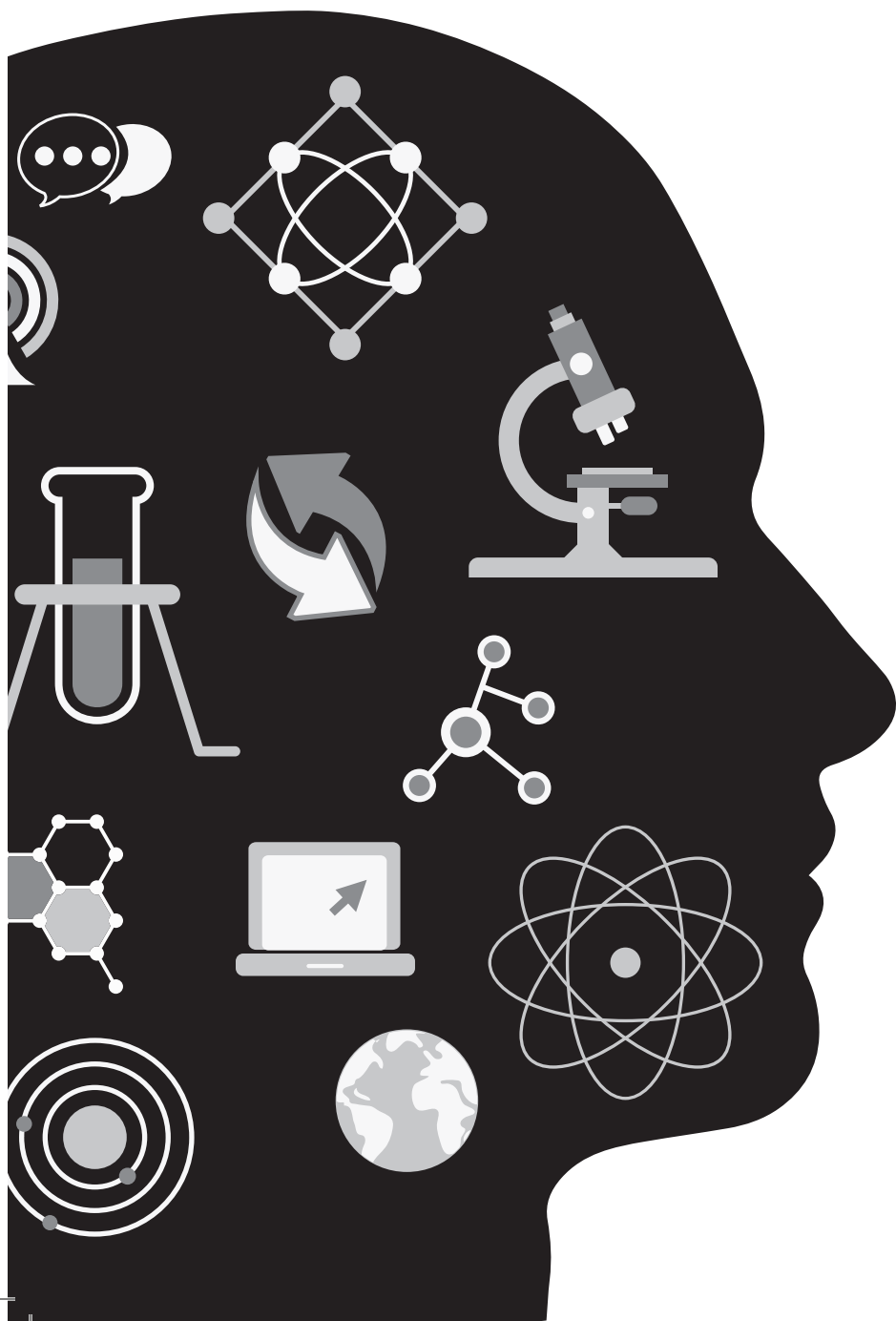


SATURDAY · OCTOBER 10, 2015

# 17<sup>TH</sup> ANNUAL MARCUS CONFERENCE

Mid-Atlantic Regional Conference  
for Undergraduate Scholarship

hosted by  
**RANDOLPH  
COLLEGE**

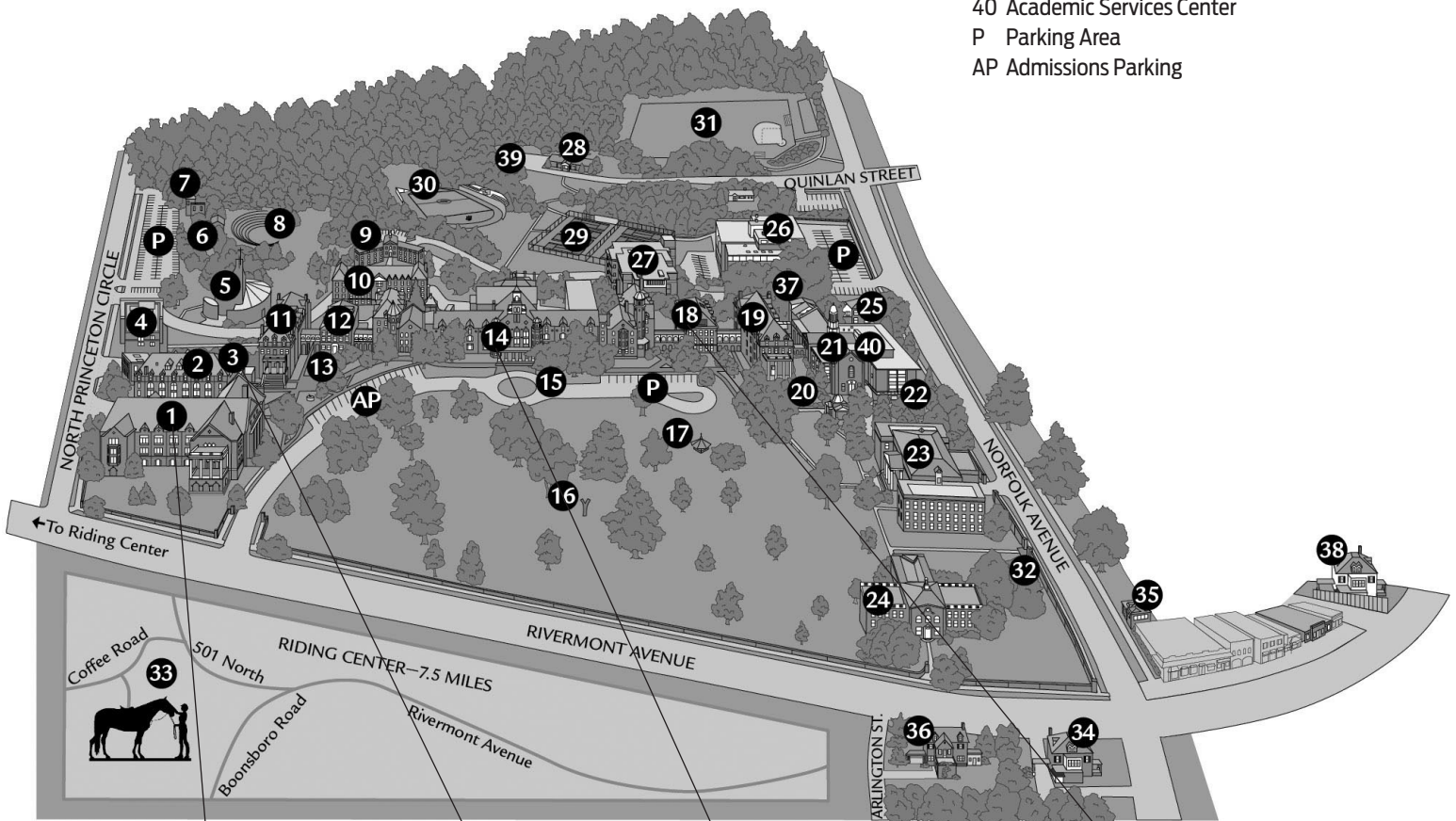




# RANDOLPH COLLEGE

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

- 37 Campus Mailroom
- 38 Rivermont House
- 39 Organic Garden
- 40 Academic Services Center
- P Parking Area
- AP Admissions Parking



**SMITH MEMORIAL BUILDING**  
Smith Hall Theatre

**CHEATHAM DINING HALL**

**MAIN HALL**  
Nichols Theatre, Student Center  
Quillian Conference Rm., Student Center  
Hampson Commons, Student Center

**PSYCHOLOGY BUILDING**  
Rm. 101 & 102



*Since its inception in 1999, the Mid-Atlantic Regional Conference of Undergraduate Scholarship*

*(MARCUS)* has attracted students from colleges throughout Virginia and surrounding states, who present their research in oral and poster sessions during the daylong event.

The conference atmosphere is one of lively inquiry in which the student researchers are the experts, presenting to an audience of their peers. Unlike many conferences, MARCUS is purposely interdisciplinary, with an emphasis on the intersection of disciplines across the liberal arts spectrum.

For instance, one presentation session may include students in history, economics, political science and anthropology, all sharing a research interest in globalization. In another session, the common topic may be preserving species habitats and include presentations in biology, environmental studies and philosophy.

## TABLE OF CONTENTS

|                |                    |
|----------------|--------------------|
| College Map    | Inside front cover |
| Abstracts      | 2                  |
| Schedule       | 4                  |
| Special Thanks | Inside back cover  |

# abstracts

## INDEX

2

|                             |         |                           |              |
|-----------------------------|---------|---------------------------|--------------|
| Abdi, Myshake .....         | p.15-16 | Clough, Isabelle .....    | p.18         |
| Andress, Will .....         | p.6     | Conter, Rebecca .....     | p.18         |
| Aoun, Stephen .....         | p.8     | Crosier, Brittni .....    | p.19         |
| Aparicio, Daniel .....      | p.16    | Cutkelvin, Kelia .....    | p.14         |
| Bajc, Austin .....          | p.13    | Dallas, Emily .....       | p.19         |
| Ballard-Abbott, Sarah ..... | p.16    | Davis, Sarah .....        | p.10, 15, 27 |
| Banks, Rhianan .....        | p.16    | Debra, Alyssa .....       | p.19         |
| Barry, Jessica .....        | p.6     | Denisch, Anna .....       | p.19         |
| Bates, Anna .....           | p.11    | Deyerle, Phillip .....    | p.19         |
| Bei, Di .....               | p.11    | Dittmar, Andrew .....     | p.7          |
| Berenato, Nicholas .....    | p.12    | Dunlap, Spencer .....     | p.16         |
| Bernard, Stephen .....      | p.10    | Echols, William .....     | p.19         |
| Betterton, Zachary .....    | p.10    | Eschbach, Everett .....   | p.8          |
| Bloomquist, Paige .....     | p.16    | Fitzgerald, William ..... | p.19         |
| Boucher, Brant .....        | p.16    | Flora, Elizabeth .....    | p.20         |
| Bouldin, Michael .....      | p.16-17 | Ford, Benjamin .....      | p.12         |
| Boyd, Marie .....           | p.13    | Freedman, Emmy .....      | p.11         |
| Bradbury, Amanda .....      | p.17    | Frye, Callan .....        | p.7          |
| Brooks, Allison .....       | p.17    | Garcia, Kiersten .....    | p.13         |
| Brown, MacKenzi .....       | p.12    | Gee, Benjamin .....       | p.9          |
| Brunke, Meaghan .....       | p.11    | Goddin, Oliver .....      | p.13         |
| Burt, Russell .....         | p.17    | Grierson, Kyle .....      | p.17         |
| Callan, Sabrina .....       | p.17    | Guth, Amanda .....        | p.20         |
| Carlin, Julie .....         | p.17-18 | Hagen, Ayla .....         | p.11         |
| Cioffi, Molly .....         | p.18    | Hansen, Andrew .....      | p.6          |
| Ciszek, Chris .....         | p.18    | Hanson, Jessica .....     | p.20         |
| Clagett, Alexandra .....    | p.10    | Harbison, Leah .....      | p.20-21      |
| Clarke, Emma .....          | p.18    | Haut, Hagay .....         | p.21         |
| Clark, Ashlen .....         | p.8     | Henderson, Sarah .....    | p.14         |

|                                |              |
|--------------------------------|--------------|
| Howard, Daisy .....            | p.21         |
| Hyser, Raymond .....           | p.14         |
| Johnson, Ryan .....            | p.13-14      |
| Jonz, Madeline .....           | p.18         |
| Jorgensen-Muga, Katriana ..... | p.21         |
| Kelly, Ashley .....            | p.9          |
| Lam, Benjamin.....             | p.21         |
| Ledin, Anna .....              | p.21-22      |
| Lee, Jin Young .....           | p. 22        |
| Litvak, Derek .....            | p.9          |
| Litzenberg, Taylor .....       | p.9, 19      |
| Lohrey, Steven .....           | p.7          |
| Luck, Mason .....              | p.22         |
| Lundquist, Kyle .....          | p.14         |
| Meeks, Meredith .....          | p.9          |
| Molina, Citlali .....          | p.14-15      |
| Moore, Adair .....             | p.7-8        |
| Murray, Shanon .....           | p.9          |
| Nelson, Tiffany .....          | p.8          |
| Nguyen, Linh .....             | p.22         |
| Nierle, Hannah .....           | p. 8, 15, 27 |
| O’Keefe, J. Patrick .....      | p.7          |
| Olivari, Renzo .....           | p.12         |
| Palmatary, Hannah .....        | p.9          |
| Pasierb, Melissa .....         | p.17         |
| Petrosky, Sarah .....          | p.22         |
| Phillips, Luke .....           | p.12         |
| Pickens, April .....           | p.15         |
| Poliakova, Tetiana .....       | p.12         |

|                              |         |
|------------------------------|---------|
| Reed, Olivia .....           | p.12    |
| Robledo, Valeria .....       | p.15    |
| Russell, Renee .....         | p.7     |
| Salomon, M’Elise .....       | p.8-9   |
| Schmidt, Alexander .....     | p.20    |
| Schwartz, Benjamin .....     | p.22    |
| Scruggs, Tresa .....         | p.19    |
| Sheffield, Samuel .....      | p.22-23 |
| Singleton, Crystal .....     | p.16    |
| Slater, Julie .....          | p.11    |
| Smith, Alexis .....          | p.8     |
| Snead, Emmalyn .....         | p.23    |
| Snoeyenbos, William .....    | p.14    |
| Swerdlow, Rebeccah .....     | p.23    |
| Taylor, Jordan .....         | p.10    |
| Thomas, Taylor .....         | p.23    |
| Tilghman, Autumn .....       | p.6     |
| Trawick, Amber .....         | p.23    |
| Trigg, Giovanna .....        | p.13    |
| VanBuren, Molly .....        | p.23    |
| Vernon, Willian “Zach” ..... | p.17    |
| Vincent, Branch .....        | p.24    |
| Wagner, Sarah .....          | p.24    |
| Watts, Michael .....         | p.24    |
| Wendt, Katharine .....       | p.20    |
| Wessels, Kelsey .....        | p.15    |
| Woodward, Sara .....         | p.21    |
| Ziesel, Joshua .....         | p.6     |
| Zotamou, Pivot .....         | p.24    |

