

*26th Annual
Arkansas Undergraduate Research
Conference
2019*



*April 5 & 6, 2019
Henderson State University
Arkadelphia, Arkansas*

*Sponsored by:
Henderson State University
Arkansas Department of Higher Education – SURF*

Mission of the Arkansas Undergraduate Research Conference

The mission of the Arkansas Undergraduate Research Conference is to provide in one combined activity, a place for undergraduate students to present original research findings, as defined by their field of study. Open discussion, honest criticism, and sincere encouragement are critical to the success of the conference. Finally, it is hoped that this opportunity will be available for all, especially for whom presentation at national professional meetings might be unavailable.

HSU Undergraduate Research Committee

T. David Bateman – Director of Undergraduate Research and Associate Professor of Chemistry

Julie Williams – Associate Professor of Curriculum and Instruction

Vincent Dunlap – Associate Professor of Chemistry

Deepak Pant – Director of the Writing Center

Eunice Akoto – Associate Professor of Public Management

Matthew Bowman – Associate Professor of History

Trudi Sabaj – Assistant Professor of Nursing

Julie Quast – Assistant Professor of Curriculum and Instruction

Matt Gross – Assistant Professor of Political Science

Brad Rowland – AURC 2019 Host and Associate Professor of Chemistry

Schedule and Table of Contents

Friday April 5, 2019

Registration & Check-In **1:00-5:00 pm**
Reynolds Science Center Lobby

Oral Presentations **3:00 pm**
Friday Oral Presentation Schedule

Session	Title	Location	Page
1	Oral Presentations Pt. 1	Reynolds 322	6

Interdisciplinary Poster Session **5:30 pm**
Garrison 1st Floor, Banquet Room List of titles Pp 8-9

Banquet and Keynote Address **6:15 pm**
Dr. Bala “Ramu” Ramachandran
Executive Vice President for Research and Dean of Graduate School,
Louisiana Tech University
Garrison Center Banquet Room

~Saturday Events on Following Page~

Keynote Address	Page 5
Poster Titles	Page 8
Abstracts Listed Alphabetically by First Author	Page 11
Index of Authors	Page 19
Announcement of Next Year’s Meeting	Page 20

Schedule and Table of Contents

Saturday April 6, 2019

**Registration, Check-in
and Continental Breakfast** **7:30-10:00 am**
Reynolds Science Center Lobby

Oral Presentations **8:30 am**
Saturday Oral Sessions

Session	Title	Location	Page
2	Oral Presentations Pt. 2	Reynolds 322	10

Keynote Address **Page 5**

Poster Titles **Page 8**

Abstracts Listed Alphabetically by First Author **Page 11**

Index of Authors **Page 19**

Announcement of Next Year's Meeting **Page 20**

2019 AURC Keynote Address

Introduction by Dr. Brad Rowland, Associate Professor of Chemistry



Dr. Bala “Ramu” Ramachandran

Executive Vice President for Research and Dean of Graduate School,
Louisiana Tech University

Profile:

Dr. Bala "Ramu" Ramachandran, Associate Vice President for Research and Dean of the Graduate School at Louisiana Tech University will serve as the keynote speaker for AURC 2019. Dr. Ramachandran is a computational chemist who has authored approximately 70 peer-reviewed publications and has worked to secure over \$41 million in grant funding for he and his colleagues work at Louisiana Tech. Dr. Ramachandran was awarded the Louisiana Tech University Foundation Professorship in 2002 based on the nominations and votes of his colleagues. Dr. Ramachandran will highlight some of the exciting research being undertaken at Louisiana Tech, discuss the impacts of the Louisiana Optical Network Infrastructure (LONI) initiative, and his sense of how his experiences as a researcher have guided his career to date.

