</i> and <i>Crassostrea Virginica</i> in North Carolina	Steven Moran
2:55 - 3:15 p.m.	Combating Trauma on Campus: A Brief Academic Intervention	Lindsay Stinson, Rebekah Thompson Chelsea Smith
3:15 - 3:30 p.m.	Additional time for questions with student presenters	
Biology Hendricks 222		
2:30 - 2:50 p.m.	Creating an Automatic Neural Pathway	John Hoover
2:55 - 3:15 p.m.	How the “Adrenaline Rush” Effects “Muscle Memory”	Michael Bridgeman
3:15 - 3:30 p.m.	Additional time for questions with student presenters	
Communications/Leadership Reeves G5		
2:30 - 2:50 p.m.	Bridging the Divide Between Theory and Practice Leads to the Development of Effective Leadership	Justin Wells, Joshua Lee, Joey Taylor Sydney Bryan, Kylie Arauz
2:55 - 3:15 p.m.	Additional time for questions with student presenters	

POSTER SESSION

Students will be standing by their posters between 2:30 - 3:25 p.m.		
Establishing the Dorsal Axis: The Beta-Catenin Protein and its Importance in Early Embryological Development of <i>Lithobates Picipiens</i> (Northern Leopard Frog)		Gabriel Gaweda
Cocaine Cutting Agent Identification		Nicole Hardin
Alkaloids in Poisonous Plants Negatively Effecting Livestock		Erika Henriksen
Amount of Money Spent on Alcohol and its Relationship to Alcohol Consumption		Isabella Tuveri, Jasmine Smith
Retention of MU Football Players		Brandon Johnson
A Greener More Sustainable Methodist University Through Permeable Pavement		Sharon Moran, Makayla Crawley
Practicality of the Use of Drones in Documenting Crime Scenes		Kelsey Harrington, Krista Zentner

THE 2nd ANNUAL

Presidential Lecture Series



DORIS KEARNS GOODWIN

Presidential Historian and Pulitzer Prize-winning Author

Featuring a special presentation on

“Leadership Lessons from the White House”

8 p.m. | Thursday, April 16, 2015

Huff Concert Hall, Reeves Fine Arts Building

ABOUT DORIS KEARNS GOODWIN

Doris Kearns Goodwin, world-renowned historian, has been reporting on politics and baseball for over two decades. Goodwin is the author of several books and has written for leading national publications. She appears regularly on network television programs and was an on-air consultant for PBS documentaries on Lyndon B. Johnson, the Kennedy Family, Franklin Roosevelt, and Ken Burns’ *The History of Baseball*. She was the first female journalist to enter the Red Sox locker room.

Her most recent work, a monumental history of Abraham Lincoln entitled *Team of Rivals: The Political Genius of Abraham Lincoln*, published in October 2005, joined the best-seller lists on its first week in publication, and soon reached #1 on the New York Times Best-Seller List. *Team of Rivals* won the 2006 Lincoln Prize for an outstanding work about the president and/or the Civil War, the New York Historical Society Book Prize, the Richard Nelson Current award, and the New York State Archives History Makers Award. When President Obama was asked if he could only bring one book to the White House other than the Bible what would it be, he said *Team of Rivals*. A feature film based on *Team of Rivals*, directed by Steven Spielberg and starring Daniel Day Lewis as Lincoln, was released in 2012.

This event is free and open to the public. Seating is available on a first-come, first-served basis.

For more information, call 910.630.7243.

The Presidential Lecture Series is made possible through the generosity of community partners BB&T; City Center Gallery & Books and Diane & Hank Parfitt; The Fayetteville Observer; First Citizens Bank; Rosalind and Terry Hutchens; Lafayette Ford Lincoln; and Daphne and Ray Manning.

MORNING SESSION | PSYCHOLOGY | ALUMNI DINING ROOM

9:30 – 9:50 a.m.

Social Conformity

Ryan Bledsoe | Senior, Psychology with a concentration in Clinical and Counseling | Fayetteville, N.C.
Cara Cohen | Senior, Psychology | Virginia Beach, Va.
Josh Franklin | Senior, Psychology | Scranton, Pa.

Mentor: Dr. Katharine Snyder

Social conformity is a universal phenomenon. Social conformity takes place when an individual adheres to the beliefs or actions of a group in order to fit in. Various studies have shown that conformity takes place in individuals of all ages. Essentially, humans are social creatures who thrive on acceptance. This study will seek to measure social conformity based on the audience members’ observations of actors who are performing variations of scenarios of athletes abusing steroids and/or students abusing Adderall, along with confederate students posing as classmates. The hypothesis is that the participants will conform to the views of the confederates according to the informational influence type of conformity (Asche & Crutchfield, Schnuerch & Henning, 2014). The participants will witness the confederate video “audience” and will adhere to their beliefs as a source of authority.

9:55 – 10:15 a.m.

The Lonely State of Mind: The Effect of Loneliness on the Perception and Learning of Negative Words

Volha Sviarkaltsava | Junior, Psychology | Minsk, Belarus
Jessica Puckett | Senior, Psychology with a concentration in Counseling | Minneapolis, Minn.
Aleksandra Przulj | Senior, Psychology with a concentration in Counseling and Clinical Psychology
Sokolac, Bosnia and Herzegovina

Mentor: Dr. Katharine Snyder

A very important component of research is emotional learning. Previous research has shown that negative words are learned quicker and remembered longer. It was hypothesized that individuals who obtain low scores on the loneliness scale would remember negative words better than individuals with high scores. The Auditory Affective Verbal Learning Test (AAVLT) and the UCLA loneliness scale were used to examine the impact of loneliness on learning emotional words. Specifically, the AAVLT included positive, negative and neutral word lists. It was predicted that the recall of negative words, for those who score high on the UCLA scale, would be greatest for the first five words on the negative list due to enhanced primacy effects (Snyder and Harrison, 1998). Results revealed that recall of the first five negative words was significantly higher than recall of the first five positive and neutral words. A significant increase in word recall from Trial 1 to Trial 5 was also found. A lack of correlation between the UCLA score and word lists will be discussed.