# schedule

---

**8:30-9:30am:** Breakfast/ Registration  
*Hampson Commons, Main Hall Lobby*

**12:15-1:30pm:** Lunch  
*Cheatham Dining Hall*

4

**9:30am-2:45pm:** Oral Presentations  
*Student Center, Psychology Building*

**2:30pm-4:00pm:** Poster Presentations,  
*Hampson Commons, Main Hall Lobby*

---

## **SATURDAY, OCTOBER 10, 2015**

### **ORAL PRESENTATIONS SESSIONS I-XII**

**Session I: 9:30-10:45am, Nichols Theatre**

9:30 Andrew Hansen, James Madison University  
9:45 Joshua Ziesel, Loyola University Maryland  
10:00 Autumn Tilghman,  
Christopher Newport University  
10:15 Will Address, Randolph College  
10:30 Jessica Barry, Sweet Briar College

**Session II: 9:30-10:45am, Quillian Conference Room**

9:30 Renee Russell, Randolph College  
9:45 J. Patrick O'Keefe, James Madison University  
10:00 Callan Frye, Randolph College  
10:15 Andrew Dittmar, Roanoke College  
10:30 Steven Lohrey, Randolph Macon College

**Session III: 9:30-10:45am, Psychology 101**

9:30 Adair Moore, Randolph College  
9:45 Tiffany Nelson, James Madison University  
10:00 Alexis Smith, Sweet Briar College  
10:15 Stephen Aoun, Randolph Macon College  
10:30 Everett Eschbach, Virginia Military Institute

**Session IV: 9:30-10:45am, Psychology 102**

9:30 Ashlen Clark, James Madison University  
9:45 M'Elise Salomon, Roanoke College  
10:00 Hannah Palmatary & Benjamin Gee,  
Washington & Lee University  
10:15 Shannon Murray,  
University of North Carolina Charlotte  
10:30- Derek Litvak, Virginia Tech

**Session V: 11:00- 12:15pm, Nichols Theatre**

11:00 Ashley Kelly & Meredith Meeks,  
Christopher Newport University  
11:15 Taylor Litzenberg, Sweet Briar College  
11:30 Alexandra Claggett, James Madison University  
11:45 Zachary Betterton, Lynchburg College  
12:00 Jordan Taylor, James Madison University

**Session VI: 11:00-12:15pm, Quillian Conference Room**

11:00 Sarah Davis, Christopher Newport University  
11:15 Stephen Bernard, Virginia Military Institute  
11:30 Di Bei, Randolph College  
11:45 Meaghan Brunke, James Madison University  
12:00 Ayla Hagen, Randolph College

**Session VII: 11:00-12:15pm, Psychology 101**

11:00 Anna Bates, Mercer University  
11:15 Emmy Freedman, James Madison University  
11:30 Julie Slater, Christopher Newport University  
11:45 Luke Phillips, Virginia Military Institute  
12:00 Nicholas Berenato, James Madison University

**Session VIII: 11:00-12:15pm, Psychology 102**

11:00 Olivia Reed & Tetiana Poliakova,  
Randolph College  
11:15 Renzo Olivari, James Madison University  
11:30 Benjamin Ford, James Madison University  
11:45 MacKenzi Brown, Randolph College  
12:00 Giovanna Trigg, James Madison University



## LUNCH BREAK

12:15-1:30PM

### CHEATHAM DINING HALL

#### **Session IX: 1:45-2:45pm, Nichols Theatre**

- 1:45 Marie Boyd, Lynchburg College
- 2:00 Austin Bajc, Virginia Military Institute
- 2:15 Oliver Goddin, James Madison University
- 2:30 Kiersten Garcia, Sweet Briar College

#### **Session X: 1:45-2:30pm, Quillian Conference Room**

- 1:45 Ryan Johnson, James Madison University
- 2:00 Raymond Hyser, University of Virginia
- 2:15 William Snoeyenbos, James Madison University

#### **Session XI: 1:45-2:45pm, Psychology 101**

- 1:45 Sarah Henderson, James Madison University
- 2:00 Kelia Cutkelvin, Randolph College
- 2:15 Kyle Lundquist, James Madison University
- 2:30 Citlali Molina, Sweet Briar College

#### **Session XII: 1:45-2:45pm, Psychology 102**

- 2:00 Kelsey Wessels, James Madison University
- 2:15 Hannah Nierle, Christopher Newport University
- 2:30 April Pickens, James Madison University
- 2:45 Valeria Robledo, James Madison University

### POSTER SESSION, 2:30-4:00PM, HAMPSON COMMONS, MAIN HALL LOBBY

1. Myshake Abdi, Hampden-Sydney College
2. Daniel Aparicio, Christopher Newport University
3. Sarah Ballard-Abbott, Randolph College
4. Rhianan Banks, Spencer Dunlap, & Crystal Singleton, Christopher Newport University
5. Paige Bloomquist, Christopher Newport University
6. Brant Boucher, Hampden-Sydney College
7. Michael Bouldin & Kyle Grierson, Hampden-Sydney College
8. Amanda Bradbury, Christopher Newport University
9. Allison Brooks & Melissa Pasierb, Randolph College
10. Russell Burt & William "Zachary" Vernon, Randolph College
11. Sabrina Callan, Christopher Newport University
12. Julie Carlin, Loyola University Maryland
13. Molly Cioffi & Madeline Jonz, Loyola University Maryland
14. Chris Cizek, Shenandoah University
15. Emma Clarke, Roanoke College
16. Isabelle Clough, Christopher Newport University
17. Rebecca Conter, Roanoke College
18. Emily Dallas, Brittini Croiser, Taylor Litzenberg & Katharine Wendt, Sweet Briar College
19. Alyssa Debra, Virginia Tech
20. Anna Denisch, Roanoke College
21. Phillip Deyerle & Tresa Scruggs, Lynchburg College
22. William Echols, Hampden-Sydney College
23. William Fitzgerald, Hampden-Sydney College
24. Elizabeth Flora & Alexander Schmidt, James Madison University
25. Amanda Guth, Loyola University Maryland
26. Jessica Hanson, Christopher Newport University
27. Leah Harbison, Roanoke College
28. Hagay Haut & Sara Woodward, Randolph College
29. Daisy Howard, Randolph College
30. Katriana Jorgensen-Muga, Sweet Briar College
31. Benjamin Lam, Hampden-Sydney College
32. Anna Ledin, Lynchburg College
33. Jim Young Lee, Christopher Newport University
34. Mason Luck, Hampden-Sydney College
35. Linh Nguyen, Hampden-Sydney College
36. Sarah Petrosky, Roanoke College
37. Benjamin Schwartz, Roanoke College
38. Samuel Sheffield, Hampden-Sydney College
39. Emmalyn Snead, Randolph College
40. Rebeccah Swerdlow, Loyola University Maryland
41. Taylor Thomas & Thomas Aberman, Christopher Newport University
42. Amber Trawick, University of Science & Arts of Oklahoma
43. Molly VanBuren, Sweet Briar College
44. Branch Vincent, Hampden-Sydney College
45. Sarah Wagner, Christopher Newport University
46. Michael Watts, Roanoke College
47. Pivot Zotamou, Loyola University Maryland

# presentations

## SESSION I, 9:30-10:45, NICHOLS THEATRE

### 9:30 | Andrew Hansen '16, James Madison University, ““All We Have Asked For Were Our Rights:” The Tennessee Convict Wars, 1891-1892”

The convict lease system plagued the South in the post-Reconstruction era and put numerous free workers out of a job by employing convicts in their place. In the early 1890s, a number of small coal mining towns in eastern Tennessee took matters into their own hands and fought against this hated system in one of the most significant labor uprisings in American history. While repeatedly trying to work through the legal system, the indifference of governor along with the inability of the state legislature to pass any meaningful reforms led these miners to free and burn down a number of company owned stockades. The repeated actions by the coal miners displayed their incredible perseverance in fighting the government against a system they found repressive and wholly unfair.

6

### 9:45 | Joshua Ziesel '17, Loyola University Maryland, “A Linguistic Study of the Distal Demonstrative Pronoun and Adjective Ekeinos, in Lysias Epitaphios”

Although the Epitaphios, or funeral oration, of Lysias is well known, his rhetorical approach to the Athenian funeral oration has not been adequately addressed through philological study. While his rhetoric is consistent with other funeral orations, Lysias use of ekeinos, to create emotional distance is at odds with the most well-known funeral oration, that of Pericles in Thucydides' History. After highlighting a spatial connection between the living and the war-dead, Lysias creates an emotional distance between the two groups by employing the distal demonstrative, in reference to the dead. By closely examining how Lysias uses this demonstrative across his entire corpus, but with a sharp focus on his Epitaphios, and by comparing his rhetorical strategy to other funeral orations, I will show the previously undetected flexibility of the demonstrative and, moreover, offer a nuanced understanding of the rhetorical technique of one of the greatest Athenian speechwriters.

### 10:00 | Autumn Tilghman '16, Christopher Newport University, “The Effect of Unplanted Species on Planted Tree Establishment in Created Wetlands”

Co-Author: Eli Wright Robert B. Atkinson

Created wetlands are designed to mitigate for habitat loss from increased development pressure. Trees are difficult to establish in created wetlands, and unplanted species may influence success. In 2008, 1596 trees were planted in three created wetlands in Loudoun County, Virginia. Tree morphometric dimensions were measured and both unplanted woody and herbaceous species importance were evaluated using cover estimated at 208 trees in summer 2015. Relative importance value (RIV, species dominance and frequency expressed as a percentage of a plant stratum) was calculated for both the herbaceous and woody strata within these 208 plots. In the herbaceous stratum, *Scirpus cyperinus* (27.5%), *Leersia oryzoides* (19.0%), and *Carex vulpinoidea* (9.9%) exhibited the highest RIV. In the woody stratum, *Salix nigra* (63.9%) and *Quercus bicolor* (12.6%) exhibited the highest RIV. All of these are facultative wetland or obligate wetland species and suggest that site wetness may limit tree growth in these sites.

### 10:15 | Will Andress '17, Randolph College, “A Story of the Story of the Buddha”

This presentation will cover the role that auto/biography plays in forming Buddhist religious identities through both the ancient and modern eras. Three works will be examined: Ashva Gosha's “The Life of the Buddha”, Soko Morinaga's “Novice to Master” and Natalie Goldberg's “Waking up in America.”

### 10:30 | Jessica Barry '16, Sweet Briar College, “Crime and Punishment in Rural Colonial Virginia”

The definition of a criminal has always been a person who commits a crime, but the definition of a crime has been fluid through time. There are levels of severity of crimes and they all don't carry the same weight in the justice system or in society. In Colonial Virginia, there were prisons in every county as well as a courthouse where the trials were held. This small conglomeration of buildings was at the heart of the county seat where the civil and social lives of the citizens flourished. This paper aims to show the effects of crime on society and how society effects what a crime is in Amherst County.



## **SESSION II, 9:30-10:45, QUILLIAN CONFERENCE ROOM**

### **9:30 | Renee Russell '16, Randolph College, "Immunohistochemistry Shows No Co-localization Between GABA and Orexin or MCH in the Lateral Hypothalamic Area"**

Co-Authors: Laura E. Michelson, Alexander Jackson & CT Akie Fujita

Narcolepsy and obesity are two seemingly unrelated diseases, however, they both arise from anomalies occurring in the lateral hypothalamic area (LHA). This evolutionarily primitive brain region is extremely complex and heterogeneous, with many different cell populations and connections to other brain regions. Through the use of GAD2-cre transgenic mice and immunohistochemistry, we quantified the co-localization of the neurotransmitter GABA with orexin and melanin-concentrating hormone (MCH), both of which are neuropeptides unique to the LHA and are implicated in disease. We found no significant co-localization of GABA with either orexin or MCH, indicating that these cells may use a different neurotransmitter as an alternative form of communication.