Friday Oral Sessions Begin at 3:00 pm

Session 1 **Oral Presentations Pt. 1**

Reynolds 322

Chairperson: Martin J. Campbell, Ph.D. Henderson State University

3:00 **Chapter activities for the Henderson State University Student Affiliate Chapter in 2018**

Susana Loarca, Nathan Steadman, Jacquelyn Mosely, Chelsea Stephens, Carlie Clem, T. David Bateman, Ph.D., and Brad A. Rowland, Ph.D.
Henderson State University

3:20 **The Princess Qajar and the Inaccuracy of Historical Memes**

Ava Baghestani and Kelsey Malone, Ph.D.
Henderson State University

3:40 **Synthesis of a family of antimalarial lead molecules**

Emily E. Williford and Martin J. Campbell, Ph.D.
Henderson State University

4:00 **Orange Is the New Everything: Does the Public Think that Rehabilitation Can Decrease Overcrowding**

Kaitlyn P. Hall and Shari Valentine, Ph.D.
Henderson State University

4:20 **Contact Mechanics of Non-layered and Layered Nitinol-60 Ball Bearings**

Caleb D. Johns and Brad A. Miller, Ph.D.
Henderson State University

4:40 **The Role and Effects of the Boys and Girls Club of America on Communities Across Arkansas**

Keanna D. Slayton and Matthew Sutherlin, Ph.D.
Henderson State University

5:00 **Imidazolium-based ionic liquid polyesters**

Ray Weldon and Martin J. Campbell, Ph.D.
Henderson State University

5:20 **Design of methylene blue analogs as contrasting dyes for sentinel node biopsy**

Nathan Steadman, David Thompson, and Vincent K. Dunlap, Ph.D.
Henderson State University

All Disciplines Poster Session

Garrison Center – Grand Ballroom

5:30 PM

2019 AURC Chair: Brad A. Rowland, Ph.D., Henderson State University

Authors should have poster mounted before 5:00 and should be present at least 30 minutes during the poster session to talk about their work. Posters should be removed after the banquet.

Abstracts Listed Alphabetically by First Author

Musical Preference as an Indicator of Neurotic Tendencies

Destiny Amos and Aneeq Ahmad, Ph.D.
Henderson State University

Drug repositioning and diversification strategy for discovery of compounds with anti-cancer activity

Matthew Chappa, Daniel Gibson, and T. David Bateman, Ph.D.
Henderson State University

Novel RNA phosphoramidite monomers: Distinguishing 2'-OH from 3'-OH

Jeffrey Davis and Vincent K. Dunlap, Ph.D.

Orange Is the New Everything: Does the Public Think that Rehabilitation Can Decrease Overcrowding

Kaitlyn P. Hall and Shari Valentine, Ph.D.
Henderson State University

Ambiguous nucleosides that heighten the HIV error load: Using viral mutagenesis to develop antiviral agents

Rachel King and Vincent K. Dunlap, Ph.D.
Henderson State University

Chapter activities for the Henderson State University Student Affiliate Chapter in 2018

Susana Loarca, Nathan Steadman, Jacquelyn Mosely, Chelsea Stephens, Carlie Clem, T. David Bateman, Ph.D., and Brad A. Rowland, Ph.D.
Henderson State University

All Disciplines Poster Session

Computational study of halogen bonding in nitrogen containing rings

Jacquelyn Mosely, Thomas L. Ellington, and Gregory S. Tschumper, Ph.D.
University of Mississippi and Henderson State University

Effect of Motivational Program on Cognitive Burnout in University Students

Nathan Price and Aneeq Ahmad, Ph.D.
Henderson State University

Social media use among college students: patterns, motives, and preferences.

Ja'Narian Rivers and Nokon Heo, Ph.D.
University of Arkansas at Pine Bluff

Design of methylene blue analogs as contrasting dyes for sentinel node biopsy

Nathan Steadman, David Thompson, and Vincent K. Dunlap, Ph.D.
Henderson State University

Imidazolium-based ionic liquid polyesters

Ray Weldon and Martin J. Campbell, Ph.D.
Henderson State University

Synthesis of a family of antimalarial lead molecules

Emily E. Williford and Martin J. Campbell, Ph.D.
Henderson State University

The use of communication technology and its influence on college student's social/psychological well-being.

