7th Annual Symposium of Artists & Scholars
Celebrating Student Excellence
April 23 & 24, 2015
# Randolph College

<table>
<thead>
<tr>
<th>Number</th>
<th>Location Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Smith Memorial Building and Smith Hall Theatre</td>
</tr>
<tr>
<td>2</td>
<td>Wright Residence Hall</td>
</tr>
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<td>3</td>
<td>Cheatham Dining Hall</td>
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<td>4</td>
<td>Bell Residence Hall</td>
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<td>5</td>
<td>Houston Memorial Chapel</td>
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<td>6</td>
<td>The Pines Cottage</td>
</tr>
<tr>
<td>7</td>
<td>Winfree Observatory</td>
</tr>
<tr>
<td>8</td>
<td>The Mabel K. Whiteside Greek Theatre (The Dell)</td>
</tr>
<tr>
<td>9</td>
<td>Terrell Health and Counseling Centers</td>
</tr>
<tr>
<td>10</td>
<td>Webb Residence Hall</td>
</tr>
<tr>
<td>11</td>
<td>West Residence Hall, Campus Store, Caldwell Commons, Center for Student Research</td>
</tr>
<tr>
<td>12</td>
<td>Thoresen Hall (Admissions Office)</td>
</tr>
<tr>
<td>13</td>
<td>Sundial</td>
</tr>
<tr>
<td>14</td>
<td>Main Hall (Reception and Information Desk, Student Center, Campus Safety &amp; Security, administrative offices, classrooms, residence hall)</td>
</tr>
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<td>15</td>
<td>Even Post</td>
</tr>
<tr>
<td>16</td>
<td>Odd Tree</td>
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<tr>
<td>17</td>
<td>Gazebo</td>
</tr>
<tr>
<td>18</td>
<td>Psychology Building</td>
</tr>
<tr>
<td>19</td>
<td>Moore Residence Hall</td>
</tr>
<tr>
<td>20</td>
<td>Mary's Garden</td>
</tr>
<tr>
<td>21</td>
<td>Lipscomb Library</td>
</tr>
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<td>22</td>
<td>Botanic Garden</td>
</tr>
<tr>
<td>23</td>
<td>Martin Science Building</td>
</tr>
<tr>
<td>24</td>
<td>Presser Hall and The Wimberly Recital Hall</td>
</tr>
<tr>
<td>25</td>
<td>Norfolk House</td>
</tr>
<tr>
<td>26</td>
<td>Randolph Athletics and Dance (RAD) Center</td>
</tr>
<tr>
<td>27</td>
<td>Leggett Building and Thoresen Theatre</td>
</tr>
<tr>
<td>28</td>
<td>Maier Museum of Art at Randolph College</td>
</tr>
<tr>
<td>29</td>
<td>Tennis Courts</td>
</tr>
<tr>
<td>30</td>
<td>WildCat Stadium</td>
</tr>
<tr>
<td>31</td>
<td>Softball Field</td>
</tr>
<tr>
<td>32</td>
<td>Margaret's Gate</td>
</tr>
<tr>
<td>33</td>
<td>Riding Center</td>
</tr>
<tr>
<td>34</td>
<td>Doyle House</td>
</tr>
<tr>
<td>35</td>
<td>Butler House</td>
</tr>
<tr>
<td>36</td>
<td>Casey Alumnae House</td>
</tr>
<tr>
<td>37</td>
<td>Campus Mailroom</td>
</tr>
<tr>
<td>38</td>
<td>Rivermont House</td>
</tr>
<tr>
<td>39</td>
<td>Organic Garden</td>
</tr>
<tr>
<td>40</td>
<td>Academic Services Center</td>
</tr>
<tr>
<td>P</td>
<td>Parking Area</td>
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<tr>
<td>AP</td>
<td>AP Admissions Parking</td>
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</tbody>
</table>

![Campus Map](image-url)
The Symposium of Artists and Scholars celebrates the scholarship and creativity of the Randolph College student body through two days devoted entirely to our students’ accomplishments.

The College’s seventh Symposium brings together students from numerous academic areas to share their research and creative projects with the campus and greater Lynchburg communities.

The Symposium features student scholarship in subject areas ranging from physics and biology to history and art. The presentations highlight the interdisciplinary and multidisciplinary themes that emerge in a liberal arts environment.

The abstracts in the program attest to the original work students have produced in their courses, senior theses, summer research experiences, and independent projects.
April 23, 2015

Dear Symposium Attendee,

Welcome to Randolph College’s 2015 Symposium of Artists and Scholars.

What an exciting way to showcase the liberal arts at work here at Randolph College! You often hear people question the value of the liberal arts in today’s world. The truth is, this type of education is more important and valuable than it has ever been. No longer do individuals stay with the same company and position their entire career. Colleges and universities must prepare students to succeed in a world filled with constant change. We are charged with preparing students for a lifetime of work, not just a single job.

Randolph College’s mission is to prepare students to engage the world critically and creatively, live and work honorably, and experience life abundantly. Since the College’s founding in 1891 as Randolph-Macon Woman’s College, this institution has remained dedicated to providing an excellent liberal arts education. That has not, nor will it ever, change. Today, 124 years later, our students continue to rise to the challenges set before them by their talented professors.

The presentations, posters, and exhibits featured in this year’s Symposium reflect the variety of disciplines we offer at Randolph College, and they are just a sampling of the learning that takes place on this campus each year. Thanks to the dedication of our nationally ranked faculty members, our students have the opportunity to develop close relationships with faculty mentors and often partner with their professors on important research. We are fortunate to be able to share the results of these endeavors each year during this Symposium of Artists and Scholars.

I would like to thank the committee members who worked hard to organize this Symposium as well as all of the students who submitted proposals. I am especially appreciative of the dedicated faculty members who go beyond their responsibilities in the classroom to foster and nurture these scholars and artists.

I hope that you enjoy Randolph College’s 2015 Symposium of Artists and Scholars.

Sincerely,

Bradley W. Bateman
President
abstracts

INDEX

Abbasi, Auzeen ............................................................. p.7
AbuAlghanam, Bashar ................................................ p.7
Ashby, Monica .............................................................. p.16
Boucher, Amanda ........................................................... p.6
Case, Tammy ................................................................. p.19
Castillo, Lauren ............................................................. p.15
Charlon, Clark ............................................................... p.9
Clinkenbeard, Jordan .................................................... p.13
Collier, Courtney .......................................................... p.10
Conrad, Brianne ........................................................... p.8
Cottone, Sarah- Elizabeth ............................................. p.18
Cutkelvin, Kelia ............................................................. p.18
Decker, Chelsea ............................................................ p.9
Diehl, Kelsey ................................................................. p.14
Dorman, Seth ................................................................. p.18
Dunton, Emilee ............................................................. p.11
Edwards, Savannah ....................................................... p.18
Eisele, Melanie .............................................................. p.15
Elliot, Teague ................................................................. p.19
Everett, Alyssa .............................................................. p.6
Ezinga, Thea ................................................................. p.19
Fischer, Amanda ........................................................... p.6
Fitzgerald, James ........................................................... p.12
Frye, Callan ................................................................. p.11
Funk, Heather ............................................................... p.13
Gafford, Beth ............................................................... p.8
Gardiner, Grace ............................................................ p.11
Garrison, Cameron ......................................................... p.9
Gillespie, Hart ............................................................... p.12
Groff, Olivia ................................................................. p.16
Hammons, Brittany ........................................................ p.8
Harrington, Alexis ........................................................ p.6
Harris, Jessica ............................................................... p.13
Haut, Hagay ................................................................. p.10, 12
Henson, Sydney ............................................................ p.18
Hoke, Morgan ............................................................... p.15
Hoover, Jensen ............................................................. p.13
Hughes, Ashlie ............................................................. p.13
Humphreys, Meredith ................................................... p.15
Hynes, Meaghan ........................................................... p.15
Klostermyer, Franziska ................................................ p.11
Lange, Victoria ............................................................. p.20
Leo, Rebekah ............................................................... p.16
Lewis, Danielle ............................................................ p.20
Maggard, Samantha ..................................................... p.18
Mahon, Ryan ............................................................... p.8
Mangano, Anthony ....................................................... p.7
Mason, Lauren ............................................................. p.17
McRorie, Aaron ........................................................... p.6
Meadows, Ellen ........................................................... p.10
Morgan, Averie ............................................................ p.7
Nguyen, Hoa ............................................................... p.12
Nguyen, Thao ............................................................. p.17
Nguyen, Tu ................................................................. p.20
Niketic, Dara ............................................................... p.7
Oliver, Nikolas ............................................................. p.16
Pandey, Shreeya .......................................................... p.10
Patterson, Mark ........................................................... p.14
Peisher, Ashley ........................................................... p.7
Pham, Harris ............................................................... p.12
Pham, Ngoc “Kelly” ...................................................... p.15
Phung, Dang “Dan” ....................................................... p.10
Poudyal, Sandeep ......................................................... p.17
Purrrington, Ryan ......................................................... p.17
Ramsey, Michael ........................................................ p.10
Richards, Emily ........................................................... p.13
Rose, Dominique ........................................................ p.10
Rush, Paul ................................................................. p.16
Shrestha, Pujan ............................................................ p.16, 17
Shrestha, Yashaswi ....................................................... p.20
Smith, Evan ............................................................... p.11
Smith, Timothy ........................................................... p.20
Snell, Laura ................................................................. p.14
Snyder, Katie ............................................................... p.14
Spencer, Jessy ............................................................. p.13
Stacey, Laura .............................................................. p.15
Suh, Young-Jun ........................................................... p.10
Sumner, Claire ........................................................... p.9
Taylor, Sally ............................................................... p.17
Terlizzi, Sarah ........................................................... p.16
Tran, Phuong .............................................................. p.16
Trieu, Diep “Penny” ...................................................... p.10
Umbarger, Alyssa ........................................................ p.9
Vasta, Erin ................................................................. p.11
Weierbach, Luke ........................................................ p.14
Wood, Brandon .......................................................... p.8
Woodward, Sara ........................................................ p.10
Zhang, Zhe ............................................................... p.20
THURSDAY, APRIL 23, 2015