10:20 – 10:40 a.m.

Your Brain on Texting: How Does it Affect Learning?

Rebekah E. Thompson | Senior, Psychology with a concentration in Clinical and Counseling Psychology | Armstrong, Mo.
Lindsay Stinson | Senior, Psychology with a concentration in Clinical Psychology | Fayetteville, N.C.

Mentor: Dr. Katharine Snyder

Previous studies have demonstrated that increased cognitive load from conversational texting during an academic lesson increases errors on tests of lesson material presented. It was hypothesized that a student’s level of cell phone reliance could further affect the level of increased errors. Undergraduate students were recruited for participation and were randomly assigned to control, mixed, and treatment conditions. Participants in all conditions completed the Cell Phone Reliance Scale (CPRS) then viewed the same 17-minute TEDx lecture. The mixed and treatment conditions included the receipt of text messages by some or all participants, respectively, transmitted by a researcher outside the classroom. These text messages were randomly assigned to participants using the Random Number Generator + app and sent at approximately four minute intervals during the video lecture. After the video, participants completed a twenty question quiz on the lecture material. It was predicted that quiz scores of control group participants would be significantly higher than those in the mixed and treatment conditions. Further, it was anticipated that quiz scores in the mixed group to be higher than those in the treatment group. No significance was found due to high variability in the constructs. It is believed that these findings are due to the few participants who responded to texts while viewing the lecture. Results found a significant correlation between CPRS score and participant age. The implication of this finding and suggestions for future research will also be discussed.

MORNING SESSION | ENGLISH & BUSINESS | HENDRICKS 122

9:30 – 9:50 a.m.

The Evolution of Transcendentalism: Charles Darwin’s Role in Early American Romantic Thought

Lin Baumeister | Sophomore, English and History | Fayetteville, N.C.

Mentor: Dr. Walter Carney

Charles Darwin, throughout his life, saw himself primarily as a naturalist, just as Henry David Thoreau saw himself. While the influence of his scientific discoveries remains monumental to modern biological thought, much of Darwin’s writing suggests that we have neglected the romantic value of his work. His autobiography, in particular, echoes Thoreau’s *Walden*, and his most well-known text, *On the Origin of Species*, published four years after *Walden*, demonstrates many of the same transcendentalist themes. While there is little evidence to suggest that Darwin would have had any familiarity with the works of Thoreau or other American writers, he certainly had an impact on their works. The closeness of their ideas, especially regarding the natural world, are a clear indicator that this romantic thought was a result of the enlightenment philosophy that had dominated western thought. This paper explores the relationship between the men and their ideas through their most well-known works, and how these all come together as part of the Transcendentalist tradition.

9:55 – 10:15 a.m.

One Flew Over the Cuckoo’s Nest: Interdisciplinary Analysis of Ralph Ellison’s *Invisible Man* Using a Psychological Interpretation of Literature

Ashlyn M. Diggs | Senior, Psychology | Panama City, Panama & Charlotte, N.C.

Mentor: Dr. Walter Carney

Scientific racism focuses on the resources, the conditions, and the strategies of science in the 20th century. To explain scientific racism, an interpretative analysis of Ralph Ellison’s, *Invisible Man*, will be used to transport the audience to the 1940’s, and illuminate the procedural misuse of Electroconvulsive Treatment (ECT) as it applies to the novel. The investigation will emphasize underlying motivations of scientist that are not practical for empirical research. Technological advances like ECT co-exist as an avenue for explaining how ECT developed, and how ECT may have affected the unnamed protagonist’s daily function. The unnamed protagonist will become victim to a factory hospital, in America, during a period of revolutionary protest against discrimination in industries. The main character offers the reader a valuable insight on the procedure from the patient perspective.

10:20 – 10:40 a.m.

Ice Cream and Instagram: The Effects of Social Media on the Food Industry

Kayleen-Marie Smithling | Junior, Business Administration with a concentration in Resort and Hospitality Management
Fayetteville, N.C.

Mentor: Dr. O.Z. Hamzah

Food has always been a means of nourishing the body and a focal point for human social interaction, both of which are deemed necessary for human development. What Abraham Maslow defined as a physiological need has evolved from a necessity to an obsession, and the effects of such a revolution have illustrated a means of transforming the food industries in the 21st century. This paper will delve briefly into an explanation of the modern day implications of social media as an influence on the food industries. The main focus of this study is how the analysis of modern social networks displays food as a vehicle for marketing, globalization, and artistic expression. The negative effects of this “foodie” phenomenon will also be evaluated, namely its effects on body imagery.

MORNING SESSION | ENVIRONMENTAL MANAGEMENT & COMPUTER SCIENCE | HENDRICKS 222

9:30 – 9:50 a.m.

Monarch Creek Stream Project

Nick Baggett | Junior, Environmental and Occupational Management | Dunn, N.C.
Nicole Spink | Junior, Environmental and Occupational Management | Havelock, N.C.
Cameron Baggett | Sophomore, Environmental and Occupational Management | Dunn, N.C.
Christopher Webster | Senior, Environmental and Occupational Management | Andrews, N.C.

Mentor: Dr. Deb Branson

Sediment is the number one pollutant of streams, lakes, and rivers in North Carolina. Students at Methodist University have a unique opportunity to study sedimentation and erosion thanks to the small stream that flows through campus and empties into the Cape Fear River. The stream, named Monarch Creek, is the main outflow for all of the storm water run off from campus. The volume of water that is directed into the stream during a rain event has caused significant erosion and sedimentation in the Cape Fear. As ENM majors, researchers are extremely interested in pollution and storm water control measures. For the last two years researchers have been monitoring the sedimentation and erosion on campus. This research project covers the main causes of sedimentation, the effects, and some controls that can be put in place to help mitigate the effects of sedimentation.

9:55 – 10:15 a.m.

Will You Pass the Salt and Benzoic Acid, Please?

Sharon Moran | Freshman, Environmental Science with a concentration in Regulatory Compliance | St. Pauls, N.C.