### **9:45 | J.Patrick O'Keefe '16, James Madison University, "Mérimee's Carmen: the Savage Gitane in Western Society"**

Prosper de Mérimée's rapport on Carmen, the young gypsy of Seville, gives the lector an overwhelming and bothersome depiction of the unknown. Carmen's exoticism is as mysterious as it is compelling to the "civilized" man. Society does not understand her; writers' and poets' depictions seem ersatz and sporadic, seldom do they pinpoint the origin of her mannerisms. She could be anything, everything--the paradise lost, Eve before the Fall, la virgo, the feminine archetype that conquered Adonis; or rather the prodigal spawn of Lucifer, as she defamiliarizes all that men once knew to be true of what a woman is in society. Back on Earth, seldom does Mérimée depict her as human but as the sprawling fauna. The desire that he expresses for her is evident--the gyptienne's sexual being transcends the realms of Heaven, Earth, and Hell that he finds exciting and rare.

### **10:00 | Callan Frye '17, "Skeletons in our Closet: The Four Lives of the 'Gamma Skeleton'"**

Co-Authors: Franziska Klostermyer, Randolph College graduate of 2015

Discovered by security on Randolph College's 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 that it originally served an academic purpose. However, 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, an academic skeleton, a secret society relic, and a research opportunity for 21st-century students. To assist the investigation, researchers utilized DNA sequencing, forensic analysis of dental attrition, and the RC/R-MWC archives.

### **10:15 | Andrew Dittmar '16, Roanoke College, "Discovering Liberty: Defining Individualist Anarchism in Liberty, 1881-1908"**

This paper is an analysis of Liberty, a periodical published sporadically in the United States from 1881 until 1907. Generally unknown today, Liberty was the brainchild of Benjamin Tucker, a political theorist who advocated for a philosophy known as individualist anarchism. The thesis of the paper argues that the content of Liberty shows a progression of individualist anarchist thought, moving from a general distrust of the state to any institution that espoused dogma: religious systems, contemporary governments, particular political ideologies. It is backed primarily with primary sources from the pages of Liberty itself, as well as secondary scholarship from the handful of scholars who have written of Tucker and Liberty.

### **10:30 | Steven Lohrey '16, Randolph-Macon College, "Chlandi Plates: A Demonstration of Sound Waves"**

Co-Author: Rachele Dominguez

In this project I studied standing waves in two dimensions on flat metal plates, known as Chladni plates, at various frequencies. Chladni plates are used produce intricate sand patterns that result from a perturbation of the plates at their resonant frequencies, which I recorded for both a circular plate and a square plate. I investigated the mathematical theory for the standing wave and explored a computational model that involved Huygens principle and the Bohr model to accurately predict the figures on the circular Chladni plates. I developed a Chladni plate laboratory exercise for undergraduate level courses to demonstrate and ascertain the theory of standing sound waves through Chladni plates. As a result I concluded that qualitative computational models are better suited for an undergraduate level audience than the two-dimensional wave equation approach and that Chladni plates have numerous applications in the field of acoustics.

## **SESSION III, 9:30-10:45, PSYCHOLOGY 101**

### **9:30 | Adair Singleton Moore '17, Randolph College, "What Happens When the Train Goes off the Track?: A Problem Based Learning Module"**

Co-Author: Dr. Cheryl Lindeman

This research focused on incorporating the April 2014 Lynchburg train derailment into problem-based learning (PBL) activities for K-8 children. Lessons were created using STEM (science, technology, engineering and mathematics) and PBL strategies providing an interactive learning environment for children to tackle the problems created by the train derailment. Involving the community stakeholders into the development of the lessons helped to capture the scope of STEM careers involved. A sampling of the children's creative projects and engineering drawings will be shared showing ways to have children dig deep into what might have caused the derailment and what might be constructed to prevent other trains from derailing at the Lynchburg James River location. This project was funded by Randolph College's Summer Research Program.

**9:45 | Tiffany Nelson '16, James Madison University, "The Whorarchy of Nineteenth Century America: Prostitution and Social Reformation"**

Following the American Revolution, women experienced an increase in personal, social, and political freedoms, including a growth in women's sexual deviancy and experimentation. The presentation attempts to describe to the audience details concerning eighteenth and nineteenth century American prostitution and the social reverberations caused by it. Topics that are specifically addressed include a brief history of women's roles in the era, motivations for prostitution, threats the women faced, and the effects that prostitution had on social structures. Through thought provoking examples and evidence supporting moral reform, the argument insists that despite social reformations that occurred in the 1830s, women continued to gain both internal and external independences throughout the nineteenth century.

**10:00 | Alexis Smith '16, Sweet Briar College, "Development of an Organic Lab: Synthesizing 4-carbethoxy-2-(3,4-dihydroxybenzylidene)-5-methyl-3(2H)-furanone"**

An aldol condensation is an important reaction in organic chemistry as it joins two compounds via a carbon-carbon double bond. The purpose of this research was to optimize a multi-step synthesis involving an aldol condensation that produced a novel compound, 4-carbethoxy-2-(3,4-dihydroxybenzylidene)-5-methyl-3(2H)-furanone, for use in a sophomore level organic chemistry lab. Thirteen trials were completed with different solvents and catalysts. The highest yield was obtained with water as the solvent and L-tartaric acid as the catalyst. The product's reactivity toward ultraviolet light was also explored. Yield: 0.1212 g, 78.8%; mp 183-185°C; <sup>1</sup>H NMR (400 MHz, CD<sub>3</sub>OD) = 7.42 (d, J=1.83 Hz, 1H), 7.20 (dd, J=1.83 Hz, 8.24 Hz, 1H), 6.81 (d, J=8.24 Hz, 1H), 6.72 (s, 1H), 4.28 (q, J=7.33 Hz, 2H), 2.73 (s, 3H), 1.32 (t, J=7.79 Hz, 3H).

8

**10:15 | Stephen Aoun '17, Randolph-Macon College, "Vikings in the East: Russia, Varangians, and Islam"**

Co-Authors: Dr. Heather Weidner

From 793 AD - 1000 AD, the Vikings terrified western Europeans. They traveled from the north to pillage churches, monasteries, and other wealthy sites, and to take slaves. Historians know a lot about Viking raids and expansion in Western Europe, but are still investigating their adventures in the Byzantine Empire, Asia, and the Middle East. This presentation will focus on Harald Hardrada's exploits in Serkland as well as the Middle East.

**10:30 | Everett Eschbach '16, "Understanding Variance in the Outcome of Revolutionary Movements"**

Throughout the 20th century, political regimes have come to power through military coups, wars and revolutions in an attempt to overthrow current political systems and establish change. To better understand how these movements find success in bringing change to a state, I have tested several independent variables derived from two prominent theories, the Political Opportunity Structure Theory and Resource Mobilization Theory. In an attempt to determine which independent variables best explain revolutionary success, measured by the outcome of overthrowing the existing political regime in a state, I use the qualitative method of process tracing. Using Mill's method of difference I compare the successful Bolivian Revolution of 1952 with the unsuccessful Dominican Republic Revolutionary Movement of 1965, and I find that level of violence, presence of human and moral resources in addition to the acquisition of an external ally significantly influence whether a movement will be successful or not.

**SESSION IV, 9:30-10:45, PSYCHOLOGY 102**

**9:30 | Ashlen Clark '17, "The American Allies: The Impact of the Oneida Involvement in the American Revolution"**

The American Revolution extended its grasp far past the white men who started it, forcing Natives across the colonies to become involved. Soon after the beginning of the Revolution the Iroquois Six Nations of New York were drawn into the conflict and forced to choose between the Americans, the British, or attempts at neutrality. After the war the Iroquois Six Nations emerged divided, broken, and severely less powerful than when they entered the strife. Through sources such as the Samuel Kirkland Papers, military journals, and the Draper Manuscripts this paper examines the impact of the American Revolution on this Iroquoian division, specifically focusing on the Oneida Indian Tribe and the effects of their alliance with the American Patriots.

**9:45 | M'Elise Salomon '17, Roanoke College, "Reshaping American Judaism: Power, Identity, and the National Council of Jewish Women"**

Established in 1893, the National Council of Jewish Women sought to overcome a perceived loss of Jewish culture through educating Jewish

women, fortifying Sabbath Schools for children, and engaging in philanthropy within their local communities. The focus of scholarly discussion has shifted from saving Judaism to how American Jewish women have used the Council to create a unifying identity, harness power, and effect both global and local change. This paper will use the proceedings from the First Convention of the National Council of Jewish Women to explore how the Council helped form a cohesive identity for middle and upper class American Jewish women and how the council-members used their power to reshape modern, American Judaism.

**10:00 | Benjamin Gee '18 & Hannah Palmatary '18, Washington & Lee University, "A Thousand Times Worse than Death: Representations of Robert Devereux, 2nd Earl of Essex"**

As Essex sat under house arrest in the spring of 1600, he penned a plea to his Queen begging forgiveness for the sake of his legacy. He wrote, "Shortly they will play me in what forms they list upon the stage, the least of which is a thousand times worse than death." Essex, who led an eventful life in Elizabeth's court, ultimately was executed for leading an unsuccessful rebellion. This uprising was a pivotal moment in history, for if Essex had succeeded, England's entire history would have changed, yet this moment remains unappreciated. But Essex's legacy did survive, for as he predicted, he has been portrayed in paintings, plays, music, poetry, opera, and fiction since his death. Our scholarly project, a thanatography of Essex which takes the form of a digital timeline, explores the various 'afterlives' of Essex and delves into the complexity of human story telling.

**10:15 | Shanon Murray '16, University of North Carolina Charlotte, "The Anatomy of Racism: A Dissection of Racial Oppression In the Poetry of Wanda Coleman"**

Contemporary African American poet Wanda Coleman represents a unique addition to the African American literary canon through her didactic poetics. Coleman has been recognized for addressing issues of class, gender, and family in American society, while her adamant stance against racism has not been the central focus of much scholarly research. By identifying that racism extends beyond the use of the word, Coleman educates her audience through the poems Drone, Business as Usual, and Late Broadcast News, about the specific features of racism, including economic inequality, poor quality of health care, and the unwarranted killings of black men and women. It is important that consumers of the literary tradition recognize the subtle markings of racism, that it is systematically embedded into the pores of American society. Only then can enthusiasts of the tradition be propelled towards social activism to challenge the current system of oppression inflicted upon minority groups.

**10:30 | Derek Litvak '16, Virginia Tech, "Publius v. Brutus: A Ratification Debate Over The Federal Courts and Judicial Review"**

This project examined two key players in the ratification debates over the Constitution, Publius and Brutus, in respect to their opinions on the proposed federal judiciary. In particular, it set out to show how the arguments of these two men showed the existence of judicial review from the very onset of the creation of the Constitution. By examining Publius's Federalist Papers and Brutus's essays, I was able to ground my research largely on primary sources, and use the words of these two men themselves as a basis for my analysis. The resulting paper showed how the many aspects of the federal judiciary that Publius argued for, and Brutus against, were important not only in their own right, but because they ultimately were the very parts of the proposed judiciary that gave it the power, as well as the authority, to exercise judicial review.

**SESSION V, 11:00-12:15, NICHOLS THEATRE**

**11:00 | Ashley Kelly '16 & Meredith Meeks '16, Christopher Newport University, "Undergraduate Student Research Using the Consensual Qualitative Research Protocol"**

Co-Author: Dr. Michelle Clark

Psychological research is dominated by quantitative studies conducted by postdoctoral professionals and graduate students. This presentation, however, will highlight the values of the Consensual Qualitative Research protocol (CQR)(1,2), a qualitative method which allows for a high level of involvement for undergraduate researchers. This protocol typically involves a series of participant interviews consisting of semi-structured open-ended questions, allowing for in-depth analysis that allows for collaboration to promote multiple perspectives. This process is composed of three steps involving a team of researchers arriving at consensus on labeling domains (categories) for the interview data, describing core ideas (abstracts), and performing a cross-analysis across cases. The presentation will describe how elements of this qualitative interview and data analysis protocol were enacted in a research study involving undergraduate research assistants. The CQR format is a rigorous qualitative method that has many possible positive implications to offer in research.

**11:15 | Taylor Litzenberg '16, Sweet Briar College, "Archaeological and Anthropological Interpretations of Sub-Floor Pits at James Madison's Montpelier"**

In order to maintain privacy, African American slaves in the United States would utilize a sub-floor pit for keeping items safely stored. At James Madison's Montpelier, when I did my archaeology field school and paid internship, there were two sub-floor pits excavated at the Field Slave Quarter site. These two pits can be interpreted by using stratigraphic records, artifact analysis, historical documents, and a chronological typology of pits. After interpreting these pits, we can see that sub-floor pits as a way that slaves created their own space and privacy away from the public.

**11:30 | Alexandra Clagett '16, James Madison University, "The Garden of Good & Evil: The Story of the Goering Brothers"**

One of the most intriguing topics for investigation that I came across was the story of two brothers, one infamous, the other ignored: Hermann and Albert Goering. During World War II Hermann was the right hand man and successor of Adolf Hitler, during this same time frame his brother Albert was helping Jews escape persecution and death. Although Albert Goering was very different from his brother, the two maintained a close relationship in spite their contrasting political views. The family name that enabled Albert to save countless lives of Jews and political dissidents and ensure their freedom, also was responsible for Albert's arrest after the war and the sad circumstances of the rest of his life. I am hoping to explore some aspects of Albert's life, his relationship with his brother, and the influences which turned one brother to good and the other to evil. I will analyze primary source documentation and corresponding literature in this study.