PRESENTATIONS

4:30–5:45 P.M.  Nichols Theatre, Student Center

Session 0a:
- Jessy Spencer, “myActions: The Social Network for the Planet”
- Brandon Wood, “Gender Representation in Ephemeral Horror Stories: An Examination of Creepypasta”
- Hart Gillespie, “Three Years of Research at Winfree Observatory”
- Anthony Mangano, “The Effect of Aerobic Exercise on Cognitive Function”

4:30–5:45 P.M.  Quillian Conference Room, Student Center

Session 0b:
- Meredith Humphreys, “Kinesthetic Movement and Math: Effects on Females’ Perceived Achievement”
- Aaron McRorie, “The Effect of Problem-Based Labs on Student Retention of Information in a Secondary Biology Classroom”
- Thea Ezinga, “Patriotism, Protestantism, and Personal Vision in Caspar David Friedrich’s Tombs of the Fallen in the Fight for Independence (Tombs of Ancient Heroes) (1812)”
- Cameron Garrison, “Increasing Test Scores of Secondary Biology Students with the use of Multisensory Education”
- Emilee Dunton, “The Science behind Questioning in a Third Grade Math Class”

KEYNOTE ADDRESS

7:00–8:00 P.M.  Nichols Theatre, Student Center

Kelley Swain ’07
“The Picture and the Frame: The Value of Uncertainty”

PRESENTATIONS (CONTINUED)

8:10–9:25 P.M.  Nichols Theatre, Student Center

Session 1a:
- Amanda Boucher, “Rusted Clockwork and Other Poems”
- Nikolas Oliver, “The Unofficiant: An Essay on Marriage Equality, Authority and Internet Ordinations”
- Beth Gafford, “History Should Not Always Repeat Itself: Giving Children a Choice in Spelling”
- Grace Gardiner, “The Art of Losing”
- Chelsea Decker and Alyssa Umberger, “Metal Contamination in Rainwater Harvesting Systems”

8:10–9:10 P.M.  Quillian Conference Room, Student Center

Session 1b: “Perception & Reality”
- Olivia Groff, “Improving Ninth Grade Students’ Grammar Skills through Journal Writing”
- Evan Smith, “Creating Spaces of Liberation Through Transgender and Cisgender Solidarity”
- Katie Snyder, “Line into Life: Realism in Degas’s dancers at the Impressionist Exhibitions, 1874-1886”
- Meaghan Hynes, Morgan Hoke, Laura Stacey and Lauren Castillo “Equine Heart Rate Monitor Research”

FRIDAY, APRIL 24, 2015

1:15–2:30 P.M.  Nichols Theatre, Student Center

Session 2a:
- Phuong Tran, “Teknolust (2002) and Agent Ruby (2002-): An Exploration of Cyborg Imageries in Lynn Hershman Leeson’s Feminist Visual Art”
- Bashar AbuAlghanam, “A Media Cr(ISIS): The Use Of Social Media by ISIS”
- Savannah Edwards, “Increasing Test Scores of Secondary Biology Students with the use of Multisensory Education”
- Erin Vasta, “SkunkDrunk”

1:15–2:30 P.M.  Quillian Conference Room, Student Center

Session 2b:
- Melanie Eisele, “The Effect of Physical Activity on Academic Achievement in a High School Science Classroom”
- Diep “Penny” Trieu, “Modes of Social Network Sites Usage and Narcissism”
- Jordan Clinkenbeard and Ashlie Hughes, “The Influence of Pro Social Behavior on Children’s Deception”

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PRESENTATIONS (CONTINUED)

• Jensen Hoover and Heather Funk, “The Polarization of Politics: Are There Physiological Differences Between Liberals and Conservatives?”
• Seth Dorman and Kelia Cutkelvin, “Cataloging A Legacy: Walter Weber’s Historic Bird Collection”

2:45–4:00 P.M. Nichols Theatre, Student Center

Session 3a:
• Auzeen Abbassi and Dara Niketic, “The Microbiology of Slow Sand Filtration”
• Dang “Dan” Hai Phung, “CO2 Sequestration: Mature and Secondary Forest”
• Tu Nguyen, “Assessing Health Risks From the Use of Rainwater for Toilet Flushing”
• Franziska Klostermyer and Callan Frye, “Skeletons in our Closet: The Four Lives of the ‘Gamma Skeleton’”
• Ellen Meadows, “‘Arden of Faversham’ as a Power Play”

2:45–4:00 P.M. Quillian Conference Room, Student Center

Session 3b:
• Paul Rush III, “Food Recovery: Reducing Hunger in Our Community”
• Claire Sumner, “Rediscovering Fame: Tracing the Inspiration for Guidobaldo Della Rovere’s Sixteenth-Century Fame Armour”
• Sarah-Elizabeth Cottone, “Visual Representation of Alice in Alice in Wonderland”
• Averie Morgan, “Jaguars in the Southern United States: Can They Recover?”
• Amanda Fischer, “Senior Choreography”

4:15–5:45 P.M. Hampson Commons, Student Center

POSTER/EXHIBIT SESSION AND RECEPTION (CONTINUED)

• Pujan Shrestha, “Smartphone Inertial Navigation”
• Pujan Shrestha, “Competitive Cellular Semi Automata”
• Ryan Purrington, “Effect of Student Choice of Classroom Activities on Achievement”
• Sydney Henson, “The School Year SPED by With a SMART Motivation Technique”
• Clark Charlton, “Social Communication-A Case Study in a Classroom Setting”
• Jessica Harris, “Preschool learning Using Play Based Curriculum”
• Brittany Hammons, “Technology Integration in Guided Reading Groups in an Elementary Classroom”
• Courtney Collier, Hagay Haut, Shreeya Pandey, Dang Phung, Michael Ramsey, Young-Jun Suh, and Sara Woodward, “The Tiny House at the Tiny College: Design and Assessment of Sustainable Micro-Housing Alternatives”
• Alyssa Everett, “The Antioxidant Capacities of Berries”
• James Fitzgerald Jr., “The Effects of physical Activity Breaks on Students On-task behavior”
• Luke Weierbach, “Physical Activity helps Raise Unit Scores for Students in an inclusion Classroom”
• Sandeep Poudyal and Lauren Mason, “Pitch of Voice and Type of Pick-up Line Both Impact Desirability”
• Alexis Harrington, “The Antioxidant Capacity of Red Wine”
• Tammy Case, “Do You Want a Worksheet with That? A Qualitative Study on Creating Choice in Elementary School Classrooms”
• Timothy Smith, “The Effect of Student Choice in Reading materials on Science Content Comprehension”
• Ngoc “Kelly” Pham, “Sequence Analysis of Mitochondrial DNA from Human Tooth Samples in the Randolph College Natural History Collection”
• Hoa Nguyen, “The story of Haiti - Volunteer in Haiti and life experience in Haiti”
• Laura Snell, “Boundaries of Existence”
• Ashley Peisher, “SETC Design Competition Entry - ’No Exit’ Costumes”
• Harris Pham, “A Museotic Exploration of London”
• Teague Elliott, “Evolving Compositional Technique in Two Piano Pieces”
• Brianne Conrad and Ryan Mahon, “Linking Nutrient Enrichment, Sediment Erodibility and Biofilms”