Mentor: Professor Megan Roberts

The development of agriculture is the greatest technological advancement of humans. In the 20th and now the 21st century, food can be stored, saved, transported across the oceans, and cooked at the consumer’s convenience due to the additives that are added to food. According to research, although most additives are regulated today, whether an additive causes harm is still in question by some scientists. By avoiding additives, humans avoid exposure to the harm additives have been shown to cause, but it is the responsibility of the federal Food and Drug Administration (FDA) to make information concerning additives available to the public so that each person can make well-informed decisions about whether to consume foods that contain additives.

10:20 – 10:40 a.m.

Shielder 3.0 Content Generator for C#?XNA Games

Bryan Bennett | Senior, Computer Science | Fuquay-Varina, N.C.

Mentor: Dr. Terry House

Shielder 3.0 (henceforth Shielder) is a game content generator for games written in C# and especially for those created with the XNA framework. Generating content for games can be done a number of ways; one can format a text file a certain way with content information or one can hard-code the content in the game, neither of which is recommended due to their time-consuming nature. Shielder attempts to solve this problem by providing the game developer with an interactive GUI that streamlines the content generation as well as a C# library that allows quick and efficient import of such content into the target game. The entire process of adding content to a game is called the content pipeline. Any increase in speed (without reducing accuracy) of the content pipeline allows game developers to easily and efficiently iterate game builds.

MORNING SESSION | ECONOMICS | REEVES G5

9:30 – 9:50 a.m.

Drug War in Guatemala: A Case Study

Rebecca Mae Burnett | Junior, Global Studies with a concentration in Business & Economics | East Wenatchee, Wash.

Mentor: Dr. Spencer Davis

This research paper will focus on the Drug War in Guatemala as a case-study and aims to demonstrate, through research, that revisions of current drug-related laws could improve the economic and political problems that Guatemala is currently facing. Findings indicate that the current laws regarding drugs in Central America only empower the drug cartel, which make them a greater threat to governments and citizens, and allows them to thrive on the massive economic gains that could instead circulate within the legal economic sphere.

9:55 – 10:15 a.m.

Capital Control Institutions and Externalities: Progressive Tax Policy in the Global Economy

Alexander Demitraszek | Junior, Financial Economics | Albany, N.Y.

Mentor: Dr. Matthew Dobra

Globalization has increased the ease and pace with which capital can move. As a result, capital is much more sensitive to the seen and unseen effects of certain institutions and policies. Excessive taxation policies, combined with this global environment have increased the likelihood of capital flight and tax competition. Taxation is popularly believed to serve as government’s main source of revenue. It’s also fallaciously believed that through the institution of taxation, society can combat income inequality. Contrary to these assumptions; excessive taxation and income redistribution policies have resulted in many negative and inefficient economic and societal outcomes. Like most government institutions and policies, taxation is likely to result in negative externalities; as the inefficiencies related to rent seeking become apparent. Due to the deadweight losses associated with taxation and the rising scope of government, fiscal churning, tax competition, and migration in reaction to tax policies have become increasingly evident, threatening the well-being and efficiency of society.

10:20 – 10:40 a.m.

Trans-Pacific Partnership Agreement: Impacts on Blue-Collar Workers in the American Workforce and Abroad

Patrina Anastasia Lowrie | Senior, Business Administration | Montego Bay, Jamaica

Mentor: Dr. Spencer Davis

Trans-Pacific Partnership Agreement (TTP) is a regional trade agreement that the United States is negotiating with 11 other Asia-Pacific countries (Australia, Brunei, Canada, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam). The TTP agreement would be a signature trade agreement for the 21st century; since the regions involved would represent more than half of the global output. One of the goals of TTP is to produce a comprehensive and high standard agreement that supports jobs; nevertheless, in free trade agreements, for example the North American Free Trade Agreement (NAFTA) there is a tendency of lost jobs in the manufacturing industry in the American workforce and a net gain of manufacturing jobs in the foreign country. As a result, blue-collar workers would be impacted the most by TTP, which somewhat replicates the NAFTA model.

The purpose of this research is to demonstrate how TTP will have a significant impact on the American workforce as well as in the foreign countries’ manufacturing industry. Blue-collar workers in the manufacturing industry in the United States (U.S.) are most likely to be impacted by TTP because there are an increasing number of displaced blue-collar workers in the U.S. In addition, workers in the manufacturing industry in foreign countries are expected to have a net gain of jobs in the manufacturing sector because most manufacturing plants in the U.S. are closed or the production facility is relocated overseas. Ultimately, these results will be beneficial in determining whether or not the trade negotiations in the TTP will benefit blue-collar workers domestically and abroad. It will also allow for further research of how the U.S. exports, trade deficits, and tariffs also play an active role in free trade agreements.

MORNING SESSION | HEALTH CARE ADMINISTRATION & ACCOUNTING | NURSING 103

9:30 – 9:50 a.m.

Veterans' Health Care System: The Strategic Approach for Those Who Served**Donnie Fann** | Senior, Health Care Administration | Salemburg, N.C.**Emilie Ingram** | Junior, Health Care Administration | Louisville, Ky.**Aaron O'Neil** | Junior, Health Care Administration | Gloucester, Va.**Mentor: Dr. Warren McDonald**

This presentation explores the Veterans Affairs (VA) health care system, both locally and nationwide, and the strategic measures being implemented to better provide health care services to our military veterans. A look at past strategies will help provide an understanding to the present state of the VA and what strategic direction it will move toward in the future. Focusing on these factors, we will determine their effects to the VA Medical Centers, clinics, and patients in Fayetteville, North Carolina (N.C.), as well as the state and nation overall. The VA health care system has served our military veterans for close to a century and has required strategic changes in operations to keep pace with the wars that have followed and provide care to the veterans affected by those wars. With the recent negative news circulating about the VA, new strategies and approaches to the health care system are being approached and analyzed. This could create a significant impact on the care the VA provides. While it is not clear what impact these changes will have, this research will better enable us to understand the new strategic direction of the VA and how the strategy will help veterans. The main goal of this research is to raise positive awareness to the VA health care system and the strategy for maintaining the largest single health care system in the country.