**11:45 | Zachary Betterton '16, Lynchburg College, "Research in Spectroscopy and Trajectory analysis of Near-Earth Objects"**

Co-Authors: M. R. Solontoi, G. Gyuk, M. J. Brucker, M. Hammergren, and K. A. Nault, Adler Planetarium

We present the current spectroscopic results of observations of Near-Earth Objects from a recently begun, NASA-funded program using the Astrophysical Research Consortium (ARC) 3.5 meter telescope at Apache Point Observatory (APO). Spectroscopy is performed using the Dual-Image Spectrograph (DIS). The results will create a data set to further the understanding of the evolution and dynamics of smaller Near Earth asteroids, a population which has not been studied as extensively as larger Solar System bodies. The results presented here focus on the spectroscopic analysis of these objects. By determining the surface composition of near-Earth objects this analysis can begin to place constraints into the origin of these objects. By the project's conclusion we expect to provide positional astrometry on several thousand NEOs, along with spectra of around 150 objects.

10

**12:00 | Jordan Taylor '16, James Madison University, "The Autonomy of Abigail Adams"**

This presentation examines the development of Abigail Adams revolutionary character through the span of her lifetime. The goal is to show that Abigail Adams fought the dictates of separate spheres for men and women by educating herself in an effort to improve her and other women's education, managing the household, and directly defying the principle of coverture. This has been done by examining Abigail's correspondence with her friends and family, and in particular with her husband John. A pattern appears during this examination in which Abigail increased her authority in areas that predominantly excluded females out of necessity, then she pushed those boundaries due to curiosity or ambition, and finally she became an advocate for expansion of the female sphere. The conclusion is that Abigail Adams circumstances did not define her revolutionary character rather it was her character that often determined her circumstances.

**SESSION VI, 11:00-12:15, QUILLIAN CONFERENCE ROOM**

**11:00 | Sarah Davis '16, "The Effects of Priming and Source on Believability and Recognition of Headlines"**

Co-Authors: Taylor Thomas, Briana Bouldin, Hannah Nierle, Lauren Shriver, Nesselyn Dearce, Morgan Epstein, Christopher Boyer, Danielle DeLucia, & Jeffrey Gibbons

Previously, we have examined the relationship between media source and skepticism on believability and recognition of news and tabloid headlines (Epstein et al., 2013). The results supported past research that unbelievable headlines become more believable over time (Gibbons, Lukowski, & Walker, 2005). The current experiment sought to investigate the relationship between source and priming on believability and recognition of believable and unbelievable headlines. We examined 146 CNU students. Participants first signed a consent form before reading one of four priming conditions and rating 24 headlines (12 believable and 12 unbelievable) for believability. Two days later the participants rated believability of 48 headlines (24 repeated headlines and 24 new headlines). Believability was measured on a scale of -3 (extremely unbelievable) to 3 (extremely believable). Participants circled the headlines they recalled to test for recognition. The experiment supported the hypothesis that source affects believability ratings. Additionally, the hypothesis that believability ratings would change over time was supported.

**11:15 | Stephen Bernard '17, Virginia Military Institute, "Lessons From Lebanon: The Applications of Consociation in the Middle East"**

Why does democracy work in deeply divided societies? This paper looks to an unlikely case, Lebanon, to explore the conditions under which democratic political stability is possible; by examining two periods of democratic success (1943-1975 and 1989-Present) and one period of failure (1975 - 1989). My analysis uncovers that consociation in Lebanon survived challenges due to a neutral arbiter, the establishment of consensus, and the salience of the state. Application of these lessons to the complex situation of Iraq contests the popular argument explaining the collapse of Iraqi government. Without the formation of consensus after the establishment of Maliki government in 2005, success might have continued if democracy had gone untested. Unfortunately, administrative issues ushered in an irrecoverable state of anarchy. As long as the state remains salient, the citizens are protected, and convocational institutions are respected, democracy can continue in a deeply divided society.

**11:30 | Di Bei '18, Randolph College, "Application of a Modified Dithizone Analysis Technique to Environmental Samples"**

Co-Authors: Dr. Bill Bare

Lead contamination is a ubiquitous problem in Lynchburg, Virginia. In environmental samples, lead is easily detected and quantified at the parts per million (ppm) level by digestion in nitric acid, followed by analysis using a flame atomic absorption instrument. In drinking water, however, detection limits in the range of a few parts per billion (ppb) are needed, requiring the use of the much more expensive graphite tube analysis. In an attempt to obtain low detection limits for drinking water samples, we have resurrected an older colorimetric technique that uses dithizone to produce a darkly colored complex with lead that can be analyzed by UV-visible absorption spectroscopy, allowing us to detect lead at 50 ppm. We have modified the traditional dithizone method using micelles which allowed us to extend the detection level down to 30 ppb.

**11:45 | Meaghan Brunke '16, James Madison University, "President John F. Kennedy and the Cuban Missile Crisis"**

During the height of the Cold War, President John F. Kennedy was confronted with a paralyzing dilemma as the Soviet Union placed their nuclear missiles on Cuban soil, right off the coast of Florida. As the world prepared for a nuclear disaster, the Executive Committee of the National Security Council (ExComm) worked with President Kennedy to evaluate all possible solutions. After careful analysis of The Kennedy Tapes, Robert Kennedy's Thirteen Days: A Memoir of the Cuban Missile Crisis, and newspaper articles one will find that President Kennedy had to examine Soviet motives, analyze public appearance, measure political impacts, and blindly trust Soviet Union's Premier Nikita Khrushchev in hopes that the survival of the human race would triumph over the desire to win the arms race.

**12:00 | Ayla Hagen '18, Randolph College, "Fiber Connections: Exploring the Mill Culture of Lynchburg, Virginia and the Piedmont Region"**

In 1957, the cotton textile mill located in Lynchburg, VA closed. A few years before this closure, a group of young graduate students attending the University of North Carolina embarked upon an in-depth sociological and anthropological research study of a South Carolinian textile mill. Their work became seminal in the study of textile mill communities, and would encourage others to research the turbulent world of mill life during the years surrounding racial integration. One of the researchers ended up teaching at Randolph-Macon Woman's College, and his work with the South Carolina mill inspired this new research of the Lynchburg mill. An exploratory search for information pertaining to the mill, the mill community, and the mill workers has exposed what seems to be a mystery surrounding the closure of the Lynchburg mill. This exploratory research has confirmed that there is much more to study historically, anthropologically, and sociologically.

**SESSION VII, 11:00-12:15, PSYCHOLOGY 101**

**11:00 | Anna Bates '17, Mercer University, "Philosophy and the Individual: A Study of Glaucon in Plato's Republic"**

While Plato's Republic is primarily a philosophical text, we must not forget that it is also a work with literary elements such as plot, setting, and characters. Recent scholarship in Philosophy is increasingly interested in these aspects of Plato's dialogues, yet, despite this new attention the role of the characters in Plato's dialogues have been largely ignored, particularly those in the Republic. My research investigated the main interlocutor, Glaucon, whose importance to understanding the Republic has been overlooked. By writing dialogues rather than treatises or discourses, Plato is writing philosophy as it actively tries to improve the lives of individuals. As such, it is not just that examining Glaucon and the interlocutors is necessary because we will better understand Plato by understanding the literary aspects of his form. It is also necessary to consider Glaucon in order to know how Plato saw the interaction of philosophy with the individual.

**11:15 | Emmy Freedman '17, "Hitler's Inconsistent Jazz Policy and How it Weakened His Control"**

My paper looks into Hitler's policy on jazz music under his regime. With the help of his Minister of Propaganda, Joseph Goebbels, he set out to eradicate this "democratic disease" from both public and private establishments. Unfortunately for him, his endeavors were met with mixed success at best and at worst were perhaps harmful to his career. Through radio broadcasts, German youth, the 1936 Olympics, and other mediums of jazz diffusion, I explore the effects of banning jazz on a society unwilling to give up their musical preferences.

**11:30 | Julie Slater '16, Christopher Newport University, "Dendrochronological Analysis of Trees Encroaching On Two Southern Appalachian Fens"**

Co-Author: Robert B. Atkinson

Southern Appalachian fens are small mountain wetland communities that often feature rare plants dependent on the open canopy and saturated conditions. Many sites are experiencing woody encroachment in previously open areas, whether due to lack of disturbance or change in environmental conditions. This study examined cores taken from trees growing in the most saturated areas of two southern Appalachian fen sites: Big Spring Bog near Galax, VA and McClure's Bog near Asheville, NC. *Pinus strobus*, *Acer rubrum*, and *Betula nigra* cores were mounted, sanded, and aged to yield approximate date of tree colonization. Tree age ranged from 40 to 60 years old. Tree colonization may have resulted from climatic events such as drought or from absence of beaver activity, fire, or human disturbance.



**11:45 | Luke Phillips '17, Virginia Military Institute, "Situationally Specific Signaling in the Chatter Call of the Adult Tree Swallow (*Tachycineta bicolor*)"**

Animal communication is a widely studied topic that may lead to a greater understanding of how humans developed their language over the course of their evolution. The focus of such research is to find communication that connotes specific meanings for specific situations. Tree swallows (*Tachycineta bicolor*) have a well-known repertoire of calls and are relatively easy to observe and study in the wild. The tree swallow chatter call is used in contrasting social situations making it a potential source of specific communication. Over 3,000 chatter calls were recorded from a nesting population of tree swallows and analyzed using Raven Pro 1.4 Sound Analysis software. Analysis revealed there were five, distinct variations of the chatter call, varying both in structure and situational usage, which were previously unidentified. These chatter call variations may change the meaning of the chatter call for different situations, indicating that tree swallows may possess specific communication.

**12:00 | Nicholas Berenato '16, James Madison University, "The Divine Force Behind Turner's Rebellion"**

My presentation will focus on the motives behind Nat Turner's slave insurrection in 1831. Turner's insurrection is considered the deadliest slave revolt in the American South. What makes Turner's insurrection unique was the motive behind it. Evidence from the time period indicates that Turner's strongest influence was his religion. This stands in stark contrast to the 1831 belief that Turner wanted Earthly retribution in the form of freedom and/or money. The influence of slave religion upon Nat Turner will be discussed. In addition, the theological and social context of Nat's life will be analyzed.

**SESSION VIII, 11:00-12:15, PSYCHOLOGY 102**

12

**11:00 | Tetiana Poliakova '18 & Olivia Reed '16, Randolph College, "Entry and Localization of Allergen Alt a 1 in Human Airway Epithelial Cells"**

Co-Author: Dr. Amanda Rumore

*Alternaria alternata* is a ubiquitous airborne fungus associated with an increased risk of allergy, asthma, and chronic obstructive pulmonary disorder (COPD). When inhaled, the fungus secretes the allergen Alt a 1 into the lung tissue. The interaction between the allergen and the epithelial cells lining the airway can cause an inflammatory response, increased mucous production, and irritation due to cell death. Our project aimed to determine the timing and localization of the Alt a 1 allergen in airway epithelial cells using fluorescent microscopy. We also examined if entry increases the release of pro-inflammatory cytokines from the airway cells and/or if cell death is induced by allergen entry.

**11:15 | Renzo Olivari '17, James Madison University, "Educating Teachers While Limiting Women: the Case of the State Normal School for Women at Harrisonburg"**

On September 15, 1908, Julian A. Burruss, first President of what would later become James Madison University, presented to the Board of Visitors his vision of making the newly established college State Normal and Industrial School for Women at Harrisonburg a training facility for rural school teaching(1). Although the goal of the school was to give women training to become teachers, the angle and organization of it was still unknown. However, this problem was not unique to Harrisonburg. As women started entering the teaching profession, the problem of higher education for women maximized throughout the country. By analyzing official school documents, student scrapbooks, correspondence, and newspaper ads, which provide an insight to the school's specific situation, I argue that, in reality, the creation of the State Normal and Industrial School for Women at Harrisonburg was due to the economic and professional needs, rather than to expand women's rights and opportunities.

**11:30 | Benjamin Ford '17, "Redditors: Creation of Online Identity through Language Use"**

Identity is an important aspect of modern life. With the rise of the internet and the social network, much of identity creation now takes place on the platform of cyberspace. Examining the processes of identity formation on reddit.com, a popular news aggregate site touted as the "front page of the internet," this presentation looks at how language usage on reddit leads to in-group and out-group identifications, both in reddit and in the smaller sub-groupings of the website known as subreddits. This presentation examines how users of the website, known as redditors, talk, not only about themselves, but also about users of other websites, and the identities created from that talk.

**11:45 | MacKenzi Brown '17, Randolph College, "Analysis of Working and Resting Heart Rate in the Horse Using Wireless Heart Rate Monitors"**

Co-Authors: Dr. Amanda Rumore

This project focused on measuring equine heart rate during normal riding sessions. We looked to find the amount of warm-up (reaching working heart rate) and cool-down (returning to resting heart rate) time required for each horse. Traditionally, these parameters are ambiguous and determined by the rider and/or trainer without an understanding or consideration of heart rate. We designed a model where we can predict how much warm-up/cool-down time a horse needs based on what we know about the specific horse. We tried to correlate the time it takes for each horse to warm-up/cool-down with known information about each horse such as age, height, breed, weight, nutrition, turnout time, and riding



level of the rider. This data will lead to a better-defined method to use when conditioning horses based on their specific needs.

**12:00 | Giovanna Trigg '16, James Madison University, "Japanese American Internment: Life in the Camps"**

The bombing on Pearl Harbor, Hawaii on December 7, 1941 brought to life anti-Japanese sentiments in America. After some debate among government officials, 127,000 Japanese Americans were forced to move into ten different relocation camps until the end of World War II. The relocation camps were to allow the Japanese Americans to continue their normal lives; however, that was almost impossible to do. Through the use of interviews, newspapers, and photographs, the struggles of adjusting to camp life in terms of living conditions, employment, education, and food sources was brought to life. Due to these adjustments, the majority of the interned Japanese Americans had difficulty transitioning back into society after their internment.