POSTER/EXHIBIT SESSION AND RECEPTION

• Yashaswi Shrestha, “Detecting Lead in Sunflowers”
• Victoria Lange and Danielle Lewis, “Exploring Gender Research at Interdisciplinary Conferences”
• Kelsey Diehl, “Puzzle Landscape paintings”
• Dominique Rose, “Transformation of Malcolm X”
• Sally Ruth Taylor and Thao Nguyen, “Improving Food Security in Lynchburg Using Community Centers”
• Mark Patterson, “3D Scanning Accuracy Using 1-2-3-Blocks”
• Zhe Zhang, “Portable Water Filter”
• Samantha Maggard, “Differentiated Instruction and Assessment as a Path Towards Increased Student Learning: A Special Education Case Study”
• Monica Ashby, Sarah Terlizzi, and Rebekah Leo, “Modern Case Studies in International Humanitarian Law; Successes and Challenges of Genocide Law”
PRESENTATIONS

Aaron McRorie MAT ’15
“The Effect of Problem-Based Labs on Student Retention of Information in a Secondary Biology Classroom”
Faculty Mentor: Cheryl Lindeman, Assistant Professor of Education
For today’s students, the pressure to perform, both in the classroom and on standardized assessments is tremendous. Performing well in this competitive environment requires students to process large amounts of information and recite it back to the teacher in a short time frame. This sort of informational brain dumping naturally leads us to ask the question, “Are students really learning the material?” Inquiry-based learning research asserts that students learn better when they interact with topics through the lens of a professional, rather than that of a student. This study looks at the effects of inquiry-based labs on the long-term retention of information in a secondary biology class. The hypothesis of this study is that through technologically enhanced inquiry-based activities, students will retain information over a longer period of time, thus making a more personal connection with the content.

Alexis Harrington ’15
“The Antioxidant Capacity of Red Wine”
Faculty Mentor: Ann Fabirkiewicz, Professor of Chemistry
Red wine is known for offering an abundance of antioxidants. An antioxidant is a substance that opposes oxidation or inhibits reactions promoted by oxygen or peroxides. Antioxidants are enzymes or other organic substances that are capable of counteracting the damaging effects of oxidation in animal tissues. In this research project, three different red wines were analyzed. Each wine sample was separated into three different antioxidant fractions and then three colorimetric assays were used to analyze the fractions, or measure the amount of antioxidants in each. The results will surprise you!

Alyssa Everett ’15
“The Antioxidant Capacities of Berries”
Faculty Mentor: Ann Fabirkiewicz, Professor of Chemistry
Berries contain significant amounts of various antioxidants, including anthocyanins and polyphenols. In this study, the antioxidants from strawberries, blueberries, and raspberries will be extracted, separated from other compounds and sugars existing in the berries via column chromatography, and analyzed using the FRAP, Vanillin, and Folin-Ciocalteu assays. The FRAP assay measures general antioxidants, the Vanillin assay measures anthocyanins, and the Folin-Ciocalteu assay measures polyphenols. Upon analysis, the antioxidant concentration of the two different classes will be determined, allowing a comparison to be made between each berry with respect to these classes. Do blueberries, raspberries, or strawberries have more antioxidants? Some are high in one class of antioxidants, but lower in another. Only the experiment will tell!

Amanda Boucher ’15
“Rusted Clockwork and Other Poems”
Faculty Mentor: Gary Dop, Assistant Professor of English
“Rusted Clockwork and Other Poems” is a collection of seven poems I have worked on during my time at Randolph College. I originally established this collection as a member of Sigma Tau Delta, the International English Honor Society. I was accepted to present this writing at the Annual Convention in Albuquerque, NM, in March 2015. My attendance at this convention was made possible by the RISE Grant. I would like to share my writing with the community, because it is this community that has helped me to reach my highest potential as an artist and a scholar.

Amanda Fischer ’15
“Senior Choreography”
Faculty Mentor: Pam Risenhoover, Charles A. Dana Professor of Dance
This project was funded by Randolph College’s RISE Grant and attempted to supplement my senior choreography project. The funds allowed me to purchase a MacBook Pro, a Canon EOS Rebel T3i D-SLR camera, a memory card, and a tripod. I filmed each rehearsal and the progress made, and made each video available to my dancers in the hopes that they could use it to become more familiar with the choreography and to self-critique. I also filmed my
choreography process in order to have a reliable record of my ideas. All of these videos were uploaded to Youtube and shared through Facebook for ease of access. The end result of this project allowed me to present choreography that is more cohesive and my performers have a better understanding of the movement.

**Anthony Mangano ’15**

“The Effect of Aerobic Exercise on Cognitive Function”
Faculty Mentor: Cheryl Lindeman, Assistant Professor of Education
Childhood obesity and obesity rates as a whole have continued to rise over the past few decades. This is alarming not only because of the health risks associated with obesity, but the potential effect it is having on students in the classroom. Research shows that obese and sedentary students perform worse in the classroom compared to their healthy counterparts. As students continue to have recess and physical education time cut from their school day, this information becomes more relevant. The purpose of this action research was to measure cognition before and after aerobic exercise in middle school students. Students were given a trail making test before and after exercise to measure any improvement in cognitive processing speed when completing the activity. It was hypothesized that students would have increased cognition speed after physical activity.

**Ashley Peisher ’15**

“SETC Design Competition Entry- ‘No Exit’ Costumes”
Faculty Mentor: Kenneth Parks, Associate Professor of Theatre/Design
Annually, undergraduate SETC (South Eastern Theatre Conference) members compete in theatrical design competitions. The student will be displaying her actualized costume design of Randolph College’s production of ‘No Exit’, which she presented at this year’s Undergraduate Costume Design. On display will be finalized renderings created with Adobe Photoshop, process renderings, sketches, process photographs, historical research images, and photos of the actualized production.

**Auzeen Abbassi ’15 & Dara Niketic ’15**

“The Microbiology of Slow Sand Filtration”
Faculty Mentor: Adam Houlihan, Assistant Professor of Biology
Slow sand filters employ biotic and abiotic processes to inactivate waterborne pathogens. The surface layer or “schmutzdecke” is essential for removal of pathogens. Little is known about the microbiology of the schmutzdecke. We constructed a filter prototype and passed contaminated water through it to establish a schmutzdecke. Total influent and effluent Escherichia coli bacteria were quantified weekly. A manure slurry was added to simulate passage of solid waste through the filter. After adding the slurry, effluent E. coli cell counts exceeded influent counts by several orders of magnitude. Therefore, improperly prepared slow sand filters can have opposite the intended effect, acting as reservoirs for pathogens. We designed a second prototype with improved filtration which filtered about 90% of bacteria from contaminated water. We then used molecular biology techniques to isolate and identify the bacteria found in the schmutzdecke that contribute to the filter’s effectiveness.

**Averie Morgan ’15**

“Jaguars in the Southern United States: Can They Recover?”
Faculty Mentor: Karin Warren, Associate Professor of Environmental Studies
Jaguars (Panthera onca) have lived all over the world since the Pleistocene era but the North and South American continents harbor the only remaining species of jaguar in existence today. Jaguars prefer dense rainforests but are adaptable to many other landscapes. Today, most of their breeding populations exist in the rainforests of South America but ranges extend into Mexico and a few have been sighted in southern US. Jaguars are considered threatened by the International Union for Conservation of Nature (IUCN) and listed as endangered under the Endangered Species Act. They face greater issues in the near future as humans continue to invade their territory. Restoring jaguars to their historical habitat in the southern United States would help with the biodiversity of the ecosystem. This could increase genetic diversity of the jaguars, which would increase their chance of survival during climate change and could result in a more resilient species.

**Bashar AbuAlghanam ’16**

“A Media Cr(ISIS): The Use Of Social Media by ISIS”
Faculty Mentor: Mari Ishibashi, Associate Professor of Political Science
In the past decade, terrorism has become a more prevalent threat than ever. The forces of globalization gave terrorist organizations the power to mobilize their radical beliefs throughout society. This power comes in the form of social media- a key player on the modern political stage. One of the rapidly emerging terrorist organizations is referred to as ISIS (or the Islamic State of Iraq and Syria). ISIS managed to distinguish itself by a strategic use of social media to recruit members, threaten ‘enemy’ states and attempt to establish legitimacy as well. The strategic use of social media by ISIS makes the organization seem more vicious and gruesome than its precedent organizations (such as Al-Qaeda). This research examines these media strategies and highlights the way in which they portray ISIS in contrast to its predecessor terrorist organizations.

Beth Gafford MAT ’15
“History Should Not Always Repeat Itself: Giving Children a Choice in Spelling”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
This study examined the effects of student choice in weekly spelling words on spelling test scores. Students in a second grade classroom were given weekly spelling tests as part of their normal routine for a four week period. Following an ABAB format, students were assigned word lists by the teacher and given a standard spelling test on Fridays. On alternate weeks, students were able to choose their spelling words and how to take the test. It was predicted that test scores would be higher overall on the weeks that students chose the spelling words. Final scores were analyzed using an ANOVA (Analysis of Variance statistical method) to determine significance of word list on test scores.