9:55 – 10:15 a.m.

The Future of Family Practice in Fayetteville, N.C. for the Coming Decade**Kaitlin Tart** | Sophomore, Pre-Nursing | Benson, N.C.**Shiva Sharma** | Senior, Health Care Administration | Syracuse, N.Y.**Miguel da Silva Guterres** | Sophomore, Health Care Administration | Baucau, East-Timor**Mentor: Dr. Warren G. McDonald**

The purpose of this research is to forecast the future of family practice in Fayetteville, N.C. for the coming decade. Methods of research include SWOT Analysis (strengths, weaknesses, opportunities, and threats); Service Area Competitor Analysis (define the service categories, define the service areas, create a service area profile, conduct service area structure analysis, conduct competitor analysis, map strategic groups, and synthesize analyses); research and data found on the Internet; and personal communication with family practice groups in Fayetteville.

10:20 – 10:40 a.m.

Benford's Law: An Insight Into Fraud Investigation**Olorato Condrad Mbi** | Junior, Accounting | Francistown, Botswana**Mentor: Professor Pamela Lauchengco**

In the world of Business, the names Enron and Arthur Andersen are a constant reminder of financial statement fraud and failed auditing. Misrepresenting earnings and altering balance sheets in its favor is what led Enron to bankruptcy. According to Steve Albrecht et al., forensic accounting is one of the most job-secure fields, especially after the Enron scandal of the early 2000's. Albrecht states that approximately 7% of revenues generated are lost to fraud perpetrators, which translates to about \$994 billion annually.

The numbers on a financial statement speak a language that fraud examiners, auditors and other professionals are able to understand. Fraud perpetrators are generally oblivious to the pattern that is usually followed by these numbers; however, Simon Newcomb and Frank Benford were able to establish a formula that states the general nature of naturally occurring numbers. Led by greed, financial pressure, or merely the presence of the opportunity to commit, fraud perpetrators alter figures on a financial statement in order to conceal the theft that has occurred. Benford's Law is one of the techniques used to detect fraud. Although inconclusive, it is used with a plethora of other investigative methods to detect fraud. Come and learn a thing or two on how to be aware of the possibility of the occurrence of fraud.

AFTERNOON SESSION | CHEMISTRY | ALUMNI DINING ROOM

2:30 – 2:50 p.m.

Concise Synthesis of Chiral Difluorinated Epihirsutanonol and Related Analogues**Mariama Jabati** | Senior, Chemistry with a concentration in Biochemistry | Freetown, Sierra Leone**Mentor: Dr. Eun Hoo Kim**

Fluorinated organic compounds are gaining prominence in a number of research fields like drug modifications, biomedical imaging and material science. In this research, a concise approach to synthesize Difluorinated Epihirsutanonol and related Diarylheptanoid via mild release of Trifluoroacetate. Difluorinated Epihirsutanonol 5 will be synthesized from commercially available 3, 4-dihydroxyhydrocinnamic acid 1 that will produce key intermediates 3 and 4. Aldehyde 3 will be produced via reduction followed by Swern oxidation of compound 1. Intermediates 3 and 4 will then be used to prepare titled compound 5 by aldol reaction with mild release of Trifluoroacetate. Pure (R)-5 and (S)-5 Epihirsutanonol will be prepared using N-Boc-L-proline coupling and then column purified. Biological activities will be tested by co-work with oriental medicinal specialists.

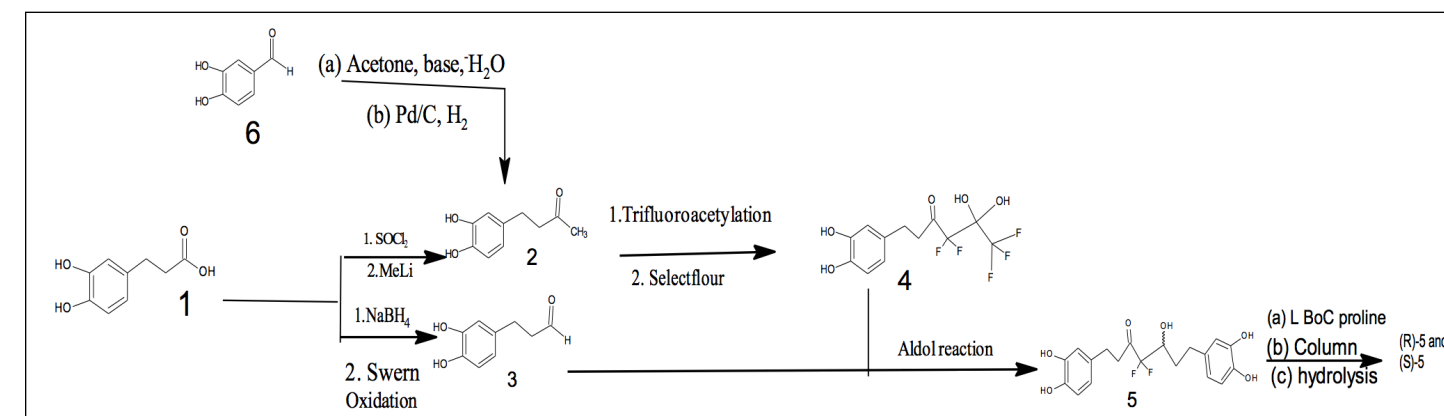


Figure 1. Synthetic Scheme for Difluorinated Epihirsutanol 5

2:55 – 3:15 p.m.