Kiana Wilson and Nokon Heo, Ph.D.
University of Arkansas at Pine Bluff

Saturday Oral Sessions Begin at 8:30 AM

Session 2 **Oral Presentations Pt. 2** Reynolds 322

Chairperson: TBD, Henderson State University

8:30 **Computational study of halogen bonding in nitrogen containing rings**

Jacquelyn Mosely, Thomas L. Ellington, and Gregory S. Tschumper, Ph.D.
University of Mississippi and Henderson State University

8:50 **A Study of Religion and Moral Decision-Making**

Brady Nix and Paul Williamson, Ph.D.
Henderson State University

9:10 **Novel RNA phosphoramidite monomers: Distinguishing 2'-OH from 3'-OH**

Jeffrey Davis and Vincent K. Dunlap, Ph.D.
Henderson State University

9:30 **Religious Fundamentalism & Child Abuse**

Lucas K. Wheatcroft and Malcolm L. Rigsby, Ph.D.
Henderson State University

9:50 **Ambiguous nucleosides that heighten the HIV error load: Using viral mutagenesis to develop antiviral agents**

Rachel King and Vincent K. Dunlap, Ph.D.
Henderson State University

10:10 **Texarkana's African-American Community Before Integration**

Olivia Parks, Andrew McGregor, Ph.D., and Jaime Cantrell, Ph.D.
Texas A&M University—Texarkana

10:30 **Drug repositioning and diversification strategy for discovery of compounds with anti-cancer activity**

Matthew Chappa, Daniel Gibson, and T. David Bateman, Ph.D.
Henderson State University

Complete Listing of Abstracts

Listed alphabetically by last name of first author

Musical Preference as an Indicator of Neurotic Tendencies

Destiny Amos and Aneeq Ahmad, Ph.D.

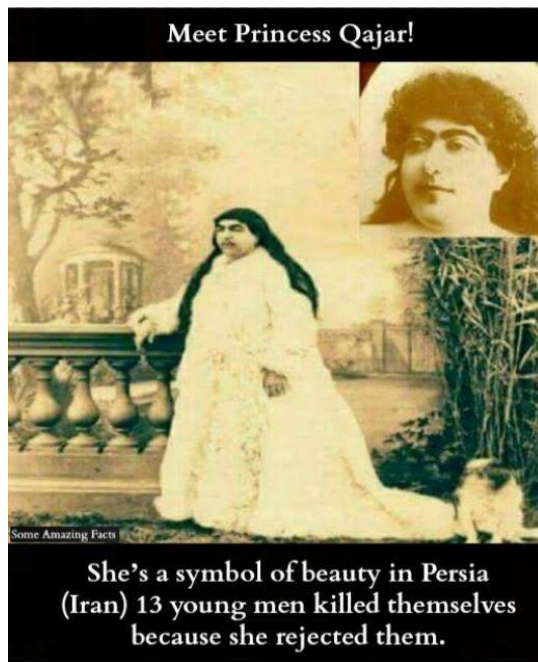
Henderson State University

Music is said to regulate and release emotions by temporarily provide escape from negative thoughts and feelings (Baker et. al, 2008). However, negative emotions can be behind neurotic tendencies and end up becoming the following psychological disorders: anxiety, depression, obsessive compulsion, and hysteria (Letteri, 2013). It is imperative to examine individuals who have such neurotic tendencies and one way to do so is to investigate their selections of musical genres. Studies have shown that music reinforces and reflects personalities, attitudes, and emotions. It is hypothesized that students enrolled at Henderson State University will score higher on neuroticism and listen to music that has been associated with neuroticism. This will affirm music either as a coping mechanism or an indicator of neurotic tendencies in undergraduate students.

The Princess Qajar and the Inaccuracy of Historical Memes

Ava Baghestani and Kelsey Malone, Ph.D.

Henderson State University



A common way that information is spread across the internet today is through the “meme,” which is an image combined with humorous, though frequently inaccurate, text. Most often, memes act as commentary on popular culture, but there is a subset of memes with a historical element. One example of this type of meme features two photographs identified as “Princess Qajar,” accompanied by a caption describing her as a symbol of beauty in Qajar Persia, so much so that “thirteen young men killed themselves” because of her rejection (Fig. 1). In reality, the photographs depict two different women: the princesses Fatimah Khanoom ‘Ismat al-Dawlah (c. 1855/56-1905) and Zahra Khanoom Taj al-Saltanah (1884-1936). Both were avid supporters of women’s rights and rejected the very societal norms imposed upon them, though there is no evidence of either woman rejecting thirteen men. The meme presents itself as a humorous take on Qajar Persian culture, but in fact misrepresents history and perpetuates a harmful and subpar dialogue surrounding non-Western beauty standards. In this paper, I will place these photographs back into their original context in order to separate the lived experiences of these women from the modern stereotypes associated with Western