Brandon Wood ’16
“Gender Representation in Ephemeral Horror Stories: An Examination of Creepypasta”
Faculty Mentor: Jennifer Gauthier, Associate Professor of Communication
The internet is being taken by storm as a new kind of short horror story gains popularity. These stories are called “creepypastas.” These stories are spread on self-deleting forums via copy and paste. Only a lucky few get saved and live on to be copied and pasted another day. In this sense, the preservation of creepypastas is democratic, as only the stories with the most user support survive. But what are these stories telling audiences and how are they representing society? Is the world of creepypasta one of equality? How do these stories stack up to those of the horror films so many know and love? As one examines the gender roles within these stories, interesting and unexpected trends begin to emerge, and audiences get to peek inside of the minds of the anonymous users who create them.

Brianne Conrad ’15 and Ryan Mahon ’15
“Linking Nutrient Enrichment, Sediment Erodibility and Biofilms”
Faculty Mentor: Sarah Sojka, Assistant Professor of Physics & Environmental Studies
Sediment movement in coastal lagoons affects nutrient flux and primary produce growth. Previous research has shown that sediment erodibility is affected by biofilm concentration and that growth of benthic organisms, which produce biofilm, is affected by nutrient enrichment. However, researchers have not examined possible links between nutrient addition and sediment erodibility. This study manipulated nutrient levels in the water column of 16 microcosms filled with homogenized sediment from a shallow coastal lagoon and artificial seawater to determine the effects on biofilm growth, measured through chlorophyll and colloidal carbohydrate concentrations. Erosion tests using a Gust microcosm were conducted to determine the relationship between sediment erodibility and biofilm concentration. Results show that carbohydrate levels decreased with increasing nutrient enrichment and were unrelated to chlorophyll concentrations and erodibility. The nutrient levels did not predictably affect the chlorophyll levels, with lower chlorophyll concentrations in the control and medium enrichment treatments than the low and high enrichment treatments. Understanding how biofilms respond to nutrient enrichment and subsequent effects on sediment erodibility is essential for protecting and restoring shallow coastal systems.

Brittany Hammons ’15
“Technology Integration in Guided Reading Groups in an Elementary Classroom”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
This action research study will investigate the effect of Kindle reading tablets on students’ comprehension. Participants will be 23 first-grade students, including 13 girls and 10 boys, in a rural public elementary school in Central Virginia. Two formats will be incorporated into the instructional method: traditional printed text and electronic tablet print sources. The research will take place over six weeks. Three weeks of instruction will be given to
print-based guided reading and three weeks will be devoted to tablet-based guided reading. Comprehension scores will be measured through a reading comprehension test administered after completion of fiction and non-fiction stories. Data will be analyzed using an ANOVA to compare baseline and post-test scores and to compare male and female scores under each condition. It is hypothesized that comprehension scores will be higher when students use electronic tablets when compared to the use of traditional printed text.

Cameron Garrison MAT ‘15
“Increasing Test Scores of Secondary Biology Students with the Use of Multisensory Education”
Faculty Mentor: Cheryl Lindeman, Assistant Professor of Education
The focus of this action research project is to examine how introducing multi-sensory education impacts the test scores of secondary anatomy students. The traditional model of teaching, while beneficial for some is detrimental for others. Multi-sensory lessons enable the students to touch, smell, and manipulate the content being covered. Novel problems or situations can be solved by doing rather than listening. Curiosity and content interactions provides an environment where students gain the confidence to do science. For this particular study, two high school anatomy classes were used in an alternating schedule of traditional and multi-sensory education, so that both classes receive multi-sensory instruction, but not on the same day. A pre-test and a post-test were performed using personal response technology and results were analyzed for a relationship.

Chelsea Decker ‘16 & Alyssa Umberger ‘17
“Metal Contamination in Rainwater Harvesting Systems”
Faculty Mentor: Sarah Sojka, Assistant Professor of Physics and Environmental Studies & William Bare, Associate Professor of Chemistry
Around the world, many people use rainwater collected from rooftops for drinking, flushing toilets, irrigation, and a variety of other uses. Even in the United States, many of these people do not test the quality of the harvested rainwater before use. This creates a possible public health issue because studies have found lead, copper, zinc, and other metals at potentially harmful concentrations in roof runoff, in addition to microbial contamination. While boiling or other simple treatment may improve microbial quality, metal contamination is not as easily treated. We have analyzed samples from six rainwater harvesting systems in Virginia for a range of metals across multiple dates. Through repeated sampling at multiple sites, we are able to analyze the temporal and spatial variability of metal concentrations. Metal concentrations are generally low, but do exceed drinking water standards in some instances.

Claire Sumner ‘15
“Rediscovering Fame: Tracing the Inspiration for Guidobaldo Della Rovere’s Sixteenth-Century “Fame Armor””
Faculty Mentor: Leanne Zalewski, Assistant Professor of Art
This paper examines the source of inspiration for the armour created by Filippo Negroli for Guidobaldo Della Rovere, Duke of Urbino that is referred to as the Fame Armor. The source for the imagery on the Fame Armor is a subject of scholarly debate. Some believe the iconography of the suit is Negroli’s imagination, building on the grotesque style that was already in fashion. Others believe the suit is meant to represent Argus Panoptes, the many-eyed giant from Greek mythology. The third opinion, and the focus of this essay, is that the iconography of the suit is derived from the popular poem Orlando Furioso by Ludovico Ariosto. This essay attempts to address an omission in the scholarly literature regarding the suit through direct analysis of quotations from Ariosto’s text in comparison to the imagery and meaning of the suit.

Clark Charlton MAT’15
“Social Communication: A Case Study in a Classroom Setting”
Faculty Mentor: Roberta Parker, Instructor of Education
In considering the many modes of communication, social communication skills or pragmatics are often the most difficult to master for persons with certain learning disabilities. Research indicates that people with Autism Spectrum Disorder (ASD), Attention Deficit Disorder (ADD), or Attention Deficit Hyperactivity Disorder (ADHD) are likely to have problems with social communication. This becomes more profound considering the comorbidity of these three learning disabilities. According to the Centers for Disease Control and Prevention (CDC), the incidence of ASD, ADD, and ADHD continues to increase. This increase translates into a greater number of students with social communication problems for which teachers will need access to research to inform their pedagogy. A single-subject case study will be conducted in a classroom setting focusing on a target behavior. This research will attempt to shed light on improving social communication skills, which could lead to improved peer relationships and a more successful classroom experience.
Courtney Collier ’16, Hagay Haut ’16, Shreya Pandey,’15, Dang Phung ’15, Michael Ramsey ’15, Young-Jun Suh ’17, and Sara Woodward ’16
“The Tiny House at the Tiny College: Design and Assessment of Sustainable Micro-Housing Alternatives”
Faculty Mentor: Karin Warren, Associate Professor Environmental Studies
The “Tiny House” movement is an architectural and social phenomenon that promotes simple living in small homes. Depending on the design, a Tiny House may also offer a sustainable housing option with regards to the use of energy and resources, as well as construction and maintenance costs. The term project in the EVST 315 Energy & Society class this spring involved researching designs of Tiny Houses and their components, and evaluating their potential for sustainability. Student teams focused on safety and building codes, rainwater harvesting systems, waste management, architectural and aesthetic design options, energy efficient technologies, passive solar design, and cob construction. Ideally, this class project will help launch the construction of a Tiny House at our Tiny College in the coming academic year and ultimately serve as a public resource to learn about sustainable design and its significance.

Dang “Dan” Hai Phung ’15
“CO2 Sequestration: Mature and Secondary Forests”
Faculty Mentor: Sarah Sojka, Assistant Professor of Physics & Environmental Studies
Numerous studies have confirmed the fact that anthropogenic CO2 emission is the direct cause of global warming, which increases the fluctuations in global climatic patterns. Forests, especially tropical rainforests, have great potential among many strategies of mitigating atmospheric concentration of greenhouse gases simply because plants are the most efficient in sequestering CO2 as a living mechanism. However, each type of forest is different from one another. The purpose of this research is to estimate the amount of CO2 sequestration in both secondary and mature forests, concentrating on several common types of Neotropical plants in Isla Colón, Bocas del Toro, and the Republic of Panama. The results indicate that although secondary forests are much denser, mature forests sequester a greater amount of CO2. The result also implied that the potential was considerably high to sequester carbon in both forest areas in the near future. Further study may focus on developing a more accurate set of formulas to better estimate the amount of CO2 sequestration in tropical rainforests.

Diep “Penny” Trieu ’15
“Modes of Social Network Sites Usage and Narcissism”
Faculty Mentor: Beth Schwartz, Professor of Psychology/Catherine E. & William E. Thoresen Chair in Social Sciences/Assistant Dean of the College
This study aims to compare college students’ levels of narcissism and aggression before and after using social media. Approximately 40 participants will use Instagram to focus on either themselves or others. The study will give insights into whether usage of social media can increase or decrease narcissism.