Quantitative Analysis of Potassium and Acetic Acid in Various Substances Used by Athletes for Rapid Muscle Cramp Relief**Taylor Tipton** | Senior, Chemistry with a concentration in Forensic Science | Saint Joseph, Mo.**Dr. Stephanie Hooper Marosek**

For many years, athletes have consumed unusual food products in order to quickly relieve muscle cramping so they can continue to play their sport. Pickle juice and mustard are two of the more common products that are ingested. In recent years, a prescription medication, K-Lyte, has been recommended to relieve muscle cramps. The main ingredient in K-Lyte is Potassium Bicarbonate. This seems to suggest that the potassium ion is instrumental in relieving muscle cramps for athletes. One thing that K-Lyte does not have is acetic acid, which can have a negative effect on the body depending on the amount consumed. The ultimate goal is to identify which substance contains the most potassium and acetic acid in order to determine which substance would be the most appropriate for athletes to consume. Dill pickle juice, sweet pickle juice, yellow mustard, distilled white vinegar, apple cider vinegar, and potassium bicarbonate are all being analyzed for their potassium and acetic acid content. The acetic acid concentration in each substance is quantified through acid-base volumetric analysis, while the potassium ion concentration is determined by both potentiometry and atomic absorption spectroscopy.

AFTERNOON SESSION | BIOLOGY & PSYCHOLOGY | HENDRICKS 122

2:30 – 2:50 p.m.

Comparative Analysis of Vibrio Abundance and Virulence Gene Frequencies Between Mercenaria Mercenaria and Crassostrea Virginica in North Carolina

Steven Javier Moran | Junior, Biology with a concentration in Microbiology/Cell Biology and a concentration in Health Occupations Science | Lillington, N.C.

Mentor: Dr. Lori Brookman

There are two pathogenic species of Vibrio capable of causing human disease and infection: Vibrio parahaemolyticus and Vibrio vulnificus. The presence of V. parahaemolyticus and V. vulnificus, and the presence of virulent strains of both bacteria were tested in the hard clam Mercenaria mercenaria and the bivalve, filter-feeding oyster Crassostrea virginica. Clams and oysters were obtained from estuarine environments, aseptically processed, and their homogenates were plated onto various selective media to grow bacterial colonies for further testing. Polymerase chain reaction (PCR) was used to test the virulence of the bacterial colonies grown on selective media. Oyster tissues contained more Vibrio spp. than clam tissues when the temperature was above 20°C, and there were more virulent and avirulent strains of V. vulnificus than V. parahaemolyticus in oyster and clam tissues. There was no evidence to support a relationship between virulent strains of Vibrio in shellfish tissue and virulent strains of Vibrio in water.

2:55 – 3:15 p.m.

Combating Trauma on Campus: A Brief Academic Intervention

Lindsay Stinson | Senior, Psychology with a concentration in Clinical/Counseling Psychology | Fayetteville, N.C.

Rebekah Thompson | Senior, Psychology with a concentration in Clinical/Counseling Psychology | Armstrong, Mo.

Chelsea Smith | Special, Non-degree seeking student | Asheville, N.C.

Mentor: Dr. Mark Kline

Post-traumatic stress disorder (PTSD) has received national attention largely due to the return of soldiers from war-time service. A survey of MU students found that 70% reported a history of trauma; many with PTSD symptom levels that are subclinical. However, there is little attention given to and few interventions developed for individuals dealing with such symptomatology. These symptoms often discourage active participation in the classroom, the inability to meet assignment deadlines, lower grade point averages, and contribute to college attrition rates. It is our aim to develop an intervention that targets college students as a means to reduce symptoms.

We recruited individuals from undergraduate psychology courses by having them complete the PCL-R scale (Hare, 2003). Those with higher PCL-R scores were invited to participate in one of three, five-week, student-led intervention groups and a fourth group was used as a control via a wait-list. Participants were introduced to coping mechanisms in the group meetings and were given assignments to complete individually as a means of symptom reduction. Further, individuals in the treatment groups were asked to solicit feedback from a professor of their choosing to indicate potential progress in participation and grades. To meet ethical considerations, individuals assigned to the control group were later offered exposure to the BATI sessions.

We project that individuals who participated in the intervention demonstrated a significant reduction in their PCL-R scores, and received improved feedback from professors as compared to the control group.

AFTERNOON SESSION | BIOLOGY | HENDRICKS 222

2:30 – 2:50 p.m.

Creating an Automatic Neural Pathway

John Hoover | Senior, Biology with a concentration in Healthcare Emphasis | Whispering Pines, N.C.

Mentor: Biology Faculty

By breaking down the most basic elements of neuroscience, researchers can build educational regimens designed to ensure maximum neurological retention with minimal physical effort. One of these basic elements is the creation of motor memories; and even though most people use different stimuli as an educational platform, learning through physical repetition primarily relies on simple circuitry that creates memories which can be recalled with precision. This paper is the summary of an experimental study that was designed to document the basic elements of how an automatic neural pathway are created and stored through repetitive training. The findings showed that most people learn and store physical movement memories in a very similar way.

2:55 – 3:15 p.m.

How the “Adrenaline Rush” Effects “Muscle Memory”

Michael Bridgeman | Senior Biology Major with a concentration in Pre-Med | Godwin, N.C.

Mentor: Biology Faculty

“Muscle memory” although being a misnomer, is a phrase that the majority of people have heard about, as well as an “adrenaline rush.” The adrenaline rush involves molecules known as norepinephrine (noradrenaline) and epinephrine (adrenaline). When released in limited amounts during a stressful situation, whether it be taking a test, playing sports, etc., these molecules are actually beneficial for accessing neural pathways (i.e. muscle memory). However, too much of these molecules can hinder accessing neural pathways. This presentation focuses on how these molecules effect neural pathways, as well as ways to diminish the undesired effects of high amounts of norepinephrine and epinephrine.

AFTERNOON SESSION | COMMUNICATIONS & LEADERSHIP | REEVES G5

2:30 – 2:50 p.m.

Bridging the Divide Between Theory and Practice Leads to the Development of Effective Leadership

Justin Wells | Senior, Religion | Godwin, N.C.

Joshua Lee | Junior, Religion | Denton, N.C.

Joey R Taylor, III | Sophomore, Organizational Communication & Leadership/Political Science with a concentration in Public Administration | Shiloh, Ga.

Sydney Bryan | Sophomore, Forensic Science and Justice Studies | Lexington, N.C.

Kylie Arauz | Junior, Computer Information Technology with a concentration in Multimedia Application | Fayetteville, N.C.