ideals of beauty that memes such as this perpetuate. While there have been a few scholars who have approached the topic of nineteenth-century photography in Persia or the biographies of these princesses, including Ali Behdad, Afsaneh Najmabadi, and Shireen Mahdavi, the self-representation of Persian women through photography is relatively understudied. By highlighting Fatimah Khanoom’s and Zahra Khanoom’s agency in constructing their own image, this paper underscores the dangers of spreading inaccurate, “historical” information related specifically to Western and non-Western beauty standards, and the importance of visual literacy in today’s image-saturated environment.

Drug repositioning and diversification strategy for discovery of compounds with anti-cancer activity

Matthew Chappa, Daniel Gibson, and T. David Bateman, Ph.D.

Henderson State University

Improvement and modification of existing drugs have a higher probability of successfully navigating the FDA approval process therefore minimizing the risk associated with the costly research and development of new drug targets. Research group set out to develop analogs of the prescription drug Tramadol via concise synthesis, which can be altered to yield a library of functionally similar compounds. The analog library will initially be screened for bioactivity utilizing simple yeast and brine shrimp assays, as well as virtual screening for comparison with experimental results. Compounds identified as potential leads will be screened for anti-cancer activity.

Novel RNA phosphoramidite monomers: Distinguishing 2'-OH from 3'-OH

Jeffrey Davis and Vincent K. Dunlap, Ph.D.

Henderson State University

With the explosion of new research in the field of RNA, a significant demand for synthesis of oligoribonucleotides has materialized thus allowing the phosphoramidite method for oligomer synthesis to become a very valuable tool in biochemical research. As a result, the demand for synthesis of phosphoramidite monomers has increased. However, there is a lack of selectivity between the 2'- and 3'-OH groups in RNA for phosphite addition, resulting in a reduction in efficiency of synthesis. Because the goal is to streamline RNA monomer synthesis, we have developed a structural analog of the 5'-OH dimethoxytrityl (DMT) protecting group, which while conjugated to an imidazole ring, aims to improve selectivity for 3'-OH phosphorylation via neighboring group participation. Synthetic methods for assembly of the protecting groups will be presented along with preliminary results from RNA synthesizer compatibility.

Orange Is the New Everything: Does the Public Think that Rehabilitation Can Decrease Overcrowding

Kaitlyn P. Hall and Shari Valentine, Ph.D.

Henderson State University

Overcrowding is one of the most prominent issues in the American prison system. It causes many problems with the inmates such as health concerns, physical abuse, mental instability, and increased rates of recidivism. In this Sociological study, I presented my literary findings to 16 community members who claimed they had little knowledge of the prison system. I gave them a pre-test to measure their knowledge before presenting them with this information, and a post-test after for comparison. My goal was to see if presenting them with information about the prison system, overcrowding, and recidivism would make the respondents change their minds about prisons, and if they would feel the need to become more educated about these issues. Of the 16 respondents, the pre-tests showed that 43.8% claimed to be somewhat educated about prison; 56.3% of respondents had a low confidence in the nations use of incarceration as punishment for nonviolent and drug offenders; 81.3% did not know what recidivism is; and 68.6% were willing to pay more in taxes to an alternative method such as rehabilitation. The post-test showed that 82.6% claimed to be educated about prison; 100% think that rehabilitation can decrease crime rates and recidivism rates; 75% were willing to pay more taxes to an alternative method such as rehabilitation; 87.6% of respondents had a low confidence in the nations use of incarceration as punishment for nonviolent and drug offenders; 93.8% thought that rehabilitation could decrease overcrowding; and 68.8% said that knowing the information presented to them changed the way they felt about incarceration. If the general public would have greater access and knowledge about the American prison system, then the public would feel the need to push for more rehabilitation programs, and issues such as recidivism and overcrowding would decrease immensely.