Dominique Rose ’15
“Transformation of Malcolm X”
Faculty Mentor: John d’Entremont, Theodore H. Jack Professor of History
This portion of my senior project involves my trip to New York City to research Nation of Islam items at the Schomburg Research Center for Black Culture. The primary focuses of my research were X’s decision to join the Nation of Islam and his pilgrimage to Mecca. The items will help me understand a part of Malcolm X’s life that was instrumental to activist career.

Ellen Meadows ’15
“‘Arden of Faversham’ as a Power Play”
Faculty Mentor: Mara Amster, Associate Professor of English
This scholarly work discusses social order in Renaissance England and examines what happens when that order is upset as shown by the events in the anonymously written Renaissance drama, ‘Arden of Faversham.’ Scholars primarily categorize ‘Arden of Faversham’ as a domestic tragedy, but some label it an historical play because it is based on an event that occurred in 1551. The domestic tragedy label applies because the main characters are ordinary, middle-class, people and the action of the play takes place in settings familiar to the original audience. The more domestic nature allows the play to explore how social politics of common people influence significant outcomes. In ‘Arden of Faversham,’ shifts in power, particularly in class and gender politics, lead to the murder of Thomas Arden.
Emilee Dunton ’15
“The Science Behind Questioning in a Third Grade Math Class”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
This mixed method project focuses on investigating the influence of student-generated questioning on academic growth. The project will take place in two third grade heterogeneous math classes. The classrooms are located in a rural school division in Central Virginia. Students will participate in the Question Formulation Technique prior to being introduced to new concepts. The Question Formulation Technique is a protocol that can be used to teach students in grades K-12 how to formulate their own questions. Pre and post surveys will be analyzed along with students’ questions and anecdotal notes. It is hypothesized that when introducing student questioning in the classroom, responsibility for learning will increase and in turn will produce higher-level thinking.

Erin Vasta ’15
“SkunkDrunk”
Faculty Mentor: Gary Dop, Assistant Professor of English
Henry finds himself at a local pub when his husband, Tristan, is admitted to the hospital due to an unknown and potentially life-threatening illness. Since their marriage isn’t legally recognized, the hospital denies Henry’s request for information concerning Tristan and refuses to allow him visitation. The story follows Henry’s experiences as he copes with the potential loss of his husband, his inability to stay informed, and the quirkiness of late-night pub life. SkunkDrunk is a short story from Erin’s senior honors collection.

Evan Smith ’15
“Creating Spaces of Liberation Through Transgender & Cisgender Solidarity”
Faculty Mentor: Kaija Mortensen, Assistant Professor of Philosophy
This presentation will address how the oppressive cisgender (anyone whose gender identification matches the sex assigned at birth) structures that currently exist in society oppress the transgender (anyone whose gender identity differs from the sex assigned at birth) masses and how those structures can be transformed to create more liberating spaces and thus flourishing. Potentially liberating spaces like college, where transgender and cisgender youth often flourish more than they did in previous environments, will be examined to highlight what qualities are present which could be applied systemically to promote transgender and cisgender flourishing. The presentation will also explain how the liberation of the transgender and cisgender masses is contingent upon the opposite group and thus how liberation can be achieved through solidarity. If spaces which empower people to critically explore their own identities and ideologies and those of others are made more accessible, then a less oppressive world will result.

Franziska Klostermyer ’15 & Callan Frye ’17
“Skeletons in our Closet: The Four Lives of the ‘Gamma Skeleton’”
Faculty Mentor: Doug Shedd, The Catherine Ehrman Thoresen ’23 and William E. Thoresen Professor of Biology & Emily Smith
Discovered by security on this very campus, the ‘Gamma Skeleton’ was named for the historic Randolph spirit group believed to have possessed it for several years, The Gamma ’13. The nearly complete human skeletal remains are fitted with turn-of-the-century wiring and metalwork, suggesting it originally had an academic purpose. But the Gamma Skeleton has obviously been up to much more than coursework. In this presentation, we explore the vastly different lives led by this skeleton: as a living, breathing human, as an academic skeleton, as an object used by a secret society, and as a research resource to current students. To assist our investigation, we utilized DNA sequencing, forensic analysis of dental attrition, and the RC/R-MWC archives.

Grace Gardiner ’15
“The Art of Losing”
Faculty Mentor: Gary Dop, Assistant Professor of English
The five poems in my mini-collection “The Art of Losing” are testaments to the cresting and troughing of poetic pilgrimage across my undergraduate years. Each poem has resulted from my work in a different Creative Writing class at Randolph, all the way from my freshman Introduction to Creative Writing class to my senior Honor’s project in poetry. Iterations of loss permeate the pieces, though each piece explores the complexities of what it
means to lose—“[to] step into the river twice”—through its own imagery, narrative, and form. What result are
five landscapes that, like my undergraduate years themselves, respond to and rift off one another, illustrating the
sometimes fragile, sometimes volatile, always consuming condition of loss as well as my ever-moving evolution as poet.

Hagay Haut ’16
“John Chapman: The Real Johnny Appleseed”
Faculty Mentor: Karin Warren, Associate Professor of Environmental Studies
Folklore icon Johnny Appleseed is one of few familiar protagonists of children’s tales that undoubtedly existed
outside of bedtime stories. During the early 1800’s, a missionary and nurseryman named John Chapman (c.1774 – 1845) wandered the American frontier sewing apple seeds and cheer for weary settlers, in turn becoming the still-prominent cultural legend Johnny Appleseed. Though analogous to the common tale, the few historical accounts of Chapman’s life do not completely coincide with the tin-wearing boy from our childhood stories. This presentation is in the form of a children’s story for aspiring young environmental historians; its narrative explores the qualitative dimensions of Johnny Appleseed and his orchards. The playful yet accurate conveyance of Chapman’s story unearths elements of frontier life that influenced our changing environmental attitudes and brings perspective to our assessment of current and past human-land interactions.

Harris Pham ’15
“A Museum Exploration of London”
Faculty Mentor: Kathy Muehlemann, Professor of Art
This presentation is the product of a 7-day trip of aesthetic pursuit in the city of London. With artistic tools such as sketches, paintings, photos, etc., I hope to provide you with an overall aesthetic description of the city of London through my visits to some of the most world-famous museums in the city.

Hart Gillespie ’15
“Three Years of Research at Winfree Observatory”
Faculty Mentor: Katrin Schenk, Associate Professor of Physics
Using the facilities available at our own Winfree Observatory, supplemented by upgrades funded by my RISE grant, I’ve done research in three areas: asteroid occultations, stellar spectroscopy, and extrasolar planets. I have observed four asteroid occultation events, which happen when an asteroid passes between a star and an observer, blocking the star’s light. Preliminary spectroscopy results show that a digital camera and a diffraction grating are capable of revealing detail in the light spectrum - such as hydrogen Balmer lines - of type A stars, and further research will attempt to measure rotational velocities of shell stars, primarily of type Be. A digital camera alone is sensitive enough to record the light curves of some exoplanet (planets outside of our solar system) transits. Along with the presentation of my results, I’ll discuss the practicality of these research areas and the possibility of initiating these projects at colleges with underused observatories.

Hoa Nguyen ’15
“The Story of Haiti- Volunteer and Life Experience in Haiti”
Faculty Mentor: John Abell, Professor of Economics
Haiti, one of the most under-developed countries in the world, faces a variety of problems, from a highly polluted environment and unstable politics to poverty and inequality. The country’s situation worsened after the earthquake in 2010. However, there is still a bright side of life in Haiti: the culture and the people of the country. During my recent volunteer trip to Haiti, I had opportunities to talk to and work with many Haitians and to experience the life of the people there. My photographs and videos share my first-hand experience with Haitians and their culture. The exhibition presents a new perspective on the Haiti to the Randolph Community. People should know that there is another Haiti besides the Haiti of an underdeveloped economy.

James Fitzgerald Jr. ’15
“The Effects of Physical Activity Breaks on Students On-task Behavior”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
The purpose of this action research study is to examine the effects of physical activity breaks on students’ on-task behavior. This investigation will take place in a public school kindergarten classroom located in a rural Central Virginia school division. Fourteen students will take part in the study, including eight boys and six girls. The study will occur over a six week period. Baseline data will be collected during the first three weeks followed by three weeks of intervention. Students will be observed in 15-second intervals, alternating the group of students being observed each time. Observation will occur for 15 minutes each day while students are completing seatwork. An observation scale will be used to measure students’ on-task behavior. Data will be analyzed using descriptive statistics and a one tailed independent t test (p< .05). It is hypothesized that physical activity breaks will increase student on-task behavior during seatwork.