Mentors: Dr. Bill Watt, Mr. Brandon Miller

The MU Journey presents students with experiential avenues for personal discovery, intellectual growth, and professional development. The Tally Leadership Center plays a significant role on campus through the coordination of the MU Leadership Fellows Program. MU students have many opportunities to participate in new and expanded leadership activities in the Leadership Fellows Program through an array of leadership courses and experiential opportunities to develop their leadership skills. Leadership Fellows participate in off-campus conferences, professional workshops, specialized mentorships, intensive internships, academic course work, and practical experiences. They will learn about the art and practice of leadership, ethical values important to building trust and respect, and develop critical skills such as decision making, team building, critical thinking, and problem solving. Fellows gain practical experiences as they serve in leadership positions on campus.

POSTER SESSION | 2:30 - 3:25 P.M. | BERN'S STUDENT CENTER

Establishing the Dorsal Axis: The Beta-Catenin Protein and its Importance in Early Embryological Development of Lithobates pipiens (Northern Leopard Frog)

Gabriel G. Gaweda | Senior, Biology with a concentration in Micro and Cellular Biology | Wilmington, N.C.

Mentors: Ms. Mouna DiBenedetto

The purpose of this study was to show that the manual separation of blastomeres at the first cleavage furrow of a *Lithobates pipiens* (Northern leopard frog) zygote would result in two genetically identical embryos. Establishment of the dorsal axis is arguably one of the most important steps in early embryological development. Because of the beta-catenin dorsal-specifying protein, how it is distributed throughout the egg, and how the amphibian egg divides, blastomeres should be able to be separated after the first mitotic division and continue to grow into individual frog specimens. The specimen used was *Lithobates pipiens* (Northern leopard frog) and blastomeres were separated using 11-0 polyamide non-absorbable nylon suture thread. Although similar experiments have been conducted with much success, this experiment did not yield the desired results, likely due to the presence of the egg jelly coat, the abrasiveness of the nylon suture on the egg plasma membrane, or the degree of constriction applied to the eggs. Much is known about the nature of beta-catenin, but it remains a protein of interest to the medical research community due to its applications for many diseases, such as colorectal cancer.

Cocaine Cutting Agent Identification

Nicole A. Hardin | Senior, Chemistry with a concentration in Forensic Science | Jonesborough, Tenn.

Mentor: Dr. Stephanie Hooper-Marosek

Under the Controlled Substances Act, cocaine is a Schedule II drug, which indicates that it has a high potential for abuse and has limited medical usage. It is a popular drug that is abused for its euphoric effects and is normally sold as a crystalline, white powder. Cocaine is frequently diluted or “cut” with an assortment of materials. According to the Drug Enforcement Administration’s Drugs of Abuse, the most common cutting agents are sugars and local anesthetics.

When chemists are examining cocaine, it is important that the cutting agents are also examined and identified. Identification of the cutting agents can assist investigators with recognizing specific dealers and also aid in the detection of the popular trends. Through this project, we are examining simpler preliminary methods than what is currently utilized to aid in the identification of cutting agents. The current method of analysis for these agents is mass spectrometry, which is very time consuming, expensive, and labor intensive. Instead, we will be using ultraviolet-visible spectroscopy, cyclic voltammetry, high performance liquid chromatography, and Fourier transform infrared spectroscopy to try and identify the cutting agents of interest. These agents are as follows: caffeine, lidocaine, acetaminophen, phenacetin, and atropine. We believe that these cutting agents can be identified by simpler presumptive methods without using mass spectrometry.

Alkaloids in Poisonous Plants Negatively Effecting Livestock

Erika Henriksen | Senior, Biology with a concentration in Microbiology | Buies Creek, N.C.

Mentor: Dr. Clay Britton

This research addresses the effect of plant-produced alkaloids in what are considered to be poisonous plants that are found in the everyday environment of livestock. My work will address this issue by examining the harmful alkaloids that are located within various plants and their effects on livestock. Plants that will be discussed include, but are not limited to: red maple (*Acer rubrum*), clover (*Trifolium repens*) and wild onion (*Allium spp.*) and I will specifically research the effects these plants have on horses and sheep.

Amount of Money Spent on Alcohol and its Relationship to Alcohol Consumption

Isabella Tuveri | Sophomore, Biology | Dolianova, Italy

Jasmine Smith | Sophomore, Chemistry | Jacksonville, Fla.

Mentor: Dr. Mark Kline

This original research project compares the issue of spending on alcohol to various aspects of alcohol use in a private university setting. This work consisted of recording amount of money spent on alcohol over a one-month period of time and its relation to drinking over that same time frame. This will be useful in clarifying factors associated with variation in alcohol use in college students and the effects of a dry campus when comparing our findings to other institutions.

POSTER SESSION | 2:30 - 3:25 P.M. | BERN'S STUDENT CENTER

Retention of MU Football Players

Brandon Johnson | Sophomore, Sports Management | Hollywood, Fla.

Mentor: Dr. Greg Combs

This study reports a marketing “needs assessment” of Methodist University football players. The intent of this poster session was to identify ways to improve player retention by meeting the needs of this target market. The following areas were found to have a significant impact with retention (cost of attending the university, playing time, and lack of interest in playing football). Data were collected by conducting surveys of players who were not returning to Methodist University. Coaches were also surveyed to identify their perspective of the players’ needs assessment. The coaches’ data on the retention was instrumental from a participant observer’s point of view. Thusly by providing their (coaches) opinions on how they think things should change in order for players to return and continue to participate in MU football. To conclude, this study attempts to provide solutions to increase player retention rates.

A Greener More Sustainable Methodist University Through Permeable Pavement

Sharon Moran | Freshman, Environmental Science with a concentration in Regulatory Compliance | St. Pauls, N.C.

Makayla Crawley | Sophomore, Environmental Science with a concentration in Regulatory Compliance | Bismarck, N.D.