Contact Mechanics of Non-layered and Layered Nitinol-60 Ball Bearings

Caleb D. Johns and Brad A. Miller, Ph.D

Harding University

Nitinol-60 (60NiTi) is being explored by NASA as a material for ball bearings in spacecraft applications because of the alloy's super-elastic properties. The contact stiffness and resulting internal stress behavior of 60NiTi ball bearings are quantified by examining the contact mechanics between a singular ball and the race groove of the inner or outer ring. Hertzian analysis is used to model the contact mechanics of the ball and race, assuming that both bodies are fully elastic. Additionally, preliminary results are presented for the effect of a thin layer that is applied to the surface of 60NiTi bodies within the bearing. Existing work for layered, identical bodies in circular contact is reviewed with the objective of transitioning to the case of elliptical contact between bodies of differing geometries and material properties.

Ambiguous nucleosides that heighten the HIV error load: Using viral mutagenesis to develop antiviral agents

Rachel King and Vincent K. Dunlap, Ph.D

Henderson State University

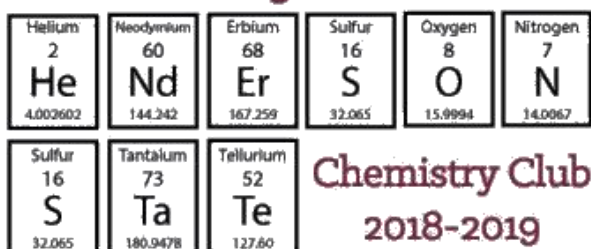
Human Immunodeficiency Virus (HIV) creates an incurable infection that uses the replication mechanisms of the host against itself. There are compounds used to treat HIV, but the host is often adversely affected by the treatment. Reverse transcriptase, the enzyme responsible for viral genome duplication, experiences a high degree of mutation and this has been responsible for the slow progression of HIV antiviral treatment. This high degree of mutation leads to a high error load that this study hopes to manipulate and use against the virus. We are developing cytosine-based nucleosides that we hypothesize will undergo tautomerization and consequently, scramble their hydrogen bonding faces thus creating greater mispairing. As it is hypothesized that the HIV genome operates near an "error threshold", introduction of the tautomer with ambiguous hydrogen bonding into the replication process will lead to an "error catastrophe" and destabilize the replicated duplex thus jettisoning virally infected cells. Design and synthesis of the bicyclic cytosine analogs will be discussed in addition to preliminary work on the spectroscopy of the compounds and oligonucleotide integration.

Chapter activities for the Henderson State University Student Affiliate Chapter in 2018

Susana Loarca, Nathan Steadman, Jacquelyn Mosely, Chelsea Stephens, Carlie Clem, T. David Bateman, Ph.D., and Brad A. Rowland, Ph.D.

Henderson State University

I'm in my element.



The Henderson State University Student Affiliate Chapter (aka Chem Club) has been actively working in the areas of community outreach, service, and extracurricular activities. To these ends, the Chem Club Charter was updated this past year to introduce organizational changes in the leadership structure of the Club which will allow the Club to more effectively plan and execute events while involving more members in these activities. Namely the Club now has three new Committees—a Green Committee which will coordinate the Club's Green Chemistry work; a

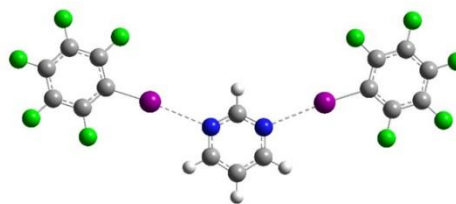
Finance Committee which seeks to discover new avenues and methods for fundraising; and a Social Committee which seeks to increase the number and participation in the Club's social events. The Chem Club will highlight the work of each of these committees and compare this year's outcomes with prior year's results. Additionally, the traditional activities of the club will be discussed: community outreach, focusing on activities such as Tinkerfest, Family Science Night, and the Garland County Library; service activities, including Henderson Halloween, tutoring, and our work at the Garland County Library; and extracurricular activities include brewery tours, environmental sampling trips, hikes, cookouts, and potlucks. Members of the Chem Club attended the Southwest Regional Meeting in Fall 2018, held in Little Rock, Arkansas. The Chem Club actively continues to pursue and promote the ideals embodied in Green Chemistry this academic year as an ongoing and sustained effort to promote Green Chemistry on our campus.