Jensen Hoover ’15 & Heather Funk ’15
“The Polarization of Politics: Are There Physiological Differences Between Liberals and Conservatives?”
Faculty Mentor: Holly Tatum, Associate Professor of Psychology
New research has been conducted to determine whether there are biological or innate reasons to explain the variances in ideologies between political liberals and conservatives. In this study, physiological differences between Randolph College students that identify as politically liberal or conservative were examined. As in previous research about the aforementioned topic, heart rate and galvanic skin response will be measured while participants are exposed to emotion-evoking images. However, because past research has not specifically focused on the responses of college students, this study will concentrate on college students exclusively. Based on findings that conservatives exhibit an increased heart rate and galvanic skin response when presented with specific images, we expect politically conservative students to demonstrate an elevated physiological response.

Jessica Harris MAT ’15
“Preschool Learning Using Play Based Curriculum”
Faculty Mentor: Roberta Parker, Instructor of Education
When you think about your school experience, what do you remember? Sitting quietly coloring a worksheet, participating in structured instructional activities or participating in play like activities? With the increasing emphasis on state standards and test scores, play is being eliminated from classrooms. The foundation of how a person views school starts at the beginning of their school career and the use of play based curriculum increases the chance of a positive outlook and enjoyment. Through the use of play, students are actively engaged in an activity and are motivated to continue to participate and learn through their play. This study examined incorporating play in the classroom through the influences of Jean Piaget and Lev Vygotsky. This study compared the views of Piaget and Vygotsky regarding the importance of play and how students should experience their learning: through simply experiencing the materials or with teacher scaffolding in order to reach their instructional level.

Jessy Spencer ’18
“myActions: The Social Network for the Planet”
Faculty Mentor: Karin Warren, Associate Professor of Environmental Studies
myActions is a non-profit company that works to increase the awareness of sustainability practices among college students. Active on over 100 college campuses, myActions works to create a significant difference with an online platform, as well as an app, where students can post “green” activities such as refilling a water bottle, taking the stairs, or recycling paper. These actions are counted in several ways, including the amount of carbon dioxide that is reduced, the amount of money saved, and as points earned toward Randolph’s cumulative score. Throughout the course of one year, students at Randolph logged actions, ultimately helping the College earn the Silver Level award for the fall semester.

Jordan Clinkenbeard ’15, Emily Richards ’15 & Ashlie Hughes ’15
“The Influence of Prosocial Behavior on Children’s Deception”
Faculty Mentor: Beth Schwartz, Professor of Psychology/Catherine E. & William E. Thoresen Chair in Social Sciences/Assistant Dean of the College
This research examined the influence of the development of theory of the mind and prosocial behavior on children’s likelihood to deceive. To assess deception, children participated in a sticker game, which allowed for a comparison of deceptive behaviors as a function of age and conditions of prosocial behavior.
Katie Snyder ’15
“Line into Life: Realism in Degas’s Dancers at the Impressionist Exhibitions, 1874-1886”
Faculty Mentor: Leanne Zalewski, Assistant Professor of Art
Although Edgar Degas (1834-1917) is introduced as an Impressionist painter by most textbooks, he considered himself a Realist. Whereas Impressionist painters focused on scenes of bourgeois leisure, Degas focused on the lower classes, a concept that started with the Realists. The Impressionists painted outdoors, or en plein air, not liking the confinement of the studio. They used looser brushstrokes, and focused on light, color, and movement. Degas, on the other hand, painted in his studio and focused intently on his subjects. The difference between Degas and the Impressionists can be seen in his works of ballet dancers that he exhibited during the eight Impressionist Exhibitions from 1874 to 1886. While his later style incorporates Impressionistic elements, he remained a Realist. This paper examines both contemporary and current criticism of his work, as well as Degas’s own view on his style, to challenge his classification as an Impressionist.

Kelsey Diehl ’16
“Puzzle Landscape Paintings”
Faculty Mentor: Kathy Muehlemann, Professor of Art
The concept for Puzzle Landscape Paintings came to me when I finished a painting of the Northern Lights: I thought to myself I want to add more to it. I decided to add another panel and after the second panel was complete, I went on to do a third panel which soon turned into four, then five, and so forth until I ended with the number I have today. As I added panels, the size of the canvas changed as well as what kind of landscape was presented: first mountains, then forest, followed by fields. The seasons changed as well throughout the work. The end result is a coherent collection of paintings that are tangent to one another and form a vast panorama of changing landscape. Each painting alone works as an individual piece, but together it forms one long landscape.

Laura Snell ’16
“Boundaries of Existence”
Faculty Mentor: James Muehlemann, Associate Professor of Art
My thesis explores the presence of humanity and the individual in the cosmic expanse. Through a collection of oil paintings, I am navigating the boundaries between the individual and the larger collective while pursuing the idea of what separates us from others, if anything. I am struck by the ultimate insignificance of our existence in the scheme of the universe, and both the fear and wonder that it inspires in me. My inquiry is inspired by my study of Buddhism, in particular the doctrine of no-self, and my personal experiences with death.

Luke Weierbach ’15
“Physical Activity Helps Raise Unit Test Scores for Students in an Inclusion Classroom”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
This action research study will investigate the effects of movement-integrated lessons in a first grade inclusion classroom of 16 students in a rural public school located in Central Virginia. The students will actively participate in various movements and gestures as part of their lessons to cement learning. The data will be collected over a seven-week period, while the intervention will last for two weeks. Achievement scores on end-of-unit tests will be compared in a pre-intervention and post-intervention design. It is hypothesized that the post-intervention scores (lessons with movement) will be higher when compared with pre-intervention scores (lessons without movement). The scores will be compared using a one-tailed paired t test (p < .05).

Mark Patterson ’15
“3D Scanning Accuracy using 1-2-3 Blocks”
Faculty Mentor: Katrin Schenk, Associate Professor of Physics
3D printing and scanning technologies are quickly become ubiquitous in commercial and research applications. This research explores the accuracy of the HDI Advance R3X 3D scanner made by LMI Technologies. Currently there is no publicly available data proving the stated accuracy of this scanner. To prove the accuracy of the scanner, the use of 1-2-3 blocks (calibration blocks) are used. They are scanned using the scanner at its three different scanning volumes. The scan data from each scan volume is then analyzed using metrology software. In order to obtain the dimensions of the blocks, planes are fitted to the surfaces and then the linear distance between the planes is
determined. Using a basic and standard calibration for the scanner, the results are obtained and represent what an average user would expect to get for the accuracy of the scanner.

Meaghan Hynes '16, Morgan Hoke '17, Laura Stacey '17, Lauren Castillo '17
“Equine Heart Rate Monitor Research”
Faculty Mentor: Amanda Rumore, Assistant Professor of Biology
Today, human athletes have the ability to track the progression of personal fitness by utilizing technology that can record vital signs such as heart rate (HR), at the push of a button. This technology has become equally beneficial to the study of non-human athletes, specifically horses. In this study, data was collected using Polar Equine heart rate monitors worn by the horses at the Randolph College Riding Center during routine exercise. HR data was analyzed alongside a brief collection of the horses’ health records. This pilot study aimed to generate data and proof of concept for the use of equine HR monitors to measure and predict fitness. It provides the basis for a larger equine heart physiology project that will present a suggestive model that outlines the relationship between the health of an equine heart and that animal’s athletic performance.

Melanie Eisele '15
“The Effect of Physical Activity on Academic Achievement in a High School Science Classroom”
Faculty Mentor: Cheryl Lindeman, Assistant Professor of Education
Physical education and physical activity are being decreased in schools. Previous research indicates the benefits of physical activity in the classroom and in non-academic settings on a variety of test ranging from math and English to memory and reaction time. The purpose of this action research study was to examine the effects of incorporating physical activity into a normally inactive classroom. The study was conducted with thirty-six high school students in a Central Virginia physics classroom. Physical activity was incorporated on specific days and no activity occurred on control days. Students were given a five question post-test after each experimental and control day over five weeks. Data was compared using a t-test to see if there was a significant difference between days when physical activity was incorporated and when it was not. The hypothesis was that test scores will be greater on days with physical activity incorporated into the lessons.

Meredith Humphreys MAT '15
“Kinesthetic Movement and Math: Effects on Females’ Perceived Achievement”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
This action research study, along with a previous pilot study, explores the discrepancy between achievement in mathematics and perceived achievement in math by female students. The study was conducted in a second grade classroom of seventeen students. This classroom was located in an urban inner city school district in Central Virginia. The relationship between movement and achievement in the mathematics classroom was examined. Students participated in a five minute kinesthetic movement activity before the normal math instruction. Kinesthetic movement is defined as any purposeful physical activity such as cheers, body positions, etc. that encourages attainment and development of taught concepts. Interest was quantified using an adapted subscale of the Fennema-Sherman Mathematics Attitude Scale both pre- and post-intervention.