Mentor: Dr. Debra Branson

Methodist University has serious erosion and flooding problems due to the rainwater that flows virtually unimpeded through campus. Because of the way that Methodist University is constructed, the rainwater drains in the direction of the Cape Fear River. Small dips and lower areas were constructed to reduce the energy and to allow infiltration. These prevent the water from entrapping clay and clogging these retention ponds. Presently some of these no longer drain within the acceptable twenty-four hour period. By adding a sidewalk of permeable cement to an area that has flooding issues (in front of the Hendricks Science Building) with even a light rain fall, there will be more rain water absorbed, causing less flooding in the already damaged areas. This would also allow water to soak directly into the ground during rain rather than flowing through campus and causing erosion and flooding. Research following the installation of this area of permeable cement would give Methodist University an idea of how much of a difference could be made to the current flooding issue. Installing permeable cement would lessen the rate of erosion, specifically in the vicinity of the Golf building where it is becoming a larger issue. Permeable cement will provide Methodist University with an easy and relatively cost-effective way to protect its grounds from erosion, flooding damage, and possible fines.

Practicality of the Use of Drones in Documenting Crime Scenes

Kelsey Harrington | Junior, Justice Studies | Mo.

Krista Zentner | Senior, Justice Studies and Applied Forensic Science | Va.

Mentors: Dave Pauly, Mark Bowman, Steve Downs, and Serena Hare

The field of crime scene documentation and processing is continually changing and evolving based on legal requirements, new techniques, and new technologies. A basic requirement for law enforcement processing every crime scene is to photograph and/or video record the scene in its pristine state once the scene is securely under law enforcement control and all live suspects, victims, and witnesses are no longer in the crime scene. New innovations are constantly sought to improve this process to make it both more efficient and effective. With the vast improvements in drones, the possibility of using them to video record a crime scene without any human entering a crime scene is believed by some to have the potential to radically enhance crime scene documentation and processing. The purpose of this is to initiate research into the use of drones in indoor crime scenes. This research will lead to new advances in crime scene documentation and sets the stage for future research and development into drones capable of completing this mandatory task in a legally sufficient manner while simultaneously producing the best possible video record of a crime scene at the time of the arrival of the crime scene investigation personnel. Our research documented the many drawbacks and limitations into using current drones and video equipment in indoor crime scenes. As drone and video technology continues to improve and evolve, the possibility of using them to video record crime scenes prior to crime scene personnel physically entering the scene remains a distinct possibility.

AN UPDATE ON THE CENTER FOR UNDERGRADUATE RESEARCH AND CREATIVITY

Dr. Clay Britton, *Director*

The 2014-2015 academic year has been an exciting one for the CURC. The students, faculty and staff of the University have embraced the mission of the Center, and have truly taken advantage of all of the opportunities the Center provides. A few highlights from this year:

- ♦ Students have been awarded more than \$7,000 to assist them in their travel to conferences, or to purchase supplies and equipment for their projects.
- ♦ Volume I of the Monarch Review: Methodist University’s Journal of Undergraduate Research and Creativity was released. Volume II is currently being edited, and its release date will be during the Fall 2015 semester.
- ♦ Methodist University will be the host of 113th Meeting of the North Carolina Academy of Science April 1-2, 2016.

The development and implementation of all these projects takes a great deal of hard work. I would like to take the time to thank each of the members of my Advisory Board. They are:

- ♦ Mr. Daniel Bennett, *School of Science and Human Development*
- ♦ Dr. Lori Brookman, *School of Health Sciences*
- ♦ Dr. Del Crisp, *ex officio*
- ♦ Dr. Christina Francescon, *School of Arts and Humanities*
- ♦ Mr. John Herring, *School of Science and Human Development*
- ♦ Dr. Eric See, *School of Public Affairs*
- ♦ Dr. Pam Strickland, *Reeves School of Business*
- ♦ Dr. Larry Wells, *School of Arts and Humanities*

I thank all of you, the Methodist University Community, for helping make the efforts of the Center for Undergraduate Research and Creativity a success.



AN UPDATE ON THE LURA S. TALLY CENTER FOR LEADERSHIP DEVELOPMENT
Dr. Andrew Ziegler, *Director*

The Leadership Pathway presents students with multiple avenues for personal discovery, intellectual growth, and professional development. Here are some of the opportunities available to Monarchs:

- ◆ **Nationally Known Guest Speakers on Leadership**
Laura Schroff, author of bestseller *An Invisible Thread*, spoke on campus October 27, 2014 in Huff Concert Hall. Her topic was “Beyond You Leadership,” which presented her message that everyone has the power and leadership potential to reach out and positively influence the life of another. Copies of her book were available for purchase and signing following the lecture. Many students for the past three years had read her book as part of their First Year Seminar course, and they were excited to meet and hear her in person and have their books signed by her.
- ◆ **Leadership Fellows Program**
Students committed to making a real difference in the world have an avenue for personal leadership development in the Leadership Fellows Program. Program, where they acquire the knowledge, values, skills, and practical experiences to empower them for extraordinary leadership. Participation is through a nomination and selection process based on academic achievement, exceptional character, and commitment. Students interested in the program should ask a faculty or staff member to nominate them.
- ◆ **Academic Courses and Minors in Leadership**
 - LSS 3000 Principles of Leadership
 - LSS 3400 Contemporary Issues in Leadership
 - LSS 3750 Future Oriented Leadership
 - Plus several others
- ◆ **Off-Campus Leadership Conferences and Workshops**
 - General Hugh Shelton Leadership Forum, N.C. State University
 - Student Leadership & Diversity Conference, University of South Carolina
 - Leadercast, Simulcast from Atlanta to Johnston County Community College
 - Plus others
- ◆ **On-Campus Leadership Programs**
 - Student Leaders @ Methodist (SL@M)
 - National Society for Leadership & Success (NSLS)
 - Plus others
- ◆ **Off-campus Mentoring, Shadowing, and Internship Experiences**

AN UPDATE ON THE CENTER FOR COMMUNITY ENGAGEMENT
Donna Wilson, *Interim Director*

The Center for Community Engagement provides MU students the opportunity to become actively involved in supporting our local community. Participation in our local community allows our students to develop community awareness, social responsibility and personal growth.