Computational study of halogen bonding in nitrogen containing rings

Jacquelyn Mosely, Thomas L. Ellington, and Gregory S. Tschumper, Ph.D.

University of Mississippi and Henderson State University

The purpose of this project was to study the additivity effects of halogen bonding. Previous works completed by experimentalists hypothesized a correlation between the binding energies and vibrational frequency stretches of halogen bonded complexes. This research tested that hypothesis with pyridine, pyrimidine, and triazine as the complex acceptors. Each acceptor system contained up to three halogen bond donors based on the number of nitrogen binding sites within the acceptor used. In total, 24 halogen bond complexes were studied using the program Gaussian16 utilizing the resources provided by the Mississippi Center for Supercomputing Research. Geometry optimizations were performed utilizing M06-2X DFT with double and triple zeta basis sets with diffuse functions, providing the data needed to compute harmonic frequency calculations. Energy values and vibrational frequency stretch values were taken from the data and compared for additivity correlation purposes. It was determined no correlation existed between the complexes' binding energies and vibrational frequency stretches. This is inconsistent with the hypothesis provided by experimentalists.



A Study of Religion and Moral Decision-Making

Brady Nix and Paul Williamson, Ph.D.
Henderson State University

The purpose of this study is to examine the relationship between religion and morality. More specifically, we will examine whether there is a significant difference in the moral judgments made by more religious and less religious participants. To investigate this issue, we created 4 moral scenarios to which participants responded using a 7-item Likert type scale. Two scenarios involved crimes such as petty theft, and the other two involved more serious actions including the humane killing of a wounded wolf and the killing of another person for revenge. Once participants rated the moral scenarios, they completed the Centrality of Religiosity Scale and the Intratextual Fundamentalism Scale as religiosity measures. We presently have collected data from 67 participants to be analyzed shortly. Although high levels of religious commitment and religiosity are often thought to be more strongly related to moral judgments than lower levels, we expect that correlation and regression analyses will show there to be no direct relationship between the religion and moral judgments.

Texarkana's African-American Community Before Integration

Olivia Parks, Andrew McGregor, Ph.D., and Jaime Cantrell, Ph.D.
Texas A&M University--Texarkana

This project (undertaken under faculty mentorship as part of the Academic Honors Program) examines the experiences of and challenges facing the African-American community in northeast Texas/southwestern Arkansas during the middle of the twentieth century. This was a period of rapid economic and population growth, as well as of segregation and racial animosity. The primary investigative approach is through a series of interviews with members of the African-American community who speak from a variety of experiences and backgrounds. The final project will incorporate these voices into a public history project and exhibit.

Effect of Motivational Program on Cognitive Burnout in University Students

Nathan Price and Aneeq Ahmad, Ph.D.
Henderson State University

Fifty male and fifty female junior-senior students from Henderson State University will be selected for this study ranging in age from 22-35 years. Individuals using drugs for psychological or physical conditions, pregnant, under academic accommodations or probations would be excluded from the sample. To test burnout we will use Copenhagen Burnout Inventory (CBI, see Appendix A), which measures burnout in any occupational group. This inventory consists of 13 questions that focus on personal, and work related areas with the exclusion of client-related. The Academic Motivation Survey (AMS) will measure motivational levels of the students before and after the motivational program is complete (see appendix B). In the packet is the motivational program which primed students to frame their academic possible identity using the goal-as-journey metaphor, a (goal-as-contained-entity), and past academic achievements. The study will employ a 3(Academic Burnout) X 2(Gender) X 2(Phase X S) mixed multifactor design; where academic burnout will be screened at three levels, low, moderate and high and gender at two levels men and women. The dependent variable, academic motivation will be measured by Academic Motivation Survey and data will be analyzed with a multifactor between-subject Analysis of Variance (ANOVA), followed by post-hoc Tukey Test. All participants will be tested in group settings (classes they were in) were given brief description of the study will be given. Participants will be asked to sign a consent form before continuing with the study; and will be compensated with extra credit for a course of their preference. Personal information about the participants will be kept confidential and anonymous, especially when data is handled. Each participant will be given a packet to complete with their demographic information (age, gender etc.) followed by completing the AMS and CBI. The CBI will divide the group into three levels off burnout. This will be followed by a motivational program; and the participants will then be asked to complete AMS again. The experimental session will end after entertaining questions from the participants.