**SESSION IX, 1:45-2:45, NICHOLS THEATRE**

**1:45 | Marie Boyd '16, Lynchburg College, "Stigma: Does Age Matter?"**

Stigma towards mental disorders are one of the major obstacles that a person with a mental disorder must face. Stigma comes in many forms and from many different people. Mental disorder stigma may prevent people from seeking or continuing treatment, and may eventually lead to suicide. Depression is one of the most common mental disorders diagnosed. Depression affects people of all ages. The current study examined stigma amongst various age groups with social distance as a measure of stigma. It was hypothesized that the most stigma towards this disorder would be towards the elderly, followed by adolescents, middle-aged, and the least amount of stigma would be towards children.

**2:00 | Austin Bajc '17, Virginia Military Institute, "Blue Blobs and Brainchilds: Anthony Lake, Partnership for Peace, and the Formation of a Post-Cold War U.S. Grand Strategy"**

This presentation analyzes the role Anthony Lake, national security advisor to President William Clinton, played in the formation of American grand strategy in the post-Cold War era. Lake formed a principled and pragmatic grand strategy through the strategy of Enlargement, which focused on expanding the blue blobs of market economies and democracies in areas of strategic interest. Clinton grand strategy scholars and NATO historians have either stated that the United States did not form a meaningful grand strategy or ignore Lake completely. Defense Department officials initially created Partnership for Peace to forestall Central and Eastern European countries admission into NATO. Nevertheless, Anthony Lake greatly influenced the evolution of this program, which became a pathway for full NATO membership within one year. The establishment of Partnership for Peace confirms that Enlargement was indeed a successful grand strategy, and its creator, Anthony Lake, may be considered a successor of George Kennan.

**2:15 | Oliver Goddin '17, James Madison University, "Success of a Partisan: Colonel John Mosby's Application of Life Lessons to Irregular Warfare"**

This project focused on the leadership qualities exhibited by Colonel John S. Mosby, during the Civil War, as he engaged Union troops with hit and run tactics across Northern Virginia. Few commanders shared the same level of success as Mosby, but what truly set him apart was his ability to thrive in war despite having no prior military experience and his development of a unique guerrilla strategy. Mosby's ability to constantly draw on previous experiences, which dated to his early childhood, highlighted his ability to capitalize on the minute weaknesses of a vastly superior force and earned him the respect of both northerners and southerners alike. Some of the most useful sources included Mosby's Memoirs, Reminiscences of a Mosby Guerilla by John Munson, James A. Ramage's Gray Ghost: The Life of Col. John S. Mosby, and various newspapers from across the nation.

**2:30 | Kiersten Garcia '16, "3(2H)-Furanone Synthesis"**

The purpose of this experiment was to synthesize a novel 3(2H)-furanone. 3(2H)-furanones are known to have antitumor properties. They also are known to undergo molecular rearrangements when exposed to ultraviolet light. The possible pathways of rearrangement are alpha cleavage, beta cleavage, and [2+2] cycloaddition (Pari and Martin). Some of these compounds have known synthesis procedures while others have never been synthesized before. Of the several syntheses that were attempted, one yielded the desired product. 2,2-Dimethyl-5-tert-butyl-3(2H)-furanone was synthesized completely but was very impure. Future research would include optimizing the syntheses and then performing a photochemical study to explore what pathway of rearrangement the 3(2H)-furanones undergo.

**SESSION X, 1:45-2:30, QUILLIAN CONFERENCE ROOM**

**1:45 | Ryan Johnson '17, James Madison University, "A Movement for Change: Horatio Robinson Storer and the Physicians Crusade against Abortion"**

This research looks at Horatio Storer a physician who led the crusade against abortion in the 19th century. This research utilizes mostly primary

sources such as letters and memoirs, as well as secondary sources analyzing medicine in the 19th century. The goal is to analyze Storer's motives in launching the nationwide effort to outlaw abortion. After extensive research, it is clear that Storer wanted to improve the image of physicians, who in the 19th century were not well respected. By launching his crusade, he attempted to portray physicians as moral, upright individuals. However, ultimately medical advancements improved the status of physicians, not Storer's campaign.

**2:00 | Raymond Hyser '16, University of Virginia, "Casting Light Onto Darkness: Britain's Motives for the Exploration of East Africa"**

This presentation explores the main motives for Britain's exploration of East Africa between 1856 and 1885. The motives of economic greed, a sense of racial superiority, and a lust for knowledge motivated the two famous British explorers, Joseph Thomson and John Hanning Speke, into East Africa. Thomson and Speke's exploration of East Africa and their subsequent "discoveries" brought invaluable knowledge to British East African trade and led to the resource exploitation of East Africa.

**2:15 | William Snoeyenbos '17, James Madison University, "The Iran-Contra Affair: A Foreign Policy Scandal"**

The Iran-Contra Affair: A Foreign Policy Scandal explores the relationship between the growth of the National Security Council and the American foreign policy blunder known as the Iran-Contra scandal under the Reagan administration. The paper argues that President Reagan's decentralization and growth of the White House national security apparatus allowed for the events of the Iran-Contra affair to occur unchecked and without executive supervision. Evidence taken into consideration includes the testimony of Oliver L. North, Robert McFarlane, and John Poindexter during Congressional hearings, and The Tower Commission Report.

**SESSION XI, 1:45-2:45, PSYCHOLOGY 101**

14

**1:45 | Sarah Henderson '16, James Madison University, "So Easy to Use Even a Blind Woman Can Operate Our Machine!"**

The innovations in domestic technologies of the mid to late 19th century forced women to internalize newly created exaggerations of household labor and accept marketing strategies that used socially constructed ideas of femininity to sell domestic appliances. This paper's argument is deeply rooted in Ruth Schwartz Cowan's ironic paradox that labor-saving devices did not alleviate women's domestic labor, but instead expanded it with a heightened standard of exaggerated expectations of her production and duties at home. After briefly analyzing the country's social atmosphere and advertising trends of the mid to late 19th century, this paper uses the examination of period sewing machine advertisements to show how manufacturers used the contemporary ideal feminism to solidify the socially constructed female identity and in turn encouraging women to exemplify the characteristics of beauty, domesticity, simplicity, maternity, and delicacy.

**2:00 | Kelia Cutkelvin '16, "Cataloging a Legacy: Walter Weber's Historic Bird Collection"**

Co-Authors: Seth Dorman

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.

**2:15 | Kyle Lundquist '16, James Madison University, "Sanborn Map Analysis of Nacogdoches, Texas, and the Connection Between Sport and Urbanization"**

The Sanborn Map Company has been creating fire insurance maps since 1867 of almost every town and city in North America, periodically updating them with more and more accurate data and information. Although beginning in Boston, the maps quickly sprawled across the United States and first found themselves in the town of Nacogdoches, Texas in 1885. These maps outline exact specifications of buildings and other man-made objects, including sporting arenas and places at which to exercise and play. By analyzing these maps from 1885-1922, one can see the growth of the city, the creation of places of sport and recreation, and the connection between the dichotomy of work and play.

**2:30 | Citalali Molina '16, Sweet Briar College, "Thermal Evaluation of Quad Flat-No Lead Packages"**

Co-Authors: Promex Industries Inc.

QFN packages provide an economical way to dissipate heat in an integrated circuit (IC). Heat transfer depends greatly on the die attach material used and how well it bonds with the IC. In this comparison, 8x8mm QFN's with different die attach epoxies and films were tested for their thermal properties. These properties include thermal resistivity and conductance. All die attach materials were chosen for their high silver content and thermal conductivity as stated in their data sheets. The manufacturing process and the integrity of each QFN was monitored closely

for anomalies and defects. The junction method was then used to determine thermal resistivity and conductivity. The combination of die attach material and package integrity has opened the window for more research opportunities to better understand the material properties related to QFN's.

## **SESSION XII, 1:45-2:45, PSYCHOLOGY 102**

### **1:45 | Kelsey Wessels '17, James Madison University, "Finding A Light In The Darkness: How did Former Slaves Retell Their Stories of Enslavement?"**

After years of turmoil and pain, one would think that former American slaves would only feel anger and hatred toward those who oppressed them during slavery. However, through exploration of accounts done by The Federal Writers Project (FWP), former slaves tell a different story. The FWP, more specifically the Slave Narrative Project, gave former slaves the chance to share accounts of their lives in their own words. After seventy years of freedom, former slaves were able to come to terms with their experiences by looking at them through the lens of Christianity. Via Christian scripture, slaves were able to parallel their lives with the lives of the chosen people of God, ultimately finding solace in knowing that their Lord had a bigger plan for them.

### **2:00 | Hannah Nierle '16, Christopher Newport University, "Fading Affect Bias in Alzheimer Patients"**

Co-Authors: Sarah Davis, Taylor Thomas, Jeffrey Gibbons

Past studies have indicated that emotions linked to negative events tend to fade quicker than emotions linked to positive events, a phenomenon commonly referred to as Fading Affect Bias or FAB (Walker, Skowronski, & Thompson, 2003). Past research has also indicated that people suffering from Alzheimer's disease tend to be more confused, irritated, and paranoid compared to people without the disease (Pocnet, Rossier, Antonietti, & Von Gunten, 2011). However, research has not yet examined the effect Alzheimer could possibly have on the FAB. The proposed study will investigate the relation between FAB and memory in Alzheimer's patients. Subjects will be asked to recall two negative and two positive events and rate them on a face pain scale ranging from -3 to 3. The proposed study is hypothesized to result in Alzheimer patients having a lower FAB than dementia, elderly, and college participants.

### **2:15 | April Pickens '17, James Madison University, "The Effect of Religious Opposition on the Mexican-American War, 1846-1848"**

The Mexican-American War began in dubious circumstances, and some Americans disagreed with Polk's War from the beginning. However, it was the united efforts of three Protestant denominations, the Congregationalists, the Unitarians, and the Quakers, that finally turned a large segment of the populace against the war. They were able to do this with their multiplying publications, which wielded significant influence in the religiously aware society that existed in America after the Second Great Awakening. When sufficient numbers of ordinary citizens and politicians began voicing their disapproval of the war, Polk and his administration realized they had to accept a lenient peace treaty with Mexico. If the President had rejected the Treaty of Guadalupe Hidalgo (which fulfilled all of his original terms), he would have alienated the majority of the American public, dooming both his party's and his own political careers.

### **2:30 | Valeria Robledo '16, James Madison University, "Kendrick Lamar and Guy Tirolien"**

Here we compare the work of Kendrick Lamar, an African-American writer, and Guy Tirolien, a Guadeloupian poet. Despite coming from different eras, both share similarities in their approach to white oppression yet differences are present. Particular attention is paid to Lamar's songs "I" and "The blacker the berry", an untitled song to Tirolien's "Prière d'un petit enfant nègre", and "Ghetto" to show their lasting relevance and how many of the same problems still persist.

## **POSTER SESSION, 2:30-4:00, HAMPSON, MAIN HALL LOBBY**

### **Myshake Abdi '16, Hampden-Sydney College, "ESR Characterization of Induced Reactive Oxygen Species: The Antibiotic Mechanism of Action Controversy"**

Co-Author: Dr. Herbert J. Sip

Reactive oxygen species (ROS) are generally volatile radicals capable of inducing oxidative damage. ROS also play significant roles in many cell signaling pathways, due to their high reactivity. Prior studies, suggesting a common killing mechanism for bactericidal antibiotics, have attributed antimicrobial lethality to in vivo production of hydroxyl radicals, an ROS, via Fenton chemistry; ultimately resulting in a lethal accumulation of oxidative damage (Collins, J. 2009). Over the course of this project, we sought to determine the susceptibility of DNA nucleotides to ROS oxidation by generating superoxide radicals (in vitro) in the presence of guanine. Characterizations of all incubations were performed utilizing Electron Spin Resonance (ESR) spectrometry. Although we were successful in generating and characterizing superoxide radicals, we remained unable to obtain definitive evidence suggesting any form of interaction between guanine and superoxide. However, in looking on to the continuation of this research, we remain confident in our agenda and have made augmentations in experimental and procedural aspects of this

study; which may potentially produce more conclusive results as to the oxidative vulnerability of guanine.

**Daniel Aparicio '16, Christopher Newport University, "The Moral Implications of Personal Pathogen Transmission"**

There is difficulty in predicting pro-health behaviors in non-hospital populations. Most investigations promote a self-awareness approach assuming that increased education will lead to better health outcomes. Our theoretical model identifies a matrix of varying trade-offs that may predict and explain these behaviors related to disease transmission: hand washing, vaccination, and safe sex. The model targets three compatible approaches for health-based decision-making: moral disengagement, welfare trade-off ratios (WTRs), and moral decision-making. Health interventions are discussed using the adopted model.

**Sarah Ballard-Abbott '16, Randolph College, "Exploring Early Psychological Tests: Researching and preserving the Randolph College collection"**

Randolph College has a unique collection of psychological laboratory equipment and psychological tests dating back to the early years of psychology as a discipline. Previous studies have researched and cataloged the physical laboratory equipment, but the extensive collection of psychological tests has never been researched. The goal of this project is to investigate the origin, authors, and use of each of the tests in the collection and to preserve the collection by improving the physical storage conditions and creating a digital catalog available to other scholars of the history of psychology. Researching these tests will provide a window into early attempts by psychologists to measure individual differences, including intelligence and personality, and how these tests relate to the cultural biases of the time. Results of the research will be disseminated through conference presentations and an online catalog of the collection.