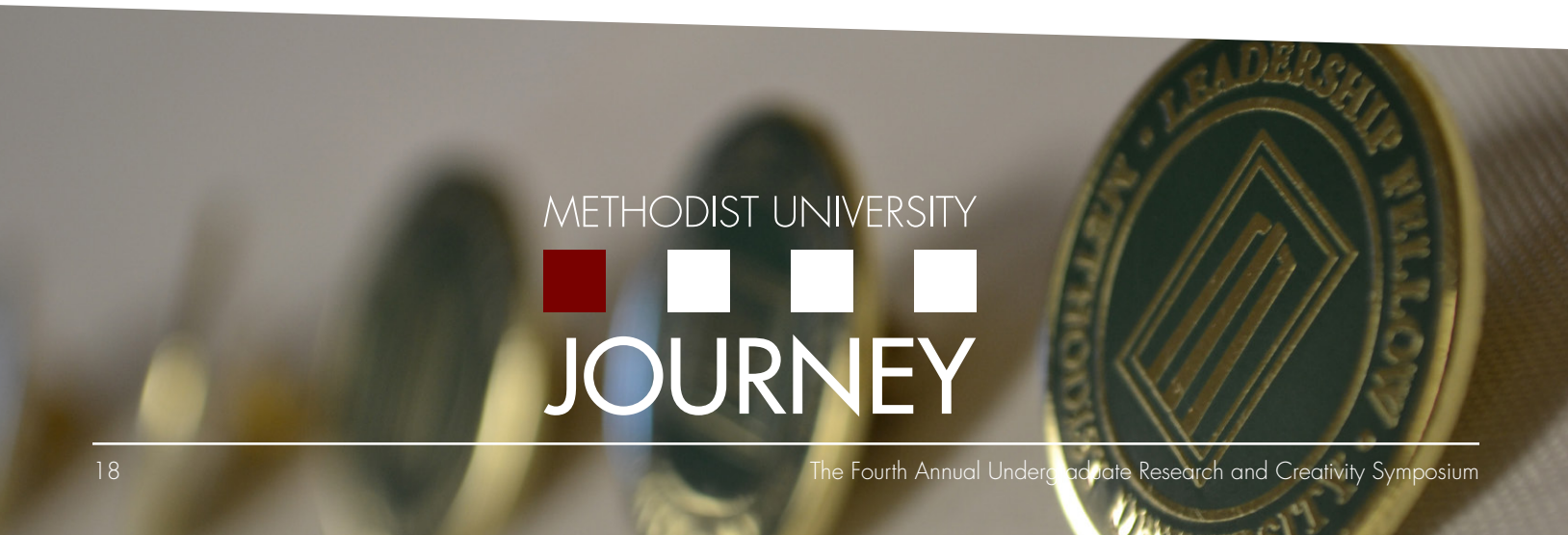
The Center for Community Engagement also offers MU students the opportunity to participate in time-limited, problem-solving community-based internships. These internships allow students to apply their classroom knowledge to real world experience in the job market which prepares them for life-long careers.

This year, MU students have partnered and participated in a wide variety of community engagement projects such as:

- ◆ Hay Street Mentoring Initiative
- ◆ March of Dimes
- ◆ MU Day of Service
- ◆ Person Street Homeless Initiative
- ◆ Play for Kay
- ◆ Red Cross Blood Drives
- ◆ Relay for Life
- ◆ Roadside Clean-ups
- ◆ United Way
- ◆ Winter Wonderland
- ◆ Wounded Warrior Project

We would like to thank our community partners for their support in actively engaging and enriching the lives of our students. A special thanks to:

- ◆ Cumberland County Schools
- ◆ Fayetteville Area Chamber of Commerce
- ◆ Fayetteville Parks and Recreation
- ◆ Fayetteville Urban Ministries
- ◆ Operation Inasmuch
- ◆ Our local small businesses
- ◆ Our local community churches
- ◆ Red Cross
- ◆ The City of Fayetteville
- ◆ The Downtown Alliance
- ◆ United Way



AN UPDATE ON THE CENTER FOR GLOBAL EDUCATION
Dr. Cristina Francescon, *Interim Director*

Global Education at Methodist University uses a variety of vehicles in order to arrive at its destination: a more global and international community. The Center supports three areas in our Methodist community: Study Abroad, International Programs, and international activities on campus.

The Center continues to encourage both faculty and students to travel abroad. Support for faculty-led trips continues to improve by assisting faculty with logistical support for planning trips abroad with students. Students are continuously encouraged to go on study abroad trips, and this year many incentives were offered. Also this year, two new summer trips have been added. Dr. Emily Leverett will lead a trip to Wales and England, where students will study English Literature. She will be assisted by Prof. Wendy Vonnegut, who will teach International Law. Dr. Cristina Francescon will lead a trip to Italy, where she will be teaching Area Cultural Studies and Italian language, while Dr. Matt Dobra will teach a course on Economics/Political Science. Both the Wales and the Italy groups will be residing at the UWC schools in these locations. This year saw an unprecedented number of students traveling abroad.

Many of our international students at MU come from UWC schools world-wide as well as from other programs. The Center supports all activities of the Office of International Programs, from Pangea to the International Food Festival, to working with international students to help them to feel more at home.

With regard to a more international presence on campus, in addition to international students, more activities have been added this year while supporting events that have been on-going such as the Foreign Film Festival. This year saw the addition of the Union-Zukowski Endowment, which has provided opportunities for international speakers to come to campus and a recent trip to Washington, D.C. for students and faculty.

The Center began in the fall semester of 2013 in order to highlight that an extended encounter with a foreign culture's different values and languages can teach us how to communicate across the barriers of customs, geography, and politics. When we talk about winning the hearts and minds of a people, we mean that we are familiar with the language, culture, values, religion, and history of that culture. Faculty and students who have studied abroad often return with a deeper understanding of other peoples, their own background, and of themselves. International students who come here to study offer new perspectives to students and faculty whether in or out of the classroom, and they also have added to their expansion of cultural/linguistic knowledge by studying in the USA.

The Center for Global Education supports all of the above efforts as it will offer a philosophical perspective that will help students find their own place in the world.

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