Social media use among college students: patterns, motives, and preferences.

Ja'Narian Rivers and Nokon Heo, Ph.D.

University of Arkansas at Pine Bluff

This study examines college students' social media use behaviors. Specifically, an online survey was conducted to explore the relationships between social media use motives and their usages. To provide theoretical guidance to the study, the uses and gratification theory was used that helped to identify key reasons for using social media, such as impression management and presenting self, as well as entertainment and information acquisition. The result also revealed a significant connection between certain motives and usage which not only validated the theoretical underpinnings of the theory and provided practical implications for social media marketers or communication content strategists. This study provides an in-road for future studies that compare social media usage and preferences among diverse groups of users.

The Role and Effects of the Boys and Girls Club of America on Communities Across Arkansas

Keanna D. Slayton and Matthew Sutherlin, Ph.D

Henderson State University

This study will examine the role of youth programs in communities that have experienced the loss of a Boys and Girls Club Program. There are many communities across the United States that have experienced a shut down. Studies show that programs geared towards uplifting and encouraging the youth are beneficial to their success in the future and help communities thrive. During the school year, these programs provide after school care. The after-school care programs offer enrichment classes and act as a haven for kids and teens while their families are working. These programs keep students off the streets and reduce the risk of drug use and criminal behavior. The Boys and Girls Club Impact Outcome reported that members experience "less contact with juvenile justice system and fewer delinquent behaviors (stealing less, less likely to start smoking marijuana). Physical activity is also an added benefit from these programs, as the rate of obesity is reduced, and health-conscious foods are provided. Furthermore, The Boys and Girls Club Impact Outcome reported "thus far, 740 Club sites have adopted healthy eating and physical activity standards, benefiting more than 100,000 youth ages 6 to 18". This study will investigate the impact of The Boys and Girls Clubs of America in Hot Springs and Arkadelphia, Arkansas. Hot Springs and Arkadelphia are a few of the towns that have experienced a shutdown of their programs. The shutdown has left both communities with one less after-school and summer program available for children and youth.

Design of methylene blue analogs as contrasting dyes for sentinel node biopsy

Nathan Steadman, David Thompson, and Vincent K. Dunlap, Ph.D

Henderson State University

Methylene blue is a dye used in sentinel lymph node identification in breast cancer patients to determine if the cancer has metastasized. However, a contrasting dye is necessary to distinguish lymph channels in the breast from lymph channels in the arm to minimize complications from lymphedema. Our goal is to develop a new dye agent based around the low toxicity methylene blue structure to achieve a distinguishable wavelength. Our current strategy involves incorporation of sulfanilamide with methylene blue to achieve the bathochromic shift necessary to give a strong contrast while maintaining low toxicity. Understanding that the sulfanilamide group is often linked to allergic responses, other functional groups are being explored to reach these goals. Presented here are the preliminary findings on synthesis of the methylene blue sulfanilamide analogs and the excitation/emission profiles associated with them.

Imidazolium-based ionic liquid polyesters

Ray Weldon and Martin J. Campbell, Ph.D.

Henderson State University

With a goal of preparing a new series of main-chain ionic liquid based polyesters, preparation and characterization of various 1,3-disubstituted imidazolium monomers is reported. Michael addition between various acrylate esters and imidazole followed by quaternization with various omega-haloalcohols gives difunctional imidazolium ionic liquids with varying carbon side chain lengths. These ester alcohols are expected to polymerize via acid-catalyzed transesterification following traditional polyester protocols. The purified individual monomers, however, as ionic liquid salts, are expected to have little to no detectable vapor pressure. Thus, any non-polymerized monomers will contribute negligible odor to the resulting polyesters, potentially making them suitable for use in closed environments where even residual low level organic-based air pollution is significant.

Religious Fundamentalism & Child Abuse

Lucas K. Wheatcroft and Malcolm L. Rigsby, Ph.D.