16

**Rhianan Banks '17, Spencer Dunlap '17, & Crystal Singleton '17, Christopher Newport University, "Fading Affect Bias and Social Media"**

Co-Authors: Kyle Horowitz, Kalli Wilson, Taryn Lewis

Walker, Voghl, and Walker (1997) showed that unpleasant emotions faded more quickly than pleasant emotions, which is known as Fading Affect Bias (FAB). Christopher Newport University students completed questionnaires and self-reported hours spent online. Participants listed two pleasant and unpleasant social media and non-social media events. Participants provided descriptions, dates, and initial and current affect for each event, ranging from -3 to 3. Participants reported when they felt an initial change in affect and when the change stabilized. Fading affect was larger for unpleasant events than for pleasant events, supporting past research (e.g., Walker et al., 1997). The Initial Event Affect x Event Type interaction was statistically significant, with FAB being larger for non-social media events than for social media events. Participants who self-reported high social media showed larger FAB for social media events, whereas participants who self-reported low social media showed larger FAB for non-social media events.

**Paige Bloomquist '16, Christopher Newport University, "Party Drinking Games as Mechanism for Pathogen Transmission among University Students: A Review of YouTubes"**

Women as compared to men are more prone to interruption in their education by illnesses. Pathogen transmission has many routes and mechanism among university populations. This paper examines typical oral-fomite mechanisms that place students at risk. Specifically, drinking games among students act as a social entertainment - but when games involve sharing drinks (e.g., cups, glasses, cans) between people, the odds of transmitting disease increases. To better understand this risk, YouTubes of party goers were collected and examined for types of drinking games, and amount of sharing of drinks. The potential for pathogen exposure and behavioral repertoires across gender are discussed.

**Brant Boucher '17, Joshua Chamberlin '17, Dane Asuigui '16, Conrad Brown '17, Hampden-Sydney College, "Synthesis, Spectroscopic Analysis, and Quantum Chemical Calculations of Nickel (II) Complexes of Schiff Base Ligands with NNOS Coordination Spheres"**

Co-Author: Dr. Nicholas Deifel

The relationship between transition metals and surrounding ligand structures in coordination compounds is of high interest in research and commercial chemistry. Of interest are coordination complexes formed from ligands synthesized by equimolar mixtures of salicylaldehydes and imines and the addition of a metal ion; herein we study Ni(II) complexes for the computational aspects of the study. This research sought to create and optimize a synthesis pathway to produce a family of metal complexes of NNOS coordination spheres with variations imines, salicylaldehydes, and metals. Characterization at each step of the synthesis pathway provided strong evidence suggesting the successful synthesis of desired compounds. These synthesis techniques were optimized to meet larger scale requirements than were detailed in previous research. A dimer compound formed as a byproduct of the synthesis pathway may be of some interest as a NNS tridentate ligand. Additionally, low-level quantum chemical calculations using Spartan v.5 were done to generate conformational structures and energies of Nickel(II) ligand complexes. Donor-atom to metal-ion bond lengths and the energies of formation are reported.

**Michael Bouldin '16 & Kyle Grierson '16, Hampden-Sydney College, "Microbial growth on Humulus Lupulus"**

Co-Authors: Christopher Hawk, Dr. Edward Lowry, Mitchell Thomas, Dr. Mike Wolyniak

Hops or *Humulus lupulus* are a commercial crop used in the production of beer. These plants are susceptible to a variety of diseases; chiefly among them is downy mildew. The focus of this research was to develop a quick test to see if plants had been infected. We utilized a process called PCR to see the level of DNA expression with the use of certain primers. We were able to develop a running culture to what we believed was downy mildew. The purpose of this research also aimed to create a new intro to biology course for the biology department here at Hampden-Sydney. The hope was to develop a new lab that would focus in certain areas and give students more of an idea of what the scientific method is and what a career in the sciences might be like. Each student who was on the project was given a module to work on.

**Amanda Bradbury, Christopher Newport University, “Edutainment and Its Impact on Education”**

Co-Author: Dr. Gayle Dow

Edutainment employs cognitive strategies commonly found in video games to present educational content in an entertaining forum. While previous research has demonstrated that game based learning increases learner intrinsic motivation, resilience, and confidence (Hogle, 1996) through promoting active cognitive processing (Mayer & Moreno, 2003), others believe that game based learning hinders the educational outcomes (Bloom & Hanych, 2002). This research explores the benefits and disadvantages of game based learning found in edutainment well as current software designs that promote higher order thinking and workforce readiness (e.g., the Alice Project and Simcoach Games).

**Allison Brooks '18 & Melissa Pasierb '17, Randolph College, “Contamination of Sediment Trappings Located Behind the Rock-Tenn Dam in Lynchburg, Va”**

Co-Author: Dr. Sarah Sojka

This study examines contamination of sediments trapped upstream from the Rock-Tenn Dam and downstream from the Lynchburg train derailment site to address local environmental concerns as well as the larger national concern of environmentally conscious changes to dam infrastructure. Forty-five samples were analyzed for organic content, D50, and the heavy metal content of a few selected metals. Organic content was calculated using a muffle furnace, D50 was calculated using several sieves, and the metal content of the samples was obtained using a digestion and flame-aa spectroscopy. TPH and PCB levels of the samples were obtained using respective enzyme immunoassay test kits. Remarkably low levels of contamination behind the dam were observed and all contaminants fell under satisfactory limits set by the EPA. While finer sediments with a high organic content usually accumulate behind dams and these factors correlate with an increase in heavy metal content, this trend was not observed.

**Russell Burt '16 & William “Zach” Vernon '18, Randolph College, “Who Gets to Rise Shotgun?”**

Co-Authors: Dr. Peter Sheldon & Dr. Sarah Sojka

Historically, the rear seat in passenger vehicles has been safer for passengers than the front seat. However, vehicle safety advances have focused on the front row, potentially reversing this trend. We compiled data on passenger vehicle collisions between 1997 and 2013 from the National Automotive Sampling System (NASS). Across all vehicle types and impacts speeds, the incidence of severe injury was lower for passengers in the front row than passengers in the second row. However, when the data was analyzed by age, all age groups except children had a greater incidence of severe injury in the second row. For example, an adult not wearing seatbelts in the second row had 36% greater chance of severe injury than an adult not wearing seatbelts in the front row. We will discuss our findings and how they may inform vehicle safety in the future.

**Sabrina Callan '16, Christopher Newport University, “A Literature Review of the BASC-2: Research Uses, Applications, and Recommendations for School Psychologists”**

The Behavioral Assessment System for Children-Second Edition (BASC-2) is a multifaceted measurement of clinical and adaptive dimensions of behavior and personality, which is designed for the use of registered psychologists to determine the diagnosis and educational classification of various emotional and behavioral difficulties in individuals of ages 2 to 25 (Reynolds & Kamphaus, 2004). This literature review will focus on conveying a general understanding of the BASC-2 and its research uses and applications, such as its regular use in the evaluation of treatment programs and other behavioral assessment tools (Community-University Partnership for the Study of Children, Youth, and Families, 2011). This literature review will also focus on highlighting some of the strengths and weaknesses of this testing tool for school psychologists. Future research should investigate the newly released, third edition of this instrument (BASC-3), and its four new subscales.

**Julie Carlin '17, Loyola University Maryland, “Investigating a different way of looking at speech and language characteristics in people with Down Syndrome”**

Co-Authors: Dr. Libby Kumin & Catherine Serzan

The question of how speech and language characteristics in people with Down Syndrome can be defined has been widely debated in the Speech-Language Pathology field, with scholars such as Dr. Libby Kumin arguing that more research needs to be done on this subject. Although progress has been made on this topic, many have not looked at the topic from another point of view. I provide a different perspective on the material in making these measurements to explore if it supports previous research or if more research needs to be done. Specifically, I look at



the transcription of speech and language in videos of four individuals with Down Syndrome in the context of speech intelligibility as well as phonological, morphological, syntactic, semantic, and pragmatic errors. In conclusion, this project, by closely examining the speech and language domains of people with Down Syndrome, sheds light on a new point of view.

**Molly Cioffi '16 & Madeline Jonz '16, Loyola University Maryland, "Purposeful and Proportionate: A Pilot Proposal for High-Risk Offenders in Baltimore's Western District"**

In Baltimore City's Western policing district, there are currently 1,653 individuals on probation. In 2014, 75% of individuals on probation in the Western district violated the terms of their probation at least once, disturbing their reintegration process into an already fragile community, driving up crime rates, and increasing the already crowded city jail population. In order to reduce recidivism, we decided to target high-risk offenders in order to support Western district neighborhoods by aiding offenders to develop pro-social behaviors. We proposed a pilot project with proportionate and purposeful responses to probation violations to Maryland's Lieutenant Governor, Boyd Rutherford, with support from the Department of Public Safety and Corrections Services and the Governor's Office of Crime Control and Prevention. Drawing on best practices from other states and behavioral therapy techniques our pilot project offers a non-custody based matrix to creatively reduce recidivism and reinvest in communities.

**Chris Ciszek '16, Shenandoah University, "Comparing DNA sequencing to morphology identification of tree endophytes in the American Chestnut (*Castanea dentata*)"**

Co-Author: Laurel Rodgers

The purpose of this project is to confirm the best method for identifying tree endophytes growing in the American chestnut (*Castanea dentata*). Traditionally, identification has been based on fungal morphology. More recently, DNA sequencing has been used for species identification. We isolated endophytes from an American chestnut tree and grew them in culture for 3-5 days. The number of species isolated was originally determined based on colony morphology. We then used a plant DNA extraction kit to isolate the fungal DNA prior to sequencing. Based on our DNA sequencing results our morphological groupings were not an accurate method for determining the number of species present within an American chestnut tree. The next step will be to identify our fungi based on spore morphology and compare these results to our DNA sequencing data. Our current data show that DNA sequencing is a more effective method for fungal species identification.

18

**Emma Clarke '18, Roanoke College, "Mapping Dragons and Their Tales: The Correlation Between *Lepidodendron* Fossils and Dragon Folklore"**

Co-Authors: Dr. DorothyBelle Poli, Dr. Lisa Stoneman, Dr. Mat Peterson

By mapping the locations of recovered *Lepidodendron* fossils and ancient dragon tales, we have found that there is a correlation between the two. This correlation could support the hypothesis that lore was inspired by these fossils.

**Isabelle Clough '18, Christopher Newport University, "The Dark Triad and Malevolent Creativity"**

This study examined the relationship among the Dark Triad (DT) traits of narcissism, Machiavellianism, and psychopathy, and their impact on malevolent creativity (MC). Narcissism is the tendency to have a grandiose self-perception and feelings of superiority (Rauthmann, 2011; Paulhus & Williams, 2002; Petrides et al., 2011). Machiavellian personality traits include being distrusting, manipulative, possessive, and unemotional (Dahling, Whitaker, & Levy, 2009; Rauthmann, 2012). Psychopathy is the mental disorder characterized by an antisocial lifestyle; they have difficulty in normal socialization and developing consciousness and moral standards (Mokros, et al., 2015; Dhingra, et al., 2014). Often associated with these personality traits is MC, the ability to develop novel and useful ideas which are intended to cause harm or destruction (Lee & Dow, 2011; Harris, 2013). A questionnaire was given to determine levels of DT traits and the Guilford Uses task was employed to measure creativity, which was then coded for malevolence. It was hypothesized that there would be a relationship between the traits of the DT and MC. While no significant was found for the DT and MC, analysis revealed a correlation between Machiavellianism and psychopathology and among the multiple uses on the Guilford task. Implications and future directions are discussed.

**Rebecca Conter '17, Roanoke College, "Biology, Education, and Art: A Non-traditional Approach to Learning Plant Evolution"**

Co-Authors: Travis Lumpkin, Dr. DorothyBelle Poli, Dr. Lisa Stoneman

Out in the field, paleobotanists collect various rock fragments that contain plant fossils. In museums, these fossils are able to be casted, molded and impressed to make them more user-friendly to the public. Coloring and activity pages can be used to present a more at-home educational experience. Rebecca Conter teamed-up with Travis Lumpkin, Dr. DorothyBelle Poli, and Dr. Lisa Stoneman in the Dragon Research Collaborative (DRC) to produce coloring pages featuring ancient Pteridophyta fossils. In the coloring book, these ancient plants are compared to their modern-day counterparts to introduce an audience of all ages to the basics of plant biology and evolution by using critical-thinking skills through crossword puzzles, mazes, diagrams, and more.



**Emily Dallas '16, Brittini Crosier '16, Taylor Litzenberg '16, Katharine Wendt '16, Sweet Briar College, "Value of Ecosystem Services from Pine Plantations and Switchgrass Fields at Sweet Briar College"**

Co-Author: Professor L. O'Halloran

Ecosystem services provide humans with resources and non-market environmental functions. Humans benefit from these natural systems in many ways, including avoided costs and positive externalities. Central Virginia is poised to provide carbon storage, biodiversity, recreational opportunities, biofuel, and wood products. We are evaluating ecosystem services in pine plantations and switch grass fields relative to each other, as well as traditional land uses, such as hay or unmanaged forest. We anticipate establishing the value of these ecosystem services using data collected at Sweet Briar College.