Monica Ashby '15, Rebekah Leo '15 & Sarah Terlizzi '15
“Modern Case Studies in International Humanitarian Law; Successes and Challenges of Genocide Law”
Faculty Mentor: Jennifer Dugan, Professor of Political Science
The 2015 Global Studies Capstone participants spent the entirety of Spring Break in the Netherlands, Switzerland and Bosnia to further the research necessary for individual senior papers. This presentation will reflect the hands on research conducted through our travels and will cater to the diverse topics we have all chosen for our senior topics. The Hague, International Criminal Tribunal for the former Yugoslavia, and Geneva were toured to gain a better understanding of the operations of International judicial organs within the International Community.

Ngoc “Kelly” Pham '16
“Sequence Analysis of Mitochondrial DNA from Human Tooth Samples in the Randolph College Natural History Collection”
Faculty Mentor: Adam Houlihan, Assistant Professor of Biology
The Randolph College Natural History Collection includes human tooth samples retrieved by Randolph Prof. Susan Stevens from a 6th century burial site in Tunisia. The goal of this project was to isolate and analyze mitochondrial DNA (mtDNA) from the tooth samples to reveal information about the number and the degree of relatedness of individuals interred at this site. Sixty teeth were processed and DNA was retrieved from seven of them. These samples were then analyzed by molecular techniques to confirm human DNA was extracted. Five of the samples were confirmed to be human mtDNA, while the others had DNA sequences linked to the potato leaf roll virus. We compared the five human mtDNA sequences and determined that they could be placed into three separate groups of relatedness. The discovery of DNA from potato leaf roll virus within the teeth samples could reveal information about the diet of this community.

Nikolas Oliver '16
“The Unofficiant: An Essay on Marriage Equality, Authority and Internet Ordinations”
Faculty Mentor: Gary Dop, Assistant Professor of English
This essay recounts my experience of performing a gay marriage on the basis of receiving a free minister’s ordination on the internet, in front of the conservative Mormon and Southern Baptist families of the grooms. I also explore the change I undergo as those in attendance incorrectly assume me to be an actual clergyman. This essay was accepted for presentation at the Sigma Tau Delta 2015 International Convention. Funding for my travels was made possible through the RISE Grant.

Olivia Groff '15
“Improving Ninth Grade Students’ Grammar Skills through Journal Writing”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
The ability to write effectively is an important skill related to success in all subjects. Despite its importance, writing is often one of the most difficult skills for students to master. For this research, three periods of ninth grade students were given five minutes daily to write in a journal. Students in one period received check marks for completion of the task. Students in the other two periods received daily feedback on their journal entries. It was hypothesized that all students who took part in unstructured journal writing would show improvement in their grammar skills, but students who received teacher feedback would show higher levels of improvement. This presentation will discuss the results of this research and explain the importance of incorporating journal writing into the English classroom.

Paul Rush III '16
“Food Recovery: Reducing Hunger in Our Community”
Faculty Mentor: Jennifer Dugan, Professor of Political Science
The City of Lynchburg has a poverty rate of 26.4% and is in dire need of help to provide food for its citizens. While there are various programs throughout the city with this goal in mind, they are unfortunately falling short due to lack of funding and supplies. This is a study on alternatives resources, such as the utilization of food waste that Randolph College can provide to help feed those who are food insecure in the city of Lynchburg. Due to complicated circumstances, the project changed to a Campus Kitchen Project. After a failure of the original initiative, we have again changed direction, to establishing a Randolph College chapter of Food Recovery Network. Through ongoing efforts, we have nearly reached our final goal.

Phuong Tran '15
“Teknolust (2002) and Agent Ruby (2002-present): An Exploration of Cyborg Imageries in Lynn Hershman Leeson’s Feminist Art”
Faculty Mentor: Jennifer Gauthier, Associate Professor of Communication
This research focuses on the cyborg imageries in two works by Lynn Hershman Leeson, the film Teknolust (2002) and the artificial intelligence web bot Agent Ruby (2002-present). It aims to gain a deeper understanding of cyborg imageries in popular culture, which can be viewed as metaphors for the public’s changing attitude and perception towards important issues such as sex, gender, identity, and power in relation to technology. As an interdisciplinary project, this research is at the nexus of several academic fields, integrating feminist theories, visual culture theories, cyborg theories, feminist film criticism theories, and participatory art theories into the analysis of two inter-related art works by avant-garde artist Lynn Hershman Leeson.

Pujan Shrestha ’15
“Competitive Cellular Semi Automata”
Faculty Mentor: Marc Ordower, Associate Professor of Mathematics
This project is based on John Conway's Game of Life, the first intensively studied Cellular Automaton. In this variation, we pit two players (red and blue) against each other. The players had total control of a fixed number of cell blocks, which are called pads. The players would use various patterns and macros to produce live cells on their pad and direct their growth at the opponents' pad. The first player to land his cells on the opponents' pad wins the game. The rest of the playing board operates on the simple propagation rules. We developed the propagation rules in order to have chaotic behavior, no explosive growth. The final goal of the project was to have a 3d game with 5 states, which is playable online. However, due to the immense knowledge that we obtained from the 2d variation, we have decided to research the 2d version more fully.

Pujan Shrestha ’15
“Smartphone Inertial Navigation”
Faculty Mentor: Peter Sheldon, Professor of Physics
Inertial navigation is accurately determining your position and orientation through time and space, and has been a necessity for ships and airplanes, using complex and expensive instruments in modern times. Inertial Navigation with the smartphone in your pocket has been made possible due to new technological developments that include micromechanical devices such as accelerometers, gyroscopes, and GPS. Using these sensors, we can use a smartphone to gather data and then calculate the position, velocity, and orientation at any instant. However, there are many issues with the data accuracy. Complications arise with noisy data and instrumental drift. We are studying different techniques to correct drift and to filter the data to increase accuracy. The aim of my research is to increase accuracy and map three dimensional motion, such as a roller-coaster ride, with a smartphone.

Ryan Purrington MAT ’15
“Effect of Student Choice of Classroom Activities on Achievement”
Faculty Mentor: Cheryl Lindeman, Assistant Professor of Education
Educators have long faced the challenge of engaging their students in planned classroom activities. Educators can involve students by allowing choices in what classroom activities they do. While current research has primarily focused on students in special education classrooms, educators like Rick Lavoie argue that empowering students with choices greatly improves the learning experience. This study focused on 126 high-school students scheduled into five classes. Two of the five classes received the option of “choice” in classroom activities during an Early Middle Ages unit. Daily warm-up SOL questions to check for understanding of the material covered in the previous day’s class and a final unit test were used as measures of achievement. The results of this action research study support the hypothesis that students’ academic performance would improve after receiving choice in classroom assignments.

Sally Taylor ’15 & Thao Nguyen ’17
“Improving Food Security in Lynchburg using Community Centers”
Faculty Mentor: Jennifer Dugan, Professor of Political Science
This project is a continuation of the Food Mapping Project completed last fall during POL 239: Global to Local. The Food Mapping Project was presented to the Lynchburg City Council in November, which led to discussions with the City Manager. On the City Manager’s behalf, we conducted an investigation of the Lynchburg community centers and their respective neighborhoods. Through the use of interviews and surveys, we sought to determine the needs of the community centers in order to better address issues of food security. We then worked to isolate the steps necessary to allow the community centers to have a better focus on food and nutrition. These findings will be used to guide the City Manager and City Council’s future decisions regarding the community centers.

Samantha Maggard MAT ’15
“Differentiated Instruction and Assessment as a Path Towards Increased Student Learning: A Special Education Case Study”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
This qualitative action research project investigates the influence of assessment and differentiated instruction on students’ academic achievement in mathematics. The case study follows an eighth-grade self-contained math class with six students diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). Students were assessed daily and instruction was planned in order to meet the students’ individual needs over a six week period. Student work samples, anecdotal notes, and outside observational notes were analyzed.

Sandeep Poudyal ’16 & Lauren Mason ’16
“Pitch of Voice and Type of Pick-up Line Both Affect Desirability”
Faculty Mentor: Dennis Goff, Charles A. Dana Professor of Psychology
Women’s attraction to potential mates is affected by perception of masculinity and reliability. The researchers had a male model with average pitch of voice record 9 pick-up-lines. The researchers manipulated the pitch by raising and lowering. The original voice was deleted. The voices were attached to an online survey and sent to students to be rated. Ratings of flirtatious, direct, or innocuous pick-lines were changed by pitch of the speaker’s voice. Direct lines delivered in a low pitch produced more interest in both short and long term relationships.