Henderson State University

Religious fundamentalism is a significant subtopic in the areas of child abuse and perceived identity of self as it goes beyond physical, verbal, and emotional abuse. Corporal punishment and right-winged authoritarianism may do more than good when tied in with strict biblical adherence, exacerbating the likelihood of developing depression, anxiety, and issues in question with sexual identity and expression. Using a 20-item survey, the researcher measured 160 undergraduate students' opinions and attitudes to examine how respondents from various majors and religious faiths perceive excessive religiosity and its impact on the years of formation.

Synthesis of a family of antimalarial lead molecules

Emily E. Williford and Martin J. Campbell, Ph.D.

Henderson State University

According to the World Health Organization, there were an estimated 219 million cases of malaria and 435,000 related deaths in 2017. Despite the success of artemisinin-based combination therapies, the parasite has rapidly developed drug resistance, posing a great threat to malaria control. Therefore, there is need for new artemisinin codrugs as well as new classes of anti-malarials. Recently, GlaxoSmithKline and other organizations have published a variety of vetted structural motifs that are potential candidates for the next line of antimalarials. Currently, we are investigating the synthesis of a series of tertiary cyanobenzamides based on a structural motif reported by GlaxoSmithKline in 2011. We report progress to date on a convergent synthesis route to a variety of these benzamides bearing substituted imidazole groups as well as a small alkyl group.

The use of communication technology and its influence on college student's social/psychological well-being.

Kiana Wilson and Nokon Heo, Ph.D.

University of Arkansas at Pine Bluff

This study investigates the social/psychological well-being of a communication technology use, namely social media. A vast majority of young Americans embrace social media in their everyday lives. Although social media and other communication technologies help young Americans fulfill their daily communication and social needs, previous research also reveals the potential for negative effects of social media, particularly among heavy users. An online survey was conducted among college students to test a possible connection between social media usage and symptoms of depression and anxiety, life expectations, self-image, and academic performance. Although we found several antecedents of social media usage and their consequences on social-being, the result also revealed a possible direct link between the usage and various indicators of social-wellbeing. The results lend support to the existing body of work and also shed new light on how communication technology influences its users in an unexpected way.

Index of all Authors

Alphabetical by first name

Andrew McGregor, Ph.D., 16
Aneeq Ahmad, Ph.D., 12, 16
Ava Baghestani, 12
Brad A. Miller, Ph.D., 14
Brad A. Rowland, Ph.D., 15
Bradley Rowland, Ph.D., 8
Brady Nix, 16
Caleb D. Johns, 14
Carlie Clem, 15
Chelsea Stephens, 15
Daniel Gibson, 13
David Thompson, 17
Destiny Amos, 12
Emily E. Williford, 18
Gregory S. Tschumper, Ph.D., 15
Jacquelyn Mosely, 15
Jaime Cantrell, Ph.D., 16
Ja'Narian Rivers, 17
Kaitlyn P. Hall, 13
Keanna D. Slayton, 17
Kelsey Malone, Ph.D., 12
Kiana Wilson, 19
Lucas K. Wheatcroft, 18
Malcolm L. Rigsby, Ph.D., 18
Martin J. Campbell, Ph.D., 18
Matthew Chappa, 13
Matthew Sutherlin, Ph.D., 17
Nathan Price, 16
Nathan Steadman, 15, 17
Nokon Heo, Ph.D., 17, 19
Olivia Parks, 16
Paul Williamson, Ph.D., 16
Rachel King, 14
Ray Weldon, 18
Shari Valentine, Ph.D., 13
Susana Loarca, 15
T. David Bateman, Ph.D., 6, 8, 10, 13, 15
Thomas L. Ellington, 15
Travis Langley, Ph.D., 8, 9, 10
Travis Langley, Ph.D., 8, 9, 10
Vincent K. Dunlap, Ph.D., 13, 14, 17

Meeting Announcement

27th Annual
Arkansas Undergraduate Research Conference

T.B.D.

Henderson State University

For all information, to submit your abstract, and to register,

www.hsu.edu/undergraduate-research

For information, contact Dr. David Bateman, batemat@hsu.edu