**Alyssa Debra '17, Virginia Tech, "Isolation of New Antimicrobials From Growth Inducing Soils"**

Co-Authors: James Narramore & Nammalwar Sriranganathan

Our research entailed the use of established and new methods to cultivate for new antimicrobial compounds from collected soil samples. Once new compounds were discovered, the research proceeded to identify, purify and isolate potential organisms for reproduction and study. A suspected soil sample that could contain new antimicrobial producers is serially diluted and plated to establish isolation of the colonies. Once isolated, a pure colony is grown on a plate and in a broth, then collected at different points of the growth cycle to establish the growth producing phase. These possible producers are plated against susceptible *S. Aureus* and *E.coli* strains, with standard Gram Positive and Negative controls to establish effectiveness. After testing various soil samples, a sample collected down river of a sewage treatment plant has shown to have antibiotic properties. This further supports the idea that environmental conditions have a bigger role in soil bacterial diversity.

**Anna Denisch '16, Roanoke College, "Imagery in Dragon Lore"**

How is it possible to make kids even more interested in Dragons? Simple. You let them design their own. The Create-A-Dragon app will allow kids to pull images from every corner of the globe, and put together a new dragon, all while learning how each geographical region portrays dragons in their lore.

**Phillip Deyerle '16 & Tresa Scruggs '16, Lynchburg College, "Platanthera peramoena (purple-fringeless orchid) pollinators in central Virginia"**

Co-Author: Dr. Nancy Cowden

*Platanthera peramoena* (purple-fringeless orchid) grows in wetlands, woodlands, meadows, and thickets. Distributed throughout the southeastern and Midwestern United States, this species ranks as imperiled in Virginia. Documenting population demographics and habitat parameters, including investigation of requisite pollinators, could assist in developing an effective conservation plan for this native plant. In this study, we concentrated on observing, collecting, and identifying insects that visited open flowers in a Bedford Co., VA *P. peramoena* population during the June-July, 2015 flowering season. While our results are preliminary, *Hemaris thysbe* (Sphingidae) and *Atalopedes campestris* (Hesperiinae) proved to be frequent visitors capable of removing pollinia from flowers and were also likely to be effective pollinators. Understanding the life history needs of pollinators, particularly as it pertains to the management of larval food plants, is an essential component of developing effective conservation strategies for sustaining native orchid populations.

**William Echols '17, Hampden-Sydney College, "Analysis and Characterization of TEPI through the Creation of a Bacterial Plasmid and Growth Experimentation"**

The goal of this research project is to study the growth of the PTEN(MMAC1/TEPI) gene under a variety of different controlled environmental factors. Using previous research, these environmental factors were chosen on their noted presence or absence in the growth and development of prostate cancer. An additional aspect of this research was to create a bacterial plasmid of the gene so that duplicates can be made for further study. Further study included point mutations to alanine, as well as further study of functional regions. Ultimately, this research yielded that the gene was able to grow in the presence of *E.coli* and *Staph A.*, as well as on media of different pHs, compositions, and in different temperatures. Bacterial plasmids were created using a protocol system; however, they were unable to be confirmed as the desired product.

**William Fitzgerald '16, Hampden-Sydney College, "The Representative Heuristic and American Attitudes Towards Muslims"**

Co-Author: Dr. Jennifer Vitale

Following 9/11, the American government made an effort to increase citizens' awareness, and knowledge of terrorism, and attention toward terrorism. The purpose of this study was to test how participants respond to ambiguous behavior by a person described as more or less representative of the stereotype of terrorist. These responses are proposed to be due to the representative heuristic (i.e., mental shortcuts used to make judgements). 150 Students at Hampden-Sydney College were given one of four scenarios describing an individual and his activities. In the scenarios the individual was either Muslim or Jewish and either from the U.S. or Middle East. Results showed that the participants were more suspicious of the Muslim individuals from the Middle East than another condition and would respond differently if the subject acts based on his

religion and nationality.

**Elizabeth Flora '16 & Alexander Schmidt '18, James Madison University, "The Role of Brain Stem Neurotransmitters in the Thermoregulatory Response to Hypoxic Stress"**

Co-Authors: Kyle Burke, Benito Felice, & Kelcy Jackson

Sudden Infant Death Syndrome (SIDS) is a leading cause of infant mortality. Alterations in brainstem development of the neurotransmitters Serotonin (5HT) and GABA have been linked its cause. 5HT1A and/or GABA-A receptor subtypes in key brainstem areas, like the Nucleus of the Raphe Pallidus (NRP), mediate protective cardiovascular responses to environmental stress. It is hypothesized that alteration in these receptors at the NRP will also impair normal thermoregulatory responses to hypoxic stress. Using aseptic techniques, male Sprague-Dawley rats (225-325g) were instrumented with radiotelemetry probes to non-invasively measure core temperature (Tc). Using a stereotaxic device, a steel cannula was inserted into the brainstem which allowed microinjection into the NRP. After recovery (1 week) Rats were housed in a thermal gradient which allowed them to select their ambient temperature (STa) and thereby allowed them to behaviorally thermoregulate. Once acclimated the gradient and to handling, 30mM of either a 5HT1A agonist (8OH-DPAT or DPAT), antagonist (WAY), a GABA-A agonist (Muscimol), antagonist (Bicuculine) or ACSF (control vehicle) was then microinjected into the NRP immediately before exposure to 6% O2 for 60 min. Rats injected with ACSF decreased their Tc by 2.7+0.2% while the Tc of those injected with DPAT and WAY decreased by 4.0+0.4% and 2.8+0.1% respectively. Those injected with Muscimol and Bicuculine decreased Tc by 1.7+1.7% and 2.1+1.1% respectively. The ACSF injected rats decreased their STa by 7.7+1.8% while the STa of those injected with DPAT and WAY decreased by 10.5+1.8% and 5.1+0.8% respectively. Those injected with Muscimol and Bicuculine decreased Tc by 6.9+5.5% and 6.8+0.9% respectively. These preliminary data (N=3 all groups except ACSF N=4) suggest activation of the 5HT1A receptor exacerbates the hypothermic response to hypoxic stress while activation of the inhibitory GABA-A receptor partially attenuates this protective hypothermic response. Furthermore, the STa changes help facilitate Tc changes suggesting coordination between behavioral and autonomic mechanisms of thermoregulation in a protective hypothermic response to hypoxic stress. This suggests the 5HT1A and GABA-A receptors are at least involved in mediation of protective thermoregulatory responses to hypoxic stress and, if poorly developed in an infant, may contribute to the etiology of SIDS.

20

**Amanda Guth '17, Loyola University Maryland, "Hospital-wide Impact of Mandatory Infectious Disease Consultation on Staphylococcus aureus Septicemia"**

Co-Authors: Dr. Amy Slenker & Dr. Mark Knouse

Staphylococcus aureus bacteremia (SAB) is associated with considerable morbidity mortality. Mandatory Infectious Diseases (ID) consultation for SAB was introduced to the Lehigh Valley Health Network in order to improve the care of SAB patients at both the Cedar Crest and Muhlenberg campuses. This study sought to determine if mandatory ID consultation improves adherence to published guidelines on quality-of-care indicators and improves outcomes of patients with SAB. A retrospective study was conducted comparing 179 SAB patients from the pre-intervention period (January 2013 through December 2013), to 197 SAB patients from the intervention period (May 2014 through May 2015). Comparison of the pre-intervention and intervention group revealed that the incidence of ID consultation was similar between the two groups (98% vs 98%, p=NS); however, there was a significant improvement in appropriate duration of treatment (72% vs 91%, p=0.009), and appropriate antibiotic de-escalation in patients with methicillin-sensitive SAB (37% vs. 53%, p=0.012) between the pre-intervention and intervention groups. The implementation of mandatory ID consultation resulted in improvement in the quality of care for SAB patients. Though the sample size was small and the duration of this study short, this quality improvement study is useful in examining the factors that lead to better patient care and aid in the advancement of standard-of-care protocols for SAB patients hospital-wide.

**Jessica Hanson '16, Christopher Newport University, "The Fundamentals of Coughing and Sneezing: An Integrative and Scope Research Approach"**

Pathogen transmission science suggests 50% of respiratory illnesses are due to coughing and sneezing. Prior research found that 74.7% of students do not comply with the Centers for Disease Control's recommendations on respiratory etiquette. The present paper presents a multifaceted model describing the cough/sneeze behavioral matrix. Specifically, our research examines coughing and sneezing from a physiological, medical, social, behavioral, and neurological approach. Our goal is to present the unique and complex intricacies of coughing and sneezing that may give us insight into pathogen transmission.

**Leah Harbison '17, Roanoke College, "What Caused This 15 Million Year Old Graveyard?"**

Co-Authors: Dr. DorothyBelle Poli, Will Badar, Dr. Elizabeth Gantt

Carmel Church Quarry near Richmond, Virginia is a 15 million year old graveyard of marine organisms, including larger mammals such as whales, camels, and horses. The presence of larger mammals is odd due to the fact that this site is in the middle of their migration pattern and would not be where they would be assumed to die naturally. It is thought that this massive marine death was caused by a Harmful Algal Bloom (HAB), which contained dinoflagellates and diatoms that released biotoxins, which can kill smaller organisms, such as phytoplankton, but if ingested

shortly after infected they can work their way through the food chain until they reach the upper organisms within it. This study will extract dinoflagellates and diatoms from the Calvert sediment at the Carmel Church Quarry site using acetolysis.

#### **Hagay Haut '16 & Sara Woodward '16, Randolph College, "The Tiny House at the Tiny College"**

Co-Authors: Dr. Karin Warren, Ludovic Lemaitre, & Spencer Cohen

We researched and compared designs for tiny houses and their components, and evaluated their potential for sustainability. We investigated and planned for compliance with campus regulations and city building codes. We made recommendations and developed plans for the construction of a prototype Tiny House in the Randolph College Organic Garden, including mechanisms for assessing elements of the house that promote sustainable use of resources. Our project will open the door for sustainable micro-housing alternatives for the College and city, and ultimately serve as a public resource to learn about sustainable design and its significance.

#### **Daisy Howard '17, Randolph College, "Theatre Magic: Creating Black Art Illusions with the KTMA Arts Ensemble"**

Co-Authors: Kenneth Parks, Hiawatha Johnson Jr., KTMA, Morgan Wardlaw

Students created a black art environment, a specific control of stage light for illusory effect, on Thoresen stage and worked with master illusionists Peter Samelson, Hiawatha Johnson Jr., and other members of the KTMA Arts Ensemble to stage performance pieces within that environment. The team created a series of portable light baffles to precisely control the distribution of light on the stage, specialty costumes and apparatus for work within the black art environment, and an aural landscape to augment and maximize the creation of illusory effects. Primary research consisted of studying optical illusions and the reactions between the visual and mental. In addition, basic magic ideas and functions were studied and then controlled to orchestrate original illusions.

#### **Katriana Jorgensen-Muga '16, Sweet Briar College, "Functional studies of the Mycobacterium tuberculosis DosS sensor kinase and its interaction with artemisinin"**

Co-Authors: Huiqing Zheng, Robert Abramovitch

Mycobacterium tuberculosis (Mtb) causes infections can be classified as either latent or active, with a latent infection being characterized by non-replicating bacteria with no outward signs of infections, and an active infection being characterized by disease symptoms. Previous studies have shown tuberculosis enters the latent phase when the bacteria are isolated in the hypoxic granuloma. Roberts, D. M. et al showed that the DosR regulon contains genes needed for the survival of bacteria in the latent infection mode and this regulon is activated by two sensor kinases, DosS and DosT. DosS contains a central heme group, to which the reduction of the iron occurs under hypoxic conditions. In a screen for potential drugs that regulate the induction of DosRST, Artemisinin exhibited the ability to inhibit activation of DosR and UV-visible spectroscopy indicates that binding of Artemisinin to the DosS kinase oxidizes the central heme. Crystallography by Cho (2011) of the DosS protein shows that access to the heme is through a channel. The goal of this study is to introduce amino acid substitutions in the DosS heme-presenting channel that may prevent interaction artemisinin with to the heme group. Mutations of E87 to leucine and arginine, G117 to leucine and Y171 arginine were successful in blocking the channel from artemisinin as the protein remained in the reduced, active state after artemisinin treatment. However the E87 arginine has a decreased absorbance signal and difficulties in protein expression indicating that the protein may be unstable. These results may have implications for the wider treatment of tuberculosis insofar as inhibiting the ability of tuberculosis to utilize genes needed to enter a latent infection model will thus force the infection to remain in the active form, increasing susceptibility to antibiotic and shortening the course of therapy.

#### **Benjamin Lam '17, Hampden-Sydney College, "Synthesis of a Tridentate Imine Complexed Ligand for the Increased Chirality in the Morita-Baylis Hillman Reaction"**

Co-Author: Dr. Paul Mueller

The Morita-Baylis-Hillman reaction is a condensation of an acrylate ester and an aldehyde forming a methylene hydroxyl ester. This reaction is known to increase the enantioselectivity of the products that it produces when a chiral catalyst is used. However, this reaction has been known to have a very slow process, and that is why we will be synthesizing a catalyst for this reaction mechanism. The catalyst will consist of several different qualities including a bulky chiral backbone, bifunctionality, and an imine portion. In this research, we will be using the amino acid boc-d-phenylglycine which has a phenyl ring as the back bone. The catalyst also has a Lewis acid metal center and a Lewis base lone pair portion to its structure identifying bifunctionality. The catalyst will be constructed through the reaction of the deprotected amino acid and a salicylaldehyde species.

#### **Anna Ledin '16, Lynchburg College, "Are orb-weaver spiders that exploit ant-acacia mutualisms cooperators or parasites?"**

Co-Author: Dr. John D. Styrsky

Two species of orb-weaver spiders inhabit two ant-protected acacia species in central Panama. The spiders do not capture patrolling worker ants, but exploit their plant-guarding services to escape predation. Spiders may provide a second layer of defense for acacias against herbivores.