Sarah-Elizabeth Cottone ’15
“Visual Representation of Alice in Alice in Wonderland”
Faculty Mentor: Heidi Kunz, Professor of English
My Senior Capstone Project is on Lewis Carroll’s “Alice in Wonderland.” I received the opportunity to go to Cambridge, MA to the Harvard University Library as well as the New York Public Library to view several manuscripts and illustrations of “Alice in Wonderland.” I wish to discuss how viewing illustrations and the original text benefit my Senior Paper as well as the process of undergoing library research in order to view the holdings. I will be comparing visual representations of Alice in Alice in Wonderland with literary representations.

Savannah Edwards ’15
“Onomatomania: Finding the Right Words in Albuquerque, NM”
Faculty Mentor: Gary Dop, Assistant Professor of English
Onomatomania is an “irrational fear of a particular word; frustration at being unable to think of an appropriate word” or “an obsession with or extreme love of names.” Working with poetry has forced me to develop a certain type of attention for and connection with finding the right words, and in a sense, to develop a sort of onomatomania. My RISE Grant enabled me to go to Albuquerque, New Mexico to participate in the literary world at the Sigma Tau Delta English Honors Society 2015 International Convention. I chaired the “Loss and Longing: Original Poetry” session during the convention and used that experience to rethink, revise, and reconfigure some of my own poetry from the beginning of the year, which I included in my senior project. I take on diction, making connections, and creating images in this project—a journey from sketch, to cross-country trek, to revision and reflection.

Seth Dorman ’15 & Kelia Cutkelvin ’16
“Cataloging a Legacy: Walter Weber’s Historic Bird Collection”
Faculty Mentor: Doug Shedd, The Catherine Ehrman Thoresen ’23 and William E. Thoresen Professor of Biology
The ever-increasing rate of extinction among species worldwide means digitization of biological collections is critical for the preservation of morphological data and DNA of individual species. Access to digitized specimen photographs and data allows researchers to study representative specimens more easily. Recently, Randolph College’s Natural History Collection received a donation of birds that nearly doubled the size of the College’s avian collection. The birds were part of the collection of Walter Weber, a mid-20th century National Geographic illustrator. Weber’s passion for ornithology and numerous world-wide expeditions produced a collection rich with important specimens, including a Carolina parakeet, two peregrine falcons, and an array of American warblers. We will discuss our work on the digitization of specimens from the Weber collection, the scientific, historical, and educational importance of the collection, and the significance of Walter Weber’s contributions to science.

Sydney Henson MAT ’15
“The School Year SPED by with a SMART Motivation Technique”
Faculty Mentor: Peggy Schimmoeller, Professor of Education
Blah, blah, blah, or click, drag, ding, swoosh, and high five? This presentation aims at examining the relationship between motivation through the use of SMART Board computer technology and academic success for middle school students. Within a Central Virginia public school, the data was collected in a resource/reading pull-out class. Motivational strategies and the use and benefits of technology within the classroom were examined individually, then together. The two, separate from each other, are important—though the two together are believed to be an even stronger factor that academically benefits middle school students with disabilities. The focus was driven
daily by the implementation of the SMART Board during vocabulary instruction. Due to a high dependency and familiarity with technology in today’s society, the different educational strategies associated with the SMART Board are examined and explained in their purpose and educational benefits through motivation and success.

Tammy Case MAT ’15
“Do You Want a Worksheet with That?” A Qualitative Study on Creating Choice in Elementary School Classrooms
Faculty Mentor: Roberta Parker, Instructor of Education
Here’s a question for you: “Do you want fries with that?” The once popular slogan of a famous food chain worked because it offered people not only fries but the power of choice, meaning self-direction. But are all choices created equal? Would consumers feel self-directed with the slogan, “Do you want your fry box to be blue or red?” It is not catchy because that choice is irrelevant. The fries will be there and will taste and cost the same. In this qualitative research study with a first and second grade math resource class, a different type of question is explored: Do choices matter? If so, are all choices equal? Students in the resource class were observed during their daily routines, while varying amount and types of choices were offered as part of their lessons. The results of that study are discussed.

Teague Elliot ’16
“Evolving Compositional Technique in Two Piano Pieces”
Faculty Mentor: Randall Speer, Associate Professor of Music
This presentation will discuss the musical techniques I employed while composing my first two piano pieces. Both compositions are structured through alteration and recombination of the basic musical ideas laid out at their beginnings. A difficulty I encountered composing music in this way is finding something new to do with an idea every time it is presented (so that the piece evolves and holds the audience’s interest) while still having the idea be recognizable (so that the piece is structurally coherent). I will explain the compositional strategies employed in both pieces to address this difficulty (in the context of my early attempt to find a compositional voice) as well as examine the technical and expressive challenges my pieces pose to a performer. A recorded performance of both pieces will be played after the discussion of the compositional process.

Thea Ezinga ’15
“Patriotism, Protestantism, and Personal Vision in Caspar David Friedrich’s Tombs of the Fallen in the Fight for Independence (Tombs of Ancient Heroes) (1812)”
Faculty Mentor: Leanne Zalewski, Assistant Professor of Art
This paper focuses on German Romantic painter Caspar David Friedrich, especially on his painting Tombs of the Fallen in the Fight for Independence (1812). Friedrich uses visual metaphors to communicate a message about patriotism, Protestantism, history and philosophy. Friedrich intended for this work to inspire his fellow Germans towards education. The painting displays Friedrich’s personal painting style, and the strong influence of his early artistic training. This paper discusses Friedrich’s use of metaphor, his idolization of a semi-mythical Medieval Germany, and his concerns and hopes for his contemporary political world. By examining the work of Friedrich, this paper creates a broader image of Friedrich the man, and his role in the greater canon of political art.

Timothy Smith MAT’15
“The Effect of Student Choice in Reading Materials on Science Content Comprehension”
Faculty Mentor: Roberta Parker, Instructor in Education
Were you ever given choices in a typical class at your high school? Recently, researchers have questioned whether giving students choices in reading materials have any effect on how they learn. For this research, students in several high school science classrooms participated in two different instruction methods: one where the teacher determined the reading materials and one where they could choose from different reading materials, including iPad apps, trade books, and interactive webpages. The students in classes who were given choices were considered the experimental group and students where typical instruction took place were considered the control group. After a week, the control and experimental conditions for both groups were flipped. Results include student comprehension of science content tests for both choice and no-choice conditions, observed student behavior from the researcher’s journal, and students’ reflections from a post-study questionnaire.
Tu Nguyen ’15
“Assessing Health Risks From the Use of Rainwater for Toilet Flushing”  
Faculty Mentor: Sarah Sojka, Assistant Professor of Physics and Environmental Studies  
According to the United States Environmental Protection Agency, the largest use of household water - 27% - is for toilet flushing. Therefore, if a homeowner implements a rainwater harvesting system into the house, a significant amount of rainwater collected will be used to flush toilets. However, given the potential existence of dangerous pathogens, such as Campylobacter spp., Salmonella spp., and Giardia lamblia, in roof-collected rainwater, it is important to determine whether there is potential health risk associated with the use of rainwater for toilet flushing.
In this research I am going to assess the risk to human health from using rainwater to flush toilets. The Quantitative Microbial Risk Assessment (QMRA) will be employed to estimate the microbial risks. I will use data from the literature, from my own designed experiment, and from a hypothetical case study.

Victoria Lange ’15 & Danielle Lewis ’15
“Exploring Gender Research at Interdisciplinary Conferences”  
Faculty Mentor: Danielle Currier, Assistant Professor of Sociology  
We both attended the annual meeting of the National Women’s Studies Association and a meeting of the Sociologists for Women in Society. Attending these interdisciplinary conferences has made us realize the importance of Women’s Studies. Each of us plans to focus our graduate studies on women in the media and examine how women are portrayed in society today.

Yashaswi Shrestha ’16
“Detecting Lead in Sunflowers”  
Faculty Mentor: Sarah Sojka, Assistant Professor of Physics and Environmental Studies & William Bare, Associate Professor of Chemistry  
Lead contamination of soil is common in the Lynchburg area, and lead concentrations can be particularly high near houses that previously used lead paint. Hyperaccumulators are plants that grow well in metal contaminated soil, and they can store high concentrations of metals in their tissue. These plants can be used to reduce lead concentrations in the soil. We have analyzed tissue from sunflowers, a common hyperaccumulator, and the surrounding soil from an area next to an old house in Lynchburg. We have also analyzed paint chips from the house. We will discuss changes in lead concentration with distance from the house and lead partitioning within the plant tissue.

Zhe Zhang ’15
“Portable Water Filter”  
Faculty Mentor: William Bare, Associate Professor of Chemistry  
The goal of this project is to build a portable water filter that has several different stages which can be easily attached or removed for the purpose of filtering water. The goal is that the cost of the filter should be low and the materials are should be easily obtained. Most importantly, the filter needs to be portable, giving it more applications than traditional filters.

Learn more about the Randolph College Summer Research Program and the Randolph Innovative Student Experience at www.randolphcollege.edu/research.
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