Alternatively, spiders may parasitize the mutualism by capturing winged ants of the reproductive caste as they disperse on nuptial flights. 45-75% of insects captured on sticky card traps in each acacia species were strictly herbivorous, but no alate ants were captured. Analysis of prey items collected from spiders' webs indicated that insect herbivores made up approximately 20% of spider prey for both species, but alate ants made up an additional 20-50% of spider prey. These results suggest that spiders both cooperate with and parasitize the ant-acacia mutualisms, but whether spiders can ultimately disrupt the mutualism depends on the overall percentage of dispersing alate ants the spiders actually capture.

**Jin Young Lee '19, Christopher Newport University, "Art Therapy and Traumatized Children"**

Co-Author: Dr. Gayle Dow

Children who have experienced significant trauma (natural disasters, neglect, sexual abuse) often exhibit anhedonia, anxiety, and/or sleep impairments. Art therapy is a form of treatment that employs music, art, drama, or other fields with a trained therapist that allows an outlet for emotions that cannot be described on paper or through talking (Selekman, 1997; Webb, 2007). The purpose of this research was to review the effectiveness of art therapy on children who have experienced trauma. This review will also determine if the effects of art therapy are emphasized in the creativity of children who have experienced trauma.

**Mason Luck '16, Hampden-Sydney College, "Germination and growth of *Centaurea stoebe* ssp. *micranthos* (Asteraceae) under different water regimes"**

Co-Author: Edward Lowry

Invasive species specialize in taking over natural populations and damaging the local ecology in the areas they establish. They are characterized by a high reproductive output, a quick growth rate, and few or no natural predators. Alien species pose the risk of harming stable environments via outcompeting native species and altering the local habitat. The Virginia Department of Conservation and Recreation study, *Centaurea stoebe*, or the spotted knapweed, was rated a high risk in Virginia. The species is known to thrive in many habitats and conditions, although its performance is variable. The plant has seeds that can remain dormant for years after they are produced. The aim of this research was to study the germination and growth of *Centaurea* under different stress levels, water availability and substrates. I also wanted to expand previous research to stay up to date on the growing problem along Virginia's High Bridge Trail.

22

**Linh Nguyen '16, Hampden-Sydney College, "Optimizations for Finding Ground States of Quantum Ising Spin Glasses"**

One of the emerging branches of theoretical physics, quantum computing has the potentials to revolutionize information processing. During the past two decades, quantum computing has been developed with the goal of designing computers that can effectively exploit quantum mechanical laws. Notably, D-Wave Systems, Inc. introduced the first alleged quantum computer in 2011, the D-Wave One. The machine is described as a quantum annealer with 128 qubits. In 2013, Boixo et al. conducted an experiment with the D-Wave One to show the evidences of quantumness inside the machine. They solved the problem of finding the ground state of quantum Ising Spin Glass. We showed that an optimized version of Simulated Annealing for this problem on a commercial PC is able to match the D-Wave Ones performance, in both success probabilities and runtime, on the same test instances.

**Sarah Petrosky '17, Roanoke College, "Examining developmental oil concentration in *Lycopodium* spores"**

Co-Authors: Patrick Dowling, Dr. William Brenzovich, & Dr. DorothyBelle Poli

Past studies have examined the flammability characteristics of *Lycopodium strobili* (Vogel et al. 2011). By examining the oil changes in the *Lycopodium* throughout development, it may provide insight as to the flammability qualities found within the strobili of the *Lycopodium* plants. This project focused on examining the concentration and identity of the oil during development of *Lycopodium* spores. A safe yet effective extraction mechanism was conducted in order to obtain the oil. An esterification process was conducted in order to convert fatty acids of the oil into methyl esters. NMR was used to begin to identify oil composition, and then GC-MS was then used for analysis. The GC-MS identifies three key components of the oil and shows a change in concentration of those key components during the early mature stage.

**Benjamin Schwartz '16, Roanoke College, "Examining Potential Antimicrobial Effects of *Antirrhinum majus* Oil Extract Against Several Strains of Bacteria"**

**Samuel Sheffield '16, Hampden-Sydney College, "Constructing and Performance Benchmarking of a Parallella Cluster"**

Co-Author: Linh Nguyen

This project aims to construct an inexpensive Beowulf cluster for educational purpose at Hampden-Sydney College. The cluster has eight nodes, each is Parallella Board with two ARM Central Processing Units (CPUs) and sixteen-Epiphany core coprocessors. System benchmarking was done by computing PI using Monte Carlo method. The runtimes were not significantly different between the serial and the parallel versions with smaller iterations (0-1000). However, as the number of iterations grew, the discrepancies in performances began to emerge. The performance

of the parallel program exhibited a significant speedup in comparison to that of a serial program. For an example, at 1,000,000,000 iterations the serial version ran around 437 seconds while the parallel version only ran in about ten seconds. We will be using this cluster in our new parallel computing course to demonstrate the methods of programming a distributed system and hope that students can benefit from this system.

#### **Emmalyn Snead '16, Randolph College, "Mustard meal as a chemical fumigation alternative in plasticulture melon"**

Biofumigants have become popular recently due to public interest in locally grown, organic foods. Advantages to biofumigants include little risk to the environment or to humans, reduced soil erosion, improved soil fertility and additional income for growers (Matthiessen and Kirkegaard, 2006). This experiment used Biofence (derived from Calienta mustard) to determine the benefits of mustard meal as a biofumigant and growth enhancer in plasticulture cantaloupes. The experiment was conducted on a 100-foot row of Superstar cantaloupes; the first 50 feet was treated with BioFence and the next 50 feet was untreated (control). Weekly weed counts were conducted throughout the experiment. Three week harvest measures included runner lengths and leaf counts. At harvest, the treated group yielded 11 weeds and the untreated section, 8 weeds. Two matched pair T-tests for leaf counts and runner lengths were not significant ( $p > .05$ ). However, the trend for robust plants in the treated group was apparent.

#### **Rebecca Swerdlow '17, Loyola University Maryland, "Temple Beth Israel: Its Congregation and Community"**

Temple Beth Israel was established in August of 1888 so that the Jewish community of Sharon, PA could have a place of worship. For the next 125 years, this temple was the center of Jewish weddings, funerals, bar mitzvahs, luncheons and home to at least fourteen different rabbis as well as multiple Jewish denominations. Researching and reconstructing the history of this temple raises an important question: how does one define community? Is this community defined religiously, geographically, socially, economically, or by a conglomeration of these factors?

#### **Taylor Thomas '16 & Thomas Aberman '18, Christopher Newport University, "Fading Affect Bias across Video Game and Non-Video Game Related Events"**

Co-Authors: Sarah Davis, Hannah Nierle, Nessalyn Dearce & Jeffrey Gibbons

Previous research (Walker et al., 1997) has shown that unpleasant event emotions decline faster than pleasant event emotions. This phenomenon is known as the Fading Affect Bias (FAB). Other research has demonstrated that there is a relation between Problematic Video game Play (PVP) and emotional regulation (Oggins and Sammis, 2012). However, the relation between FAB and PVP for video game or non-video game related events has yet to be investigated, which will be the topic of our study. Participants will be undergraduate students at Christopher Newport University. Participants will be asked to list events related to both positive and negative video game and positive and negative non-video game related events. We hypothesize that FAB will be larger for video game players than non-video game players with video game events. We also hypothesize that FAB will be greater for non-video game players than video game players with non-video game events.

#### **Amber Trawick '15, University of Science and Arts of Oklahoma, "Investigation of the reaction of 2,6-dichlorophenol and monochloramine in basic aqueous medium"**

Co-Author: Dr. David L. Zoetewey

Toxic halogenated byproducts are synthesized upon addition of disinfecting agents to humic acid residues during the wastewater treatment process. The reaction between 2,6-dichlorophenol and  $\text{NH}_2\text{Cl}$ , a common water disinfectant, in basic aqueous medium was investigated. We identified two of the known products, 2,4,6-trichlorophenol and 2,2',6,6'-tetrachloroindophenol, via GC and UV-Vis analysis respectively. N,2,6-trichloro-p-benzoquinoneimine or 2,6-dichloro-p-benzoquinoneimine are suspected intermediates in the formation of the indophenol; the former was not detected by GC due to probable consumption to synthesize the indophenol. We have also identified two minor but significant products; the second has been shown to have the mass of an apparent dimer of 2,6-dichlorophenol, but the exact isomer has yet to be confirmed. Knowledge of further reactions between halogenated phenolic residues of humic acids and disinfecting agents could be used to control harmful DBP formation for wastewater treatment facilities.

#### **Molly VanBuren '16, Sweet Briar College**

Bacteria are vital for energy production and nutrient cycling in soil, but not much is currently known about the structure and diversity of soil microbial communities, like those in Sweet Briar's Switchgrass fields. The goals of this project are to determine the number and diversity of bacteria found in the Switchgrass fields, and to identify the species of bacteria isolated from these fields through biochemical and 16S rRNA sequencing. We have identified 42 different morphotypes of bacteria, distinguished by their appearance. DNA has been isolated from all of these and from that a ~300 base-pair fragment of the 16S rRNA has been cloned using PCR and TA-cloning. These will be sequenced to determine the species of the bacteria. We are also currently determining glyphosate resistance levels in representative members of the species, and attempting to increase their baseline glyphosate resistance levels in order to uncover novel resistance mechanisms.



**Branch Vincent '16, Hampden-Sydney College, "Using genetic programming to automatically develop models from observational data"**

Co-Authors: William La Cava & Dr. Kourosh Danai

Mathematical models can be used to accurately describe dynamic systems in many diverse disciplines. The field of system identification aims to construct such models from observed data in order to estimate and predict the system's behavior. The goal of this research is to construct an accurate model of the poorly understood physical process known as vortex-induced vibrations (VIV). This phenomenon occurs when a fluid induces vibrational motion on a given body, potentially resulting in fatigue damage. To address such systems, we propose the method of Epigenetic Linear Genetic Programming (ELGP). This method uses genetic programming based on symbolic regression to efficiently develop models from scratch. Using observed data measured at 19 different flow speeds, ELGP was implemented and successfully improved upon the van der Pol oscillator model commonly used to describe VIV. We are currently analyzing our identified model and hope to understand the physical meaning behind it.

**Sarah Wagner '16, Christopher Newport University, "Effectiveness of Integrative STEM Instruction on Content Knowledge in the Elementary Classroom"**

While the need to foster STEM (Science, Technology, Engineering, and Math) in our K-12 school system has been well established, the implementation is still a work in progress. This research project investigated the effectiveness of integrative STEM instruction on elementary school students as part of the Integrative STEM for Pre-service Teachers (inSTEP) program, a two-year scholarship program funded by NASA and the Virginia Space Grant Consortium. Pre and posttests were administered to third, fourth, and fifth graders at local elementary schools. It was hypothesized that integrative STEM instruction, targeting content knowledge and the learning process of trial and error, would increase students' knowledge of STEM subjects over five integrative STEM lessons (e.g., meteorology, engineering, scientific method, etc.). Data revealed significant increases in student knowledge of the three lesson plans focused on weather patterns and anemometers, environmental resources, and the scientific method ( $p < .05$ ). Additionally, the two lesson plans on transportation and structures approached significance ( $p < .10$ ). These results provide evidence for the effectiveness of hands-on integrated STEM education in which students are encouraged to experience failure as part of the learning process.

**Michael Watts '15, Roanoke College, "Autism Awareness on a College Campus: A Brief Report"**

Autism Spectrum Disorders (ASDs) are becoming increasingly prevalent throughout our society. Therefore, the researcher believed it was important to assess the awareness and opinions regarding autism among undergraduate students at a small, Southern, four-year liberal arts college. The researcher found that 80 participants who completed the survey, correctly identified 13 of the 20 statements and were somewhat aware and knowledgeable of the various aspects and symptoms of ASD, in relation to earlier studies where the participants were less knowledgeable. The limitations in the study include a smaller sample size and the distributed survey was too lengthy. The author suggests further research on comparing autism knowledge from a large university to the general population.

**Pivot Zotamou '18, Loyola University Maryland, "Two-choice Heat Repellency and Attraction Assay"**

Co-Authors: Dr. Anandasankar Ray & Tom Aguada

Mosquitoes are attracted to heat and they use their sense of smell to detect odor or find their hosts. They transmit diseases such as dengue and malaria; however, using chemical odors we can control mosquitoes behaviors. The two-choice heat repellency & attraction assay is a simple mechanism to test mosquitoes behaviors, and this allows to identify odorants that may be used to push mosquitoes away from human or pull them into a trap and test them. Here I tested 10 chemicals to find more repellents and attractants chemicals so that we can use them to control mosquitoes.





## Special Thanks

### **Student Scholarship Committee**

Gary Dop, Assistant Professor of English

Wes Fugate, Vice President and Chief of Staff

Heather Garnett, Director of Alumnae and Alumni

Chris Lemasters, Director of Residence Life

Amanda Rumore, Assistant Professor of Biology

Gordon Steffey, Associate Professor of Religious Studies

Peter Sheldon, Professor of Physics and Director of the Center for Student Research

### **Center for Student Research**

Jenna Carr

Callan Frye, Student Assistant

### **Buildings and Grounds**

### **Office of the Dean of the College**

### **Aramark Dining Services**



RANDOLPH  
COLLEGE

2500 Rivermont Avenue  
Lynchburg, Virginia 24503-1526